

# Peer training for improved social interaction in children with autism

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Thesis submitted in fulfilment of the requirements  
for the degree of Doctor of Philosophy

Graduate School of Education  
The University of Queensland

November 2005



The work presented in this thesis is, to the best of my knowledge and belief, original and my own work, except as acknowledged in the text, and the material has not been submitted, either in whole or in part, for a degree at this or any other university.



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17th November, 2005

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## Abstract

In view of the trend towards increased inclusion, the placement of children with autism into inclusive educational settings is likely to increase. An important benefit of such inclusive placement is the opportunity for the children with autism to socially interact with typically developing peers. However, such social interaction fails to result—physical proximity is insufficient. The lack of social interaction is usually explained as a result of deficits of social skills in the children with autism. However, social interaction is a reciprocal process, and it is reasonable to expect that the difficulty that children with autism experience in social interaction with typically developing children is partly due to the typically developing children being unable to recognize or understand social cues and responses used by the children with autism.

Accordingly, a training program to teach typically developing children how to interact with children with autism was developed. The experimental test of this training program was the primary focus of the research described in this thesis. A modified subjects-as-their-own-controls design was used, with the same children with autism each playing with a trained peer and an untrained peer in dyads. This models a peer-mediated play intervention, and the difference in success between trained and untrained dyads allows the effectiveness of the peer training to be determined. The levels of cognitive play and social interaction displayed by the children with autism were measured. The level of social interaction provides a direct measurement of the immediate success of the peer-mediated play intervention, and is the best available indicator of possible long-term benefit for the children with autism. While the level of cognitive play provides a more indirect measurement, it is widely used, using the Piaget–Smilansky categories, as a measure of the effectiveness of various interventions.

In addition, the impact of participation as peer-players on the typically developing children—in particular, changes in ideas about disabilities and attitudes towards children with disabilities—was investigated. Finally, responses from parents and teachers were examined for information about their opinions and ideas about the peer-mediated play intervention and its effect.

It was demonstrated clearly and conclusively that when typically developing peers were systematically trained, they were able to more effectively and consistently able to play and interact with children with autism. Untrained peers, on the other hand, were not able to interact effectively with the children with autism, and the level of social interaction did not improve over time, indicating that experience alone is ineffective. This demonstrates that the peer training program was both effective, resulting in improved social interaction, and necessary, as no improvement occurred without training.

However, the measurement of the level of cognitive play did not provide clear answers. In indoor settings, there was a small but statistically significant increase in the level of cognitive play in trained dyads, and a decrease of similar magnitude, also statistically significant, in the untrained dyads. In the outdoor setting, however, there was a large increase in the level of cognitive play in both trained and untrained dyads. This indicates that the Piaget–Smilansky cognitive play categories are a poor indicator of success of intervention programs.

No difference between trained and untrained peers was seen in the change in ideas and reported attitudes. Initially held negative stereotypes were replaced by ideas gained from actual experience, resulting in a positive change. On the other hand, reported attitudes became more negative; this may result from the peers initially underestimating the difficulties involved in acting as peer players, with more realistic attitudes reported afterwards.

Although responses from parents and teachers were positive, there was no clear evidence of changed play behaviour of the children with autism outside the peer play sessions. Since this project was intended as a test of the peer training program, and significant learning by the children with autism is only likely as a result of a longer term intervention, this was expected.

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# Chapter 1

## Introduction

What is education supposed to accomplish?  
What changes in human conduct do or should  
the schools effect? What are the real objectives  
of education?

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Karl A. Menninger  
(Menninger & Menninger, 1942, p. 236)

### 1.1 Background of this research

“Inclusive education” appears as a refinement of mainstreaming, integration, and full inclusion in the education research literature resulting from the arguments about segregation and exclusion (special education) versus integration and inclusion (full inclusion). In particular, the debates on full inclusion versus special education have continued, from various perspectives such as philosophical human rights for individuals with disabilities in inclusion and integration (Frederickson & Cline, 2002), the preference of “ableists” for exclusion and segregation (Hehir, 2002), and effective instructional strategies (Gallagher, 2001; Kavale, Forness, & Siperstein, 1999).

The debate continues over applying empirical science to special education. Kauffman (1999) and Hallahan and Kauffman (2003) emphasised that special education shows how best to teach children with disabilities. This is done by demonstrating the effectiveness of instructional strategies through empirical research. Kavale et al. (1999) stressed that the effective instructional strategies are developed from special education and involve improving reading comprehension, mnemonic instruction, direct instruction, peer tutoring, computer-assisted instruction, formative evaluation, behaviour modification, and early intervention.

In comparison, research on inclusive education is often criticised as being based on philosophical assumptions of egalitarianism such as ideas of equal-

ity, fraternity, human rights, democracy in a sense of fairness, and justice and compassion, rather than concrete observation and empirical research, as Barrow (2000) and Wilson (2000) noted. In addition, much of the empirical research on inclusion that has been carried out is flawed by methodological issues, making it difficult to evaluate successful inclusion (Thomas, 1997; Wilson, 2000). The methodological issues include the impossibility of matching the control group, difficulties in generalization due to the different criteria for disabilities, and different forms of inclusion with various inclusive provisions in different countries (Farrell, 2000). Nakken and Pijl (2002) examined studies since 1985 on the effects of integration and inclusion on children with disabilities and typically developing peers, focusing on social outcomes. Much research on students with learning disabilities and much of the smaller body of research on students with severe disabilities was found to have a number of methodological problems. Often, samples were matched only partially in terms of IQ, behavioural problems, sensory disabilities, and so on. Since populations of children with mild disabilities in segregated special education settings and children with profound disabilities in regular classes were rarely found, it may be difficult to correctly interpret the results. Moreover, inadequate disability categories of samples are used by using local or national classification systems with mixed compositions of their own set of terms. Another methodological problem was related to settings, with inaccurate or insufficient descriptions of settings used being common. In addition, other factors such as different types of educational programs and teacher qualification in each setting that may influence the results were not accurately described so that it was difficult to be convinced that the conclusions drawn were correct. Therefore, there may be no suitable common ground for comparing social contacts in integrated and segregated settings. Kavale and Forness (2000) urged that more convincing empirical evidence is required for inclusion. Otherwise, children with disabilities may be at risk of adverse effects due to the implementation of a full inclusion policy.

However, the claims for empirically effective treatments of special education were disputed by Gallagher (2001) as misunderstandings about science by the testing of intervention strategies. Gallagher (1998) argued that true "science" that is based on scientific knowledge is unattainable in special education because of the inability to generalize and the lack of progressive advancement in the nature of educational research. However, general applicability is often claimed for intervention methods shown to work in tightly controlled laboratory settings, administered by highly skilled personnel in special education research. Even though the intervention appears to work, there are many other variables that may contribute to the result as well. Gallagher (2001) claims that, in view of the continuing lack of real solutions to problems, special education can hardly be regarded as "scientific". There is a gap between theory and practice, with practices often being

empirically developed without reference to theory, rather than following directly from the theory. Questions such as how to match specific teaching technologies or methods to particular learning differences, the determination of optimal placements, and so on, remain without a known “best” answer. Gallagher (2001) concluded, therefore, that it is not possible to argue against inclusion on the basis of scientific support of special education.

Moreover, special education can hardly be regarded as a genuine scientific knowledge because of the lack of cumulative resolution about problems. It is evidenced by the gap between theory and practice in long-standing complaints to match specific teaching technologies to particular learning differences and to determine the optimal placement. Gallagher (2001) concluded, therefore, that the empiricists’ debate through scientific inquiry cannot justify special education in opposition to advocates of inclusion.

According to advocates of full inclusion, education for children with special needs should be conducted in settings with typically developing peers along with appropriate support services. From the viewpoint of full inclusion, it is believed that all children with special needs, regardless of severity of disability, can receive benefits. These benefits include behavioural modelling of peers, more learning, greater self-esteem, and more accepting attitudes on the part of peers. In addition, less isolation and stigma would result for these children with special needs and their families.

In spite of the debates, there is an increasing trend toward inclusion (Kehoe, 1998) and a great deal of impacts related to inclusion appear in general and special education. Kavale and Forness (2000) pointed out that, in fact, the full inclusion movement is politically and socially driven, rather than built on a foundation of empirical research, by associated groups of The Association of Persons with Severe Handicaps (TASH) who aim for a more responsive and resourceful system in general schools for all students regardless of severity of the disability. The focus of debates on segregated forms of special education and inclusion is likely to be shifted to the reality of full inclusion for all students with diverse learning needs including those with severe disabilities, and the effectiveness of inclusion.

Although there is widespread support for the *principle* of inclusion among educators, however, its achievement in practice is often regarded as an unrealistic and Utopian ideal, due to the lack of appropriate resources and expertise to care for children with disabilities in general education fields (Taylor, 2002). In a practical sense, decision-making for educational placement of children with disabilities in inclusion is a complex process influenced by multiple factors that interact with each other within families, classrooms, communities, and society. Hanson et al. (2001), for example, identified multiple factors such as influences from recommendations of professionals, the ability of families to access infor-

mation, supportive influence of advocates, the match between family needs and expectations and school options and expectations, and the characteristics of the child including the level and type of disability, personality and behaviours.

In particular, the sharp debates on inclusion and considerable reservations remain in the case of children with severe disabilities (Croll & Moses, 2000; MacLeod, 2001). Placement in general class settings are more likely to be easily accepted for children with mild forms of disabilities such as physical, learning, sensory, and mild intellectual disabilities than for children with severe disabilities such as autism, emotional and behavioural difficulties, severe learning difficulties, or multiple disabilities. Children with severe disabilities are often viewed as a group unsuitable for inclusion, especially if they have behaviour problems and health care needs (Avramidis & Norwich, 2002; Evans & Lunt, 2002).

In addition, it has been shown that parents of child with high support needs (HSN) do not primarily care about the educational quality of their children's schooling, but rather are more concerned with quality of care (Foreman & Arthur, 2002). Inclusive education for students with high support needs (HSN) who have no oral language and need assistance for eating and hygiene does not seem to appear as a major issue for their parents. The parents answer that they are generally satisfied with current segregated programs and feel more therapy services are needed for their children for functional life skills. However, it has been implied that the parents' answer is likely to come from lack of information about and experience in inclusion as well as lack of belief in benefits for their children from inclusion due to the severity of their children's disabilities. Although support for a full-time aide is available for students with HSN in regular classes when this study was done, special schools seem to be the first choice for parents of students with HSN. The reason for it may be explained by Cook and Swain (2001), Logan and Gast (2001), and Logan et al. (1998)—often, placement in segregated settings for children with severe disabilities was pre-determined by local educational authorities (LEA) and their parents were notified without in-depth discussion to develop a clearer picture of the children's education, and neglecting the children's preferences.

In practice, the implementation of inclusive education seems to depend on the conditions, for example with a guarantee that typically developing peers are not disturbed by the children with disabilities in the mainstream class. Some parents of typically developing peers are concerned about instructional effectiveness, inappropriate behaviour influences for their children, and the capacity of teachers to deal with children with disabilities in inclusive classes (Duhaney & Salend, 2000). Thus, a question arises: is there any educational benefit for typically developing peers from inclusion with children with disabilities?

Interestingly, there are many positive consequences rather than negative influences for typically developing children in inclusion (Nakken & Pijl, 2002). Fisher,

Roach, and Frey (2002) summarized the general benefits for typically developing peers from inclusive education reported in the literature. Typically developing peers are not at any disadvantage in inclusive education programs. Typically developing peers who interact with children with disabilities have growth in social cognition, show less prejudice and reduced fear toward others of different appearance, feel more accepting of others, are more tolerant because of awareness of disabilities, have more positive self-esteem from helping classmates with disabilities, have more effective communication skills, and display more prosocial skills such as sharing, helping, volunteering, and altruism. Moreover, some of them become advocates for their friends with disabilities. Brabeck and Rogers (2000) pointed out that inclusion can provide an opportunity for typically developing children to extend their insight and take another's perspective, which is emphasised in moral education and human right education.

Furthermore, the inclusion setting or context influences not only prosocial behaviours but also academic achievement. Shann (1999) examined the correlation between school culture or school climate and school effectiveness, as rated by 1,503 students and 92 teachers in four urban middle schools. School culture was measured in terms of prosocial behaviours such as helping others directly or with tasks, friendship, and showing respect towards students, administrators, and each other, and antisocial behaviours such as lesser infractions and major transgressions. School effectiveness was measured by academic achievement. It was noteworthy that the academically top ranked schools had a more caring culture, with higher prosocial behaviours and lower antisocial behaviours among students. Meanwhile, academically lower achieving schools were rated as having higher levels of antisocial behaviours and lower prosocial behaviours among students. The results suggested that students' academic achievements are enhanced by caring cultures at school.

These positive consequences for typically developing peers in inclusion may be explained by the claim made by Voltz, Brazil, and Ford (2001) that all children may feel socially and emotionally safe, valued, and accepted in an inclusive climate. "Fairness" may be understood as everyone getting what they need, rather than everyone getting the same thing. In order to facilitate this climate, typically developing peers may need to be taught about various types of human diversity, individual strengths and weaknesses, and human commonalities. In this climate, students with disability can be recognized as individuals to be valued, rather than hidden or eliminated. The climate of inclusive education, therefore, can be beneficial for typically developing peers who are classmates of children with disabilities, as well as for children with disabilities.

From the general educational view, general teachers in regular classrooms may be under pressure to achieve academic curriculum goals as well as managing their classrooms, including managing the behaviour of all of the children,

by themselves. When a child with severe disabilities, such as autism, shows social and communicative impairment and behaviour problems in regular classrooms, the regular teachers may be uncomfortable in dealing with them. Marshall, Ralph, and Palmer (2002) reported that primary and secondary teachers' attitudes to having a child with a disability in their class seemed to depend on the severity of the child's disability, and the expected extra workload. If the child with a disability was placed in their classes, they believed that they should prepare to teach him or her with the feeling of challenge. The majority of teachers were concerned about the extra time, extra resources, and extra training required to deal with inclusion, regardless of their gender, teaching subject, and previous knowledge and experience of children with disabilities. Therefore, it is often said by these teachers in practice that "inclusion is good, but not in my classroom". Furthermore, when the regular teachers have not been trained to teach these children with severe disabilities, they may fear that inclusion would bring heavier workloads. In these circumstances, it is not surprising to note that inclusion may well face rejection by a majority of general teachers working in schools.

A teacher aide who assists the child with severe disabilities may be available when the child with severe disabilities is placed in the regular classroom. However, such a teacher aide may not be available all the time. This depends on funding. On the other hand, children with severe disabilities may lose opportunities for direct contact with typically developing peers who are classmates in school activities because they are assisted by the teacher aide rather than collaborating with classmates. Therefore, children with severe disabilities may miss the chance to be involved in peer groups; peer group involvement is considered to be a crucial for children's development.

In Australia, by the early 1990s, the notion of service provision for individuals with disabilities moved from welfare to equity and social justice. In school systems, integration started to be seen as a matter of human rights, and integration became an issue for curriculum as well as a rights issue (Jenkinson, 2001). However, even today only a very small number of children with severe disabilities such as autism are in inclusive settings. In this prevailing segregation, the organization of any program to meet the concept of the least restrictive environment for children with autism is of considerable importance. In fact, short and temporal integration programs that provide "contact time" with typically developing peers have been implemented in these segregated settings. This can be called "part-time integration". This usually involves selective curriculum areas such as art, and physical education, or "reversed integration", where typically developing peers visit special schools to carry out their particular curricula. Although this falls short of the concept of full inclusion, it may be a step forward towards the future.

However, the meaning of "inclusion" arises in these kinds of integration pro-

grams because *proximity* (physical mainstreaming) only produces *opportunities* for social contact. The opportunity alone does not facilitate positive social interaction between children with autism and typically developing peers in integration programs. In fact, educators often describe that even though social and communicative skills in children with autism are sufficiently improved by training, they still appear to act alone without interaction with typically developing peers or participation in school activities and generalization of their trained social interaction skills still remains an unsolved task.

Moreover, the majority of typically developing peers do not seem to be comfortable to establish positive social interaction or friendship with children with autism, if the classmates with autism show “aloof” behaviours that are not socially appropriate or conventional. Children with disabilities, particularly autism, are often described as outsiders, lonely, or disruptive by typically developing peers. It remains unknown where these negative descriptions or perceptions come from. However, it would be supposed that when typically developing peers lack experience with how children with autism express themselves, they may be prone to misinterpret actions of the child with autism. Thus, social interaction between these two groups may not occur, or it may occur in undesirable or negative ways. It is likely that this results from simple ignorance—children with autism and typically developing peers spend so little time interacting with each other that they remain unaware of differences in social behaviours. Also, appropriate information about the classmates with autism is not provided to typically developing peers. Considering that language differences cause an initial barrier for peer interaction, even among typically developing children, in social play (Clawson, 2002), similar, or more difficulties can be anticipated in social play between children with autism (who have communication difficulties) and typically developing peers.

In these circumstances, it is not surprising to see the failure of establishing and maintaining positive social interaction between children with autism and typically developing peers. Proximity (physical inclusive placement) is not sufficient to promote positive social interaction between these two groups of children. Social skill training for only children with autism is not sufficient as well. How, then, can positive social interaction between these two groups of children be promoted? Given that social acceptance and positive social interaction by typically developing peers—one of the potential outcomes of inclusion—does not occur unless the peers are supported and encouraged to do so toward children with disabilities (Favazza, Phillipsen, & Kumar, 2000), it may be answered that any intervention designed to improve interaction between children with autism and typically developing peers must include effective training for the typically developing peers (peer training).

Then, what elements should be included in the peer training? No study ev-

identifies unique elements for effective peer training. Elements for peer training appear variously in the research, from single (e.g., modelling, prompting, etc) to multiple elements (e.g., pivotal response training). There is no exact guideline for peer training program in practice. However, given that each peer would have different experience about children with autism, as well as different skills to interact with others, essential elements for peers training would be various. It may imply that an effective peer training program for children with autism may need to contain not only general elements, but also integrate specific features of the target group—children with autism. In the research in this thesis, a peer-training package that was developed according to this view is tested.

Voltz et al. (2001) emphasised that effective inclusion could be promoted by developing inclusive environments in the systems of education for all groups of students who have different and diverse learning needs. In this inclusive education system, students with severe disabilities are simply a part of the group of all students, one group of diverse learners, rather than a separated group with special needs apart from all other. Then, to develop this system, elements that can be barriers or facilitators for inclusive education (Pivik, McComas, & LaFlamme, 2002) should be investigated and identified. This may ultimately lead to school improvements for all children. Ultimately, the findings from this research may contribute to intervention strategies to promote the practice of inclusion or facilitate understanding of inclusion for all children.

## **1.2 Rationale for and significance of the study**

Are children with severe disabilities, such as autism, to be included in inclusive education? No clear answer appears for this question in the literature. Before this question, a vital issue in inclusive education is whether or not the children with severe disabilities benefit, either educationally or otherwise. The benefits of inclusive education for children with disabilities were reviewed by Freeman and Alkin (2000) in relation to academic achievement and improvement of social behaviours, using both qualitative and quantitative studies. While the academic progress of students with disabilities was generally recognized by educational staff, parents, and the students themselves, the social benefit was much more intangible, and contradictory views are held. In Freeman and Alkin (2000)'s review on the effect of integration, the findings indicated that students with intellectual disabilities improved their academic and social competence more in integration than segregation. The improvement was shown more strongly by younger school-aged groups than older groups, and more strongly in full integration than partial integration. Students with disabilities seemed to have greater academic achievement, including higher functional levels than expected, in integrated classes.



However, although inclusion is more beneficial academically to children with disabilities than segregation, their social benefits (social interaction and relationships) are not so clear-cut, as social interaction and relationships with typically developing peers are not always positive. Better social competence and individual awareness of their own identity in students with intellectual disabilities (Lawrence, 1996) is not correlated with their social acceptance by typically developing peers. Social acceptance of school-aged students with intellectual disabilities varies. It does not always depend on the students' developmental level and severity of intellectual deficit. The length of time spent in regular classes does not always contribute positively to the social status of students with intellectual disabilities. Part-time placement in a regular class can cause less acceptance or even rejection. Acceptance by typically developing children may depend instead on participation in an activity group together, or on neighbourhood factors. It is concluded that, compared to social acceptance of typically developing children, students with intellectual disabilities are socially less accepted because of their dissimilarity from typically developing children. Disruptive behaviour may contribute further.

Focusing on both social and cognitive development, much of the peer-mediated intervention research in both integrated and segregated settings reports success in improving the social skills in children with disabilities, when typically developing peers are employed. Peers, especially as behavioural agents, contribute to develop social skills for children with autism. For example, typically developing peer tutors engage in a training program for learning the skills to invite the target children with autism into play activities, to maintain social interactions during their activities, and to extend social skills in the target children during their activities. Some advantages of peer-mediated intervention, in contrast to teacher-mediated intervention, are longer periods of interaction between the children involved, and the results are more likely to be generalizable to inclusive settings.

Peer-mediated interventions (PMI) for young children with autism are best implemented in a play context because play is a major activity in early childhood with profound developmental impact. Piaget and Vygotsky observed multi-developmental dimensions in children's play in relation to cognition and language, socialization, and motor development. It may also be possible to use familiar play activities for implementing peer-mediated interventions, minimising disruption for the children with autism. The choice of play activities may be enhanced by a consistent description of play disorders as a feature of social behavioural deviation in children with autism (American Psychiatric Association, 2000). Play activity is either used as a means to teach social skills for children with autism or specifically and directly taught to improve their cognitive play skills.

Play behaviour deficits in children with autism are argued on the relationship with their cognitive impairment, lack of symbolic or pretend play, and their language capacity. In particular, children with autism often fail to display pretend play in comparison to mental age matched controls in unstructured and spontaneous conditions. In spite of this common lack of symbolic play, children with autism can engage in some simple symbolic play when general or specific prompts are given. This implies that children with autism may increase their play behaviours when provided with appropriate modelling and reinforcement.

Furthermore, much research reports that attitudes of typically developing peers towards disabilities can be more positive and constructive when they know about disabilities and how to interact with the child with a disability through longer social contact. If typically developing peers have positive experiences with children with disabilities over a sufficient time period, even closer friendship can be expected between typically developing peers and children with disabilities.

However, there is a lack of studies comparing cognitive play skills and positive social skills that show the impact of peer training in children with autism. Many studies have been examined only cognitive or only social skills for children with autism through PMI. The results were mostly successful. It has been often concluded that PMI is promising intervention strategy for children with autism in relation to both cognitive skills and social skills. Therefore, it is not clear yet whether PMI is more effective to develop either cognitive or social skills in children with autism. The peer-mediated play intervention program of this study may provide clear evidences that PMI is more effective for social skills in children with autism. In other words, it shows that peer training is essential to facilitate positive social interaction between children with autism and typically developing peers who are play partners. This may indicate that PMI is a milestone in the promotion of effective inclusive education.

In practice, PMI is likely to be one of the least used teaching methods for children with autism. This may result from the lack of clear guidelines for peer training, doubts about the ability of typically developing peers to perform PMI, or administrative difficulties in the implementation of PMI in practice. The peer training program of this study can possibly be used as a component of a behaviour management program for professional development training (empowerment of teachers). It has been suggested by Cook, Tankersley, Cook, and Landrum (2000) and Cook (2001) that, rather than quantity, the quality of training for teachers should be considered so that they can improve their instructional tolerance and knowledge. If they are provided with appropriate training to be able to deal with students' behaviour problems, their attitudes may be changed positively towards students with disabilities. If typically developing peers are able to interact with children with disabilities who may be classmates or playmates in an appropriate

manner, the need for teacher aides to look after children with disabilities may be reduced, with resulting budgetary benefits (benefits for administrators).

Typically developing peers can have opportunities to learn about diversity and differences in people and to develop social interaction skills in play. Typically developing peers may improve their pro-social behaviours such as helping and sharing with others, leadership, and management of interpersonal relationships. In the predominantly segregated climate in Queensland, Australia, this cross-aged peer-mediated play intervention tested in this study may find possible application as a qualitatively applied model in both “reversed integration” and “part-time integration”.

### **1.3 Purpose of the research**

This study primarily intends to investigate the effectiveness of peer training for peer-mediated play intervention on the cognitive play skills and social interaction skills of young children with autism. It may be an applied model for effective teaching strategies to establish positive social interaction between typically developing peers and children with autism. Numerous questions about the nature of peer-mediated play and its impact on the development of children with autism arise. These questions include:

1. Does peer training positively affect the cognitive play behaviours of children with autism?
2. Does peer training contribute to increased social interaction with peers in children with autism?
3. Do cognitive and social play skills acquired during trained peer play sessions transfer to untrained peer play sessions?
4. To what extent are social play skills associated with cognitive play skills in the PMI?
5. Does peer training build positive ideas about and attitudes towards their playmates with autism in typically developing peers?

These are the research questions addressed in this thesis.

### **1.4 Specific environment for this research**

The segregated education system for children with disabilities prevails in Queensland, which has been evaluated as the least inclusive Australian state (Seymour, 2001; Wills & Jackson, 2001). Most children with autism are placed in segregated or separated settings such as Special Education Developmental Units (SEDU), Special Education Developmental Centres (SEDC), or Special Education Schools (SS), due to their impairments of communication and behaviour problems.

In the process of obtaining school supports for this study, school gatekeepers placed a number of strictures on the study's implementation. These were imposed to minimise the physical risk to students and any practical difficulties and accidents arising from the need for students to move from their standard classroom environments to the research area during the course of the observation sessions. Three conditions were imposed:

- Firstly, to minimise the impact of the peer-mediated play program on existing curriculum, the study was limited (preferably) to one term, otherwise (less desirably) to a maximum of two school terms.
- Secondly, for safety purposes, participants were escorted between the observation location and their classroom for the play sessions by nominated adults (either a teacher's aide or the researcher).
- Lastly, the teacher aide stayed in the corner in indoor and outdoor play settings during the play sessions in State Primary School-A (SPS-A) to monitor and prevent any aggressive behaviours of the child with autism toward the typically developing peer.

## 1.5 Research plan

The primary component of the research reported in this thesis is the testing of the peer training for peers acting as peer players in a peer-mediated play intervention program. This is designated Study 2, and forms the core part of this research. Study 2 is preceded by Study 1, consisting of a profiling and screening of the participants in Study 2. Two further auxiliary studies are presented: Study 3, which studies the impact of participation in the peer-mediated play intervention on trained peers and untrained peers, and Study 4, in which responses from parents and teachers are analysed.

If the reader is interested in implementing a similar peer training program in practice, the peer training package used in the peer training is reproduced in appendix C, and the philosophy and design are discussed in chapter 5.

This research was divided into five phases of data collection:

- First, *orientation phase* to obtain parental consent, screen participants, and collect participants' profiles (Study 1).
- Second, *pre-training phase* to determine the performance level of cognitive play and social interaction displayed by children with autism within each dyad in the absence of peer training, from late May to the middle of July, 1999 (Study 2).
- Third, *peer training phase* to train half of the typically developing peers (regular peer players and reserve trained peer players), from the middle of July to late August, 1999 (Study 2).

- Fourth, *post-training phase* to compare play behaviours of children with autism in dyad groups with trained peers (trained dyads) against dyads with untrained peers (untrained dyads), from late August to early November, 1999 (Study 2).
- Finally, *follow-up phase* involving questionnaires and interviews for typically developing peer players, regular teachers, special educators, and parents of children with autism (Study 3 and Study 4).

## 1.6 Outline of thesis

Chapter 1 provides an introduction to and the background and purpose of the study. Establishing positive social interaction between children with severe disabilities such as autism and typically developing peers is a major issue in the promotion of effective inclusion. This study aims to investigate the effectiveness of peer-training for the improvement of cognitive play skills and social interaction skills of young children with autism in a peer-mediated play intervention. This study includes observation, play intervention, and follow-up interviews and questionnaires.

Chapters 2, 3, and 4 provide a review of the theoretical basis on which this study can be anchored, and of relevant literature review. An overview of the play behaviours of children with autism in relation to cognitive and social skills is given on the basis of Piaget's (chapter 2) and Vygotsky's (chapter 3) theories. In addition, the necessity of training typically developing peers is suggested to facilitate positive social interaction with children with autism. A variety of peer tutoring approaches in peer-mediated interventions for children with autism are reviewed in chapter 4.

Chapter 5 presents the research design and methodology, and the design of the peer training program.

Chapter 6 (Study 1) presents profiles of the participants, including information on cognitive play and social behaviour of the children with autism, and the social skills of the typically developing peers.

Chapter 7 (Study 2) presents the results of the main experimental component of this research, the determination of the effectiveness of peer training for the improvement of cognitive play and social interaction of children with autism in peer-mediated intervention. It was found that peer training resulted in a large and clearly statistically significant improvement in social interaction in trained dyads, while no improvement was seen in untrained dyads.

Chapter 8 (Study 3) investigates the change in ideas and attitudes towards children with disabilities reported by the typically developing peers who acted as trained and untrained peer players. Prior stereotypical ideas were replaced by ideas depending more on actual experience, while reported attitudes changed to

represent a more realistic, though pessimistic, view of the difficulties of acting as a peer player. These changes appear to have resulted from contact with children with autism—the training did not observably affect them, since there were no statistically significant differences between ideas and attitudes, and changes in them, between the trained and untrained peers.

Chapter 9 (Study 4), in which response from parents and teachers are analyzed, show no clear evidence of changes in play behaviours of the children with autism; some positive changes in some children with autism were reported their parents and special educators after the peer-mediated play intervention, but it is impossible to rule out the possibility that this was entirely due to observer bias.

In chapter 10, the results are summarized, and overall findings reported and discussed. The significant results, implications of, and limitations of this research are considered. In addition, some directions for further research are suggested.

Following the bibliography, the classification of observed behaviour in children with autism is discussed in appendix A, and binary keys are suggested as a practical tool for classification. Classification schemes are developed for both cognitive play, based on the Piaget–Smilansky categories (see chapter 2) and for social interaction.

Appendix B presents some mathematical details of the data analysis.

The peer training package is reproduced in appendix C.

The remainder of the appendices (appendix D and onwards) present instruments, forms, and questionnaires designed by the researcher for this study.

## Chapter 2

# Cognitive Aspects of Play for Children with Autism

Theories serve two functions. First, they help organize and integrate existing knowledge into a coherent account of how children develop. Second, they foster research by providing testable predictions about behavior.

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Hetherington, Parke, and Locke (1999, p. 32)

### 2.1 Introduction

It is striking to note that there has been no general agreement as to how to characterise children's play—there is no single universally accepted definition of play. The use of different sets of definitions by different workers leads to confusion and difficulty when comparing results. Despite the plethora of definitions, there is widespread agreement that play contributes substantially to the cognitive and social development of children. Therefore, it should be possible to infer at least some details of cognitive development from observation of play behaviour. Accordingly, it has become a standard procedure to measure play behaviour in order to cast light on cognitive development. This applies as much to play-based interventions as it does to observation of naturalistic play, and measurement of play behaviour is therefore commonly used to estimate the effectiveness of such interventions.

The pre-eminent theory relating play and cognitive development is that of Piaget (1952, 1977), and taxonomies and classification schemes—which provide a bridge between the concepts embodied in the theory and the practical matters of measurement and experiment—based on his theory and its derivatives are in common use. However, Piaget's theory was formulated in the context of typically

developing children, and it is necessary to discuss the applicability of Piagetian theory to play behaviours of children with autism.

This chapter examines conceptualisations of the role of play and its connection to cognitive development and taxonomies of play based on Piaget's cognitive developmental theory. Play behaviours of children with autism are discussed in relation to the cognitive developmental play categories, with the intent of better specifying the characterisation of play in naturalistic environments. These cognitive play categories can be applied with a particular view towards the operationalization of play categories used to code the behaviour of children with autism, particularly in naturalistic settings rather than laboratory settings. In order to do that, problems typically associated with existing general cognitive play definitions are discussed.

## 2.2 Play and playfulness

Play is an essential part of children's life. Most children's play occurs with peers (Hetherington et al., 1999). This is true of both indoor and outdoor play. The lack of general agreement as to how to characterise children's play noted above persists despite considerable philosophical and psychological discussion as to the nature of play and its role in children's development. As well as being a theoretical issue, this also affects practical research; behavioural intervention studies for children with autism have relied on various play categories and definitions, often making it difficult to compare results from the studies. Perhaps as a consequence, some play categories and definitions seem to be so context-bound or task-specific that it is difficult to see how they would generalise to other contexts (e.g., Phillips, 1994). The play categories and definitions used in these studies seem to be constructed on an ad hoc basis for the particular therapeutic setting of the study. As such, it may not be reasonable to use such definitions of therapeutic play categories and definitions for children with autism in general educational settings. A uniform definition of play and a conceptual basis for the operationalization of play in observational studies could contribute significantly to how observational research in play is conducted in the future.

Given the lack of uniform definition of what constitutes play it may be useful to begin with some broad definitions of play. Play has been defined as a psychological disposition, observable category of behaviour, or situational context. It has been approached from different cultural bases in classical theories (theory of surplus energy, recreational or relaxation theory, practice or pre-exercise theory, and recapitulation theory) and modern theories (psychoanalytic theory, arousal modulation theory, Bateson's metacommunicative theory, and cognitive theory) (Mellou, 1994; Takhvar, 1988). In a classic study that still provides a basis for contemporary research, Rubin, Fein, and Vandenberg (1983) achieved a synthesis of



these various definitions and approaches, describing play in relation to children's development as follows:

- Play is intrinsically motivated,
- It involves attention to process or means rather than products or ends,
- It mainly takes place with familiar objects,
- It includes non-literal behaviours such as pretend activity and rough-and-tumble play.
- It is free from externally imposed rules and the rules can be modified by the players.
- It also helps to relieve and release boredom, pain, or stress.

Some authors have extended the argument to distinguish play from “work”. Bundy (1997), for example, noted that work is both extrinsically motivated and obligatory and this distinguishes it from play. Furthermore, the competing demands of play and work may be counterproductive, perceived as “play–not learning” versus “work–learning” (Howard, 2002).

Given this conception of play as a competitor for resources with work it may be useful to further expand on the definition of work:

- Work is extrinsically motivated,
- It involves attention to productive outcomes,
- It deals with tasks aiming to complete,
- It is conducted to achieve certain goals and consequences in reality for the action.
- It is allocated as duty that has limited potential for negotiation.
- It may increase tension or stress.

Of course, these distinctions may have limited relevance in the context of play in early childhood because children in early childhood and the early years of schooling spend very little of their time in what might be identified as work. Firstly, it should be noted that these criteria might be useful as the basis for distinguishing between play and non-play behaviour in children as they identify a set of characteristics which exclude play. Secondly, these criteria emphasise that the most distinctive discriminator between play and work may be playfulness. According to Lieberman (1965, 1966), playfulness comprises five constituent dimensions: physical spontaneity, social spontaneity, cognitive spontaneity, manifest joy, and sense of humour. These have been more fully defined by Barnett (1990) as:

- Physical spontaneity—the physical alertness of motor activity expressed how well-coordinated, preference of active, and amount of running, skipping, hopping, and jumping.
- Social spontaneity—qualities of the child's interaction with others such as cooperating, sharing, leading, responding to others, and taking the initiative.

- Cognitive spontaneity—the imaginative ability of the child such as the ability to take different character roles, invent unique games, use unconventional objects, and stay with one activity or change activities.
- Manifest joy—the expressive nature of the child's play including enthusiasm, exuberance, enjoyment, lack of restraint, and vocalizations.
- Sense of humour—joking, gentle teasing, generating funny stories, clowning, and laughing at humorous stories.

Playfulness has been associated with positive outcomes for language development, sensory enhancement, cognitive functioning, general reasoning and emotional expression of typically developing children (Boyer, 1998; Haennikaeinen, 2001; Lieberman, 1977) in both play and non-play contexts (e.g., Cheyne & Rubin, 1983; Swain, 2000, respectively).

In other words, play has been used as an index of cognitive development, social development, and to a lesser extent, motor development, in typically developing children (e.g., Cooney, 2004; Gitlin-Weiner, Sandgrund, & Schaefer, 2000; Linder, 1993). Much evidence has emerged that play can facilitate the development of skills such as exploration (Kelly-Vance, Ryalls, & Glover, 2002), divergent and convergent problem solving (Lloyd & Howe, 2003), language (Lim, 1998), literacy (Saracho, 2004), creativity (Saracho, 2002), emotion regulation (Galyer & Evans, 2001), friendship (Dunn, Cutting, & Fisher, 2002), and object manipulation (Stagnitti & Unsworth, 2000) in typically developing children.

In contrast, it appears that there has been little research on the playfulness of children with autism in naturalistic settings. Its efficacy has been implied in psychotherapy studies of children with autism which have linked playfulness to language development and emotional expression (e.g., Barrows, 2002; Mittedorf, Hendricks, & Landreth, 2001). Assessments of play have been used as a screening device in the diagnosis of autism in some studies (e.g., Doherty & Rosenfeld, 1984; Sigafos, Pennell, & Graves, 1999).

## **2.3 Cognitive developmental perspectives on children's play**

Mental (or intellectual) growth may be fundamentally internal; as such, the process of mental growth cannot be directly and simply observed whether it interacts with environments or not. The pre-eminent theory of cognitive development is that of Piaget (1952, 1977). Piaget believed that the cognitive development of children is primarily an internally-driven biological process, viewing children as active constructors of knowledge. Just as physical development (also an internally-driven biological process) is sustained by input from the environment (eating), cognitive development also depends on the interaction of the child

with the environment, and the child actively seeks the required experience. Piaget claimed that the child's intelligence is developing from motor movement (interacting with the environment in order to acquire knowledge). As child organize his or her knowledge of the world, his or her mental or "cognitive structures" ("schemata") that are network concepts for understanding and responding to the environment become more complex. In other words, a child's cognitive structure increases from innate reflexes (built-in schemata) such as looking, crying, or sucking through sensory motor coordination (integrated information from different senses) to highly complex cognitive activities (Bee, 2000; Cohen, 2001; Hetherington et al., 1999).

Children possess different schemata in memories, thoughts, and strategies, and those change. As children grow older and obtain more experiences, they use more mentally based schemata such as strategies, plans, and rules for solving problems, rather than physically based ones. Piaget proposed two basic processes to explain this shifting of mental schemata: "assimilation" and "accommodation". Assimilation is the "taking-in" or "active absorbing" process to incorporate or integrate new information into existing similar knowledge schemata. For example, when babies see new objects, they try to assimilate the objects into their looking-reaching or looking-grasping-sucking schemata. When a child sees a small animal, he or she assimilates the animal into his or her dog schemata by labelling it "dog". In these trials, some cases are not successful. Babies realize, for example, that it is not possible to grasp and suck a big ball. They then modify their strategies and adapt a new approach, such as holding the ball in his or her arms and licking it, to explore the big ball. This is accommodation, a process for re-adjusting or altering existing schemata as a result of the new information (Bee, 2000; Hetherington et al., 1999).

Piaget (1952, p. 6) assumed that the child understands the world through adaptation, achieving an equilibrium (balance) between assimilation and accommodation. Piaget said, "Intelligence is an adaptation" (Piaget, 1952, p. 3) and "(i)ntelligence tends towards permanent equilibrium between assimilation and accommodation" (Piaget, 1962, p. 85). Piaget (1977, p. 12) asserted that the child strives for coherence to solve the unbalance or contradictions in between assimilation and accommodation. This drives the child to go beyond his or her state (re-equilibrations). Piaget said, "(t)he non-balance (sic) arises, it produces the driving force of development. Without this, knowledge remains static" (p. 13).

Piaget (1962) argued that the order of the stages is sequential for children, although the occurrence age of these four stages is not exactly the same for different children. Each of the four hierarchical stages of cognitive development needs to be mastered, one by one, in order to proceed to the next (Cohen, 2001; Hetherington et al., 1999):

1. the sensory-motor stage (0 to 2 years)
  - exploring and manipulating things that can be seen, felt, touched
  - developing motor skills
  - intelligence in action
2. the preoperational stage (2 to 7 years)
  - thinking dominated by own perception
  - oriented to the present
  - preconceptual (2 to 4 years) and intuitive (4 to 7 years) rather than logical
  - becoming more capable of symbolic functioning
3. the concrete operational stage (7 to 11/12 years)
  - understanding numbers, space, and classification
  - applying logical reasoning to concrete problems that are real or can be seen
4. and the formal operations stage (11/12 to adult years)
  - thinking abstractly, hypothesizing, generalizing, reasoning and forming different standpoints, and developing logical ideals

Although there are difficulties in measuring intelligence in children with autism (Edelson, 2005) and its individual fluctuation with chronological age (Sigman & McGovern, 2005), when Piagetian cognitive development is applied to individuals with autism, the majority of children with autism are likely to have intellectual disability. Sadock, Kaplan, and Sadock (2003) reported that approximately 75 to 80 percent of children with autism have a deficiency in their intellectual function. Thirty percent of them show a mild to moderate level of it, 45 to 50 percent of them show a severe to profound level. There is a negative correlation between autism and IQ (Sadock et al., 2003). Severe difficulties in verbal sequencing and abstraction skills seem to be positively associated with the IQ scores in children with autism. These indicate more impairment in language-related function than non-verbal function in children with autism. Along with these intellectual features of the group of child with autism, much individual variation in their abilities in relation to increased IQ and age is also present (Mayes & Calhoun, 2003). Mayes and Calhoun (2003) emphasized that interventions for children with autism, particularly during early childhood and early school-age years, should be designed to remedy the verbal weakness as well as to enhance the non-verbal strengths.

### **2.3.1 Play as cognitive behaviour**

Piaget (1962) claimed, "Intelligent adaptation, imitation and play are thus the three possibilities, and they result according as there is stable equilibrium between assimilation and accommodation or primacy of one of these two tenden-

cies over the other" (p. 86) and "When there is real curiosity, we are no longer in the realm of play but in that of intelligent experimentation" (p. 116). For Piaget (1962), children imitate others in a serious attempt to accommodate their environment. Simultaneously, children assimilate the world into their present cognitive abilities through play that is almost pure and free assimilation for "pleasure", without accommodation, at the beginning in child development.

- "(w)hile imitation is a continuation of accommodation for its own sake, ... conversely ... play is essentially assimilation, or the primacy of assimilation over accommodation" (p. 87)
- "Play is primarily mere functional or reproductive assimilation" (p. 87)
- "(p)lay, in which reality is subordinated to assimilation which is distorting, since there is no accommodation" (p. 86)
- "(p)lay proceeds by relaxation of the effort at adaptation and by maintenance or exercise of activities of the mere pleasure of mastering them and acquiring thereby a feeling of virtuosity or power" (p. 89).

According to Piaget (1962), play is regarded as evolution phenomenon that is derived from the child's cognitive structures, so that it could only be explained by their cognitive structures in child development. Piaget (1962) said, "Play follows an exactly similar line of development" (p. 288). At the initial stage, play behaviours are characterized as "pre-exercise of essential instincts" (e.g., reflex) that is almost identical with sensory-motor behaviours. These behaviours represent imitation (inherent symbol), intelligence, and satisfaction. With socialization, symbolic imagination and rules are gradually acquired in the child's play.

Notably, Piaget deliberately ignored social factors. Piaget (1962) explained "We are of course entire in agreement that thought cannot be explained without recourse to social factors, but the general concept of 'social life' seems to us inadmissible in psychology. 'Society' is neither a thing nor a cause, but a system of relationships, and it is for the psychologist to classify these relationships and analyse separately their respective effects" (p. 68). Hetherington et al. (1999) pointed out that the focus of Piagetian theory is on the set of innate cognitive abilities or limitations of children associated with each stage and as such social and cultural influences on children's cognitive development are largely not addressed.

However, Piaget's view that play is derived from the child's mental structure may be arguable from the view that play is a medium for the child's cognitive development. Sutton-Smith (1966) criticised that if play is a mere assimilation as Piaget claimed, it does not obviously contribute to children's learning new skills. Play functions for only practice and consolidation of acquired skills in Piaget's theory. Sutton-Smith (1966) argued that play has taken on a more effective role for children's cognitive development beyond assimilation. Sutton-Smith (1967) believed that play develops children's mental flexibility through the

symbolic transformations in dramatic play. Children take opportunities for role reversal, learn how to change established ideas, test ideas together in new or different ways, create their own, enhance individual freedom for developing divergent thinking. Therefore, children's cognitive structures may be developed or strengthened and enriched by play. Following this view—play as a medium for learning—children's play has been investigated, focussing on different aspects such as diversity and culture (e.g., Kendrick, 2005; Nasir, 2005), emotional and behavioural intervention programs (e.g., Josefi & Ryan, 2004), and so on.

## **2.4 Play and exploration in children with autism**

In the cognitive developmental process, a person, throughout their entire life, uses sensory-motor schemas to explore their environment. From early life, an infant collects his or her experiences and organizes them into expectancies through combinations with previous knowledge; schematic learning occurs. Such basic sensory abilities as visual tracking to scan objects scanning, swiping at objects with the hands, tactile exploration with the hands, recognizing a mother's face, imitating facial gestures (tongue out, mouth opening, lip protrusion, and head movement), listening to distinguish familiar voices or detect locations, touching to feel, and smelling and tasting to discriminate foods are rapidly developed into more complex perceptual skills such as perceiving depth, discriminating various emotional expressions on faces, noticing sound patterns, and combining information from several senses (Bee, 2000; Snow, 1998). Infants and toddlers experiment with bodily sensation and motor movements with objects and people through trial and error such as pushing, grasping, rolling, kicking, crawling, shaking, and so on. These sensory-motor behaviours are repeatedly or rhythmically performed and gradually transformed in one or more purposive combinations of actions and manipulations in typically developing children (Bee, 2000, p. 86, 119). This means that typically developing children progress through a phase of repetitive behaviour as they learn to control their bodies and this tends to lessen as they develop.

Power (2000) reported further exploratory behaviours such as the manipulation of various physical objects in an investigative manner. In typically developing infants and toddlers during their first two years of life, these behaviours include poking and touching, mouthing and biting, scratching, pressing, rotating, bringing to eyes, and instrumental sequential action (sequential actions involving objects). Exploratory object manipulations change as the child matures from an initial more oral pattern through visually guided examination to engaging in instrumental sequential actions. However, there is no correlation between age and the total amount of exploration because older children's exploratory behaviours may be increased with complex stimuli. In fact, chil-

dren's exploratory behaviours are more systematically elaborated and less driven by stimulus as they mature and cognitively develop (Power, 2000). These exploratory behaviours become enmeshed during preschool years and remain so into later life (Fenson & Schell, 1985).

In general, exploration appears in play in its process and leads eventually to thinking that involves the integration of previous with current experiences. As children explore an object, they may gaze at the object, be highly engaged, and be even playful until they become familiar with the object's attributes and functions. Exploration takes place to search for the object's possibilities ("what is this object?"), extraction of information about the characteristics of objects, and reduce uncertainty about the environment in a somewhat stereotyped manner, play occurs to create possibilities for the object ("what can I do with this object?") (Power, 2000, p.52, 77); this clearly suggests a cognitive component of play. Exploration refers to a stimulus-dominated behaviour to acquire information about an object or situation by self-manipulation. Exploration contributes to integrating previous thinking with current experiences. When the child acts upon the object to determine its properties, the child starts exploring to gain information (Pugmire-Stoy, 1992). While play is primarily to increase effective activity for development of certain strengths and skills, exploration are mainly to contact with different facets of an object for receptive activity (Aldis, 1975). As a result, it indicates that exploration behaviours may be considered more purposive examining, but pre-determined, than some other forms of play behaviour.

Even though it is not clear whether learning occurs in exploration itself, it is considered by Power (2000, pp. 63–77) that exploratory behaviour may help children learn appropriate use of unfamiliar objects or create alternative ways of using familiar objects because once the child becomes familiar with the object, he or she can move on to other play behaviours. Thus, it can be assumed that exploratory behaviour and play are related behaviours. It seems that the exploratory process is an important part of play. In continuous play activity, it is difficult in practice to differentiate play behaviour from exploration because exploration is often exhibited with stereotyped behaviour feature and play is displayed in variable behaviours (Johnson, Christie, Yawkey, & Wardle, 1987). However, exploratory behaviours are discriminated from other play behaviours in some studies (e.g., Fiese, 1990; Malone & Langone, 1998; Sigafos et al., 1999).

There has been little research to investigate exploratory and whole play characters of children with autism (Williams, 2003). Therefore, it is not clear how exploration is associated with play in children with autism. In a recent study (O'Neill & Happe, 2000), it was found that, unlike typically developing children and children with Down syndrome, children with autism are significantly different in both the level of their perception of the toy they found of interest and the communication timing of their topic initiations. Less time exploring the toys and

less behaviours with the toys were shown by children with autism than in either of the other two groups of children. It was noted by Roeyers and van Berckelaer Onnes (1994) that children with autism often smell, lick, or spin objects and toys, but do not play with them like other children do. However, these behaviours were not seen to have an exploratory aim by observers because the children with autism may be fascinated by the act alone.

It is possible that these differences in exploratory and play behaviour of children with autism may be due to great variation of sensory sensitivities. In particular, it appears that variation in the sensory sensitivity of children with autism may deprive them of some of the pleasure derived from exploration. Indeed, for some children, exploratory behaviour may be aversive. In some studies (Jones, Quigney, & Huws, 2003; Rogers, Hepburn, & Wehner, 2003; Talay-Ongan & Wood, 2000), overall sensory sensitivities in the auditory, tactile, visual, olfactory, gustatory domains and so on presented from both children and adults with autism in comparison to a control group have been described as having significantly hyper- and hypo-sensitivities. Rogers et al. (2003) reported that these abnormal sensory sensitivities were significantly associated with overall adaptive behaviour in children with autism. However, it is difficult to assess how much these apparent differential sensitivities contribute to the play behaviours of children with autism.

The unusual senses of children with autism may be associated with poor sensory-motor skills that may affect social interaction, communication, and cognitive development. Sensory-motor deficits or delays in both gesture imitation or motor skill development may be early milestones which might assist in the early diagnosis of play disorder in children with autism (CA), compared to either children with developmental disabilities (CD) or typically developing children (TC). For example, behaviours such as mouthing of objects (CA=18%, CD=9%, TC=8% of intervals), social touch aversion (CA=9%, CD=2%, TC=1% of opportunities) along with other sensory-motor deficits such as significantly more unusual posturing, more name prompts needed, and less orientation to visual stimuli were reported to distinguish infants with autism from the other two groups of children (Baranek, 1999).

Most play interventions for children with autism have been focused on their pretending skills in play (Jarrold, 2003). Exploratory behaviours of children with autism have been often ignored or subsumed into other play behaviours. It is plausible, for instance, that exploratory behaviours have been simply identified as stereotyped or problem behaviours and coded into a non-play category, because stereotyped and problem behaviours are regarded as “inappropriate” and “socially stigmatized” or challenging behaviour that falls into a non-play behaviour category.

As indicated earlier, sensory-motor practice for exploration often appears to



be stereotyped with self-stimulation and repetitive behaviours in typically developing children. Exploratory behaviours through the sensory-motor stage in typically developing children are generally clear. However, it is much more complicated in children with autism when considered that, as Sigafos (2001) pointed out, challenging behaviours are used differentially by individuals with developmental disabilities for manifold purposes such as gaining attention, escaping from a demanding task, to obtaining preferred objects or activities, or sensory stimulation. Multiple functions of stereotyped behaviours in students with autism (Kennedy, Meyer, Knowles, & Shukla, 2000) and of problem behaviours in children with autism (LaBelle & Christy, 2002) were observed in a series of conditions including recreation or play. Consequently, it is difficult to discriminate when a child with autism uses a stereotype behaviour or problem behaviour from object exploration in play.

In addition, exploratory behaviours in children with autism may occur in unclear patterns. As such, it is hard to catch a particular moment of exploration in any given observation period without an explicit coding schema, and an awareness of the context of the behaviours being observed. This is particularly difficult given that children with autism may be frequently engaged in stereotyped behaviours in which exploration may be nested. As a result, it is difficult to determine what correlation, if any, exists between stereotype behaviours and exploratory behaviours in children with autism in play contexts. Therefore, exploratory behaviour of children with autism can only be distinguished from stereotyped behaviour when it is clearly an investigating behaviour.

In fact, this difficulty identifying sensory-motor exploration amongst stereotype behaviours is systematically embedded in the general play definition that was described by Rubin et al. (1983). In this play description, play behaviours share similar features with stereotype behaviours. The three factors in the descriptions—intrinsically motivated, attention to process or means, and relieve and release boredom, pain, or stress—are matched with characters and functions of stereotype behaviour, and sometimes even with problem behaviours (e.g., for fun), depending on the situation. For example, when a child with autism throws toys on the floor, this behaviour may be characterised with three different play descriptions. His or her repetitive throwing of toys can be viewed as stereotyped behaviours from its repetition, exploratory behaviour if interpreted as the child investigating the sound of toys as they hit objects, or as problem behaviour from its destructive component. In short, the lack of coding specificity in existing play definitions, and the ambiguity of the behaviour confounds observers attempts to interpret this repetitive and rhythmical behaviour as exploratory behaviour, play behaviour, or typical stereotyped behaviour.

Furthermore, an even more fundamental question about what constitutes stereotyped behaviours in children with autism may be raised from locomotor

studies. According to Power (2000), solitary locomotor play (running, leaping, skipping, jumping, swinging, hanging, and climbing) and locomotor-rotational behaviours (sliding and dancing) are often shown in rough-and-tumble play, play-fighting, or play-chasing by typically developing children where they are associated with playful signals (e.g., smiling, cheerful vocalization or verbalization). Play-chasing peaked in preschoolers and gradually declined with increasing age. Due to the paucity of locomotor studies, it is not yet known what, if any, differences may be found between the play and non-play locomotor patterns in children with autism and typically developing children. There seems to be little research on locomotor features of children with autism. In one recent study (Vernazza-Martin et al., 2005), it was found that, although some irregular locomotion was observed in children with autism, there were no significant differences in gait parameters and balance control locomotion between children with autism and typically developing children. In contrast, another locomotor study (Berkeley, Zittel, Pitney, & Nichols, 2001) using a Test of Gross Motor Development (Ulrich, 1985) for fifteen high-functioning children with autism reported that 70% of male participants showed delayed locomotor skills whereas only 30% showed delayed object control skills. However, given that this test was performed at their home school gymnasium (four participants) and a university-based facility (eleven participants) under the administrator's direction, it is unclear to what extent this result may be generalized to locomotor play that may occur intrinsically in children with autism.

Despite this confusion with stereotyped behaviour, exploratory behaviours may need to be identified to find out its possible positive function for cognitive learning in children. Berkson and Tupa (2000) reported that stereotype behaviour and self-injurious behaviours have been observed in the course of typical human development. These disappear with age in typically developing children whereas they persist in children with developmental disabilities and reinforced by environments. It is not obvious yet whether these behaviours are necessary for children's development and how they function for children's play. However, stereotype behaviours have been generally regarded as barriers to be removed because their negative consequences for learning in children with autism. Lee and Odom (1996) reported that when children with autism initiate play with typically developing peers, stereotype behaviours were decreased and social interactions were increased. Conversely, stereotyped behaviours were increased when social interactions were decreased. This decrease of stereotype behaviours was resulted as a collateral effect of peer training for initiation.

There may be another plausible reason for the confusion in identifying exploratory behaviours of children with autism. When age-matched control groups such as typically developing children and other children with developmental disabilities are used, these control groups of children show no or little stereotyped

manner in their exploratory behaviours compared to children with autism. If autism is viewed as a symptom of delay rather than as permanent impairment, exploratory behaviours of children with autism in play activities can be compared with infant or toddler groups. If so, stereotype behaviours in children with autism can be interpreted as an exploratory form of sensory stimulus behaviour. Sometimes children with autism seem to be engaged in stereotyped self-simulative and repetitive behaviours in much the same way as typically developing infants or toddlers. That is their manner is playful, and suggests that they are enjoying the sensations associated with the behaviour rather than either being destructive or simply stuck in a cycle of repetition. It may be that some clues for designing play interventions for children with autism may be obtained from the way play evolves in typically developing infants and toddlers. As yet, this notion has not been reflected in early interventions. This may be due to a lack of understanding about stereotype and problem behaviours in both children with and without disabilities.

## **2.5 Cognitive play categories for children with autism**

As the cognitive complexity of the child increases, the complexity of play increases. From this cognitive developmental perspective, three classes of children's play behaviour have been proposed by Piaget (1962)—practice games, symbolic games, and games with rules—in typically developing children. These three classes of games were viewed as corresponding to three forms of intelligence: sensory-motor, representational, and reflective. These play categories proposed by Piaget were elaborated and reconceptualized by Smilansky (1968, pp. 5-7) into four sequential hierarchies—functional play (practice games), constructive play, dramatic play (symbolic games), and games with rules. These three or four cognitive play categories have been widely used in research on play of children with and without disabilities.

### **2.5.1 Practice games and functional play**

Piaget (1962) described practice games as lacking symbols, make-believe, and rules. Much play behaviour displayed by animals is of this type. For example, when a kitten runs after a wool ball, it seems to do it for fun, and not more than that—the kitten does not, insofar as we can tell, pretend that the ball is a mouse, but rather runs after it simply because it is moving. Piaget (1962, p. 111) was of the opinion that practice games should include behaviour that had previously been described as “pre-exercise”, “post-exercise”, and “marginal exercise” by Groos (Piaget, 1962). Piaget's practice games category was renamed as func-

tional play by Smilansky (1968) and (re-)defined as simple muscular actions and manipulations with or without objects in a repetitive manner in order to practice his or her physical capabilities and explore the immediate environment.

Since Piaget (1962, pp. 115–117) believed that frequency of practice games are diminished as other games and language appear, practice games can be further divided into two categories: practice games remaining purely sensory-motor (“mere practice”, “fortuitous combination”, and “intentional combination”) and those having some bearing on thought itself (“mental exercise”). Piaget (1962) claimed that each of these categories indicates transition from sensory-motor practice to intelligence and to verbal intelligence.

The child repeats mere practice for the pleasure of exercising his power. For example, picking up pebbles and throwing them into a pond, filling a pail with sand, overturning it, demolishing the sand-pile with his or her spade and beginning again, sticking pine-needles into some tar and then pulling them out again, lacing and unlacing his or her shoes to learn how to do it, making insects run over the back of his or her hand and laughing when it tickles, collecting as much dust as he or she can in his or her hand and enjoying the sensation it as it flows through his or her fingers and beginning again, and taking a big piece of clay and breaking it into small pieces, then putting them together and beginning again (Piaget, 1962).

When the child builds up new combinations with new toys or instructional materials, he or she is no longer engaged in mere practice games. The child engages in fortuitous combinations that are often imperceptible. For example, arranging ninepins in a line two at a time, putting some pebbles in a pail, putting them back, transferring them from one pail to another, walking along some railings, touching one after the other, and beginning again, threading beads onto the rods of a counting frame, mixing the colours, piling up blocks and knocking them down again, emptying a box of bricks onto the floor and putting them back again, and pushing one brick against another, putting one on top of the other, then pushing them all. When the child is socialized, some of these practice games become games with rules (Piaget, 1962).

Furthermore, Piaget (1962) explained that practice play is used for higher function in children. This is mental exercise that includes the three practice games above. For example, when children engage in asking question games, they do it for the fun of asking with no real interest in the problem or the answer. The child makes up stories merely to contradict or put ideas together, without concern with what he or she says, as he or she is pleased. When the child is really interested in the thought itself, these aimless exercises become symbolic games (Piaget, 1962).

Comparing play behaviour in children and animals, non-pretend object-directed behaviours of typically developing children in the first two years of life have been demonstrated by Power (2000) in procuring behaviours (picking up,

holding, carrying, transferring, bilateral hold, and two-handed hold) before they decide to what to do with the object and play behaviours with the objects. Object play behaviours include transforming behaviours, (tearing/breaking, twisting/untwisting/bending, and wadding/squeezing), relating behaviours (rubbing, hitting/striking, dropping, and touching together), and other large-motor behaviours (waving/shaking, pushing/pulling, and throwing). In transforming behaviours, squeezing objects are increased towards the end of the first year. Relating behaviour increases with age and peaks before 18 months (Piaget, 1962). It is then divided into nonfunctional relational manipulation and functional relational manipulation. Finally, vigorous banging behaviours are decreased whereas sliding and rolling behaviours are increased. These object manipulations generally decline after 18 months of age as pretend play is increased.

Research on functional play behaviours of typically developing preschoolers is likely to be investigated on play preference and cognitive competence in conjunction with middle and lower social classes. For example, it was reported by Rubin and Maioni (1975) that dramatic play was more associated with spatial relational and classification skills than constructive play. It was posited that constructive play was more associated with the intentional use of materials to fashion, or make a model of, a real object, as well as utilising physical skills developed in practice play in addition to representational abilities gained in pretend play.

On the other hand, research issues on functional play shown by children with autism are somewhat different from those in typically developing children. First of all, it is problematic to discriminate functional play from symbolic play or constructive play in children with autism. As Baron Cohen (1987) noted above, judgment about the functional behaviours of children with autism depends on operational definitions. While functional play only requires first-order representations (primary representation—depictions of the world as it really is), pretend or symbolic play requires second-order representations (metarepresentation) that decouple first-order representations from their relationship with the real world. A child who can use second-order representations knows what an object is and pretends simultaneously that it is something different—for example, a banana is used as a phone (object substitution), non-existent properties are attributed to an object—an empty cup is said to be full (attribution of pretend properties), the child is able to imagine absent objects—a doll eats an imaginary cake (reference to an absent object) (Leslie, 1987). In first-order representations, therefore, children with autism are not impaired in presenting functional play behaviours.

Highlighting difficulties with defining and coding criteria for functional play, in general, it was recognized that functional play behaviours in children with autism were qualitatively less elaborate, less varied, and less integrated than those of developmentally matched children with Down syndrome and typically developing infants. Children with autism were less time-engaged in play and

participated in fewer acts than control groups (Williams, Reddy, & Costall, 2001). Functional play behaviours in children with autism were described by Roeyers and van Berckelaer Onnes (1994) as simple manipulations or combination play in a rigid and stereotyped manner, for example a cup belongs with a saucer. These behaviours seemed to be mechanical and almost automatic and not part of a meaningful whole, such as cup-saucer-tea-drinking.

This lesser quantity and lower quality of functional play in children with autism may be related to poor motor skills. In one study (Stone, Ousley, & Littleford, 1997), toddlers with autism were reported to perform more poorly on motor imitation skills than matched typically developing children, or other children with non-autistic developmental delay. However, these three groups showed identical patterns of performance on motor imitation skills. It was noted however, that body movement imitation (e.g., clapping hands) was more difficult than imitation of actions with objects for toddlers with autism. While body movement imitation was associated with expressive language skills, object imitation was associated with play skills in children with autism. When the actions with objects imitation were divided into non-meaningful action and meaningful action, non-meaningful action imitation (e.g., pushing a teacup across table) was more difficult than meaningful action imitation (e.g., pushing a toy car across table) for all three groups. Total imitation scores in children with autism and in typically developing children were not statistically different. It was argued that motor imitation skills of children with autism may be a reflection of a delayed pattern of development, rather than impairment per se.

Morin and Reid (1985) reported that although qualitatively superior balance skill of high-functioning children with autism was found compared to a functionally matched intellectual disability group, the autistic group also showed inappropriate and nonfunctional arm movements, and immature motor patterns in throwing, jumping, and running (although it should be noted that was no statistically significant quantitative difference in the poor motor performances of these two groups). It was suggested that the poor motor performance in the autistic group might be linked to a factor of their intellectual deficit. DeMyer, Hingtgen, and Jackson (1981) reported that children with autism do not show motor development consistently balanced with their chronological age. In particular, children with autism have difficulties with particular tasks requiring physical integration skills, motor object, and body imitation tasks (DeMyer, Barton, & Norton, 1972). Rogers (1988) indicated that children with autism show sensorimotor deficits in both gestural imitation and motor skills, compared to either children with intellectual disability or typically developing children.

High-functioning children with autism and children with Asperger syndrome were reported to be clumsy, this has been attributed to underlying motor impairment (Iwanaga, Kawasaki, & Tsuchida, 2000; Green et al., 2002). Other interpreta-

tions include impairment resulting from neurological brain dysfunction (Hauck & Dewey, 2001; Mueller, Pierce, Ambrose, Allen, & Courchesne, 2001; Rinehart, Bradshaw, Brereton, & Tonge, 2001). In earlier research, Jones and Prior (1985) reported that children with autism have an underlying neurological dysfunction resulting in poor performance on body imitation ability such as gesture and dynamic movement. They agreed with DeMyer et al. (1981) that the poor performance of motor imitation tasks in children with autism may be caused by motor dyspraxia.

On this background, play programs for children with autism may need to be designed through a “theraplay” concept (play as a therapeutic medium) to maximize spontaneous motor activity as suggested by Kraft (1983). For example, children with autism may develop gross motor skills through roller skating, fine motor skills through puzzles, block assemblies, and pegboards, eye-hand or eye-foot coordination through catching, throwing, and kicking, and body awareness through the touching of different body parts to each other in physical activities. This approach can be also incorporated into school curricula such as physical education to develop motor proficiency such as catching and striking skills (e.g., Schleien, Heyne, & Berken, 1988).

### 2.5.2 Constructive play

In Piaget’s theory (Piaget, 1962), constructive play occupied by both representational and reflective intelligence was not categorized because it was viewed as being half-way between play and goal-oriented work, or between play and imitation. In Piaget’s analysis, constructive activities were not seen as completely playful. For example, when the child makes a wooden boat by hollowing out the wood and putting other parts such as masts, sails, and seats, this construction contains creative game, imitation, or representation using materials. It indicates an internal transformation of symbolic notion towards adapted representation. It leaves the realm of play and enters that of imitation and work.

- “(c)onstructional games do not form a category of the same kind as the others, but are a boundary class between games and non-ludic behaviours” (Piaget, 1962, p. 110).
- “There are practice games, symbolic games, and games with rules, while constructional games constitute the transition from all three to adapted behaviours” (Piaget, 1962, p. 110).

When Smilansky expanded Piaget’s play categories, she argued that constructive play with a predetermined end-point, such as drawing, cutting and pasting, and doing jigsaws, should be considered as a focused effort to create a new entity (Takhvar & Smith, 1990). Smilansky described constructive play as manipulation of objects to create something, with the end goal either self-directed or imposed

by another.

It was reported by Rubin et al. (1983) that in typically developing children, constructive play became the most prevalent form of play by the age of four, and occupied about 50 per cent of play activity in typically developing preschoolers. Rubin and Maioni (1975) found that as constructive play did not have significant correlation with the frequency of either functional or dramatic play in young children, it may be predictive of convergent problem-solving. For typically developing children, it was concluded that constructive play contributes to coordination and creativity (Feeney & Magarick, 1984) as well as spatial relationships and symbolic representations (Reifel, 1984). To promote children's constructive play, a variety of expendable two dimensional and three dimensional materials—including papers and fabrics of many textures, crayons and markers, wood scraps, sticks, stones, blocks of wood and plastic and cardboard and other available fit-together toys—were used by Readdick and Chapman (1992).

Given rigid and restricted patterns of behaviour, interests, and activities in children with autism (American Psychiatric Association, 2000) that contrast against flexible and creative features in constructive play, it would be supposed that children with autism engage in creative activities rarely, or less than typically developing children (Craig & Baron Cohen, 1999). However, no clear evidence is found on this matter since there is little research on constructive play in children with autism. Constructive play of children with autism seems to be often included in their functional use of objects. This may be due to the difficulties involved in interpreting their play behaviours. In particular, when children with autism do not show sufficient language skills, including vocal or verbal cues, judging constructive play behaviours may depend on the observer's interpretation. While there is a dearth of research on constructive play and children with autism, a study by Murphy, Callias, and Carr (1985) has indicated that structured play training, especially constructive play, may lead to improvement of behaviour modification in children with profound disabilities (even though that study failed to combine constructive play and behaviour modification).

### **2.5.3 Symbolic games and dramatic play**

In Piaget's theory (Piaget, 1962), in contrast to practice games, symbolic play involves imagining that an object or person is a thing or person that it is not. It may also take the form of representation of an absent object, or the representation of a make-believe person or object. Piaget (1962) claimed that symbolic imagination is the key factor to distinguish symbolic games from practice games. Piaget (1962, p. 119) said, "(t)he symbol provides him with the means whereby he can assimilate reality to his desires or interests". Through symbolic play, the child may achieve compensation, catharsis, wish fulfilment, and liquidation of



conflicts. The child may further be able to show sequential combinations by constructing a whole imaginary scene such as school life, weddings, etc., rather than a single action. Symbolic play becomes adapted representation and develops towards constructive activity or work. Smilansky (1968) renamed this class of behaviour dramatic play, describing it as the substitution of an imaginary situation to freely display and fully extend the child's personal wishes, needs, and social tendencies.

Piaget (1962) claimed that symbolic play appears only at age two. However, this does not mean that sensory-motor practice suddenly disappears and is replaced with symbolic play. Piaget (1962, p. 112) said, "(w)hen the symbol becomes a part of sensory-motor practice, it does not replace the sensory-motor element, but merely subordinates it. Most symbolic games ... make use of complicated actions. They are therefore both sensory-motor and symbolic, but we call them symbolic when the symbolism integrates the other elements. Moreover, their functions deviate more and more from mere practice". For example, when the child uses a pillow to pretend to sleep, the child provides context using the pillow. A child might draw a bird, and shut his or her hand as if he or she holds the bird, and claim that he or she has the bird in his or her hands. In these examples, the symbol is ritual action done without representation. In other word, the child practices symbolically. For Piaget (1962), these behaviours were regarded as a primitive form at the early stage of symbolic games because they contain no more than pretence of usual actions. Piaget (1962) called these "symbolic schemas". Piaget (1962) claimed that the child engages in these activities to freely use his individual power, express himself or herself and show off to others, and assimilate without the need to accommodate at the same time.

According to Piaget (1962), as the child grows with the systematic acquisition of language, self-directed pretence at the transitional stage of symbolic schema (merely a make-believe reproduction of the child's own action) is applied to new objects (other-directed pretence). Piaget called it "projection of symbolic schemas on to new objects" (p. 121) (for example, putting a doll on the bed and covering it with a postcard, using various objects as pretend telephones, making his or her doll use a telephone), "simple identification of one object with another" (p. 123) (for example, using a shell as a cup to pretend to drink, sliding a post card along the floor as a pretend car), "identification of the child's body with that of other people or with things" (p. 124) (for example, moving their finger along the table and saying "finger walking ... horse trotting"), "game of imitation" (p. 125) (for example, pretending to iron, imitating others' gait), and "symbolic combinations" (p. 127) (for example, pulling a doll's hair back from its ears in order to make it listen to a music box).

Piaget (1962) saw that symbolic games peak between four and seven years of age, and become more imitative representation of reality as the child is socialized.

It is described as relative “ordered symbolic combination” (p. 136), “exact imitation of reality” (p. 136), and “collective symbolism” (p. 138) with differentiation and adjustment of roles. Piaget (1962) said, “(i)t could equally well be maintained that coherence of thought comes from progress in socialization .... it is interesting to find this interaction of social and mental acquisitions in the field of ludic symbolism in addition to finding it continually in that of adapted representation .... a transition from initial egocentrism to reciprocity, as a result of a double coordination in inter-individual relationships and in representational correlation. But in the case of the ludic symbol we must note that progress in socialization, instead of leading to an increase in symbolism, transforms it more or less rapidly into objective imitation of reality” (p. 139). In the final developmental period, between the age of seven or eight and eleven or twelve, symbolism declines, being displaced by either games with rules or adapted work such as construction, handwork, and drawing (Piaget, 1962).

It has been speculated that symbolic play demonstrated in the two social forms of solitary pretend play and socio-dramatic play with play partners contributes to school readiness, social skills, and creative accomplishment (Singer & Lythcott, 2002), emotional regulation (Galyer & Evans, 2001), creative thinking and problem solving (Saracho, 2002), divergent thinking for solving problems (Russ & Kaugars, 2001), verbal language development and communication (Roulstone, Loader, Northstone, Beveridge, & The Alspac Team, 2002; Yawkey & Hrncir, 1983) in typically developing children. In particular, Bee and Boyd (2002, p. 157) emphasized that socio-dramatic play (small group pretend play) may be an important vehicle for a shared understanding among children by creating a mutual pretence. When children take familiar roles such as mother, father, sister, brother, and baby in socio-dramatic play, they may instruct each other as to the right way of playing the role.

In contrast to the frequent and varied symbolic play in typically developing children, delayed or abnormally functioning symbolic play (American Psychiatric Association, 2000) has been characterized as one of the clinical features in autism. In fact, Kanner (1946) detected that metaphorical language in early infantile autism was neither creative nor directly communicative for share the symbols with others. Diagnosing children with autism as having a play disorder (American Psychiatric Association, 2000; Filipek et al., 2000; Gray & Tonge, 2001) can sometimes be interpreted as them not knowing how to play or not engaging in pretend play (e.g., Rapin, 1997).

So far, there is no firm evidence to suggest that children with autism have a significant deficiency in understanding pretence or identifying pretend substances compared to children with moderate learning difficulties (Jarrold, Smith, Boucher, & Harris, 1994) or typically developing children (Kavanaugh & Harris, 1994). However, the level of ability in children with autism to engage in sym-

bolic play is also not clear. Hammes and Langdell (1981) found that children with autism are relatively able to imitate concrete actions. However, they do not seem to be able to produce imitations at the level of symbolic quality that children with intellectual disability are able to do. It was concluded that although children with autism seem to possess one basic requisite of symbolic behaviour in order to form internal images, they seem to lack the ability to manipulate these images in a purposeful and meaningful manner. Libby, Powell, Messer, and Jordan (1997) investigated the imitation ability of pretend play in children with autism in comparison to children with Down syndrome and typically developing children who are matched on verbal mental age. Surprisingly, children with autism were better than the others on single scheme tasks (e.g., using a wooden cube as a cup). However, they had difficulties in performing multi-scheme tasks (e.g., feeding, bathing, and going to bed with toys). Furthermore, symbolic ability in children with autism was explained in terms of lower symbolic fluency (Riguette, Taylor, Benaroya, & Klein, 1981), and less ability to recall sequence of familiar symbolic actions (McDonough, Stahmer, Schreibman, & Thompson, 1997).

Some researchers (Lewis & Boucher, 1988, 1995; Jarrold et al., 1994) suggest that the production of structured, elicited or instructed symbolic play may not be impaired in children with autism. Lewis and Boucher (1988) assessed spontaneous, instructed and elicited play with conventional toys such as cars and dolls, and “junk” objects such as boxes, bricks, and fabric strips in relatively able children with autism, compared to children with learning disability and young typically developing children. All the groups were comparable in expressive language ability. In the elicited play sessions children were asked to show what the toys presented to them could do (“What can these do? Show me what you can do with these”). In the spontaneous play sessions, children were invited to play with the toys while the experimenter “did some writing”. Children with autism showed significantly less functional play and very little symbolic play than the controls in the spontaneous play. However, they produced as much functional play and as much symbolic play as the control groups in the elicited play. The results suggested that children with autism are not impaired in pretend play either in terms of duration or of quality of symbolic play. Children with autism can perform symbolic play but do not do so spontaneously. They concluded that the lack of spontaneous symbolic play in children with autism may be due to conative abnormalities such as motivational factors rather than a cognitive dysfunction such as symbolic deficit.

However, Baron Cohen (1990) criticized that the experimental conditions of Lewis and Boucher’s study (Lewis & Boucher, 1988) do not require children to generate symbols for themselves because the child was handed the car and a box by experimenter. These relatively bright children with autism might simply guess that since the car is a car, the box must be a represent the garage, and there-

fore put the car into the box. Baron Cohen regarded Lewis and Boucher's study as a good evidence of the ability to follow instructions and make sensible guesses in children with autism. Boucher and Lewis (1990) answered Baron Cohen's criticism by noting that all subjects with autism showed a range of imaginative and diverse symbolic play in the elicited conditions. Boucher and Lewis (1990) argued that it reflects true creative symbolic play rather than guessing in the large majority of instances.

Furthermore, Lewis and Boucher (1995) investigated the ability to generate for play with a car and a doll in children with autism compared to children with learning difficulties and typically developing children. They were asked to generate 12 different actions and follow 12 instructions with the car and the doll. The children with autism showed an impairment to generate original actions with the car. However, the children with autism, unexpectedly, showed more ability to generate play with the doll than with the car. Similar amounts of symbolic play were seen in all three groups. It was concluded that children with autism may be impaired in spontaneous play, but not in generating ideas for play relative to controls.

As a result, the absence or presence of symbolic or pretend play in children with autism has not been clearly established yet. No study has provided a complete answer to the question. For example, while most children with autism in the study by Wing, Gould, Yeates, and Brierley (1977) failed to demonstrate symbolic play, two children with autism showed it. As such it appears that symbolic play may be within the repertoire of some children with autism. Nevertheless it appears that there may be limits to the extent to which intervention can influence symbolic play in children with autism. Even though symbolic play of children with autism was improved, it still did not reach the level of that of control groups in the modelling test trials in the study by Riguet et al. (1981). Charman and Baron Cohen (1997) found that children with autism are able to produce pretend play under prompted conditions. There were no differences between children with autism and children with intellectual disability in their study about the production of functional and two object substitutions trials for pretend play when prompted. In addition, fewer subjects with autism showed novel, unprompted pretend play acts. No clear conclusion was made in this study by Charman and Baron Cohen.

On the other hand, symbolic play behaviour in children with autism has been examined in relation to their language skill. In general, play is viewed as an effective tool for developing language and communicative competence in typically developing children, while at the same time, language is viewed as necessary and integral to facilitating their play. Language as a cognitive symbol, therefore, could be a clear clue for symbolic play in not only typically developing children but also children with autism. Wetherby, Prizant, and Schuler (2000) pointed out

that the limited verbal (e.g., fewer vocalizations to express intentions) and non-verbal communication (e.g., pulling or manipulating another's hand to communicate, lack of conventional gesture) in children with autism may be understood as a representation of their difficulty in using symbols in play contexts.

However, it is not simple to find a developmental relationship between symbolic play and language in children with autism. According to Lewis (2003), the intuitive association between play (the first evidence of development) and language (the next evidence) are clear in the development of typically developing children. However, this association does not seem to be established in the development of children with autism. Indeed, regardless of impaired language ability and inferior play skill, the association between language and play in children with autism has not yet been clarified.

In one early study (Wing et al., 1977), a group of children who showed stereotyped behaviour, no symbolic play, and autistic features had a language comprehension age of less 20 months. Another group of children who took part in symbolic play showed a language comprehension age of above 19 months. However, approximately 10% of the sample did not show symbolic play, even though their language comprehension age was 20 months or more. Themed symbolic play did not seem to occur in the sample with nonverbal children. The result suggested that language comprehension age may have more effect on symbolic play of children with autism. Some children may not develop symbolic play beyond their language skill despite ample opportunity. However, in another study (Ungerer & Sigman, 1981), it was reported that the incidence of symbolic play was positively correlated with language comprehension level in 16 children with autism with a mean mental age of 24.8 months. Children with autism who show high language comprehension engaged in more functional and symbolic play and longer sequential play acts than ones with low language comprehension.

In a more recent study (Amato, Jr., Barrow, & Domingo, 1999), it was found that verbal groups of children with autism demonstrated a higher-order level of symbolic play than a nonverbal group of children with autism. While verbal subjects engaged in more elaborated symbolic play involving more relevant action sequences (e.g., combing the doll's hair, putting a cup around the doll's mouth as if feeding), nonverbal subjects engaged in mouthing the objects or showed no interest in the objects. It was suggested that children with autism should not be considered as a homogeneous group in regard to language ability and symbolic play skill.

The uncertainty of symbolic play in children with autism is at least partly due to methodological issues. Baron Cohen (1987) argued that this is an artifact of the constraints associated with particular definitions of symbolic play which are not sufficiently broad to capture the symbolic play of children with autism. A major contributor to this uncertainty about what constitutes symbolic or pretend play

in research involving children with autism has been identified by Baron Cohen (1987) as the inadequate operational definition of *pretence*. Baron Cohen (1987) demonstrated that using a rigorous coding scheme and judging procedures using both qualitative and quantitative measures resulted in fewer children with autism being identified as engaging in “spontaneous” pretend play compared to comparison groups with intellectual disability or typically developing children. It was also reported that children were able to perform using objects for their intended purpose that is reality or functional play. For example, some children with autism said, “Are these potatoes? I don’t know. They might be peas [pointing to the sponge]”, or “Don’t touch it. It’s hot [referring to the toy cooker]”. This is called a second-order representation, and it is claimed that the combination of both verbal expression and physical action represent symbolic representation of a concept. However, if the children with autism did not show any evidence of conceptual understanding to match these utterances, then the pretend play might indicate first-order representation where these utterances of children with autism were judged as a form of word-association or echolalia, and not a symbol for pretence. Indeed, different and frequently unclear operational definitions for symbolic or pretend play have been commonly used in many studies for autism (e.g., Jarrold, Boucher, & Smith, 1996; Sherratt, 2002; Williams et al., 2001; Wing et al., 1977).

A range of hypotheses have been suggested to explain the low incidence of spontaneous symbolic play in children with autism. One hypothesis is cognitive impairment of the ability of children with autism to process meta-representations. Alternatively, Baron Cohen (1987) suggested that multiple processing systems are involved in children’s play, and the conceptual distinction of different levels of representation between functional play and symbolic play. A deficit in the processing of symbols by children with autism may contribute to their lack of a theory of mind (Baron Cohen, Flusberg, & Cohen, 1994; Leslie & Roth, 1993). Further models include the hypothesis that difficulty of symbolic play in children with autism is a hypothesized side effect resulting from a motivational deficit (Lewis & Boucher, 1988) and not a cognitive deficit as such, or as a consequence of central executive impairment (Jarrold, 1997). As yet there is no clear evidence which, if any, hypothesis is right. Indeed, all might contain an element of truth, given that children with autism form a biologically and behaviourally heterogeneous group (Courchesne, Courchesne, & Pierce, 1999).

Noting these complex issues involved in symbolic play for children with autism, such as its spontaneous production and association with language, the question arises as to ways to intervene to enhance play behaviour in children. Lifter, Azaroff, Anderson, and Cowdery (1993) suggested the notion that children with autism or autistic-like behaviours can learn and generalize pretend play activities in a developmentally appropriate level rather than an age appro-

priate level. In the child-as-agent play category, subjects could consistently learn the play activities and transfer their newly acquired skill to different toys. However, not all the subjects acquired the play activities in the doll as agent play category despite the greater number of teaching trials. In addition, the subjects showed less generalization in these age appropriate skills to other activities or toys. This study suggested that using the same toys across several different activities may enhance generalization of the play skills. Lifter et al. (1993) concluded that children with autism are more likely to acquire play behaviours quickly, spontaneously, and also to generalize to other stimuli and situations in developmentally appropriate activities than in age appropriate activities. This may be a key to teach cognitive play skills for children with autism on the acceptance of generalization deficits in children with autism; this was specifically discussed by Jarrold et al. (1996) in relation to pretend play in autism.

Apart from direct instruction of appropriate play skills (Jarrold, 1997; Lifter et al., 1993), some training strategies for symbolic play have made use of verbal and non-verbal prompts (Lewis & Boucher, 1988), modelling and prompts (Charman & Baron Cohen, 1997), modelling and imitation (Riguet et al., 1981), affective emotional expression and gesture (Wieder & Greenspan, 2003), positive over-correction strategy (Bierly & Billingsley, 1983) and Pivotal Response Training (PRT) consisting of naturalistic play interaction behaviours (Stahmer, 1995, 1999; Thorp, Stahmer, & Schreibman, 1995). All these strategies have been embedded in adult direct teaching and indirect peer tutoring approaches through training peers (Kok, Kong, & Opitz, 2002) in both structured or naturalistic play settings. It was recommended by Roeyers and van Berckelaer Onnes (1994) that children with autism need to be offered the opportunity to explore the different play levels and various play activities, especially playing with toys. Highly structured and predictable play training for children with autism also needs to be considered. Overall, these strategies appear to be effective in symbolic play interventions, and are often intended to increase language as well as social skills in children with autism.

#### **2.5.4 Games with rules and rule-governed play**

According to Piaget (1962), when regularity (rule) is added to symbolic play, it becomes games with rules. Piaget (1962) said, "Unlike symbols, rules necessarily imply social or inter-individual relationship" (p. 112), "Rules are a regulation imposed by the group, and their violation carries a sanction" (pp. 112–113), and "as symbolic games involving more than one character may give rise to rules, so games of make-believe may become games with rules" (p. 145). In children's games, rules are distinguished in two categories. One is handed down from one generation to the next with social reality. The other is spontaneous games with

rules that are based on temporary agreement among the group members. Rules consist of obligations and prohibitions as the outcome of socialization. As the child adapts himself or herself to the natural world by expanding his or her social circle, games with rules become to some extent constructional beyond symbolic make-believe assimilation (Piaget, 1962). Smilansky (1968) rated games with rules as the highest play development stage. Rubin, Maioni, and Hornung (1976) gave a short definition as the acceptance of pre-arranged rules and the adjustment to these rules.

The early form of rule-governed play may be nonlinguistic games such as peek-a-boo or patty cake initiated by parents. Given that these games are performed on a regular, repetitive, and predictable base, children begin to learn rules of language such as turn taking (Hetherington et al., 1999). As children grow older, they show more logical and socialized ways of thinking that make them play with peers in rule-governed games and formal games. Rule-governed play or games with rules appear by age five or six more for having fun rather than for winning or losing. Piaget believed that games with rules is an indicator of transition for the concrete operation period in children's cognitive development (Bee & Boyd, 2002).

Rule-governed play enables typically developing children to elaborate their understanding the roles of different players, and discover necessary rules that work well through organizing a game (Berk, 2001). Typically developing children also can develop self-awareness, objective self or the actor of various roles, through repetitive and ritualized interactions with other peer players in the games (Parker & Milbrath, 1994). Typically developing children learn better to deal with cooperation in a competitive exchange among peer players in order to continue the games (Hughes, 1991). They also learn more about the concepts of helping, sharing, being friendly and co-operating as well as a variety of social skills through participation in teacher-initiated co-operative games programs (Hill & Reed, 1990). Co-operative games are more associated with positive behaviours whereas competitive games are more associated with negative behaviours in typically developing children (Finlinson, Austin, & Pfister, 2000).

Given that social skills are a primary requirement for players to participate in games, it may be expected that, as reported by Bernabei, Camaioni, and Levi (1998), children with autism rarely participate in conventional social games. Nevertheless, it has been shown (Baker, Koegel, & Koegel, 1998; Baker, 2000) that social games can be designed for children with autism, making use of obsessive behaviours to produce strong performance in the games. This may be an example of combining "weak coherence skills" (superior focus on parts and details) in children with autism suggested by Happe (1999) and the character of games with rules.

In addition, rule-governed play contexts were used to teach deception skills



(Reinecke, Newman, Kurtz, Ryan, & Hemmes, 1997) and identify toy preference (Dewey, Lord, & Magill, 1988) in children with autism. In an object-hiding and guessing game play, students with autism were able to learn deceptive play skills through adult's modelling and frequency of winning (Reinecke et al., 1997). Along with high correlation between games and peer interaction, children with autism mostly chose structured games materials (e.g., dominoes), whereas typically developing children and children with behaviour disorders mostly preferred dramatic toys (e.g., doctor's kit) (Dewey et al., 1988). These two studies (Dewey et al., 1988; Reinecke et al., 1997) support the idea that children with autism learn to respond appropriately in a highly predictive and repetitive sequence of activities and environments as Ferrara and Hill (1980) suggested.

## 2.6 Discussion

Two distinct approaches have appeared in play intervention for children with autism—play-focused intervention (mainly using toys) has been used to teach play skills and play-based intervention has been used to teach other skills such as social skills, language and communication, and motor skills (Sigafos, 1999). In these play interventions, there are no standard operational definitions of play or type of play, although they are usually based on Piaget and Smilansky's cognitive play categories (Boucher & Wolfberg, 2003). Different studies frequently make use of different definitions, and sometimes the same behaviour is defined as belonging in different play categories; this makes comparison or generalization of results problematic.

Moreover, systematic problems in Piaget's cognitive play definitions and categories do not seem to be considered when such operational play definitions for children with autism are established. Problems with Piaget's play categories have been reported by Smith, Takhvar, Gore, and Vollstedt (1985) and Takhvar and Smith (1990). One problem is the notion of sequential hierarchy in the play categories. In fact, Piaget (1962) said, "Just as symbolic games frequently contain sensory-motor elements, so games with rules may have the same content as the earlier games: e.g., marbles is sensory-motor practice, and charades make use of symbolic imagination. But a new element is added, rules, which are as different from symbols as symbols are from mere practice, and which result from collective organization of ludic (sic) activities" (p. 113). This implies that children's play behaviour appear with overlaps, particularly during developmentally transitional periods. It would be very difficult to distinguish each play category when the child freely and often shifts from one play category to the others.

Indeed, the primary concern of Piaget's categories was to distinguish object-play following children's cognitive development, and as a consequence, playfulness and other forms of play such as "rough-and-tumble" play and language play

have deliberately not been placed in the categories (Smith et al., 1985; Takhvar & Smith, 1990). Takhvar and Smith (1990) contended that “this lack of inclusiveness of the scheme is not a problem if it is just used as one way of categorizing play with objects, but it is a problem if, as is often the case, it is used as an all-embracing scheme of categorizing play, or playful behaviour.” In addition, “hierarchical schemes may be successful only when applied to quite limited play domains” (Takhvar & Smith, 1990).

Another problem one encounters in studies of children’s play behaviours is the difficulty of practical measurement using intervals as children’s play behaviours change continuously. For example, block play among children may start as functional (rolling blocks together), become constructive (stacking up the blocks in a tower), then changed to dramatic (pushing the blocks over and saying “you’re dead”). If the changes in the play behaviours do not match the interval boundaries (and, in general, they will not), the coding of the flow of play behaviours may not be correct (Smith et al., 1985; Takhvar & Smith, 1990). However, the problems with interval coding are frequently disregarded, and interval coding appears to have been the mostly used coding method in play intervention research for children with autism.

Two suggestions for solving the measurement problem of children’s play behaviours have been made by Smith et al. (1985) and Takhvar and Smith (1990). Firstly, to ask the child directly what he or she is doing—it may be conceivable to ask this of typically developing children who are able to understand the question and answer appropriately. Thus, it may be possible to reduce errors resulting from discrepancies between the coder’s judgment and the child’s real action. However this is often not possible for many cases of children with autism and very young children such as infants and toddlers. Secondly, one can infer information from the child’s behaviours—essentially a “just do it as accurately as you can with the given play categories” approach. This may well be the standard coding practice in most research examining the play behaviour of children with autism. A more thorough solution is to develop methods directly based on what can actually be observed (Choi, Nieminen, Bahr, & Bahr, 2002). This is explored in detail in appendix A.

Whether play is treated as a single category or a class of behaviours, it is clear that there are different types of play behaviours in children with autism. Developing better definitions of play and types of play that can be applied in naturalistic settings and establishing measurement systems to make valid judgments may be a fundamental task for future research on issues of play behaviours in children with autism. Having a lack of theory based play categories for children with autism in naturalistic settings, a more easily applied theoretical foundation is needed so that empirical research can proceed on the basis of theories, rather than ad hoc definitions. Hetherington et al. (1999) pointed out the benefits of us-

ing theories, noting that theories are useful for two reasons: They integrate and give meaning to a wide array of information, and they lead to new research by stimulating hunches and providing direction into new areas of exploration.



# Chapter 3

## Socialization, play, and children with autism

Communication falls into the same category as food, drink and shelter—it is essential for life. Without communication life becomes worthless.

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Anne McDonald, 1992 (Crossley, 1994, p. 8)

### 3.1 Introduction

Two major perspectives on children's development emerged early in the twentieth century: Piaget's genetic epistemology and Vygotsky's socio-cultural theory (Vygotsky, 1962). The theories of these two contemporaries (Piaget 1896–1980 and Vygotsky 1896–1934) were formulated as general theories, applicable to all children. Thus, they should also be applicable to children with developmental disabilities such as autism and other developmental disabilities. These theories, however, were developed from different approaches to social interaction in child development. Therefore, the wider applicability of these theories needs to be critically examined; naïve application would be fraught with peril. Focussing on the importance of social interaction for children with disabilities in Vygotsky's work, it is found that the Vygotskian's scaffolding approach provides a new view about social interaction and play for cognitive development in children with autism

In this chapter, social disability in children with autism will be reviewed in relation to social interaction with typically developing peers. The inadequacy of Parten's categories of peer play types for the measurement of social interaction is noted, along with the lack of standard criteria for the classification of social interaction of children with autism.

### 3.2 Theoretical perspectives on the social development of children

These theories developed by Piaget and Vygotsky (1962) are sometimes described as conflicting theories in competition against each other. However, this is not supported by the content of the theories themselves—the theories are more properly regarded as complementary. The idea of opposition appears to result from two main causes. Firstly, Piaget's work was overinterpreted as only focusing on individuals and biological causes (De Lisi & Golbeck, 1999). In fact, Piaget did not neglect the universality and role of social interaction in individual development (Piaget & Maschler, 1970; Piaget, 1973, 1997).

Piaget accepted social interaction as fundamental and as a non-specific factor in the development of cognitive structures—the importance of social interaction was acknowledged, but it was not considered to be an *independent* factor amenable to study by reductionism (Shulman, 1985). Piaget (1973, pp. 27–30) proposed that social transmission of knowledge to the child (education in a broad sense) was neither a determining factor nor a sufficient causal factor by itself for intellectual development because it depended on what others try to teach the child (Thomas, 1996, p. 240).

A second reason for the impression that Piaget's and Vygotsky's theories are conflicting may be an overgeneralization of the central difference between Piaget's and Vygotsky's perspectives toward learning. It was pointed out that the central difference between them was the child's position in the learning process. While the learning process is driven by an individual child in Piaget's view (see chapter 2), the learning process is an integration of the child, experts (adults and peers), and symbolic psychological tools (e.g., signs, symbols, texts, formulae, graphic-symbolic devices) provided by a given society in Vygotsky's view (Kozulin, 1998).

Therefore, from Piaget's perspective, the emphasis is on child's role as an active learner interacting with the physical and social environment in his or her learning process. Piaget's search for genetic developmental processes and structure in the child's mental development may well be necessary for complete understanding. From Vygotsky's perspective, the role of society is emphasised in the "integrative learning circle" where the child is viewed as a *part* of the learning process. Vygotsky's search for the effect of society on the child's mental development may well also be necessary for complete understanding.

The central difference in their theories may have resulted from different focuses to establish their perspectives on child development. While Piaget focused on age-related cognitive development in the individual (Piaget, 1973), Vygotsky (1962) focused on the structural differences in people's thinking based on cultural variations. In this sense, Vygotsky's sociocultural theory, which languished for

decades under Stalinist suppression until it became generally available, provided a new view in which learning and development in children is influenced and facilitated by social and cultural interactions. It freed developmental theory from the “Piagetian straightjacket” which gave insufficient attention to external factors such as social-emotional and cultural contexts of cognitive development (Suizzo, 2000). The differences between these two theories may well in large part be due to the social and cultural differences of their originators, with a close association with defining intelligence on the one hand (Piaget), emphasising intrinsic ability, and Marxism on the other, emphasising environmental influences (Vygotsky).

In fact, Piaget’s theory—an inborn natural cognitive function for attention, perception, and memory (elementary mental functions) in children—was the foundation for Vygotsky’s theory. Vygotsky emphasized that the elementary mental functions are transformed by interaction with society and culture into more complex and higher-order cognitive functions (higher mental functions) such as voluntary attention, and logical abstract thinking. Also, different types of mediators such as language and other symbolic systems develop through their interaction. These mediators function for children’s better cognitive skills. In Vygotsky’s sociocultural theory, children’s learning can be influenced and facilitated by social and cultural influences (Hetherington et al., 1999, pp. 350–354, 362–363). As a result, it may be reasonable to consider that these two theories are comparable, and more complementary (Shayer, 2003) than competitive.

### 3.3 Social interaction and cognitive development

Certainly, somewhat different beliefs about child development were expressed by Piaget and Vygotsky. Solso (2001, p. 391) summarised it as “For Piaget, development precedes learning, for Vygotsky, learning precedes development”. Starting from their different beliefs, their speculations regarding the role of social interaction in cognitive development proceeded in different directions. According to Kozulin (1998, p. 40), learning occurs “in an unassisted interaction between the child’s mental schemas and the objects of the external world” for Piaget whereas “it occurs in the collaboration between children and the adults who introduce symbolic tools-mediators to children” for Vygotsky.

In Piaget’s theory (Piaget, 1959), cognitive development of the child can be achieved by reconciling different views (conflict) for equilibrium in his or her understanding. Social interaction provides more opportunities to do so. In this sense, Piaget emphasised cooperation between children who are of equal or similar status as a significant factor for cognitive development (Piaget, 1959; Rogoff, 1990).

According to Piaget (1959), a symmetrical relationship (child–child relationship) enables the children to understand each other’s view and reconsider their

ideas. Through discussion involving reciprocal exchange of alternative ideas (social), each child develops his or her cognition (individual). However, relationships with adults are essentially unequal for the child (asymmetrical relationship) due to the authority and superiority of adults. Therefore, cognitive conflict for restructuring is not likely to occur through discussion with adults (Piaget, 1959; Rogoff, 1990).

Piaget emphasized the positive function of peer interaction to revise the child's cognitive system in relation to peer influence on reasoning about social justice and fairness. Piaget's notion was that peer interaction and collaboration could enhance children's socio-moral reasoning through debate and discussion to justify their moral positions. In addition, Piaget's theoretical work on logical and spatial thinking was profoundly applied in mathematics and science education in relation to peer influences. According to some of the Piagetians, it was evidenced that the cognition of children could be more effectively promoted through contradiction and the resolution of contradiction provided by peer interaction than by independent and individual work (De Lisi & Golbeck, 1999).

For Piaget (1995), the young child is intellectually egocentric and therefore cannot have much intellectual operation through social interaction before middle childhood (about 7 to 12 years) when he or she is able to coordinate various points of view and collaborate with others. "In every case, there is a gradual transition from egocentric non-coordination to gradual collaboration, generally with relatively more rapid modification between 6 and half and 8 years" (p. 307). According to Piaget (1995), lessons from adults contribute to the abandonment of the young children's ideas because young children's ideas are not explicitly formulated and cannot compete with the views of adults. "The child continues to make assertions without proof: he just substitutes adult authority as the ultimate criterion of truth for his own decision and does not see the need to verify it" (p. 204). "(t)he intelligent teacher knows when to step down as a superior and to become an equal, when to engage in discussion and to require proof rather than merely to make assertions and to compel morally, that the traditional school has rendered its services" (p. 204). Therefore, discussions with adults and peers as equals can be possible when they have their internal freedom in adolescence (Piaget, 1995).

Although Piaget noted the importance of social interaction with peers, his work on the influence of social interaction on child development was mainly limited to interactions between children of equal status and comparable age. This was based on his assumptions about the importance of freedom from overwhelming authority, and the importance of existing equal internal intellect. However, these assumptions exclude various types of important social interaction, for example, child-adult relationships. Rogoff (1990) noted that Piaget overlooked adults who deliberately adopt non-authoritarian postures in order to have more



equal interaction in play or formal lessons. This issue of equality and teachers' roles can be variously presented in terms of directing versus facilitating in different educational tasks, in different time periods, and in different societies. Particularly with respect to the content of this thesis, we must also realise that Piaget's assumptions are too narrow to cover peer interaction in children with severe disabilities.

In contrast with Piaget's view, Vygotsky considered that the child's development cannot be established without social interaction. Children's development cannot occur in isolation, but within a set of social matrices. These social matrices consist of two key elements. One is the social interaction with other people in society. Children's cognition is developed by interaction with experts or more skilled partners such as parents, teachers, and older peers through solving problems together, or with the partner's assistance (Nicolopoulou, 1999). The other is the cultural heritage of the society in the form of collectively elaborated conceptual and symbolic systems because the resources in culture contain not only specific information but also organizing cognitive structures. In turn, children acquire information for cognitive tools, skills, and interpersonal relations (intrapyschological development) through direct interaction and communication with capable peers and adults who pass on the cultural heritage (inter-psychological development) (Nicolopoulou, 1999).

The notion of "Zone of Proximal Development" (ZPD) was proposed in Vygotsky's theory as the region between a child's current developmental level for independent problem solving and their potential developmental level for solving problems with adult guidance or by collaborating with more capable peers. Especially in relation to social interaction with others, ideal partners are not equal in terms of skills and understanding. More skilled partners are required to facilitate cognitive growth of the child because the skilled partner can facilitate the child's ZPD (Tudge & Rogoff, 1999). Using this notion, parents and teachers are assigned the role of transmitting accumulated cultural resources including linguistic and other symbolic systems, cognitive frameworks, and concrete knowledge for children's development by their societies. This role is carried out through social interaction in instruction or other joint activities (Nicolopoulou, 1999). One form of instructional process inspired by Vygotskian thinking is termed "scaffolding"; the amount and type of support systems for a child's development building on the child's knowledge and experiences (Hetherington et al., 1999, p. 352).

Vygotsky's main theme of cognitive development through social interaction may be explained as "shared problem solving" in the apprenticeship model. In the apprenticeship system, a novice child's learning proceeds by participating in culturally organized activity with a more skilled partner. Simultaneously, the more skilled partner develops his or her cognitive skills and understanding by guiding the novice in the activity (Rogoff, 1990). The social environment is a nec-

essary scaffold for the child to advance his or her learning in Vygotsky's theory because the child's development depends on interaction with people and the cultural tools (Berk & Winsler, 1999). Therefore, children of suitable age and ability so as to be able to act as expert peer, rather than adults or equal-age or equal-ability children, are the ideal intervention agents for this study. The peers need to have sufficiently developed social and cognitive skills in order to be "experts" relative to the children with autism, but must also be young enough so that they can engage in sufficiently symmetric interaction with the children with autism.

Indeed, a new understanding of social interaction for children with disabilities results from Vygotsky's insistence that segregated special schools must be integrated with the general education system to achieve social goals such as productive labour and self-sufficiency (Vygotsky, 1987). Vygotsky's application of abnormal psychology to children with disabilities focuses on how the disability changes the child's participation in the activities of his or her culture, for example, the outcome of social interaction. Interference with the opportunities to experience positive interaction with adults and peers causes secondary problems in social activities for the cultural development of children with disabilities. In turn, limited, or lack of, development in higher mental functions such as self-regulation is a result of isolation or lack of full participation in social activities. In Vygotsky's view, the social difficulties cause more serious problems than the original difficulty, thus social interaction with adults and peers in the regular activities of the primary culture is most important for educating children with disabilities (Berk & Winsler, 1999).

The significance and necessity of social interaction for the development of children with disabilities was supported in a review study (Rogers, 1988). Although children with disabilities showed the same basic developmental sequences with exploratory and symbolic play as typically developing children did, children with disabilities showed qualitative differences in play. For example, children with autism or severe visual impairment showed significant abnormalities or delay in sensorimotor play and development in relation to motor and gestural imitation, as well as symbolic play. These cognitive difficulties in play behaviours in children with disabilities might be made worse by insufficient environmental stimulations such as lack of close relationships, and lack of appropriate language and social models. Children with more severe disabilities are even more strongly affected (Rogers, 1988).

### **3.4 Play and social learning**

In Vygotsky's views on the effect of social interaction on cognitive development, play is a social activity, even in solitary play, because the individual child expresses his or her understanding of and appropriation of the sociocultural mate-

rials of his or her society through play themes or episodes. Especially in relation to ZPD, play is emphasised as an essential social activity that significantly contributes to children's cognitive development rather than simply a reflection of it as in Piaget's theory. Play is the source for ZPD in children by creating an imaginative opportunity to achieve their own desires with self-chosen rules, formulate real-life plans and volitional motives. Play serves as a mediating process by intimating fusion between word (meaning) and perception, word and object, and word and action. Play also fosters abstract thinking and internalized thought by separating meaning from objects and actions. Therefore, from Vygotsky's perspective, the benefits of play are examined by finding correlations with the development of cognitive abilities such as creativity, problem solving, and language acquisition. It occurs through interaction with caretakers and peers within a shared cultural framework (Nicolopoulou, 1999).

Vygotsky particularly stressed play in imaginary situations, such as make-believe play or socio-dramatic play, as a social context and on-going learning activity on the basis of reality for children to learn social rules in cognitive development (Vygotsky, 1978). This was clearly stated by Vygotsky (1967):

“(p)lay is not the predominant form of activity, but is, in a certain sense, the leading source of development in preschool years” (Vygotsky, 1967, p. 6).

“(h)ow does play moves? It is a remarkable fact that the child starts with an imaginary situation when initially this imaginary situation is so very close to the real one. A reproduction of the real situation takes place.” (Vygotsky, 1967, p. 16).

In Vygotsky's view, play benefits the development of intellectual and social skills and language ability. First, children can “try out” many challenging activities and acquire many new competencies by performing representational activities in make-believe play. For example, typically developing preschoolers showed longer interactions, more involvement, and more cooperation when they were engaged in socio-dramatic play than in social non-pretend activities such as drawing or putting puzzles together. Also, the teacher assessed children engaging more in socio-dramatic play as displaying more social competence. This result implied that children engaged more in socio-dramatic play might have more opportunities for advanced intellectual development (Berk, 2001).

Secondly, social fantasy play may be more predictive of peer-oriented social skills and maturity of affective role taking than non-fantasy play. For example, it was reported that typically developing preschoolers who frequently engaged in social fantasy play were rated as more popular playmates and more socially skilled among their peers by teachers (Connolly & Doyle, 1984). Fantasy and

socio-dramatic play provide more cooperative activities with peers, language and intellectual growth, and resolution of emotional fears and conflicts (Smith, 1983). These results suggest that when typically developing children engage in play activities, they learn social skills such as turn-taking, cooperation, helping, sharing, and social problems solving in socially acceptable ways. In learning these social skills, they also can acquire conceptions of friendship, social morale judgements, and an understanding of others' points of view (Johnson, Christie, & Yawkey, 1999; Saracho, 1998).

Finally, play is an effective tool in developing communicative competence in young typically developing children, stimulating language innovation, introducing and clarifying new words and concepts, motivating language use and practice, developing meta-linguistic awareness, and encouraging verbal thinking (Levy, 1984). It was reported that typically developing children use words in imaginative play in various ways: firstly, to change personal identity ("I'm the driver"), secondly, to substitute for action ("drive, drive, drive"), thirdly, to change the nature of objects ("Here's my ticket"), and finally, to describe situations ("We're going down the road"). Language is also used in planning, developing, and maintaining play ("I'm going to stop, and you can get on"). The verbal communication in play enables children to learn new words and concepts from the vocabularies and experiences of the other participants ("You're the passenger") (Smilansky, 1968). It was found that those who are good players are significantly more verbal and show more task related speech in imaginative play, even if they are socio-economically disadvantaged children (Jurkovic, 1978).

In particular, typically developing children could rapidly master language in playful activities. The first use of the most complicated grammatical and pragmatic forms of speech were often shown in play situations (Bruner, 1983). It was found that children who show slow language development are less mature in development of play patterns than younger, language competent, children. Children who demonstrated slow language development interacted with only one child in their social play. If the one child was absent, or occupied, the children with slow language development seldom became involved with other children or activities. Children with slow language development, as a result, missed more play opportunities than other children (Sherrod, Siewert, & Cavallaro, 1984).

### **3.5 Language and social interaction**

In play, typically developing preschoolers show frequent and loud apparently self-directed talking, while with others as well as alone. Piaget (1959) named these utterances "egocentric speech". It should be noted that Piaget believed that language reflects thought, but does not affect thought; thought determines language. Based on observation of the language of two typically developing boys

aged six, Piaget (1959) suggested the existence of three types of egocentric speech: repetition, monologue, and collective monologue. In these three forms of egocentric speech, no individual is addressed, and no reaction is expected:

- Repetition (echolalia): a child repeats words and syllables for the pleasure of talking, with no intention of talking to anyone, not even thinking that his or her speech will make sense.
- Monologue: a child talks loudly to himself or herself, apparently thinking aloud.
- Collective monologue: a child talks aloud to himself or herself in front of someone else, but the point of view of the other person is never taken into account. The other person's presence serves only as a stimulus, so the child never listens to the other's talking (Gleason, 2001, p. 271)

Piaget's egocentric speech has been interpreted as selfish speech because it is not addressed or adapted to a listener. Egocentric speech is carried on with apparent satisfaction in the absence of any signs of understanding by a listener. The child talks for his or her self without consideration for others. As the child grows older, there is accompanying intellectual growth—by age seven or eight, he or she can see other's different viewpoints, often through disagreements with peers. As a result, egocentric speech declines and diminishes at the end of the preoperational period in Piaget's theory (Berk, 2001; Hetherington et al., 1999), although the playful manipulation of sounds in the manner of imitation, repetition, and transformation continues throughout early childhood (Piaget, 1962).

In fact, Piaget (1959) found that about half of the spontaneous language of two boys he observed was egocentric speech. Again, Piaget found just less than half of 20 other boys and girls aged between four and seven showed egocentric speech in another observation (Gleason, 2001). Another study found that 33.5 percent of the total language of five-year-old typically developing children during play is egocentric speech. It was suggested that play may encourage egocentric speech, which becomes inner speech or thought (Teece, 1976).

However, Piaget's view on nonsocial and non-useful cognitive function of egocentric language was disputed by Vygotsky (1987). In Vygotsky's view, thought is independent from speech, and speech is the actual expression of thinking. Speech is regarded as an aid for regulating cognitive plans as well as a communication tool. Therefore, talking-to-self has been viewed as a form of self-direction or self-instruction (self-regulation) to solve problems or formulate plans. As the child gets older (by school age), talking-to-self is internalized as silent, inner speech or thought, or "private speech" in Vygotsky's view. Private speech enables children to be more attentive, involved, and be able to better perform challenging activities (Berk, 2001; Hetherington et al., 1999).

A five level developmental hierarchy of private speech was identified by Kohlberg, Yaeger, and Hjertholm (1999):

**Level 1:** Pro-social self-stimulating language (word play and repetition for their own sake).

**Level 2:** Outward-directed private speech (remarks addressed to nonhuman objects, or describing own activities).

**Level 3:** Inward-directed or self-guiding private speech (questions answered by the self or self-guiding comments).

**Level 4:** External manifestations of inner speech (inaudible muttering).

**Level 5:** Silent inner speech or thought.

Supporting Vygotsky's view for the central role of private speech in verbal self-regulation of behaviour (Berk, 1999), a variety of functions of private speech have been suggested: understanding of the self as a speaking agent among other speakers (Fernyhough & Russell, 1997), self-motivation to complete challenging tasks, or work with less assistance from adults (Chiu & Alexander, 2000), planning (Levina, 1999), integrating verbal-motor coordination in puzzle-solving (Goodman, 1999), and formation of mental processes (Luria, 1999) in typically developing children, especially at preschool age. In addition, a strong age trend on the self-regulatory utterance (89%) in private speech has indicated that the amount of audible private speech was decreased with increasing age in typically developing preschoolers aged from four and a half to six years (Patrick & Abrahavanel, 2000).

However, the findings on private speech in typically developing children are not consistent (Krafft & Berk, 1998; Winsler, Carlton, & Barry, 2000). Winsler et al. (2000) pointed out that patterns of private speech vary in typically developing children, depending on differences in age and contexts. In this study (Winsler et al., 2000), four-year-old typically developing children showed more private speech in sustained and goal-directed activity than in rapidly changing and non-goal-directed activity. More selective use of private speech appeared in the four-year-old typically developing children than in three-year-old ones, although both age groups of children used more private speech in the self-selected activity classroom contexts than in large group and outside free play classroom contexts. Also, both groups of children showed private speech when they were alone the most, with the presence of peers the second most, and with the presence of a teacher the least. Another study (Krafft & Berk, 1998) reported that typically developing preschoolers demonstrated greater private speech when they engaged in non-teacher-directed open-ended associative play with peers. However, their private speech was reduced when a teacher was involved, and in closed-ended problem solving activities.

While talking-to-self behaviour in play contexts appears temporarily in the on-going developmental process for typically developing children, this talking-to-self behaviour often manifests as “atypical utterance” in children with autism. Two types of echolalia, with either exact copies or slightly changed forms of the original utterances appear in children with autism. These are immediate echolalia, which occurs very soon after the original utterance, and delayed echolalia that occurs later, perhaps hours, days, or even weeks since they heard the utterance (Gleason, 2001). Williams, Whiten, Suddendorf, and Perrett (2001) suggested that echolalia may be a stereotyped mimicking behaviour resulting from neurological dysfunction of the frontal cortex in children with autism. Malvy et al. (1999) argued that excessive occurrence of echolalia could be identified as an atypical verbal imitation, from deficient imitation of facial, gestural, vocal, and affective imitation in children with autism.

Although echolalia is viewed as an aspect of the language deficits in children with autism, it might also be used for social communicative purposes. It was suggested that functional usage of echolalia varied in terms of responsiveness, organizational devices, cognition, requesting, assertiveness (Rydell & Mirenda, 1994), attention seeking (Ross, 2002), and emotional anxieties in children with autism (Rhode, 1999). In this sense, echolalia was used as an educational tool in language instruction for some children with autism by incorporation into a receptive naming task (echoing the requested character name) by Leung and Wu (1997). Wetherby et al. (2000) suggested that proper contextual support and matching language input should be provided for children with autism to develop their language form beyond echolalia.

Despite these various functional usages of echolalia, its non-communicative usage (e.g., preoccupation with particular echoes) was also shown in children with autism (Wootton, 1999). Therefore, the communicative usage of echolalia is not convincing in the strict sense of communicating with others or reciprocal understanding of language (Carpenter & Tomasello, 2000).

### **3.6 Research perspective for socialization of children**

There is no dominant definition for socialization in child development, and different theoretical perspectives exist. However, socialization can be broadly defined as a sharing, thinking, and feeling process with others such as parents and peers in the acquisition of skills for the demands of the group life. Therefore, socialization is variously measured in terms of different types of interaction with others such as attachment (e.g., parent and infant), reciprocity (e.g., friends), hierarchy (e.g., power- or authority-based interaction), and social identity (e.g., gangs). Socialization is an internalized processes through a complex integration of biological, cognitive, and social-cultural factors. The biological factors include

innate perceptual sensitivities, various cognitive abilities such as interpretation, categorization, remembering, and so on, and a wide range of social-cultural factors, including other individual people and society as a whole, influence socialization processes (Bugental & Goodnow, 1998).

By biological influence involving genetics, socialization is conceptualized as shared sensitivities and reciprocal response patterns using selective channels such as eyes, ears, mouth, skin, etc. It is expressed in the form of social signals in interpersonal interaction such as, for example, facial expression, smiling, crying, or vocal signals from infants, and higher pitch along with shorter utterances from parents. The awareness of biological influence can be a fundamental basis from which it can be understood why some groups of children (e.g., typically developing children) can more easily participate in some socialization processes (e.g., learning spoken language) than other groups (e.g., children with hearing impairment) (Bugental & Goodnow, 1998).

The influence of the other two factors—cognitive and social-cultural factors—on socialization is much more complicated, and it is difficult to discriminate “purely innate cognitive” development “in the head” from “whole” development through involvement in lifelong activities in diverse social-cultural contexts. According to Bugental and Goodnow (1998), socialization processes are organized by cognitive operation within a child (cognitive factors) to interact with others (social-cultural factors). Therefore, it may be concluded that the socialization process of a child occurs through interaction between the child and others as an ongoing process within the cultural frame of the child.

### **3.7 Social interaction with peers**

Social interaction with others such as peers is important for child development (Hartup & Laursen, 1999). In particular, close friends play an important role in children’s development for social cognition and behaviour shaping, regardless of the variety of roles and characteristics of, and varying impact of, friends for children of different ages (Brendgen, Bowen, Rondeau, & Vitaro, 1999). Hartup and Stevens (1999) claimed that positive and supportive friendships contribute to the child’s ability to cope with developmental transitions and life stress in terms of the whole child’s emotional and behavioural adjustment in society.

Although there are individual differences, including gender differences, in young children’s interactions for making friendship (McElwain & Volling, 2002), it has been found that friends have more similarities in vocabulary scores, smooth communication, emotional understanding, “mindreading” abilities, and sharing behaviours, as well as fewer and more quickly resolved conflicts. Friends frequently create make-believe worlds together, and cooperate in boisterous games. It was concluded that friendship is likely to contribute to children’s development



of socialization, cognition, and language, even in early childhood (Dunn et al., 2002; Dunn & Cutting, 1999) and behavioural development in the continuum of social network based on mutual acceptance (Gest, Bermann, & Hartup, 2001), regardless of whether a child has a disability or not (Overton & Rausch, 2002).

Therefore, the importance of positive peer interaction for children's development is also applicable to relationships between children with developmental disabilities and typically developing peers. Such relationships can be expected to produce social benefits (Katz & Mirenda, 2002) such as positive outcomes in the area of social interaction, communication, behaviour outcomes.

### **3.8 Social disability in children with autism**

Since children with autism have been found to be deficient in relationships with other social beings (in marked contrast with their very high level of interest in their physical non-social environment), social deficit is an essential feature for the diagnosis of autism (Kanner, 1943). Social deficits in autism are described as difficulties in verbal behaviours and non-verbal behaviours in relation to social interactions, communication, and other related behaviours such as play (American Psychiatric Association, 2000). It includes lack of social reciprocity (e.g., lack of social smile, poor eye contact, and lack of attachment), disturbances of communication and language (e.g., language deviance, language delay, and difficulty with expressive language), stereotyped behaviours (e.g., rigid and repetitive play activities, and resistance to transition and change), sudden mood changes (e.g., bursts of laughing or crying without obvious reason), and so on (Sadock et al., 2003).

These "bizarre" verbal and non-verbal behaviours may cause difficulties for children with autism to have positive social interaction with other people such as typically developing peers. Volkmar, Klin, Schultz, Chawarska, and Jones (2003) claimed that social disability in children with autism interferes with their understanding about others, as well as with establishing and maintaining reciprocal interaction with others—social disability as a core feature affects disability in other areas such as communication behaviours.

In relation to a gross deficit and metaphorical expression in the development of language and communication skills in infantile autism (Kanner, 1946), the absence of, or limited, babbling, failure to use vocalizations for social engagement including vocal turn-taking and vocal imitation, and monotonic sound are commonly documented in the early history of children with autism (Prizant, 1996). Although there was no evidence that children with autism had a lack, or deprivation, of social stimulation or parenting than other children, children with autism had more difficulty in acquiring language than other children. Children with autism also showed difficulty in social conventional usage of language when

they engaged in verbal and nonverbal social communication with others. These atypical language and communication features of children with autism were correlated with difficulty in understanding other's communicative intentions, role-reversal imitation, and joint attention problem in children with autism (Carpenter & Tomasello, 2000).

Joint attention, as a precursor to communication with others, includes sharing enjoyment, interests, or achievement with others. A deficit in joint attention for the purpose of communication usage causes difficulties in drawing another's attention to an object or event for a child with autism (Jones & Carr, 2004). It was found that children with autism showed difficulties in gestural joint attention (e.g., showing or pointing to direct attention), commenting, and labelling in social communication with others. Meanwhile, requests (to get others to do something) and protests (to stop others from doing something) remained the predominant communicative method for children with autism. Again, these joint attention problems for social-communicative usage are closely linked with difficulties in play with peers in children with autism (Wetherby et al., 2000).

Two assumptions have been made about the social disability in children with autism: firstly, that there is a lack of social cognition and a lack of "theory of mind" (i.e., a lack of understanding that other people have their own plans, thoughts, and points of view (Baron Cohen, 1995)), and secondly, that there is dysfunction of executive function.

Through social cognition or social perception, human beings interpret, analyse, and remember information about themselves and others in different social contexts. Generally, typically developing children develop a variety of skills that seem to indicate their awareness of simple physical causality from early in their life and application of the understanding to the more social world (Pennington, 2000).

Unfortunately, children with autism have deficits in their social-cognition or social perception to understand the social world. This results in difficulty in social interaction and communication in children with autism. Therefore, children with autism are likely to have difficulties in establishing or maintaining interpersonal relationships with typically developing peers, and even more so with other children with autism since both parties will have social deficits (which suggests that segregation is particularly isolating, and that Piaget's notion of equal partners being best might not be very applicable to children with autism). This has been seen in many studies (Carpenter, Pennington, & Rogers, 2001; Charman et al., 2000; Escalona, Field, Nadel, & Lundy, 2002; Leekam, Lopez, & Moore, 2000; Receveur et al., 2005; Rieffe, Terwogt, & Stockmann, 2000; Ruffman, Garham, & Rideout, 2001). It was found that children with autism, from the infant period, displayed difficulties in using social gaze in joint attention tasks, producing emphatic response, imitating modelled action with objects, as well as

demonstrating no spontaneous pretend play (Charman et al., 2000). Children with autism have difficulties in understanding their own and others' emotions (Rieffe et al., 2000) and intentions (Carpenter et al., 2001), performing gaze behaviour toward social stimuli (Ruffman et al., 2001), joint attention (Leekam et al., 2000), and imitation (Escalona et al., 2002; Recheval et al., 2005).

It was also reported by Carpenter, Pennington, and Rogers (2002) that children with autism showed different development sequences or impaired forms with somewhat individual differences in social cognitive skills in joint attention, communicative gestures, following others' gaze direction and pointing, imitation, and production of referential language, compared to other children with developmental delays such as speech and language delays, fetal alcohol syndrome, and unspecified mental retardation or typically developing children. Travis and Sigman (1998) claimed that due to the deficit of social cognitive skills, children with autism might have more difficulties to establish and maintain social relationships with others. It might limit their quality of life more than, for example, Down's syndrome. We can note in passing that the lack of social cognition of autism has been called "mindblindness" in the theory of mind by Baron Cohen (1995, 2001).

However, the lack of social cognition in children with autism is not a sufficient and complete explanation. Mundy, Sigman, Ungerer, and Sherman (1987) reported that object play skills and nonverbal communication such as gesture and joint attention, and language abilities are not significantly correlated. It was suggested that individual differences in the communication skills of children with autism may be managed not only by cognitive factors but also by affective factors. There is another assumption that the primacy of social deficits in autism causes a failure to engage in emotional relations and delays the acquisition of symbolic play skills—this is the *social-affective hypothesis*. Hobson (1999) suggested that impairments of cognitive, language, and imaginative play skills in children with autism may be an extension of incapacities of personal relatedness in children with autism.

Secondly, along with the lack of theory of mind, social deficits in children with autism have been claimed to be problems related to executive functions such as planning goal-directed behaviour, inhibitory prepotent inappropriate responses to salient stimuli, attentional flexibility, and working memory that are regarded as linked to frontal lobe functioning. This was used to explain social communicative peculiarities in autism (Hughes, 2002, 2001). For example, although a striking similarity of everyday social lives of children with autism and children with Down syndrome has been noted, children with autism showed less frequent and less complex social behaviours, along with less self-initiation. It was argued that these social deficits in children with autism might be a result of problems of attention and executive function as secondary effects within the context of other

longer goal-directed behaviours (Ruble, 2001).

In another study (Pierce, Glad, & Schreibman, 1997), the effect of the number of social cues that reflect ability of social perception was investigated—how children with autism interpreted social situations on videotaped vignettes. Children with autism performed as well as comparison groups of both children with intellectual disabilities and typically developing children on both general attention questions and simple social perception questions with one social cue. However, children with autism demonstrated poorer performance when social perception questions were presented with multiple cues. That is, children with autism used insignificant cues such as leg movement and sitting on a chair to identify social behaviours. These results supported the notion that the impairment of social perception in children with autism may be related to their attention deficit.

### **3.9 Social interaction with typically developing peers in children with autism**

Issues of social benefits for children with autism seem to be fiercely controversial. This might be because children with autism, a developmental disability, are diagnosed as having primary impairment in socialization (Gillham, Carter, Volkmar, & Sparrow, 2000; Travis & Sigman, 2000). The social impairment in autism has been viewed as a symptom of neurobiological disorder (Akshoomoff, Pierce, & Courchesne, 2002) that results in heterogeneous levels of cognitive and behavioural functioning (Courchesne et al., 1999; Harrower, 1999; Harrower & Dunlap, 2001).

Therefore, a fundamental question about the need for and the possibility of peer relationships or friendships in children with autism arises. Other children with disabilities such as learning disability (Pavri, 2001) and intellectual disability (Hughes et al., 1999) have a lack of social interaction and support from typically developing peers, and similar suffering from loneliness and lack of friendship has been reported by high-functioning children with autism. For example, Bauminger and Kasari (2000) found that high-functioning children with autism demonstrated strong involvement in social relationships when interviewed. Although high-functioning children with autism perceived themselves having at least one friend, including a best friend, they still reported more intense and more frequent loneliness than typically developing children. It was suggested that their loneliness might be a result of a gap between actual and desired social status. The loneliness in high-functioning children with autism might need to be interpreted in association with the quality of friendship such as reciprocal friendship, non-reciprocal or unilateral friendship, and acquaintances as well as social-emotional deficits in autism.

Strong social desire in children with autism was also seen in another study by Smith, Lovaas, and Lovaas (2002). It was observed that high-functioning children with autism had more interactive play and communication, as well as less solitary and self-stimulation, when they interacted with typically developing peers rather than with other children with autism. Such interactive behaviour was maintained in high-functioning children with autism due to the frequent cues and responses delivered from typically developing peers, even though this study was conducted over a small number of sessions of only one hour. In contrast, the high-functioning children with autism had temporally negative effects such as imitating self-stimulatory behaviour when they were paired with other children with autism. From this result, it was concluded that typically developing peers might play a vital role in behaviour treatment for high-functioning children with autism.

Moreover, the loneliness and lack of friendship are likely to be on-going problems through the life of children with autism. As they get older, the lack of social interaction or inadequate mutual understanding with others seems to result in severe forms of unpleasant emotions such as alienation, frustration, depression, and pervasive fear or apprehension (Jones, Zahl, & Huws, 2001).

Despite such findings on social desire and loneliness in high-functioning children with autism, studies on types or levels of social participation of children with autism to interact or play with typically developing peers in natural settings are very limited. However, given that segregated settings or very limited integrated settings have been the dominant placing for children with autism, it is not surprising to find only little research on social interaction with typically developing peers of children with autism in natural settings (e.g., Brown & Whiten, 2000; Koegel, Koegel, Frea, & Fredeen, 2001).

Through observing a natural setting, Brown and Whiten (2000) reported that subjects with autism showed less interaction with peers, more manipulative and relational play, less symbolic play, and less understanding of mental states compared to controls, although there were no group differences in general motor play and functional play. Koegel et al. (2001) also found that children with autism in inclusion hardly ever or never initiated or responded to interact with typically developing peers and spent more time playing by themselves, compared to typically developing peers who interacted frequently with other children. Although children with autism showed a similar amount of social interaction with adults, and a comparable number of toy play activities, as did typically developing peers, children with autism showed a much shorter engagement time in the activities, about half of the duration, in contrast to typically developing peers who engaged in the activities for almost the entire session.

Considering that social interaction behaviours shown by children with autism are much fewer and of lower quality, it would be hard to consider that social skills

learning would occur for children with autism just by placing them in social play activities with others. In this sense, the issues about social interaction for children with disabilities can be thrown into designing intervention programs from the Vygotskian view that carefully designed social environments and scaffold activities maximize the potential of children with disabilities.

In other words, the scaffolding approach is rationalised in social interaction and play intervention for children with autism in order to promote their communication with others. Due to the negotiation of themes and variations in play with peers, children with and without autism may learn how to interact and relate to others and objects simultaneously, and find common ground where they can collaborate mutually. Also, the coordination of joint attention and social referencing is naturally provided to the players. Therefore, peer participation needs to be more encouraged in play interventions for children with autism from the view of the nature of children's play. In this sense, inclusive environments and interactions with more competent peers should be supported. Conclusively, peer play interventions with individually tailored support structures promote social and cognitive developments of children with autism (Schuler & Wolfberg, 2000).

### **3.10 Measuring social interaction of children with autism**

Despite the importance of social interaction with peers for child development, it is difficult to measure its long-term benefits—measurement of long-term benefit would require long-term observation of subjects and suitable controls for a significant fraction of their entire lives. Is there a suitable measure that is expected to be correlated with long-term benefit? The answer may be to quantitatively measure socialization instead, since socialization is the primary source of the benefits of social interaction, and it can be practically measured in a short- or medium-term study. In particular, quantitative measurement and analysis of the amount and type or level of social interaction can be used in order to compare the relative degree of success of different treatments in intervention studies. While the exact relationship between the level of social interaction and long-term benefit is quite unknown, the theoretical and observational basis for expecting a correlation is sound. Therefore, the measurement of social interaction provides a practical and useful estimate of possible long-term benefit.

Therefore, the social interaction and social skills displayed by the children with autism in this study must be classified as a second measure of success of peer intervention (the first measure being the cognitive level of play, using the widely accepted Piaget–Smilansky categories). However, there are no standard criteria to classify these social interaction and social skills of children with autism.

Verbal- and non-verbal behaviours in children with autism have been classified according to type and level of social interaction, with the particular categories used depending on the goals of the particular study. For example, the ad hoc definitions might include positive and negative behaviours, initiation and response, and specific items such as eye-contact, smiling, affective hugging, and so on (e.g., Bauminger, 2002). These are often combined with play interaction behaviours (e.g., Wolfberg & Schuler, 1993). Verbal (e.g., Kravits, Kamps, Kemmerer, & Potucek, 2002) and non-verbal (motor) interactions (e.g., Carpenter et al., 2002) are sometimes used specifically as cues for classifying these social interactions and skills. Occasionally, the categories include active and passive levels (e.g., Kohler, Anthony, Steighner, & Hoyson, 2001). However, there do not seem to be any widely used or accepted standard categories.

In general, it is difficult to classify ongoing social behaviours (the various and relative usage by interacting different partners in different contexts) into discrete categories and to achieve the maximum level of observer consistency. In particular, when children with autism show “bizarre” verbal- and motor- interaction behaviours resulting from their primary social disability, it becomes extremely difficult to not only classify their social behaviour into categories, but also to be consistent in the process of judging the behaviours. In the absence of *systematic criteria*, large overlapping ranges of interaction behaviours in different categories can result. Sometimes, only some types of social skills are selected as representative of social interaction in children with autism; as a result, the actual social interaction behaviours cannot be measured if they are not included in the selected group and these non-selected social interaction behaviours are overlooked.

One explanation for the lack of standard categories or criteria for the classification of social interaction behaviour might be the absence of satisfactory theoretical categories for social interaction. Socialization in child development does not appear to have been sufficiently clearly defined yet, and other influences are involved in the process. Although Vygotsky drew attention to the role of social interaction in child development, no sound and widely accepted formulation exists (perhaps because of Vygotsky’s early death). The contrast with cognitive categories, which were established by Piaget and further developed by Smilansky (see chapter 2), is strong. A more fundamental reason may be that while cognitive play falls into natural discrete categories, social interaction behaviours form a continuum, and divisions between different categories are arbitrary.

However, the six categories (unoccupied play, onlooker play, solitary play, parallel play, associative play, and cooperative play) established by Parten (1932) are widely used for the measurement of the social aspect of peer play in typically developing children (Farran & Son-Yarbrough, 2001; Fox, 1996; Johnson et al., 1999; Pugmire-Stoy, 1992; Saracho, 1993), and have even been used in some studies of children with developmental delay (e.g., Brophy & Zukowski, 1984) or

with autistic spectrum disorder (e.g., Yang, Wolfberg, Wu, & Hwu, 2003). Since Parten's categories can be considered to be a standard set of categories for the classification for peer play behaviour, some further consideration is appropriate.

Parten's categories can be usefully applied in research on the play behaviour of children with disabilities. For example, Brophy and Zukowski (1984) used Parten's categories for children with developmental delay including prematurity, social/familial background, and Down syndrome, assessing these children's free play behaviours in comparison with typically developing children in an integration setting. In terms of interaction among children, children with developmental delay engaged in more looking at or listening to and less talking to their peers or adults than did typically developing children. Children with developmental delay preferred interaction with adults rather than their peers. They were also involved in more solitary play or parallel play but showed no cooperative play. In contrast, typically developing children engaged in more associative play or cooperative play. It was concluded that the lack of cooperative play in children with developmental delay might be due to their deficiency in verbal ability.

In the study by Yang et al. (2003), two children with autistic spectrum disorder (ASD) showed predominant isolated and onlooker behaviours during baseline phase. After intervention (participating adult guided social play groups for both children with ASD and typically developing peers), social play with peers in children with ASD was dramatically improved towards parallel and common focus (consisting of associative and cooperative behaviours) play. It was reported that the improvement of social play coincided with improved cognitive symbolic play, suggesting an association between social reciprocity and cognitive growth, as expected from the Vygotskian view.

However, Parten's categories do not seem to be sufficient to classify *meaningful* types or levels of social *interaction* of children with or without disabilities. Using Parten's two play type divisions, unsocial play (unoccupied, solitary, and onlooker) was observed about 25 percent of the time, while social play (parallel, associative, and cooperative) occupied the remaining time (Farran & Son-Yarborough, 2001; Parten, 1932). However, it does not mean that the order of Parten's categories is developmentally sequential. Berk (2001, p. 254) claimed that all six types of social categories coexisted at preschool age. The unsocial play types were the most frequent play behaviours in typically developing children aged three to four years old, and appeared in one third of free play time in typically developing preschoolers.

Moreover, there may be other social-cultural factors to consider in social play with peers. It was reported that social play behaviour with peers was influenced by other elements such as cultural variations (Berk, 2001; Rubin, 1998) and social status (Farran & Son-Yarborough, 2001) in typically developing children, as well as access to play materials to promote social play between children with disabilities



and typically developing peers (Ivory & McCollum, 1999). It was noted by Barnes (1971) that typically developing children in the 1970s were not involved in as much associative and cooperative play as typically developing children did in the 1930s, and engaged more frequently in solitary play possibly due to the social influences of television and the greater abundance of toys in modern society.

In addition, in relation to all kinds of social play types, social cognition may be an important factor. A positive correlation between more social cognitive competent and higher levels of play (associative-constructive and cooperative-dramatic play) and between less cognitive and social competent and lower levels of play behaviours (solitary-functional and onlooker) in typically developing preschoolers was reported by Farmer Dougan and Kaszuba (1999). Therefore, there are many difficulties in classifying the verbal and non-verbal social interaction behaviours of children with autism using Parten's six categories. A more serious matter is the question of whether Parten's categories are even meaningful for low functioning children with autism who show extremely "subtle" social skills for a few seconds (e.g., hugging a peer for two seconds). Given that children with autism have primary deficits of socialization (McConnell, 2002), and, in particular, show more impaired social interaction with peers (Hauck, Fein, Waterhouse, & Feinstein, 1995) than with adults (Jackson et al., 2003) in naturalistic settings.

Furthermore, Parten's categories do not allow the measurement of social interaction occurring without play. Even in play-centred settings, this is a serious limitation; while social interaction during play sessions will usually be part of play activities, non-play social interaction can occur, and must be measured. If play is not the primary activity of the children whose behaviour is being measured, this limitation makes Parten's categories fundamentally useless. This has been recently noted by Anderson, Moore, Godfrey, and Fletcher-Flinn (2004) with some surprise, since the categories are in wide use.

Therefore, it is necessary to design new categories to classify social interaction and play with peers in children with autism to allow for the hesitant, vague, uncertain, and brief social behaviours that can be expected. Since this is intimately connected with the collection, processing, and analysis of data in the experimental part of this work, this taxonomy of social interaction forms the subject of section A.3 in the context of the experimental design and methodology.

### 3.11 Conclusion

In relation to the socialization process in child development, Vygotsky's perspective is generally applicable to social development and play in children with autism or other developmental disorders, compared to Piaget's biological perspective on in-born cognitive impairment (Morgan, 1986). From Vygotsky's per-

spective, children's play is vital as a medium for social interaction with peers (Hetherington et al., 1999).

However, some clarifications and amplifications are necessary for proper description of social interaction and play seen in children with autism—these behaviours are not adequately addressed by the usual expression of the theory which was formulated in the context of typically developing children. It is noted that this does not constitute a modification to the theory as such, but is a more detailed description of behaviours that are not considered to be important in typically developing children but are important in children with autism and other developmental disorders.

Therefore, there is a further practical aspect that should be considered—namely, that it is highly desirable for various researchers to use as uniform as possible a set of categories into which to classify observed social interaction behaviour. Identical, or at least similar, categories allow the results of different researchers to be directly compared. Such a situation would be a significant improvement over the current plethora of single-use *ad hoc* sets of categories. Although Parten's categories are in wide use, they are not adequately designed for both children with autism and typically developing children, and, indeed, do not provide a measurement of the degree of social interaction as such (see appendix A).

# Chapter 4

## Children with autism and typically developing peers

No Man is an *Iland*, intire of it selfe

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John Donne, 1624 (Donne, 1975, p. 87)

### 4.1 Introduction

Difficulty in social interaction has been recognised as a major diagnostic sign of autism; manifesting as interaction with typically developing peers being either negative or rare. Theories and hypotheses on this difficulty in interaction have focused on the social disability of children with autism (see section 3.8).

However, given that social interaction is a fundamentally reciprocal process, with the involvement of all parties to the interaction, a more symmetrical approach is appropriate, rather than the standard asymmetrical perspective considering all difficulties to lie with the children with autism. Since the characteristics and social abilities of both children with autism and typically developing peers contribute to the interaction, both can be expected to contribute to the positive and negative aspects. Therefore, the main factors that might contribute to negative social interaction between these two groups of children should be investigated not only in children with autism but also in typically developing children.

From this reciprocal view, preferences displayed by typically developing peers for interaction, and their various acceptances toward disabilities including autism are reviewed in this chapter. Most importantly, the necessity of peer training is suggested to promote positive social interaction with children with autism. Practical techniques that can be taught to typically developing peers to facilitate interaction, and suitable methods of instruction for imparting these techniques are examined. These include both simple and multiple interaction skills on the basis of modelling, initiating, and responding in various forms of peer-mediated

intervention for children with autism. Having acquired these interaction skills, trained peers will be better prepared to serve as behavioural and instructional agents for children with autism.

## 4.2 Interaction between children with autism and typically developing peers

A child can influence the social development of other children, either positively or negatively. Positive and supportive interaction with peers contributes to development in both children with and without disabilities, as discussed by Hartup (1999), Piaget (1959), and Vygotsky (1962). On the other hand, peers can negatively influence children by reinforcing inappropriate behaviour, for example by paying attention to aggressive disruptive behaviours in children with developmental disorders (Marcus, Vollmer, Swanson, Roane, & Ringdahl, 2001). Therefore, the sense of well-being, and quality of life, of students with disabilities at educational settings might be more dependent on supportive peer relationship in terms of inclusive education programs, rather than either integrated or segregated placement issues (Allodi, 2000).

In relation to teaching social interaction skills, peer groups have been regarded as a social context (Van Acker & Wehby, 2000) that could be used as instructional resources to support young children with disabilities (Kohler, Ezell, & Paluselli, 1999) and methodological heuristics for disability evaluation (Bell & Barnett, 1999). The importance of positive and supportive peers is likely to be emphasised by the increasing trend towards inclusion (the *inclusion movement*), because children with disabilities have more opportunities to be in contact with typically developing peers. Furthermore, the formation of a supportive peer network may be a preparation to increase employment (Ohtake & Chadsey, 1999) and member of advocacy groups (Ashman & Elkins, 2002) for adults with disabilities after schooling.

This inclusion movement has been reinforced by the assumption that proximity draws more frequent social contact (quantitative) and positive social interaction or friendship (qualitative) between these two groups of children (Nakken & Pijl, 2002). However, this “proximity assumption” is not likely to be sufficient to generate positive social interaction or closer friendship between these two groups of children in reality. For example, although children with autism have increased opportunities for social contact with typically developing peers through integration or inclusive programs, children with autism are still lonely (Bauminger & Kasari, 2000) and engage in solitary play (Koegel et al., 2001). That implies that *more frequent* social contact does *not automatically* produce *better reciprocal* social interaction between these two groups of children (Brown & Whiten, 2000; Koegel

et al., 2001).

The reason for the failure of social interaction between children with disabilities and typically developing children can be inferred from general social interaction in human relationships. Social interaction between human is relative, not absolute. Reciprocal exchanges are essentially required to maintain on-going interaction (Laursen & Graziano, 2002; Laursen & Hartup, 2002). Therefore, social interaction topics such as how and why interaction works between children with disabilities and typically developing peers need to be investigated in terms of mutual or reciprocal ways of human interaction (Gutstein & Sheely, 2001). It may be realized that factors which cause difficult or negative social interaction between these two groups of children result from both parties, not only from children with autism but also from typically developing peers. Therefore, acceptance levels and the general behavioural patterns towards children with disabilities in typically developing peers should be investigated. In particular, considering the report by Smith et al. (2002) on the vital role of typically developing peers in behaviour treatment for children with autism, investigation of the interaction characters in typically developing peers is warranted, and may be necessary to design effective and systematic social skills and friendship programs for children with autism. In addition, if the number of friends or playmates is used as a criterion to evaluate for successful inclusion in early childhood as Buysse, Goldman, and Skinner (2002) suggested, any possible exaggerating factors in social behaviours of typically developing peers towards children with autism should be considered when evaluating the success of such inclusion, and when investigating what factors contribute to any such success.

#### **4.2.1 Preference and acceptance in typically developing peers**

Social interaction between children with disabilities and typically developing peers does not seem to be straightforward even if they are in inclusive settings. For example, although Guralnick, Connor, Hammond, Gottman, and Kinnish (1996) reported that children with developmental delays and typically developing peers were more interactive with each other and showed higher level of social interaction composed of group play, positive social behaviours, active conversation, and parallel play in inclusive settings when compared to segregated settings, at the same time, a higher proportion of negative social interactions occurred. It was assumed that the higher proportion of negative social interaction would have resulted from the higher activity levels in the inclusive setting. However, it is not clearly stated what the higher activity levels in the inclusive setting in this study consisted of, and why higher activity should increase negative interaction between these two groups of children.

In the study by Guralnick et al. (1996), it was also noted that typically devel-

oping preschoolers certainly preferred to associate or play with other typically developing preschoolers who were at the same developmental level, rather than children with developmental and cognitive delays. The non-preference of typically developing peers towards children with disabilities was also seen in another study (Buysse, Nabors, Skinner, & Keyes, 1997) on the choice of playmates by preschoolers on a peer-rating task. Teachers reported that approximately half of dyad groups composed of one child with a disability and typically developing peer showed non-preference to play with each other. In dyads composed of two children with disabilities the lowest mutual playmate preferences were displayed, with children with disabilities appearing to prefer to play with typically developing peers instead. The reasons for selecting a particular peer as a playmate were associated with sharing activities whereas the rejection of playmates was associated with aggressive behaviours, although friendship at this age seemed to be easily changeable and recalled by a recent encounter, irrespective of ability status.

Initially, similarity that is perceived by typically developing peers to promote shared activities may be a critical factor influencing interaction preferences. This similarity preference possessed by typically developing peers was exhibited in a study (Clawson, 2002) showing that language difference caused an initial barrier for peer interaction among typically developing children in social play. Laursen and Hartup (2002) asserted that social exchange in children's interaction involved cognitive representation and behavioural manifestation based on a norm of equality and need.

Therefore, it is not surprising to find that typically developing children display little interest in, or show negative behaviours towards children with autism who have communication difficulties, as well as a lack of (or different) play skills and challenging behaviours including aggressive behaviour. Considering that children's understanding about the feelings and thoughts of others affects their social interaction with these others (Denham, 1998), if typically developing peers do not know about autism, for example, how children with autism behave, communicate, and interact with others, a lack of interaction (no-interaction or no-exchange) or negative interaction (negative exchange), from the typically developing peers towards children with autism, may be the main consequence, regardless of increased opportunities for social contact resulting from inclusion. When children with autism show "bizarre" behaviours (for example, some of the behaviours that are diagnostic features of autism (American Psychiatric Association, 2000)), it would not be easy for typically developing children to see similarity with children with autism. Therefore, it is unlikely that they would choose to be directly involved in playing with children with autism unless they have some particular reason to do so.

Based on the reactions of typically developing children to video tapes of a boy

actor showing autistic symptoms such as gaze aversion, rocking behaviour, hand flapping, and echolalia, compared with video tapes of the same actor not displaying such symptoms, Swaim and Morgan (2001) concluded that typically developing children had less positive attitudes towards the boy with “autism”, regardless of additional information about autism, such as medical causes of autistic symptoms and similarity with themselves. Older children in particular were less willing to share activities with the boy with “autism”. It was suggested that interventions for social interaction may be more effective when they are more systematically implemented rather than simple audio-visual demonstration, and also if the typically developing children are younger. Another study (Campbell, Ferguson, Herzinger, Jackson, & Marino, 2004) using the same tapes, the same preference in typically developing peers (more favour towards the typical boy without autism than with autism) was confirmed.

Apart from the similarity factor, peer acceptance may be also affected by perceived abilities or potential contribution of children with disabilities to perform shared activities. Cook and Semmel (1999) measured peer acceptance of 285 students towards 44 students with disabilities such as intellectual disability, multiple handicaps, severe orthopaedic impairment, severe emotional disturbance, and autism in 14 elementary classrooms, by nominations for whom they would most like to play with at recess and work in a reading group and as their everyday playmate on a regular basis. As expected, peer acceptance was correlated with recognition of similarity. Students with mild and severe disabilities were rated significantly lower than typically developing students on the nomination scale. In regard to academic work, students with severe disabilities were rated as a less desired group than students with mild disabilities, as a result of low acceptance of the lowest achievers in a work context. In a play context, peer acceptance scores were better than in a work context, but followed the same pattern. This better acceptance result from peers’ nurturing attitudes (for example, as seen in adults) towards students with severe disabilities. However, students with severe disabilities were rated much lower as everyday playmates than in the other nomination categories.

Various and inconsistent or changing peer relationship patterns were shown in a longitudinal study by Hall and McGregor (2000) with three children with disabilities from kindergarten to upper elementary grade in an inclusive school. Nomination as a preferred playmate by typically developing peers for Nathan who had cerebral palsy, epilepsy, an intellectual disability, and limited verbal communication skills dramatically decreased in upper grades. No peers in upper grades called Nathan a friend whereas he was frequently called a friend or even best friend during kindergarten. Manuel, who has Down syndrome, received relatively improved nomination in the upper grade and a mutual friendship with one classmate during both time periods. Mike, who has an intellectual disability,

hyperactivity, and poor balance with an unsteady gait as a result of being born without a left cerebellum, obtained no nomination as either a preferred or non-preferred playmate and mainly interacted with girls in both grade one and six. However, other than chasing (shown as preferred activity of the three children with disabilities), fewer shared activities in reciprocal peer interaction were observed during the upper grades, in comparison to more frequent involvement in activities in kindergarten and grade one. Typically developing peers did not help or assist the children with disabilities as much as they described when interviewed.

Interestingly, there is a discrepancy between positive, or at least non-negative, attitudes reported by peers when interviewed and their actual behaviours, when observed, towards children with disabilities. Although typically developing children often report their “nice” or “kind” manner towards children with disabilities when interviewed, their actual behaviour does not support their claims, as Cook and Semmel (1999) and Hall and McGregor (2000) observed. This discrepancy may well result from the desire of typically developing peers (interviewees) wanting to appear as “nice people” giving “polite and good” answer to an adult (the interviewer), rather than any intent to lie about their attitudes towards children with disabilities—note that sometimes they may actually show such a “nice” manner towards children with disabilities.

As a result, the general perception and interactive behaviour shown by typically developing peers towards children with disabilities are likely to be inconsistent and complex. According to Fisher, Pumpian, and Sax (1998), typically developing peers could be either negative or positive towards children with disabilities. It would depend on their individual experiences about behaviour shown by and requirements of care needed by children with disabilities. Innes and Diamond (1999) found that individual experiences of typically developing peers towards disabilities could be influenced by or learned from adults, for example through conversations with their mothers, particularly when they were younger. Due to these multiple variables in various contexts, it is a very complicated task to attempt to find out how an individual “typically” developing child forms his or her acceptance and understanding of children with disabilities including autism.

Among the complication of multiple factors, as seen above, influencing the acceptance of typically developing peers towards disabilities and children with disabilities, some ways to help form positive acceptance or attitudes can be identified. Firstly, a certain amount of initial contact time may be necessary for typically developing peers to become familiar (to find similarity) with children with autism. Such contact would also allow peers to carry out actual interactive behaviours with children with disabilities, in order to have positive individual experience. Shevlin and O'Moore (2000) proposed that a prolonged time period



within the context of a school link program (consisting of a cooperative learning approach in Arts, Crafts and Physical Education sessions) was required to foster prosocial attitudes in 30 typically developing pupils (females aged fifteen to sixteen) towards their 16 counterparts with severe intellectual disabilities (aged eight to seventeen). Compared to non-intervention group pupils, typically developing pupils in the intervention group demonstrated positively increased comfort and confidence in interacting with their counterparts with severe intellectual disabilities over a longer time of contact (a two-year period in this study). These intervention group pupils consistently requested additional guidelines about interactions with people with intellectual disabilities. However, they did not request more available voluntary work, and remained uncertain in their responses.

Secondly, direct involvement and more exposure appear to be another necessary factor to promote peers' positive attitudes towards disabilities. Favazza and Odom (1997) found that, compared to a no-contact group (16 preschoolers) and a low-contact group (15 preschoolers who had daily incidental contact in recess, lunchtime, music periods, or the library), a high-contact group (15 preschoolers in a 9-week intervention consisting of discussion about disabilities, storytime, structured play with children with disabilities, accompanied by reading books about disabilities at home) significantly improved their acceptance level towards children with disabilities. No significant gender difference was found in this high-contact group. Increased attitude scores in the low-contact group did not reach a statistically significant level. No change occurred in the no-contact group.

#### **4.2.2 Necessity of training for typically developing peers**

According to Ochs, Sadlik, Solomon, and Sirota (2001), inclusion for children with autism should be stressed in the social view with typically developing peers because the peer relationship of children with autism can be enhanced either negatively (negative inclusion), or positively (positive inclusion) by interacting ways from typically developing peers. In negative inclusion, children with autism were neglected, rejected, scorned, isolated, and frustrated by typically developing peers. In contrast, in positive inclusion, they were included through invitation and affection, affiliated into the school community as members, as well receiving care such as correction of atypical behaviours by typically developing peers. Conclusively, positive or negative inclusion for children with autism may depend on the way they are treated by typically developing peers.

To prevent negative relationships and facilitate positive social interactions between typically developing peers and children with disabilities, typically developing peers may need to be trained to learn how to initiate and respond to classmates in an appropriate manner, as well as how not to pay attention to, thereby reinforcing, inappropriate behaviours in various contexts. Although it was found

by Buysse et al. (2002) that there was a higher probability for positive relationship or friendship formation between preschoolers with and without disabilities by the proximity effect when they were placed together, it does seem to be difficult to establish and maintain positive social interactions between these two groups of children without training for typically developing peers.

Training for improving social skills and diminishing problem behaviours can be more effectively achieved for students with disabilities by using supportive involvement of peer groups (Farmer, Acker, Pearl, & Rodkin, 1999); this can be called peer-mediated intervention. Weiss and Harris (2001) argued that peer-mediated interventions facilitated and supported successful social interaction for all children. Peer-mediated interventions might also help overcome the limited generalization of social skills learned in adult-mediated interventions and reduce the dependence of children with autism on adults.

Another rationale for the necessity of peer-mediated interventions for children with autism is the naturally different interaction pattern seen in child–peer groups compared with child–adult groups, with consequent differences in focus and outcome. Hartup (1999) claimed that child–child interaction was structurally, cognitively, and behaviourally different from child–adult interaction with regard to time spending, expectation, and strategies used for compliance. In clinical observations, asymmetrical relations such as “helping and assisting” are more commonly seen in child–adult interactions. This may be due to the large age-gap and maturity-gap between them. On the other hand, relatively symmetrical relations such as ‘sharing’ and ‘giving and taking’ are more often seen in child–peer interactions in which the peer is of the same or similar age as the child.

Despite this, social intervention research often uses only adult experts for training social skills for children with autism, without considering the peers’ function and the necessity of peer training. Strain and Hoyson (2000) pointed out that isolated, rather than comprehensive, social skills training was conducted for children with autism by incorporating adult-mediated interventions. The outcomes of social exchange were poorly generalized. Despite this, such results were often claimed to be the best possible outcome.

This failure to generalize social skills acquired from adult experts to interaction with others is likely to be glibly explained as a generalization inability in autism. Then, when the child with autism fails to interact with typically developing peers, whether the child with autism masters the social skills or not, this failure to interact with the typically developing peer is all too often explained simply by the fact that “the child has autism”, rather than any lack of interaction skills in the typically developing peers who may be immature interaction partners. Skills to interact with children with autism in typically developing peers are not likely to be evaluated because any failure to successfully interact is assumed to be solely the fault of the child with autism. Indeed, there seem to be little, or

even no, awareness of any necessity to teach skills to typically developing peers to help them learn about interacting with children with autism in education practices. Social skills seem to be often regarded as “special” skills, regardless of the simplicity or complexity of the skills, to be taught only to children with autism.

### **4.3 Peer-mediated interventions for children with autism**

Since Andrew Bell and Joseph Lancaster introduced peer tutoring in England in the late 18th and early 19th centuries (Goodlad & Hirst, 1989), this approach has appeared in a variety of educational applications in cognitive-academic or social interventions for children with disabilities (Bolich, 2001). The term “peer” commonly refers to companions who are equal, or similar, in status. Tutoring means complement teaching in a one-to-one or small group session (Goodlad & Hirst, 1989). Thus, peer tutoring in educational studies has often been defined as a more capable or older child instructing less capable or younger child to accomplish academic or social tasks designed by a teacher or adult. The child who provides the instruction can be called the tutor, and the child who receives instruction can be called the tutee. In peer tutoring for cognitive-academic tasks, the cognitive-academic knowledge can be transmitted in a linear model from the teacher via the peer tutor to the tutee (Goodlad & Hirst, 1989, 1990; Topping, 1988; Topping & Ehly, 1998). The size of the group can be expanded from one-to-one peer tutoring dyads to bigger learning groups, for example in one-to-more than two, or group-to-group, in collaborative or cooperative learning groups (Dillenbourg, 1999; Putnam, 1998).

With the growth in emphasis on social inclusion for children with autism, it has been realized that inclusion might be a necessary but not sufficient condition to improve social interaction for young children with autism (e.g., Harrower & Dunlap, 2001; Koegel et al., 2001). With this realization, the peer tutoring approach has been modified and identified as a behavioural intervention that focuses on social development for young children with autism in inclusive strategies (e.g., Mastropieri & Scruggs, 2000). This type of intervention, often called peer-mediated intervention, is intended to provide a variety of social skills training through interacting with peers (McConnell, 2002), as an alternative strategy in applied behaviour modification (Strain, 2001). In peer-mediated interventions for children with autism, typically developing peers, and occasionally other peers with mild disabilities, act as tutors, with the aim of improving social interaction in children with autism (the tutees) through natural combinations of play activities.

Various interaction skills such as modelling, initiating, and responding have

been included as the components of peer-mediated interventions for children with autism to promote reciprocal social interaction between these two groups of children (Lim, Ko, Choi, & Ireland, 2003; DiSalvo & Oswald, 2002; Utey, Mortweet, & Greenwood, 1997). Peers and children with autism have received either a single or package type of treatment constructed with the interaction skills in dyad, triad, or group modes in peer-mediated interventions. These components are likely to be used individually or combined together, depending on the educational objectives. It should be noted that different terminology seems to be used for similar interaction skills in various peer-mediated intervention studies.

### **4.3.1 Peer modelling**

In relation to social interaction with peers, Vygotsky's socio-cultural theory becomes complementary to Bandura's social cognitive theory (Bandura, 1977). In social cognitive theory, modelling has been regarded as a means of learning through observation to acquire skills, beliefs, attitudes, and behaviours (Bandura & Rockville National Institute of Mental Health, Md, US, 1986). In particular, Schunk (1998) emphasized that modelling is associated with the observers' motivation. When observers are interested in what models do, observers are likely to attend to the model, try to retain what they learn, and produce similar actions in their learning process. Because there is no guarantee of learning in the simple observing model per se, some factors affecting observational learning should be identified, such as the developmental status of observers, model status and competence, outcome expectation, explicit consequences, self-efficacy, and so on.

It was reported by Schunk (1998) that the similarity between model and observer is often regarded as the critical factor in peer modelling in relation to different strategies often used in teaching by peers (more nonverbal demonstrations) or adults (more verbal instruction and related information) for typically developing children. For example, when peer models show errors and difficulties and how to deal with them by explaining and demonstrating, observers with learning difficulties can feel similarity with the peer models. When the observers have difficulty in verbalization, direct demonstration by peer models showing how to perform specific tasks and what outcomes can be achieved may have strong motivational effects for the observers.

A study (Ryalls, Gul, & Ryalls, 2000) found that infants (thirty infants aged 14-18 months) were more likely to learn through imitation from a peer model (a three-year-old boy) rather than an adult model (a female college student), showing the effectiveness of learning in an elicited imitation paradigm. The result suggested that using peers might be better than using adults in model-imitation learning for young children because young children may recognize some similarity between themselves and the peer, and simply be more interested in watching

them. It has been claimed that peer models may contribute effectively to the development of cognitive skills for children and produce generalization effects. Peer models may be a strong motivational factor for child tutees because of similar competence, as compared with adult teachers (Schunk, 1998).

With this background of similarity and motivational factors in observational learning for typically developing children, peer modelling has been successfully implemented for cognition and language related skill developments in children with autism and their generalization skills since the 1970s (e.g., Charlop, Schreibman, & Tryon, 1983; Coleman & Stedman, 1974; Egel, Richman, & Koegel, 1981). Coleman and Stedman (1974) reported that a ten-year-old girl with autism acquired more appropriate voice volume and labelling vocabulary by imitating a peer model. Egel et al. (1981) found that children with autism showed a dramatic increase in correct responses on all five tasks in discriminating colour, shape, preposition, and affirmation in peer modelling intervention. Furthermore, similarity and motivational factors in peer modelling have been tested in an interesting manner Charlop et al. (1983) by employing four peer models with autism who were very similar in chronological and mental age and autistic behaviours to four target low-functioning children with autism. In the study by Charlop et al. (1983), it was particularly pointed out that generalization and maintenance of two receptive labelling task performances in the children with autism to a new setting and new experimenter was better in the peer modelling condition than in the more typical and traditional trial-and-error condition with an adult. It was concluded by Charlop et al. (1983) that the similarity between the children inherent in peer modelling generalized more observational learning in low-functioning children with autism due to it being a less structured, looser, and natural way of learning.

However, peer modelling for social interaction and affection behaviour in children with autism does not seem to be as effective as it is for cognitive development. Peer modelling was compared to time delay (Charlop & Walsh, 1986), and it was found that peer modelling was not successful for four boys with autism in terms of increasing spontaneous verbalizations of affection, for example "I like (love) you", in an indoor free play setting. In the time delay procedure, however, all four children with autism quickly acquired the target verbalization by imitating the experimenter's verbalization. In the time delay procedure, some of them successfully generalized across settings such as outdoor free play settings and with other people such as family members at home. The failure of peer modelling for affection behaviour was attributed to the lack of stimulus control such as self-stimulation in children with autism and failure of controlling the structure of the modelling environment. It was pointed out that these might be key factors for peer modelling in observational learning for children with autism because these factors could decrease the attention paid by children with autism to the model.

Another study (Werts, Caldwell, & Wolery, 1996) manifested a failure of peer modelling in social interaction. Even though twelve multiple peers and three children with development disabilities (including one child with autism) actively and successfully performed response chain tasks incorporated with peer modelling each day in an inclusive primary classroom, social interactions between these two groups of children in entire classroom activities, snack time, or small group activities were still low. It was concluded that peer modelling did not affect social interactions between peers and children with development disabilities, including autism. Werts et al. (1996) suggested some likely reasons such as the short involvement of each peer model in each week (only a few minutes) and the lack of a requirement for interaction in peer modelling sessions.

Indeed, no study was found that compared *effective* learning in peer modelling versus adult modelling for children with autism. Ihrig and Wolchik (1988) indicated that children with autism did not show meaningful differences in acquiring expressive language tasks related to daily life in both peer modelling and adult modelling. Jones and Schwartz (2004) found that preschoolers with autism did not show different learning of novel languages in three modelling conditions (peers, siblings, and adults). It may imply that, as Weiss and Harris (2001) pointed out, when children with autism have social skill deficits such as difficulty in understanding social stimuli, in initiating and responding to attempts at socialization, and in appreciating affection, simply asking children with autism to watch peer modelling may not be a sufficient intervention to generate reciprocal social interaction.

#### **4.3.2 Peer initiation and response from children with autism**

Currently, the difficulty for initiation in children with autism is usually explained as a symptom of brain dysfunction (McNamara, 2001; Goldberg et al., 2002) in conjunction with the psychological assumption of executive function impairment and lack of attention shifting ability (Ruble, 2001), or as neuropsychiatric and neuropsychological deficits in children with autism (Niklasson, Rasmussen, Oskarsdottir, & Gillberg, 2002). Whatever the cause, the difficulty of social initiation, especially initiation directed towards, is one of the behavioural indices of children with autism (Hauck et al., 1995).

Therefore, training typically developing peers to teach them how to initiate towards and appropriately respond to children with autism may be necessary to promote positive social interaction between these two groups of children. Considering that cognitive skills including vocabulary and comprehension of affect are related to initiation by children with autism (Hauck et al., 1995; Willemsen Swinkels, Buitelaar, & Engeland, 1997), a degree of scepticism may arise about the possibility and practicability of acquisition of initiation skills by children with

autism. Instead, one may argue that teaching appropriate response skills to children with autism may be more effective and plausible.

Following the notion that high rates of response training may be more beneficial for children with autism because it is likely to get peers to continue to initiate, McGrath, Bosch, Sullivan, and Fuqua (2003) demonstrated a social skill training program for reciprocal social interaction between one boy with autism and eighteen typically developing peers in a local preschool. In this study, typically developing peers were taught initiation skills while the boy with autism was taught response skills. Appropriate play behaviours were taught to both groups of children. In two intervention phases (with and without adult prompt), a significantly increased number of positive initiations and responses was observed between both groups of children. It was observed that the main type of play was changed, from solitary and parallel play before training, to associative and cooperative play in intervention after training. The frequency of invitation for the boy with autism to play increased from zero before training to rarely or often after training. It was concluded that increased positive responses from the boy with autism after training were influenced not only artificial promptings by adults but also by natural initiations by the trained peers. In turn, initiations by peers were increased and continued as a result of high rates of response from the boy with autism.

### **4.3.3 Initiation by children with autism and peer response**

Reciprocal exchange is required for on-going interaction (Laursen & Graziano, 2002; Laursen & Hartup, 2002). Although initiation skill is difficult for children with autism to master, at least some kind or some degree of initiation skill is necessary for children with autism if there is to be reciprocal interaction—a matter of real world importance. Training self-initiation skills for children with autism has been urged for four main reasons:

1. practically, trained peers are not always available (Weiss & Harris, 2001),
2. highly favourable outcomes are associated with spontaneous self-initiation (Koegel, Koegel, Shoshan, & McNerney, 1999),
3. if children with autism are trained only to respond to initiations of peers, their ability for initiation may remain an unachieved potential, or even be suppressed—initiation by children with autism might not be able to occur spontaneously without prompts (Odom, Hoyson, Jamieson, & Strain, 1985), and
4. occurrences of prosocial behaviours in children with autism is generally much lower than in typically developing peers (Greenway, 2000) and certain prosocial behaviours such as nurturing and praising are not seen at all in children with autism (Honig & McCarron, 1988).

In these circumstances, typically developing peers can be included as responders to initiators with autism.

The achievement of improved reciprocal social interaction may need to include training for typically developing children as responders for children with autism, as well as initiation training for children with autism. Initiation training for reciprocal interaction was emphasized by Haring and Lovinger (1989), where peers were trained when and how to refuse or to accept the child's initiation, as well as to not respond to inappropriate initiations, following cues and prompts by teachers. The target children with severe disabilities including autism were taught how to initiate play and repeat it to another peer when a previous initiation was refused. Results showed that although training composed of awareness activity plus rewards enabled the peers to increase initiation to interact with the target children, the peers' responses were still low when the target children initiated. Meanwhile, when the target children received training for appropriate play initiation, both initiation by the target children and response by the peers were increased.

More fruitful outcomes resulted from initiation training in children with autism were shown by Belchic and Harris (1994) and Odom and Strain (1986). Odom and Strain (1986) found that when typically developing peers were trained using simple instruction skills to initiate with children with autism, increased social responses were reliably shown in interaction behaviours of children with autism. Moreover, when children with autism were verbally and physically prompted—the simplest form of initiating training for children with autism to initiate with peers who were trained to respond to the initiation from the children with autism—both increases in initiations and responses were shown by children with autism as well as longer social interaction between these two groups of children.

Belchic and Harris (1994) employed five typically developing peers merely as responders. When the children with autism showed a 75% mastery level of the play initiation skills in the pre-intervention training with an adult, each child with autism was transferred to social initiation training with peers. The peers were instructed to not initiate but respond to play suggestions from children with autism. The adult also stayed in the sessions and provided verbal prompts when the child with autism failed to initiate. Results showed that the children with autism learned to initiate and maintain their play interaction with the peers, and generalized the skills across different settings such as home and playground and different people such as other children with autism and their siblings.

On the other hand, much more limited generalization was noted by Oke and Schreibman (1990) in a study on the effectiveness of initiation training in relation to the negative correlation between social interaction and disruptive behaviour in a boy with autism. Peers were trained as helpers to share, organize play (ask-



ing), and encourage the boy with autism in intervention one. In intervention two, discriminating parallel play and interactive play was added. Although social interaction was increased in intervention one and two, it decreased again in a reversal phase (baseline). The boy with autism was taught to initiate play and to discriminate between parallel and interactive play in a manner similar to his peer training procedures in intervention three, and then social interaction increased again and was maintained in the following reversal phase. Interestingly, disruptive behaviours of the boy with autism were decreased only in intervention three, not in intervention one or two. No generalization appeared during free play in the school setting, although positive behaviours were generalized with an untrained peer in the training setting.

Studies showed that typically developing peers have been involved as responders in social initiating training for children with autism as above. However, the mere presence of peers may not be sufficient for children with autism to generate self-initiated interaction without systematic prompts or reinforcement by teachers or other adults (e.g., Belchic & Harris, 1994). In addition, the generalization effect of spontaneous initiating skills was not consistent or not clear. Factors such as idiosyncratic variation in the number of peers, different levels and kinds of involvement of teachers, context variables, and variation in the behavioural characteristics of subjects may account for the different generalization results for children with autism (Gunter, Fox, Brady, Shores, & Cavanaugh, 1988). In any case, we can conclude that directly adult-mediated social skill training and some degree of involvement by adults seems to be necessary to facilitate self-initiation in children with autism before or during peer responding intervention.

On the other hand, strategies such as high-probability request (Davis, Brady, Hamilton, McEvoy, & Williams, 1994), priming strategy (Zanolli, Daggett, & Adams, 1996), and script procedure (Goldstein & Cisar, 1992; Krantz & McClannahan, 1993; Sarokoff, Taylor, & Poulson, 2001; Terpstra, Higgins, & Pierce, 2002) have been introduced to minimize adult involvement and to maximize spontaneous initiation in relation to social interaction with typically developing peers for children with autism.

In the *high-probability request* strategy (Davis et al., 1994), instruction or requests that had successfully elicited appropriate response previously (e.g., "Touch the block", or "Sit down") were used to increase the target boys' responses to *low-probability requests*, requests judged to have a low probability of eliciting a successful response, including requests to extending social initiation to a trained peer (e.g., "Share the phone" or "Give the toy to [peer]"). In this study (Davis et al., 1994), the target boys were trained with low-probability requests to make an initiation to a trained peer. It was reported that the target boys demonstrated unprompted initiation (without the low-probability request) and continued interaction with the trained peers in following phases and in new set-

tings. Furthermore, they generalized their interaction to untrained peers. Only occasional adult help such as hand signals were needed for the peers to wait and respond to the boy's initiation and to control for possible confounding variables from peer initiations because typically developing peers were taught about the initiation behaviours of each boy with severe disabilities (including autism) so they could identify them in advance.

Zanolli et al. (1996) claimed that a *priming strategy* with minimal teacher involvement enabled preschoolers with autism to increase spontaneous social initiations with peers. Prior to the play activities, preschoolers with autism were taught to smile, look at, touch, and talk to peers using the same materials by a teacher using models, verbal instructions, corrections, and prompts to behave directly to peers in the priming sessions. Peers were trained to deliver the consequences in the same way as responses in the play activity sessions. After practice in the priming sessions, teacher prompts were only given to the peer when they did not respond to the initiation by the child with autism. However, when priming sessions for children with autism were reduced, the rate of initiation was also lower, and it was concluded that generalization and maintenance were limited.

In the *script strategy* (Krantz & McClannahan, 1993), a written set of expected behaviours was constructed by the teacher in the form of questions or statements with content reflection, recently completed or planned activities, and objects in school environment. Children with autism repeatedly read it with assistance from the teacher in the form of manual guidance before each session. Scripts were then systematically and gradually reduced. When a script-fading procedure was introduced for children with autism to produce spontaneous initiation with peers, even unscripted initiations were shown, in contrast to no imitation of peers' initiation by the children with autism in the baseline phase. Results showed that, although minimal written prompts were still required for children with autism to generalize to a new setting, time, teacher, or activity, two of the children with autism showed an ability to maintain initiation with peers even after a two-month school vacation. The successful application of the script strategy for training both preschoolers with autism and typically developing peers in social-communicative interaction (Goldstein & Cisar, 1992) and the effectiveness of using scripts embedded with text stimuli to teach children with autism to engage in conversation about the stimuli (Sarokoff et al., 2001) were both demonstrated.

In more recent research, attempts are made to deal with the initiation difficulty of children with autism towards peers by using interventions made up of a combination of types of direct interventions, shaping an effective training package, rather than a single type of intervention. These combined interventions may be required to measure social understanding and social behaviours in children with autism such as false belief understanding, affective perspective taking, empathy,

concern to distress, and initiating joint attention (Travis, Sigman, & Ruskin, 2001). For example, a cognitive behavioural intervention combined with interpersonal problem solving, affective knowledge, and social interaction for high-functioning children with autism (Bauminger, 2002), and a social interactive training program composed of contingent imitation, use of naturally occurring reinforcement, expectant look, and environmental arrangement (Hwang & Hughes, 2000b, 2000a) have been used.

### **Multiple interaction training for peers with and without training children with autism**

Acknowledging that there is no panacea for children with autism (Krantz, 2000; Prizant & Rubin, 1999), most peer training for interacting with children with autism appears to be developed in conjunction with improving social skills in children with autism. Therefore, interaction training for typically developing peers can be constructed with multiple components.

Interaction training composed of multiple components for typically developing peers appears to be a promising social interaction intervention for children with autism in two ways. Firstly, training in a single method only does not show interaction between different possible methods, so that only the effectiveness of the isolated single method can be measured. Favazza et al. (2000) demonstrated that multi-component programs (such a a combination of storytime and guided discussions about disabilities at school and home, and structured play with children with disabilities) was significantly more effective in increasing peers' acceptance than single component programs such as participating only in direct play (structured play with children with disabilities) or only in storytime (storytime and guided discussions about disabilities at school and home). No great difference was found between play and story groups. Secondly, peer intervention may be optimised in practical usage (Kohler & Strain, 1999) in terms of maximizing outcomes and grounding natural contexts that may expand generalization effects (Rogers, 2000; McConnell, 2002; DiSalvo & Oswald, 2002).

As DiSalvo and Oswald (2002) pointed out, interaction training for typically developing peers may promote peer efforts through changing peer expectancy charged with high motivation to interact with children with autism. Training strategies for peer effort are likely to be developed from simple initiating skill training in early studies to more delicate multiple interaction skills training in late studies.

In simple initiating skill training (e.g., Carr & Darcy, 1990; Strain, 1977; Strain, Shores, & Timm, 1977; Strain, Kerr, & Ragland, 1979; Strain, 1983), similar aged typically developing peers were often chosen because it was judged that they were socially competent or emitted positive social behaviours towards the child

with autism on the basis of compliance with adults' requests. Effective generalization effect has often claimed on the basis of this simple version of peer multiple interaction skills combined with peer modelling and peer initiating skills. A typical example might have typically developing peers involved in brief training sessions prior to the intervention phase, for example two, four, or six 20 minute sessions, depending on the abilities and number of peers, with a standard set of play materials in a small room. Training methods involve simple verbal commands, such as "(t)ry your best to get [name of child with autism] to play with ...", modelling to show how to initiate play, for example "(r)oll the ball to [name of child with autism]", encouraging by verbal prompts and reinforcements, for example "(v)ery nice", sharing play materials, providing physical assistance related to play activities, for example pulling the child with autism by the arm, and peers' practicing these behaviours and statements.

Gradually, multiple interaction skills were delicately elaborated and applied in training typically developing peers to increase social and communicative interaction with children with autism. Similar teaching methods were used, including adult-directed instruction approaches, but the number and duration of training sessions for training typically developing peers varied. The similarity of many of these studies is somewhat disguised by the use of different terminology such as peer-mediated intervention (McConnell, 2002; DiSalvo & Oswald, 2002; Goldstein, Kaczmarek, Pennington, & Shafer, 1992; Strain, Kohler, & Goldstein, 1996; Goldstein & Wickstrom, 1986), peer tutoring (Mundschenk & Sasso, 1995; Rogers, 2000; Sasso, Mundschenk, Melloy, & Casey, 1998; Sasso, Mitchell, & Struthers, 1986), and pivotal response intervention (Pierce & Schreibman, 1997a, 1997b, 1995; Koegel, Koegel, Harrower, & Carter, 1999; Koegel, Koegel, & Carter, 1999). Peer-mediated intervention appears to be the most common, and peer buddy (e.g., Hughes et al., 2002; Laushey & Heflin, 2000) appears to be the least common.

In these peer-mediated interventions composed with multiple interaction skills for peer training, the general aim was to facilitate on-going interaction by using appropriate initiating and responding skills in both verbal and motor behaviours. Typically, successful outcomes are reported using this approach. Often, this approach can be a "safety net" in these peer intervention studies for children with autism (regarded as promising intervention), although generalization effects are various on each target child with autism in the studies and between the studies.

Compared to early studies (simple training), much longer training periods and more intensive training procedures are likely to be required for peers to acquire the delicate multiple interaction skills in these later studies. For example, in one of studies of peer-mediated intervention aiming for a high rate of communicative interaction with children with autism (Goldstein & Wickstrom, 1986),

peers were trained in eleven sessions to learn specific social skills such as establishing eye contact and joint attention, describing their own and the target child's play activities, requesting with particular sequences, responding by repeating and clarifying, and suggesting a joint play activity. Verbal instruction, adult modelling, progressive increase of difficulty of tasks, and gradual delay of response for longer periods of time were used as teaching methods in peer training sessions. Peer training was continued until the skills were independently performed on four consecutive trials. Similar interaction training was implemented for peers by Goldstein et al. (1992) for typically developing peers to attend to, comment on, and acknowledge the behaviours of preschoolers with autism in triad mode. Overview of new skills, review of previous skills, verbal instruction, adult modelling, adult-child practice, and child-child practice were used for training peers and children with autism. Achievement of 80% accuracy on two of three consecutive days was the criterion for determining mastery of skills for each peer.

In these peer-mediated interventions, the details of peer training, such as the number and duration of training sessions, teaching methods, and learning skills, and mastery criteria for the skills vary depending on the abilities of available peers, the behaviours of the target children, and the research contexts. Such interventions are often implemented in dyad (one child with autism and one typically developing child) or triad (one child with autism and two typically developing children) modes (see table 4.1).

In the peer tutoring approach, tutor (often typically developing peers) and tutee (often children with autism) roles are assigned to same-, similar- or cross-aged children. The age chosen for peer tutors seems to depend on the study tasks and the individual research context. Rogers (2000) reported that, following peer tutoring, children with autism have shown significant improvement of their social interaction tasks as well as cognitive-academic tasks. Optimal peer tutoring conditions for social interaction in children with severe disabilities and autism have been investigated—by using different numbers of trained peers (three (Mund-schenk & Sasso, 1995) and two (Brady, Shores, McEvoy, Ellis, & Fox, 1987)), different peer arrangements (dyad and triad (Sasso et al., 1998)), and using peer-nominated peers, high-status peers and low-status peers (Sasso & Rude, 1987).

According to Koegel et al. (1999), pivotal response training (PRT) for peers was developed to motivate children with autism to respond to multiple cues in natural environments or mostly controlled natural environments. It was assumed that if the pivotal area improves due to the intervention, a large number of collateral improvements in other areas including spontaneous initiations should be expected in children with autism. Therefore, it is a cost-effective and less time consuming intervention. Often the consequences in PRT showed a positive correlation between increasing on-task behaviour and decreasing disruptive

Table 4.1: Individual and small-group oriented peer-mediated interventions (continued on next page).

Authors	Sessions (duration)	Teaching methods	Learning skills	Criteria for mastery
Goldstein and Wickstrom (1986)	11	Verbal instruction Adult modelling Progressive increase of difficulty Gradually delaying response	Eye-contact Joint attention Describing play activities Requesting Responding Clarifying Suggesting	Independent performance on 4 consecutive trials
Goldstein et al. (1992)	11–16	Overview of new skills Review of previous skills Verbal instruction Adult modelling Adult-peer practice Peer-peer practice Skill posters Rewards	Getting attention skills by moving around, looking, calling name, tapping shoulder Talking about activities Watching and listening	80% accuracy on 2 of 3 consecutive days
Sasso and Rude (1987)	1 (1 hour)	Discussion for awareness of disabilities Description of participants with disabilities Discussion of specific games and activities Presentation of five manual signs Peer modelling and practice Discussion of several type of interaction	Focusing on initiating to continue social contact	Not established

Table 4.1: Individual and small-group oriented peer-mediated interventions (concluded).

Authors	Sessions (duration)	Teaching methods	Learning skills	Criteria for mastery
Sasso et al. (1998)	1 (1 hour)	Discussion of specific games and activities Instruction for tutoring skills Teacher modelling Prompts Peer practices	Focusing on initiating	Not established
Mundschenk and Sasso (1995)	1 (30 min)	Watching video on behaviours of children with autism Prompts and social reinforcement Peer practice Self-monitoring sheet for peers Feedback after each intervention session on self-monitoring sheet	Initiating and responding	Not established
Pierce and Schreibman (1997b)	4 PRT training (30 min)	Modelling Verbal instruction Role playing	Paying attention Allowing child with autism to choose Varying toys Modelling	Demonstration of the knowledge of the PRT procedures
	2 months Post-PRT (10 min)	Practicing PRT training in dyads with a child with autism Feedback and suggestion	Reinforcing attempts Encouraging conversation Extending conversation Turn taking Narrating play	80% accurate implementation of skills

behaviours. Furthermore, it was claimed that the ultimate goal of PRT is one of the key goals of inclusive education—improved quality of life for children with autism through improved social and educational proficiency.

Koegel et al. (1999) argued that although PRT consisted of discrete trials, it could be distinguished from analog discrete teaching. Firstly, PRT used more natural reinforcement that could be directly related to the task consequence. For example, common toys were used in play activities. A jar with a candy inside was employed to teach the word and concept of “open”. Task-related attempts were praised even if they were not entirely correct. In contrast, the analog teaching used more arbitrary reinforcement such as external rewards (such as food items) that were not related to the task consequence—for example, a candy that was not inside the jar was provided for the target child to reward his or her correct performance of the target word “open”. Secondly, while child-selected or child-preferred materials were used in various trials at irregular intervals in the pivotal approach, adult-selected materials were used with massed trials in analog teaching. Previously mastered tasks were interspersed randomly and frequently together with new tasks for mastery learning in PRT. Finally, PRT focused on child-initiated responses whereas the analog teaching focused on adult-initiated interactions.

In one study (Pierce & Schreibman, 1997b), typically developing peers received PRT to be socially communicative agents to interact with children with autism. Skills for training consisted of paying attention, choosing toys by children with autism, modelling appropriate social behaviours, reinforcing attempts, encouraging and extending conversation, turn taking, narrating play, and requiring object properties in order to teach response to multiple cues. These skills were taught by modelling, explanation, and role-playing during four 30-minute PRT sessions without children with autism. After successful demonstration of knowledge of the PRT procedures from peers, approximately two months of Post-PRT training was added with feedback and suggestion in dyad sessions with a child with autism to practice the skills until typically developing peers show eight out of ten accurate implementations of the skills. Results showed that high levels of interactions, more initiations, using varied toys, and increased appropriate language were demonstrated by children with autism. Children with autism who have more developed expressive and receptive language skills were likely to have more benefits from the peer-mediated pivotal response intervention. Furthermore, Pierce and Schreibman (1997a) claimed that the limited generalization in peer-mediated PRT could be reduced by using multiple trained peers. With interaction with multiple trained peers (more than three trained peers), children with autism were more likely to generalize their newly learned social skills with untrained peers.

Despite successful outcomes in most peer-mediated interventions, teacher



prompts are likely to be still required to generate and maintain motivation for the peers to continue initiation (Strain, Danko, & Kohler, 1995). For example, Goldstein et al. (1992) found that social interactions in children with autism were increased with a high rate of general prompting by adults for peers to interact with them (intervention phase). When peers were prompted and verbally praised to interact with the other peer (reversal phase), social behaviours by peers towards the target children with autism were reduced. Odom and Watts (1991) found that increased peer initiations and social interactions of children with autism occurred only when the teacher provided prompts. Therefore, it should be pointed out that systematically fading teacher prompts are necessary to maintain the social action level even though the maintenance period is short (Odom, Chandler, Ostrosky, McConnell, & al., 1992).

A larger number of typically developing peers can be recruited in more group-oriented peer-mediated interventions. Such interventions have been called the peer buddy approach (Laushey & Heflin, 2000), circle of friends approach (Whitaker, Barratt, Joy, Potter, & Thomas, 1998), special friends approach (Schleien, Mustonen, & Rynders, 1995), classwide peer tutoring (Kamps, Barbetta, Leonard, & Delquadri, 1994), cooperative learning group (Kamps et al., 2002), group-oriented contingency (Kohler, Strain, Maretsky, & DeCesare, 1990), and peer network (Garrison Harrell, Kamps, & Kravits, 1997; Haring & Breen, 1992) (see table 4.2). These group-oriented forms of peer-mediated intervention may be of great practical value in a classroom context, with the group consisting of all class members, as well as increased generalization effects.

In group-oriented peer-mediated interventions, it is often the case that all classmates, regardless of their developmental status—whether they are typically developing or have other disabilities—are taught how to assist or how to tutor the children with autism who are enrolled in the same settings as peer buddies or friends in dyads. The members in dyads can be rotated so that each child with autism can buddy with different peers. For example, the “buddy system” approach was used in social skill training for preschool children with and without high-functioning autism because it promoted higher frequencies of occurrence of appropriate social interactions between these two groups of children than the passive proximity approach (Laushey & Heflin, 2000). Hughes et al. (2002) also used this kind of approach for high school students with intellectual disabilities and autism to be assisted and supported in their academic work and extracurricular activities by peer buddies who are enrolled in one-credit peer buddy course. A similar peer group support approach was used to promote inclusive education for social interaction in high-functioning children with autism and children with Asperger syndrome during lunch time (Whitaker et al., 1998), for children with moderate and severe autism who participated in a community art program (Schleien et al., 1995), and for children with autism in a community summer camp

Table 4.2: Whole-class-oriented peer-mediated interventions (continued on next page).

Authors	Sessions (duration)	Teaching methods	Learning skills	Mastery area
Laushey and Heflin (2000)	About 18 weeks (daily free-play time)	Awareness of different people Explanation Buddy chart Tangible reward (candy or prize)	Stay with buddy Taking turns Sharing toys and games Joining in buddy's play Inviting buddy Bring toys to buddy Talking to buddy	Social skills
Kamps et al. (1994)	3 (45 min)	Teacher-student discussion Individual reading aloud to the class Public posting of total reading score Repeatedly reversed tutor-tutee roles Bonus points for appropriate tutor-tutee behaviours Unstructured free social time	Reading of passages by tutee Feedback from tutors for reading Correction of errors Orally read scores to the teacher	Reading and comprehension
Kohler et al. (1990)	Daily for 15 days (15 minutes)	Instruction Adult-modelling Rehearsing Role-playing Assistance Feedback Correction Praise Practice	Play organizer skills Sharing offers and requests Assistance offers and requests	Social skills

Table 4.2: Whole-class-oriented peer-mediated interventions (continued on next page).

Authors	Sessions (duration)	Teaching methods	Learning skills	Mastery area
Haring and Breen (1992)	Once per week (30 min)	Group meetings	Establishing eye-contact	Social interaction
		Pizza and soda	Appropriate physical proximity for initiation	
Garrison Harrell et al. (1997)	8 (30 min)	Peer-centered discussion	Ignoring inappropriate initiation and response	Social- communicative behaviours
		Adult facilitator	Prompting response	
		Prompt, reinforcing, focusing discussion		
		Review interaction data		
		Modifying interaction schedule		
		Discuss social skill strategies		
		Role play and model		
		Assess group members' satisfaction		
		Social praise		
		Data sheets		
Garrison Harrell et al. (1997)	8 (30 min)	Discussion about friendship	Initiating	Social- communicative behaviours
		Discussion about autism	Responding	
		Circle of friends activity	Conversing	
		Adult modelling	Sharing	
		Review previous taught skills	Instructing	
		Feedback	Saying nice things	
Garrison Harrell et al. (1997)	8 (30 min)	Role play		Social- communicative behaviours

Table 4.2: Whole-class-oriented peer-mediated interventions (concluded).

Authors	Sessions (duration)	Teaching methods	Learning skills	Mastery area
Whitaker et al. (1998)	1 (45 min)	Watching slides about children with severe disabilities Recreation activities including art Listening to audiotapes on friendship with someone who has a disability Visiting a museum Instruction on positive attitudes with special friends Some art activities together	Staying near Smiling Talking pleasantly Encouraging How and when to assist Modelling Offering assistance Asking physical position of an art image	Community art program
Hughes et al. (2002)	Daily (one class period)	A verbal directive "interact as a friend" One-credit peer buddy course	Assisting with assignment Supporting in extra-curriculum	Leisure activities (playing board games, looking at magazines, walking laps, etc)

(Brookman et al., 2003).

Similarly, in classwide peer tutoring, peer networks, cooperative learning, and group-oriented contingency, a number of peers work together with the target child with autism in a tutor-tutee relationship to complete assigned tasks. Often, all children are paired in small groups and have team competition on academic tasks to earn points. Tutor-tutee pairs may be changed each session, daily, or weekly. Their tutor and tutee roles may change during the daily sessions to keep the children motivated. Social benefits such as self-esteem and responsibility may be acquired by individuals with and without disabilities in their group activities.

In some studies (Kamps et al., 1994; Kamps, Leonard, Potucek, & Harrell, 1995), it was reported that classwide peer tutoring was better than traditional teacher-led instruction to increase reading instruction, as well as social interaction in free-time following immediately afterwards, for children with autism at primary schools. It was suggested that effective tutor and tutee group performance might occur when children were divided into pairs or groups as tutors and tutees since they could more actively participate in the learning program than in a traditional teacher-led lesson. Moreover, Kamps et al. (2002) claimed that cooperative learning groups having trained peer tutors for vocabulary and social studies curriculum were better than social skills groups and control groups in order to increase the higher generalization effects of social behaviours in children with autism. In addition, generalization of social skills across non-training settings and novel persons were greater in groups having trained peers, compared to groups having untrained or stranger peers.

However, these studies (Kamps et al., 1994, 2002) are open to criticism since generalization was measured immediately after intervention sessions with the children with autism and peers told to play with supplied play materials while remaining seated at a common table; this may well poorly reflect genuine long-term generalisation, and the natural behaviour of the children involved. Thus, their results, while encouraging, cannot be regarded as definitive, and require further support. In addition, in the study by Kamps et al. (2002), the groups of peers (control, social skills, and cooperative learning) compared in the study were not equivalent, as admitted by the authors, casting doubt on their conclusions of successful generalization of social skills by both groups of children with and without autism.

Some limitations, obstacles and problems in actual implementation of classwide peer tutoring need to be considered. If this classwide peer tutoring is implemented for older children, it may well be important to consider the ability or academic performance level of children with autism, as well as to control the difficulty level of cognitive tasks. Also, some kinds of reinforcements for the group performance, not individual performance, are likely to be essential (e.g., Piercy, Wilton, & Townsend, 2002). Kohler et al. (1990) made the criticism

that these kinds of group-oriented reinforcement contingency approaches did not produce consistent levels of supportive peer behaviours although they produced increased frequency of interaction with children with autism. The interaction behaviours of peers in these kinds of group contingency might only result from a desire to obtain points in relation to academic tasks, rather than any intent to form social relationships with children with autism.

Lastly, for teenagers or adults with autism, a peer network approach can be designed to remove or minimize direct involvement by adults or teachers in the intervention phases. The peer network approach enables groups of typically developing peers to support individuals with autism in a variety of social activities, rather than in academic tasks. Peer members are recruited voluntarily on the basis on having known each other in a mainstreamed class, having common interests and hobbies in sports and music, and sharing an on-campus job. It seems to be effective for individuals with autism to establish and maintain on-going and age-appropriate interactions promoting friendship by positive social environment in natural social contexts. Increased frequency and quality of social interaction between the peer members and target students with autism may produce expanded friend activities in out-of-school social events in natural contexts, for example “hanging out” together away from school, after school, or on weekends. Therefore, the peer network approach is likely to be related to quality of life for individuals with autism in terms of social inclusion by establishing friendship through peer networks (Haring & Breen, 1992). In addition, peer networks can be applied with a cooperative learning strategy in social-communicative behaviours for children with autism through training peers to use an augmentative communication system (e.g., Garrison Harrell et al., 1997).

#### **4.4 Considerations on peer-mediated interventions**

Due to the many impediments, it may be unrealistic to expect that positive social interaction would occur in a mutual or reciprocal way between typically developing peers and children with autism without some active steps being taken to overcome the difficulties. Apart from social deficits and play disorders in children with autism, the preference based on similarity and various and inconsistent acceptances by typically developing peers also reduce the chance of spontaneous successful interaction. One possible approach is peer training. A number of studies on peer-mediated intervention using various peer training approaches have been made for social interaction with children with autism. The outcomes of most of them were positive, implying that these interventions may be promising.

Kohler, Strain, Hoyson, and Jamieson (1997) pointed out that difficulties in peer-mediated intervention pertain to limited school contexts and very short time frames, rather than a lack of behavioural effect. In practice, educators are not

likely to be aware of the positive and negative functions of peers in the quality of life of children with autism, or to recognize the capacity of trained peers for social interaction with children with autism, or have the skill to implement a peer-training program for children with autism. One possibility of solving such problem may be professional development programs including in-service programs to promote inclusive education.

Another source of difficulties is concern about interference in the academic learning of the peers. An answer may be found in studies (e.g., Rankin et al., 1999) showing that group lessons with students with disabilities including autism do not produce decreased gain scores for other typically developing students. Rankin et al. (1999) suggested that the most important thing for group lessons might not be the presence of students with disabilities but effective instruction arrangements and teaching strategies. However, this passive answer may well prove insufficient to obtain consent from peers, educators, and parents to participate in peer training.

A more active answer to this concern may lie in the question of what benefits can be achieved for peers in peer-mediated interventions for children with autism. The answer may be found in a study by Whitaker et al. (1998) where fifty-two peer participants in a group-of-friends group reported feeling good about themselves as helpers (self-evident pride and pleasure), developing themselves (enhanced self-expression, more understanding of others, and improved self-esteem), and achieving targets and satisfaction. Most of them wanted to remain involved in the peer-mediated intervention. Another study (Kamps et al., 1994) found that thirteen peers in classwide peer tutoring answered that they liked being tutors a lot (69%) and somewhat (25%). They also reported an improvement in reading fluency and comprehension skills, getting along better with other peers, and willingness to participate in peer-mediated intervention again. Kamps et al. (1998) provided the opinions of 203 peer participants in various peer interventions for children with autism and developmental disabilities such as classwide or small group tutoring, buddies or networks, and social skills or play groups. The majority of peers made positive comments with only a few negative ones. Peer participants felt that they benefited academically and/or socially and enjoyed tutoring or helping others. Most peers (84–100%) wanted to be involved in further peer-mediated interventions.

From the preceding, two points can be immediately drawn. The first is that, in general, peer-training works to improve the social skills of peers to interact with children with autism. The inability of peers to properly interact with children with autism can be corrected through training. In fact, given that it is much easier to train typically developing peers in social skills than to train children with autism, they are the optimal targets for training. Peer-mediated interventions for children with autism are likely to be a promising strategy for inclusive education,

given appropriate training for the peers.

Secondly, however, peer-mediated intervention for social interaction in children with autism may be limited by the generation and maintenance of motivation for peers. This is not surprising, since it is well known that typically developing children experience great difficulty when attempting social interaction with children with autism. In addition, although improvements in the level of cognitive skills displayed by the children with autism have been reported, the level of cognitive skills is not likely to be an accurate indicator of the success of the intervention for autism. This was discussed in chapter three, noting that the lack of improvement in social skills is far more significant, indicating that the primary deficit of children with autism has not been addressed.



# Chapter 5

## Methodology

I often say that when you can measure what you are speaking about and express it in numbers you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind: it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of *science*, whatever the matter may be.

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Lord Kelvin (Lindley, 2004, p. 294)

In section 1.3, it was noted that the main purpose of this research was to investigate the effectiveness of a peer-mediated play intervention program for children with autism. In particular, the effectiveness of training typically developing children to interact successfully with children with autism—seen in the previous chapter to be a promising strategy—is to be determined. Essentially, this can be done by developing a training program, and then comparing the use of trained and untrained peers in a trial peer-mediated intervention program. This amounts to an experimental (or, to be more technically precise, quasi-experimental) test of the hypothesis that peer training results in an increased level of cognitive play and social interaction in children with autism. The rationale for and description of this experimental study forms the bulk of this chapter.

While the long-term benefit for the children with autism would be the true indicator of success, it is not possible to measure such long-term benefit in a study of limited duration, such as this research project. In fact, measurement of long-term benefit would be very challenging even in a long-term study. Instead, it is necessary to measure short-term effects; here, the level of cognitive play and the level of social interaction displayed by the children with autism during peer play sessions is measured. As reviewed in chapters 2 and 3, child development is intimately linked with cognitive play and social interaction. This provides a sound

and widely-accepted theoretical basis for expecting these to indicate long-term benefit. In particular, from the Vygotskian perspective, not only is social interaction correlated with cognitive development, but it is a vital element contributing to it. Therefore, the level of social interaction is of particular interest, due to the social impairments shown by children with autism, and can be considered as the best available short-term indicator of long term benefit for the children with autism.

Apart from the main experimental study, it is necessary to first collect background data on general behaviour, social interaction, and specific play behaviours in participants. Firstly, it is important to screen potential participants to check if they are sufficiently representative of the typical range of typically developing children and children with autism. Secondly, such data allows the results to be more readily compared to other studies. As this screening and profiling procedure is distinct from the main experimental study, the results of this screening and profiling are presented separately. This preliminary study is termed Study 1, and the experimental test of the peer-mediated intervention is termed Study 2.

It is also possible to carry out some useful ancillary studies. While the experimental test of the effectiveness of peer training and the peer-mediated intervention focuses on the children with autism, the impact of participation on the typically developing peers is also of interest. A third study, Study 3, aims to find out whether typically developing peer players change their ideas and attitudes towards children with disabilities either positively or negatively after participation.

A fourth study, Study 4, investigates the possible generalization of play behaviours in children with autism before and after the peer-mediated play intervention, based on observations by parents and special educators. In addition, Study 4 also presents opinions on the impact of the peer-mediated play intervention, collected from parents, special educators, and regular teachers.

The organization of these studies can be summarised as:

**Study 1**

Profiles and screening of participants.

**Study 2**

Experimental test of peer training and peer-mediated play intervention.

**Study 3**

Ideas and attitudes of peer players towards disabilities.

**Study 4**

Responses from parents and teachers.

## 5.1 Quasi-experimental research

Experimental research is a powerful method for the testing of hypotheses about cause–effect relationships—in this study, the hypothesis that training of peer play partners results in an increased level of cognitive play and social interaction. Indeed, it is even claimed that experimental research is the *only* valid method (Gay & Airasian, 2003).

Quasi-experimentation is similar to experimentation, except that variables are less controlled in a quasi-experiment than in an experiment—variables other than the specific experimental variable (the effect of which is the subject of investigation) differ between the groups being compared. Burns (2000) and Gay and Airasian (2003) explained that in educational research, there are two reasons for a researcher to conduct experiments in natural settings or real-life situations. One is when true experimentation is not feasible. Another is to provide greater external validity of the study when the study is conducted with practical applications in mind. In these situations the researcher may have to accommodate to existing conditions in the natural setting that may prevent the implementation of strict experimental conditions.

An experiment, strictly speaking, requires identical experimental and control groups. When the individual subjects are not identical (such as when the subjects are people), each group must contain enough subjects so that the *groups* are essentially identical. In this research, only five children with autism were available, which, especially considering the high degree of individual variability among children with autism, is far too few subjects from which to form separate experimental and control groups. This, in addition to the reasons above, leads to the adoption a quasi-experimental method for this study.

The quasi-experimental methods for dealing with very small numbers of participants can be broadly categorised as *single-subject designs* (Kazdin, 1989; Neuman & McCormick, 1995) or *within-subjects designs* (Whitley, 2002). Essentially, each subject is compared with itself, under both experiment (intervention or post-treatment) and ‘control’ (baseline or pre-treatment) conditions. Since each subject is only compared with itself, the inter-subject variability does not affect this comparison—this is why the method is so useful for small numbers of subjects. Through this perfect matching, lower variances and consequent higher levels of statistical significance are attained than with equivalent between-subjects experiments (Whitley, 2002). However, since the experimental and ‘control’ measurements are made at different times, the subject can be affected by extraneous factors, and thus the ‘control’ subject can differ from the experimental subject by other than the experimental condition, despite being the same individual.

In this study, to determine the effectiveness of peer training on cognitive play and social interaction within dyads composed of a child with autism and a typ-

ically developing peer, it is necessary to compare two such dyads, one with a trained peer (trained dyad), and the other with an untrained peer (untrained dyad), but otherwise as similar as possible. Maximal similarity is achieved by using the same two children to form each dyad—they comprise the untrained dyad before training, and the trained dyad after training. The pre-training dyad is *not* identical to the post-training dyad since both members of the dyad are affected by the passage of time, and therefore this is a quasi-experimental design, rather than an experimental design, in the strict sense.

The primary aim of the study is to measure the impact of trained peers as play partners on the interactions of children with autism. The impact of trained peers on the play of children with autism is measured by the level of cognitive play and social interaction displayed by the children with autism during play sessions with trained peers.

## 5.2 Participants

Five children with autism and thirteen typically developing children participated in Study 2. These participants are described in Study 1 (chapter 6).

The children with autism are designated as CA1, CA2, CA3, CA4 and CA5. The typically developing children are designated as P1 through to P14 (P13 was present as a reserve peer, but did not participate in any play sessions and is not counted as a participant). A prepended T or U is used to distinguish between trained and untrained peers when relevant (for example, TP3 was a trained peer, and UP8 was untrained).

## 5.3 Design

Typically, research in this area adopts multiple baseline designs across behaviour, people, or settings, or, reversal (withdrawal) designs—ABA (baseline-intervention-baseline), the reversal replication (ABAB) design with one treatment, ABAB with two treatments, and ABAC designs are typically used (Neuman & McCormick, 1995).

However, for this study, the schools involved ruled out multiple baseline designs due to the expectation that such designs would result in extended baseline periods. Intervention (B) in multiple baseline designs would be extended to the next child with autism only when the previous child with autism shows clear improvement. This is not beneficial for the next or last child with autism who is not being helped during the extended baseline phase.

Reversal designs cannot be used while retaining the original dyads, since the peers cannot revert to an untrained state after having been trained. While different groups of peers could be used in each phase of an ABA reversal designs,

this would shed no light on whether any improvement is due to learning by the peers from experience alone, although it would indicate the degree to which the children with autism have learned cognitive play and social skills. The benefits of the within-subjects design would be lost. In addition, as the schools involved wished to limit the duration of the study, so as to minimise disruption to routine school activities, ABA designs were not feasible.

As a result, a modified design—subjects as their own controls—was used for this study. An alternative method is to use a comparison group comprised of dyads of the same children with autism paired with peers who remain untrained. If the trained dyads show improved social interaction in the post-training sessions as compared with their pre-training sessions, and the dyads which remain untrained show no improvement, training is unambiguously and conclusively shown to result in improved cognitive play and social interaction.

Indeed, Gay and Airasian (2003) described subjects as their own controls as a control technique for standardising of the experimental conditions. A simple way to attempt to eliminate any difference between the experimental group and the control group is to simply use the same group of participants for both. That is, expose the same group to both the control treatment and the experimental treatment sequentially. However, the latter treatment may be affected from the previous treatment effect as sequentially performed—this is called the *carryover effect* (Whitley, 2002) or *crossover effect* (Pedhazur & Schmelkin, 1991). This can be reduced by randomly dividing the available groups into two smaller groups, with each smaller group receiving both treatments in a different order (Gay & Airasian, 2003). The small number of subjects precluded that approach in this study.

The technique of using subjects as their own controls is used in behavioural research, including, for example, studies on peer play intervention for high-functioning children with autism (Smith et al., 2002). Smith et al. (2002) aimed to investigate the main effects of different peer grouping—typically developing peer or peer with autism. To provide the most straightforward comparison of different peers, within-subjects crossover experiments were employed in two conditions: integrated and segregated. Each child with autism was alternatively paired with typically developing peers (integrated condition) and with a peer with autism (segregated condition). The conditions were conducted in an alternating sequence and were counterbalanced across the high functioning children with autism (Smith et al., 2002).

This type of design can be called a *within-subjects longitudinal crossover design*. This kind of design, with two groups of peers providing the two conditions (experimental and ‘control’) for one group of subjects at more than one point in time, is not typically or commonly used, perhaps due to the possibility of carryover effect. However, this design can be deliberately used to achieve some specific

research aim in specific circumstances.

For Study 2, it was expected that both cognitive play and social interaction in children with autism would be improved when they played with trained peers. There may be some improvement within the untrained dyads, possibly due to practice effects or carryover effect. However, persistent improvements of social and cognitive functioning in children with autism are not expected because such improvement is only expected as a result of long-term intervention—the short and relatively few sessions in the course of this experiment are unlikely to result in major gains by the child with autism (recall that this is why the level of social interaction is used as an indicator of the likely long-term benefit in the event of long-term intervention—see section 3.10 and the introduction to this chapter). Therefore, it is expected that both the level of cognitive play and social interaction will alternate as the sessions with trained peers are followed by sessions with untrained peers. In effect, the longitudinal crossover design used is an extended reversal design.

As Gay and Airasian (2003) pointed out, maximization of internal validity means more rigid control over participants and experimental conditions, making the experiment more like laboratory experimentation. The findings then become less generalizable to real-life situations. Gay and Airasian (2003) suggested simulated settings that are intermediate between laboratory and natural educational settings may provide the researcher with sufficient control for adequate internal validity and a degree of realism for generalizability.

There are some possible confounding factors such as testing, maturation, mortality, and diffusion related to this type of research that may affect the research participants (Campbell, Stanley, & Gage, 1966; Ray, 1997). The first of these, testing, is a possible confounding factor that occurs by practice, familiarity, or memory when the participants repeat same measurement regardless of whether there is any treatment in between. Practice on the pretest may result in improved scores on the posttest. This testing factor is especially important in this study because the effect (increased cognitive play and social interaction in children with autism) hypothesised to result from the cause (peer training) can quite plausibly result simply from learning by the peer without any training at all. Gay and Airasian (2003) pointed out that the time between tests should be carefully considered not to be too short in the research design. Although the length of the pre-training period was chosen so that learning without training should be evident if present, it would not be possible to present a definitive conclusion unless pre-existing (prior) levels of play without training can be conclusively eliminated as a factor contributing to any observed improvement in cognitive play and social interaction.

It is for this purpose that one group of peers remains untrained; improvement shown in these untrained dyads can result from either practice alone, or learning

by the children with autism from the trained peers. The improvement shown in the untrained dyads is due to the combination of these effects, and provides an upper limit to the learning through practice. Since the children with autism are not expected to significantly improve their social skill over the course of the study, any improvement observed will most likely be due to learning by the untrained peer through practice alone.

Secondly, maturation refers to natural biological changes in the participants as they are growing older, wiser, stronger, and healthier, as well as more tired, more bored and so forth. For example, when participants perform too many tasks over too long a time, the results of the study could be due to the participants' boredom, fatigue, or frustration, rather than the treatment. Whitley (2002) called this *fatigue effects*, contrasting it with practice effects. In this study, maturation was not major issue. To minimise the impact of participant frustration the session was stopped when participants showed signs of frustration such as tantrums.

Thirdly, mortality refers to problems when participants drop out because either they are not able to or do not want to take part in an experiment. Gay and Airasian (2003) indicated that volunteers may drop out when demands made on them exceed their motivation; this is more likely to occur if they belong to an experimental group. In this study, reserve untrained and trained peers were available to play with the children with autism to maintain the regular play routine if the regular peer partners were not available.

Lastly, diffusion (imitation of treatments) occurs by sharing information about the experiment among participants. If participants in the experimental group share the information of treatments with all or some participants in the control group, it may result in misleading conclusions about the treatment effect in the study. In this study, trained peers were told not to talk about what they learned during the peer-training period to their classmates until the end of this project. Adherence to this instruction was monitored by classroom teachers. According to the teachers, the typically developing peers who participated in this study were not close friends who would spend recess time together at their schools, and therefore such diffusion seemed unlikely.

## 5.4 Settings

Play and interaction in both indoor and outdoor settings were measured in this study. These settings were simulated naturalistic settings, providing a high degree of both control and generalizability to real-life situations (see section 5.3 above). Both indoor and outdoor settings were used since children in inclusive education could be expected to play together in both indoor and outdoor settings on a daily basis. Most similar studies were restricted to indoor settings only, pre-

sumably on the grounds of experimental practicality. Thus, it was possible that the outdoor settings might provide especially new and interesting results.

The children with autism and their peer partners came from two Special Education Developmental Unit (called SEDU-A and SEDU-B) and State Primary School (called SPS-A and SPS-B) pairs. For the SEDU-A–SPS-A pair (dyads with CA1, CA2, and CA3), the play sessions were held at SPS-A. Teacher aides in SEDU-A escorted the children with autism to SPS-A. For the SEDU-B–SPS-B pairs (dyads with CA4 and CA5), the play sessions were held at SEDU-B. The researcher of this study escorted the typically developing peers to SEDU-B. These choices were necessitated by the practical availability of space.

In SPS-A, the indoor play setting was a space of approximately four and a half by five metres which was partitioned off by desks and chairs from a larger function room. In the SEDU-B, the indoor play setting was a room of approximately four metres by four metres in size.

The outdoor play settings at SEDU-B and SPS-A were similar in that both included a sandpit and an adequately-sized playground. The outdoor play setting at SEDU-B also had a play area used for playing with outdoor toys, distinct from the playground. The SEDU-B playground was also smaller, approximately half the size (but still of adequate size), and access was dependent on usage by other classes.

#### **5.4.1 Materials**

For the indoor play sessions, four sets of play materials were chosen from those available at the SEDU attended by the children with autism and placed on the floor. The play materials were selected to focus on the four cognitive play categories of functional, constructive, symbolic, and rule-governed play. Each set of toys was considered as a representation for each play category. For example, a cars and road set was for functional play, blocks for constructive play, a kitchen set for symbolic play, and matching-cards for rule-governed games (see table 5.1).

For outdoor play sessions, some sandpit play materials were chosen from the two SEDU (see table 5.2). In addition, playground facilities such as slides (and monkey bars at SPA-A) were used. Other outdoor play equipment such as a baseball set and a tenpin bowling set were set up in SEDU-B (see table 5.3).

### **5.5 Procedure**

After the initial profiling and screening phase (Study 1), indoor and outdoor play sessions, covering a pre-training phase, a peer training phase, and a post-training phase) were held two days per week for each dyad from late May to early November in 1999. Unfortunately, CA4's regular trained peer (TP10) with-



Table 5.1: Indoor play materials

SPS-A (CA1–3)	SEDU-B (CA4–5)
Cars and road	Cars and road
Doll and bassinet	Doll and clothes
Doctor set	Doctor set
Ring-toss games	Lego train and track
Plastic chains and connectors	Dice
Skittles and ball	Card game set
	Plastic farm animals
	Cooking set, with fruit and vegetables
	Drinking straws

Table 5.2: Sandpit play materials

SPS-A (CA1–3)	SEDU-B (CA4–5)
Sieves	Sieves
Shovels	Shovels
Containers	Containers
Trucks	Trucks
Sand-turned wheels	Stove, frypan, and spoons

Table 5.3: Playground play materials and facilities

SPS-A (CA1–3)	SEDU-B (CA4–5)
Monkey bars	T-ball
Climbing bar	Hanging ball and rackets
Climbing net	Skittle
Tyre tunnel	Hoops
	Baseball set

drew after the peer training phase (and continued to participate in this study as a reserve trained peer). TP10 was replaced by TP12 as the regular trained peer player for CA4 during post-training phase. The data from these unmatched dyads (CA4–TP10 and CA4–TP12) were collected. Even though the data from these unmatched dyads could not provide conclusive evidence of improvement due to training (since improvement from CA4–TP10 before training to CA4–TP12 after training could be due to TP12 being more able to interact with CA4, independent of the training), it would still be useful to check whether or not these data support the conclusions drawn from the matched dyads.

### 5.5.1 Indoor play

While the room in the SEDU-B was always available for indoor play sessions of this study, two other rooms had to be used occasionally due to the unavailability of the regular room and space in the SPS-A. Because this study was implemented in naturalistic education settings for about seven months, availability of the room and space for this study depended on the educational contexts such as extra room

facilities for other educational programs and services, school time schedule, and school activities. Then, collaborative negotiations in a flexible manner were required to use the room and space.

It was suggested by McEvoy and Brady (1988) that placing various toys and having contingent access to play materials could be used as a reinforcement for academic work in children with autism. Taking these views, play materials were randomly selected from the teaching material shelves in the two SEDU. Information about how often children with autism used them (frequency) and how much they knew about them (familiarity) before they were involved in this study was acquired from teaching staff in the SEDU. According to the teaching staff in the SEDU, the play materials were used as often as they could be, depending on their educational programs.

On the top of this random selection, the level of familiarity or obsession with, and novelty of, each play material for each child with autism were screened to make as even a balance as possible. When the two children with autism (CA4 and CA5) often showed appropriate functional and constructive play with particular toys such as the cars and road set and Lego (relatively lower task materials) during the pre-training play sessions, these were replaced with other play materials that could be used more in pretend play or rule-governed game (relatively higher task materials) such as a doctor's set and a card game set. Similar screening procedures for balancing familiarity and novelty for each play material were carried out for the other three children with autism (CA1, CA2 and CA3).

However, the selected play materials were occasionally not available. Toy substitutions were sometimes necessary, as the toys used in this study were drawn for the SEDU involved, and were sometimes in use elsewhere in the SEDU. Substitute toys were chosen in the same category so as to minimise change. There was no systematic pattern of toy unavailability, so the results should not be affected. In addition, such toy substitutions affected trained and untrained dyads equally—a change seen in trained dyads but not untrained dyads would not be due to toy substitutions.

### **5.5.2 Outdoor play**

While playground facilities in SPS-A were included, playground apparatus in SEDU-B was not used, for two reasons. Firstly, some apparatus, such as a swing bar, were too low for the typically developing peers. Secondly, this avoided conflict with use of those facilities by other children at SEDU-B, who used them on their regular schedule. Instead, other playground play materials, such as a T-ball, hoops, and a baseball set, were set up near the sandpit area for outdoor play sessions at SEDU-B.

### 5.5.3 Dyad play group and duration of the session

Each child with autism was alternatively paired with an untrained peer (untrained dyad) and trained peer (trained dyad). Counterbalancing was generally maintained to minimize the effect of the problem of same order implementation through alternating sequence of untrained and trained dyad as well as alternating sequence of indoor and outdoor setting. Sometimes, however, the times at which the trained and untrained peers were available did not allow such alternation. When this happened, it was necessary for the child with autism to play first with the trained or untrained peers for two sessions in a row. In this case, the alternation would take place in the following session, and continue as before.

At the start of a play session, each dyad was told “It is play time together! You can play with these toys and have fun!” Each dyad had two play sessions, one indoor and one outdoor, on each day they played. Therefore, each child with autism participated in four play sessions, two with the trained peer, and two with the untrained peer, on each day they played (twice per week). Each session lasted for about six minutes—six minutes was the standard play session length, but variations did occur, as discussed below. Where the session exceeded six minutes in duration, data were only recorded for the first six minutes.

In the play sessions, the dyad was reminded once or twice about unused available play materials if they used only one item for more than half the time of the session (3 minutes). Occasionally, other teaching materials were nearby, having been prepared for other children by teaching staff, in which case, near the play settings. Then, the dyad was reminded which play materials were available in the play session.

When one child in the dyad did not want to keep playing in the session, the child was encouraged to continuing playing. After one or two minutes, if the child still did not want to keep playing, the session was stopped. On the other hand, if both children in the dyad group wanted to keep playing longer than six minutes, they were told that they would have more opportunities to play together on other days. If they still insisted on playing longer, they were allowed to play for about one or two minutes more. However, this extra play time was only requested a couple of times from the trained dyad of CA4 in the late post-training play phase.

Given that children with autism are especially vulnerable to disruption of their routines (American Psychiatric Association, 2000), if a regular peer was unable to attend the scheduled play session, one of the reserve trained or untrained peers was used as a substitute. This was important to minimise disruption for the children with autism. No notable disruption was observed as a consequence of the substitute peer play partner. Play sessions with substitute peers were not counted as play sessions for the regular dyad in data analysis, since the dyad

was different. The play sessions with substitute peer were still all recorded, even though the data were not to be used in this study.

## 5.6 Play training for peers

Half of the typically developing peers were chosen randomly to receive a series of play training sessions (Trained Peers—TP), the other half, the comparison group, were not trained (Untrained Peers—UP). In this peer training phase, the play training sessions for the randomly chosen peers were arranged according to their school schedule, and implemented in the same places for indoor and outdoor sessions where they played in the pre-training phase. Untrained peer players kept their regular lessons in their classrooms.

The peer training was implemented in the group sessions. However, if a TP missed a play training session due to sickness or participating other programs, another time was individually arranged for him or her. A total of 12 peer training sessions was run at each SPS and each play training session lasted approximately 30 to 40 minutes.

### 5.6.1 Training program package

The series of play training for typically developing peers was designed for the peer players, and attached as a training package in appendix C of this thesis. It contains mainly disability awareness (focusing on abilities) and play interaction skills that were modified from peer approach interventions (see table 5.4).

Table 5.4: Training of peers

Structure	Contents
Being friends	Characteristics of friends and the importance of friendship
Play interaction skills	General play activities and behaviours
Different people	General and/or specific differences in people
Play with different friends	Verbal and non-verbal social communication skills
Understanding autism	Comparing general behaviours between children without autism and with autism
Play practice sessions	Elaborating the play interaction skills to play with play partner with autism in indoor and outdoor settings

In the play practice sessions, a total of fifteen specific play interaction skills were taught to the trained peers. Eleven play interaction skills were adopted from Pivotal Response Training (PRT) (Pierce & Schreibman, 1995) as follows: getting attention from the child with autism by touching and speaking (“Hello, [name of the child]”), allowing the children with autism to choose play materials

(e.g., “What do you want to play with, this car or this doll?”), paying attention and waiting (“Please, show me how to use this car”), demonstrating play activities, including verbal statements (e.g., “My car goes on the road, just like this, brrrrum!”), suggesting activities to children with autism (“Let’s play with the car”), turn-taking (“It’s my turn” or “It’s your turn”), narration of play activity to children with autism (e.g., “This is very spicy pizza,” or “You drive a car to go to the shop.”), providing help to children with autism (“Push it more. I can help you.”), sharing activity (“We can use the ball together”), explaining (“Stand up in the circle, then roll it in the circle”), and reinforcement of attempts to encourage and extend appropriate play behaviours and social skills in children with autism (e.g., “Well done!”). Four additional play interaction skills, asking for help (“Can you help me? Push the block more”) and using eye-contact, gesture, and personal space, were also included.

The training consisted of watching videotapes, discussions, specific instruction, modelling, role-playing, feedback, worksheets, a self-monitoring form (*Play Note*), and rewards (see table 5.5). Videotapes that show general information about friendship, differences in people, and typical behaviours of children with autism were used to help the peers’ understanding of play interaction with children with autism. Relevant segments of educational films were prepared to fit within the limited time of play training session. Discussion about play and social interaction was guided in a child player-centred manner. The discussion was supported and facilitated by simple questions focussed on the theme of each session. The topic of discussion was started with general friendship in typically developing children’s lives, and expanded to special friendships with children with disabilities, especially children with autism. Also, it focused not only on the notion that what children with disabilities are not able to do *due to* their disabilities, but what children with disabilities are able to do *with* their disabilities.

In the peer training, peers were guided to develop ways to play and interact with children with autism. The peers exchanged their experiences and ideas of play with their siblings or other friends in order to use these when playing with the children with autism. Role-playing was also used to assist the peer play partners to understand more about playing situations. In these role-play sessions, peers were ‘given’ a disability (such as being blindfolded to emulate visual impairment) so that they could more easily empathise with the children with disabilities. While peers experienced these disabilities, they could recognize the abilities and different needs of individuals with disabilities from individuals without disabilities. The worksheet enabled peers to summarize the session.

On the general understanding and experiences of dealing with people with disabilities, peers practised and elaborated the play interaction skills by performing peer-adult, peer-doll, and peer-peer in role-playing. When one peer demonstrated the play interaction skills, other peers monitored him or her and allocated

Table 5.5: Teaching strategies in peer play program

Methods	Aims
Audio-visual materials	To understand related topic and to monitor own play
Discussion	To clarify the topic
Specific instruction	To know interaction behaviours in children with autism
Modelling	To demonstrate appropriate or inappropriate play behaviours
Role play	To realize abilities and different needs of children with disabilities and to develop their own play interaction skills
Feedback	To evaluate own performance
Worksheet	To summarize and clarify what has been learned
'Play Note'	Self-monitoring method by scoring play activities
Rewards	To maintain and facilitate motivation

them a score on the *Play Note*. This monitoring activity was also carried out visa versa. When one peer demonstrated play interaction skills, others identified what skill was used and their score on the *Play Note*. Eventually, each peer performed the play interaction skills with an accuracy level above 80% to play and interact with an adult who took the role of a child with autism. All these practices were carried out in playful mood.

An accuracy level of 80% in the implementation of peer interaction skills was adopted as the criterion of mastery; this level of 80% is commonly used (e.g., Goldstein et al., 1992; Pierce & Schreibman, 1997b—see table 4.1). The actual level of accuracy was determined using the *Play Note*. *Play Note* allowed peers to record whether they successfully implemented the social interaction skills during a session; this allowed the success rate to be quantitatively determined.

While it would have been interesting to use the play sessions to quantitatively measure the extent of implementation of, and the success of, individual play interaction skills by the trained peers, it was found that this was not feasible in practice. As many of the play interaction skills are complex behaviours, with many elements in common with each other, unambiguously identifying individual play interaction skills would be a formidable, if even possible, task. In addition, the simultaneous use of multiple play interaction skills makes this even more difficult, and possible synergies complicate analysis of such data. In any case, the overall level of effect of the training is the most important measure of success, and this was the primary measurement made in this study.

### 5.6.2 On-going play training in post-training play phase

After the peer training phase, five more training sessions were performed in the post-training phase. These on-going training sessions were given to the trained peers (TP) on a fading schedule. It commenced with two days play framework, then, a training session following the third day's play day. Each consecutive playtime frame had an additional day added before the 'on-going training' day. These on-going training sessions lasted for about 20 minutes during lunch or recess time.

In the on-going training, the twelve play interaction skills were written on a piece of paper and read by the TP, before they played with the children with autism. After the play session, the TP watched videotapes that showed their play session with the children with autism, and monitored their play interaction skills on the *Play Note*. If they missed the on-going training session due to sickness and participating other programs, another individual session was scheduled. Also, untrained peers watched their own play sessions of tapes. Untrained peers were not provided with the play interaction skills on the *Play Note*. As such, all TP and UP watched their 'play movies' on the videotapes.

## 5.7 Data collection

Indoor and outdoor play sessions of each dyad were filmed with a hand-sized analogue video camera, Sharp View Cam Slim 40x. The film of dyad play sessions were transferred to analogue VHS videotapes and viewed using a Panasonic Video Cassette Recorder AG-5700 (this is an editing machine which was used since it provides high-quality stills and accurate rewinding and fast-forwarding). The dyad data on videotapes were classified into two sets of behaviour categories: one measuring the cognitive play, and the other measuring the level of social interaction displayed by the child with autism as a function of time for each session.

The total durations occupied by each category of behaviour of the child with autism in matching dyads are of greatest interest; these were calculated for each session, and are hereafter given as proportions of the total session. The data that is analysed here consists of the proportion of the total time for each six minute (360 second) play session occupied by each cognitive and social category. That is, each category has a duration of between 0 and 1, where 0 indicates a complete absence of the behaviour, and 1 would indicate that it was the only behaviour displayed during that entire session. For example, a duration of 0.4 would mean that a total of  $0.4 \times 360 = 144$  seconds was occupied by that behaviour (assuming that the session was the standard 360 seconds long). Note that the sum of the proportions of all of the cognitive or social categories for a single must be equal

to 1, and an increase in one category must be accompanied by decreases in other categories.

The practical matter of assigning the observed behaviour to the most appropriate category is clearly an important step. A binary key was used as the primary classification tool; this provides a simple method for the simplification of difficult classification decisions and the enhancement of consistency in coding (see section A.1 in appendix A for further details).

This, and the closely allied question of design and definition of the categories to be used, merit further consideration in depth, provided in the next section. For the moment, it can be noted that the widely-used and widely-accepted Piaget–Smilansky categories (see chapter 2) are an ideal choice for the measurement of the cognitive level of play. These categories can be regarded as standard, and provide a basis for comparison with other studies. Unfortunately, the same cannot be said for social interaction. As discussed in section 3.10, there appear to be no suitable standard categories for measuring social interaction in children with autism. There is a practical aspect to this that should be considered—namely, that it is highly desirable for various researchers to use as uniform as possible a set of categories into which to classify observed social interaction behaviour. Identical, or at least similar, categories allow the results of different researchers to be directly compared. Such a situation would be a significant improvement over the current plethora of single-use *ad hoc* sets of categories. Recognizing that Parten’s categories are in wide use, it is unfortunate that they are not adequately designed for both children with autism and typically developing children. Therefore, a taxonomy of social interaction suitable for the measurement of social interaction in children with autism was developed; this is described in appendix A. It is hoped that these will allow the results of various researchers to be directly compared.

The key for the classification of the cognitive level of play is shown in figures 5.1 and 5.2, and the key for the classification of the level of social interaction is shown in figures 5.3 5.4. The keys are shown in both the more traditional typeset “list” form (figures 5.1 and 5.3) and the easier-to-use graphical tree form (figures 5.2 and 5.4); the graphical tree format was used in this study.



- 
1. Is the child obviously playing?
    - a) Yes—go to 4
    - b) No—go to 2
  2. Is the child exploring or examining play objects or the play partner's play?
    - a) Yes—*Exploratory*
    - b) No—go to 3
  3. Is the behaviour typical stereotyped behaviour?
    - a) Yes—*Stereotyped behaviour*
    - b) No—*Non-play*
  4. Does the play consist only of play objects being used in a physical manner?
    - a) Yes—go to 5
    - b) No—go to 6
  5. Are the play objects being organised spatially?
    - a) Yes—*Constructive play*
    - b) No—*Functional play*
  6. Are rules obviously being followed?
    - a) Yes—*Rule-governed play*
    - b) No—*Symbolic play*
- 

Figure 5.1: Key for classification of cognitive play (list format)

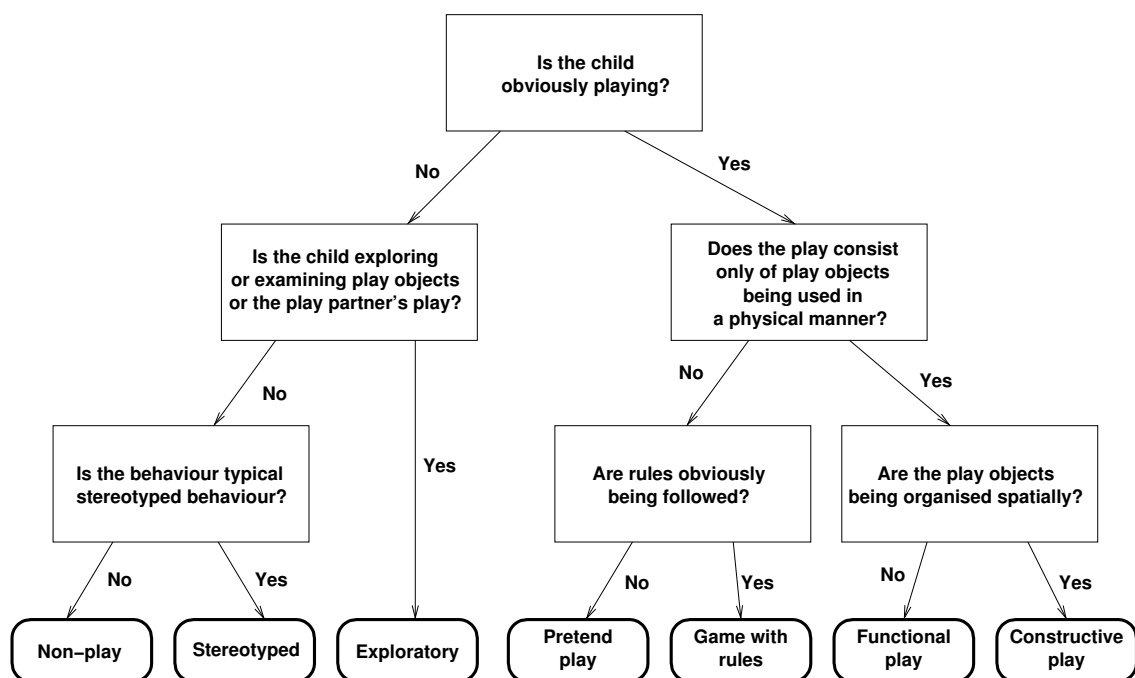


Figure 5.2: Key for classification of cognitive play (tree format)

- 
1. Does the child with autism show non-negative response or initiation?
    - a) Yes—go to 3
    - b) No—go to 2
  2. Does the child with autism show negative social behaviour?
    - a) Yes—*Negative interaction*
    - b) No—*No interaction*
  3. Is the child with autism only responding to the peer (i.e. not initiating)?
    - a) Yes—go to 6
    - b) No—go to 4
  4. Is there any non-negative response from the peer?
    - a) Yes—go to 5
    - b) No—*Unilateral*
  5. Is there clear and reciprocal interaction?
    - a) Yes—*Active-high*
    - b) No—*Active-low*
  6. Is there clear initiation by the peer and clear response by the child with autism?
    - a) Yes—*Passive-high*
    - b) No—*Passive-low*
- 

Figure 5.3: Key for classification of social interaction (list format)

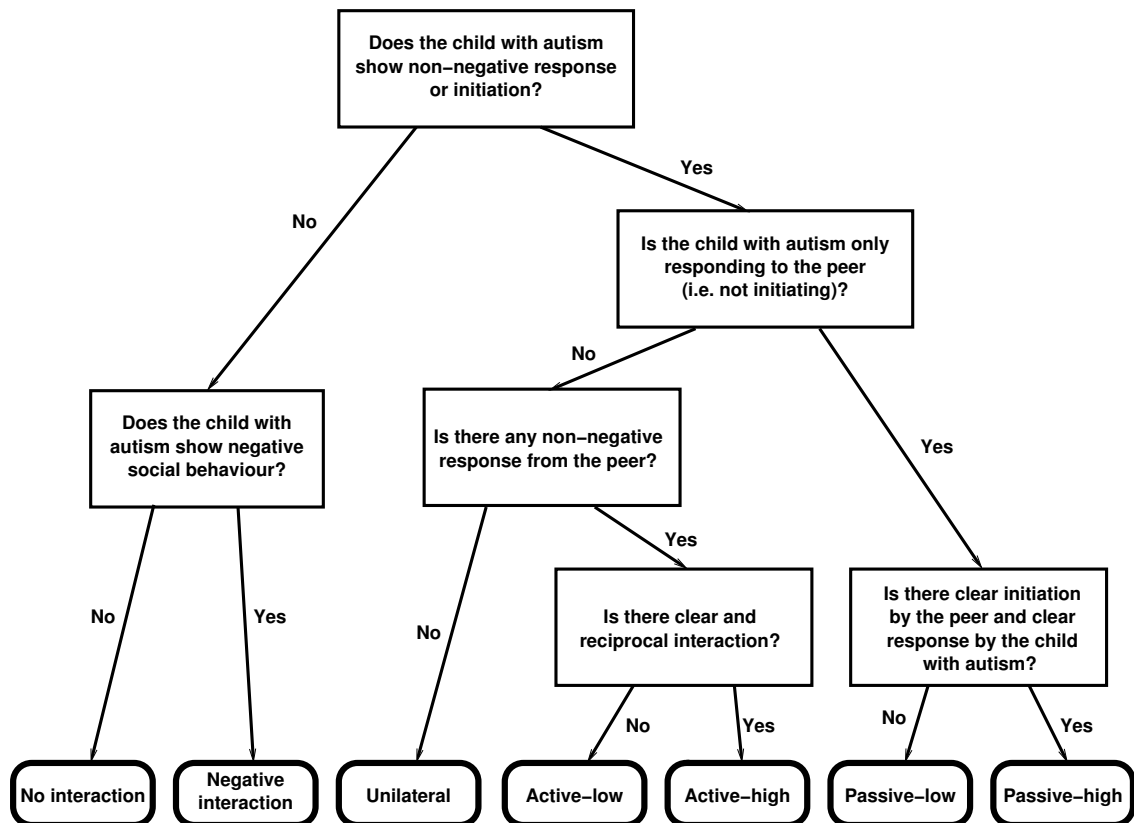


Figure 5.4: Key for classification of social interaction play (tree format)

## 5.8 Data coding

While the classification keys in the previous section provide a useful tool for simplifying and easing the consistent classification of the observed cognitive play and social interaction behaviours, and guided the design of a workable taxonomy of social interaction in children with autism, some further practical aspects of data coding must be considered.

The cognitive play categories and social interaction categories listed above (developed in subsections A.2 and A.3) are mutually exclusive sets of behaviours. That is, only one cognitive play behaviour was present at any moment of time, and only one social interaction behaviour was present at any moment. Since both the cognitive and social behaviours included no-play/no-interaction behaviours, at all times it was possible to assign a behaviour from each category to the observed behaviours.

The observed behaviour must be quantitatively recorded in such a manner as to allow analysis for visually or statistically significant trends (Whitley, 2002). Accordingly, the duration of cognitive play and social interaction in children with autism was recorded (real-time recording (Suen & Ary, 1989)). *Real-time recording* was used because it was found to be more accurate and more suitable than frequency recording in coding trials in this study. It was found that a suitable interval bout for frequency recording could not be determined due to the occurrence of frequent changes in play behaviour. Indeed, play activities shown by children with autism and typically developing children changed abruptly, naturally, and continuously from one play category to another. For example, a child with autism showed functional play such as pushing a car back and forth for two seconds, which then suddenly transformed into pretend play such as flying the car over an imaginary hill accompanied by vocalized gunfire sounds for three seconds. In this case, it would be difficult to categorize the play behaviour into one category in a time interval coding system.

An alternative that is sometimes used is to record the frequency of behaviours. Although it is often a useful measure, and, indeed, sometimes the best way in which the behaviour can be quantified, it is quite unsuitable for the types of behaviour being measured here. This is because of the rapid change in the play behaviours, which would result in meaningless high frequency counts. This can be seen using a simplified example: two children with autism who primarily engaged in non-play for the session, say for 330 seconds, with the remaining 30 seconds occupied by functional play. If for the first child, this functional play occurs in a single 30 second block, functional play would occur with a frequency of one. Meanwhile, if the functional behaviour of the other child occurs in six blocks of five seconds each, the frequency would be six. It would be unreasonable and incorrect to score the second child as engaging in six times more functional play.

As this is what the result would be if frequency was the measured quantity, it is clearly inappropriate here.

Therefore, the duration of cognitive play behaviours and social interaction behaviours was recorded and analysed. This was done by recording the times at which the category into which the behaviour would be classified changed. This time is the stop time of the previous behaviour and the start time of the next behaviour.

The researcher performed all the coding of observed behaviour in the five children with autism in the course of this study. Since there was only a single observer, the researcher, inter-observer reliability checking was not needed in order to be able to compare data coded by different observers.

This still leaves the question of reliability of coding by the single observer. There are three major concerns: firstly, the possibility of random observer error, secondly, the possibility of systematic and consistent observer error, and thirdly, the possibility of observer bias (a systematic error that is not the same over all sessions). All are potentially serious problems that can invalidate typical single-subject studies or studies with few subjects.

As far as the first is concerned, it must be noted that the present study differs from typical single-subject or small-number-of-subjects studies in that many data are available for both the pre-training and post-training phases. This allows the variation in coded behaviour to be determined statistically—essentially, not only can the mean behaviour be measured, but also the error in the measurement of the mean behaviour. This is discussed further in the following sections. For the moment, it is sufficient to realize that if there is significant random observer error, it will primarily contribute to an increased error in the measured mean behaviour, since random errors in individual sessions will tend to average to zero. Thus, random error is unlikely to lead to an incorrect statistically significant conclusion, but could result in the statistical variation being too large to obtain a statistically significant result. Random errors in coding can be checked for by carrying out a coding–recoding check.

After coding had been completed, approximately 10% of sessions were randomly selected for recoding. The level of agreement was measured by the fraction of the whole session for which the original coding and the recoding agreed exactly; that is, the behaviour was coded in the same category in both cases. The level of agreement between the original coding and the re-coding was 97%. The major part of the small amount of disagreement was due to small differences in the times at which one behaviour changed to another. It was also found that stretching or expansion of the videotapes due to heating in the VCR may have been responsible for a large part of these time differences. Accounting for this, the coding–recoding agreement could have been better than 98%. Due to the very small differences on recoding, the coding can be considered largely free

of random observer error. Since the primary conclusions are drawn from single scores for combined cognitive play behaviours and combined social interaction behaviours (as described in the following sections), errors in coding of less frequent behaviours that might have evaded detection by the coding–recoding check would not have any significant effect on the results.

The experimental design chosen is fundamentally robust against the second concern, consistent systematic error. Only differences are used to determine the effectiveness of the training—firstly, the difference between pre-training and post-training behaviour for each dyad, and secondly, the difference between trained and untrained dyads. Since consistent systematic error is, by definition, the same for all sessions, using differences rather than the absolute measurements automatically eliminates this potential source of error.

Finally, the possibility of observer bias needs to be considered—the possibility that knowledge of whether a particular peer is trained or untrained, or whether a particular session is pre-training or post-training affects the coding. A highly effective solution to this is to use a “blind” coder—that is, a coder who is not informed whether of not a session is a pre-training or a post-training play session, which peers are trained and untrained, and so on—to code all of the observations, or at least to test for systematic bias by the primary coder. While this would have been highly desirable, this was ruled out by budgetary constraints. Since it was not possible to use a blind coder, two steps were taken to reduce the possibility of systematic bias in the coding. Firstly, a coding system that used unambiguous and consistent rules—as described earlier—was adopted, and secondly, the videotaped sessions were coded in a random order, with the ordering determined by a computer-generated random permutation, after a long lag-time (approximately two years) to reduce observer recall of the sessions.

Overall, the cognitive play and social interaction behaviours of the children with autism in each trained and untrained dyad in indoor and outdoor settings were coded from the 53 videotapes (one tape for each SPS or SEDU setting per day). The cognitive play behaviour and social interaction behaviour were coded in separate passes through the set of videotapes.

## 5.9 Data analysis

Finally, it is necessary to consider methods by which it can be determined whether or not changes in the cognitive and social behaviour are statistically significant. Essentially, if one has a quantitative measure of the behaviour in the pre- and post-training phases, and a *quantitative measure of the error* in the measure of the behaviour—such as the *standard error* or other suitable *confidence interval*—then one can see how likely it is that the apparent change is a genuine change, and not a result of random variation. Such random variation can arise from

two sources. Firstly, random error in observation and coding, which should be eliminated or minimized (and, judging by the coding–recoding agreement noted above, such random error was small). Secondly, the actual behaviour displayed by the children is expected to vary; on any given day, a great number of factors can influence the child, such as his or her mood, how energetic she or he feels, what was watched on television that morning, and so on. In a naturalistic study, these factors cannot be controlled, and can be expected to cause variation. Therefore, it is necessary to collect data over a number of sessions to, firstly, allow the quantitative measure of behaviour to be determined, and secondly, to allow the error in that measurement to be determined.

Since a number of sessions, either before or after the training period, are to be used to determine a suitable measure of behaviour across all of the relevant session, the question arises as to what is the most suitable measure. The most commonly used would be the *mean* or average, the *median* or middle value, and the *mode* or most common value (for non-multimodal cases). An important point to consider is that behaviour that only occurs in a minority of sessions, whether positive or negative, could have a significant impact on the children with autism (or the peers). Therefore, the median and mode, which are relatively insensitive to such minority variations, are less appropriate measures than the mean, which is sensitive to such variations. (Conversely, one is sometimes most interested in the majority of the population, and choose the median as the best measure in order to exclude such extreme members of the population.)

Furthermore, it is difficult, if not impossible, to determine whether or not a change in variance of behaviour would be beneficial, detrimental, or neutral for a given behaviour. Thus, it appears that statistical tests that test solely for a difference in means would be the most appropriate.

Unfortunately, such tests generally either assume a normal distribution in the population (i.e., all possible behaviours) being sampled, or a large sample size. Since the sample sizes, while not very small, are still small (approximately 5 pre-training sessions and 12 post-training sessions per dyad), and there is little reason to expect a normal distribution of durations of behaviours (and, in fact, the distributions were non-normal in practice), these, at least at first, appear to be excessively strong assumptions.

However, since for any probability distribution with a non-infinite variance, the probability distribution of means of finite samples approaches a normal distribution (the central limit theorem (Feller, 1945; Kallenberg, 1997)), and, indeed, for most non-pathological distributions, the distribution of the mean approaches a normal distribution very rapidly even for only a moderate number of samples (Wonnacott & Wonnacott, 1969), statistical tests that assume that sample means are normally distributed should be applicable. While the usual rule-of-thumb is that a normal distribution can be assumed if the sample size is greater than

thirty, in practice, even samples as small as five or ten can be usefully close to normal (Wonnacott & Wonnacott, 1969), even for samples with distributions as profoundly non-normal as discrete uniform distributions.

A second common requirement of such statistical tests is that the samples be independent (although the existence of tests for *paired* samples can be noted). Since sessions were a week apart for each dyad, it can be safely assumed that they were independent.

There will, of course, be differences in the behaviour of individual children due to differences between the individual children. This makes it perilous to base conclusions on the absolute level of behaviour. However, the *change* in behaviour from the pre-training phase to the post-training phase is less dependent on such individual differences—equal contributions to both phases due to such differences are completely eliminated by subtracting the pre-training behaviour from the post-training behaviour to determine the change. Since the trained and untrained dyads played with the same children with autism, individual differences between children with autism will not affect the results. The comparison from which conclusions regarding the effectiveness of the training program can be drawn is trained peers against untrained peers.

Therefore, the primary statistical test employed in this work will be a simple comparison of means and standard errors in the means, to determine whether the difference in the means can be, with appropriate corrections for the small sample size, be statistically distinguished from zero. The details of this test are described in appendix B. If the means in question are directly obtained from a set of measurements, this is simply a two-sample *t*-test, but for a mean (over subjects) of such means (within subjects), it differs. Since this is omitted in many of the usual statistics textbooks, the details of the analysis are given in appendix B.

## 5.10 Overall scores for cognitive play and social interaction

Single combined scores for the cognitive play and social interaction can be obtained by assigning a numerical weight to each category and calculating the combined score as

$$S = \sum_{i=1}^N w_i d_i \quad (5.1)$$

where  $S$  is the combined score, and  $w_i$  is the weight for the  $i$ th category,  $d_i$  is the duration of the  $i$ th category, and  $N$  is the total number of categories. This allows a condensation of the categorical data into single cognitive play and social interaction scores. Suitable numerical weights must be chosen for each cat-

egory; the weights used are shown in table 5.6. The actual numerical values are somewhat arbitrary; however, the more desirable categories are (and must be) assigned higher values.

Table 5.6: Weights for cognitive and social sub-categories

Cognitive play		Social interaction	
Sub-categories	Weights	Sub-categories	Weights
Non-play	-1	Negative	-1
Stereotype	0	No interaction	0
Exploratory	1	Passive-low	1
Functional	2	Passive-high	2
Constructive	2	Unilateral	2
Symbolic	3	Active-low	3
Rule-governed	5	Active-high	5

### 5.10.1 Statistical software

Statistical analyses were carried out using MATLAB 7 (MathWorks, 2004). Since MATLAB, which was the main analysis tool used in this study, is likely to be unfamiliar to the reader, a brief description is warranted. MATLAB is a matrix-vector oriented software package for numerical calculations and data visualization, widely used in engineering and physical sciences, and sees some employment in behavioural research. It is in fact an interpreter for a general programming language, allowing extreme flexibility in visual presentation (i.e., graphing etc) and input and output of data; this was the main reason for its use. With the data available within MATLAB, statistical analysis is a simple matter. A statistics toolbox is available for MATLAB, and was used where appropriate.

Some preliminary and confirmatory analyses were carried out using SPSS 11 (SPSS, 2001).



## Chapter 6

### Study 1—Participant profiles and screening

No mechanically exact science of an individual is possible. An individual is a history unique in character. But constituents of an individual are known when they are regarded not as qualitative but as statistical constants derived from a series of operations.

---

John Dewey (Dewey, 1929, p. 249)

#### 6.1 Purpose of Study 1

An initial profiling and screening, designated Study 1, of children with autism and typically developing peers who were under consideration for participation in the main study in this thesis (Study 2) was carried out. This process was conducted during an orientation phase lasting approximately two weeks, in mid-May, 1999.

The primary goal was to collect background data on general behaviour, social interaction, and specific play behaviours in participants. This data will allow the results to be more readily compared to other studies. It is also important to screen potential participants to check if they are sufficiently representative of the typical range of children—if participants possess skills or abilities outside the usual ranges for children with autism or typically developing peers, then any results may well depend on these unusual abilities, and such results would not be generalizable to more typical populations.

In particular, it is important to describe the abilities and behaviours of the children with autism in some detail, so that the reader can judge the suitability of a similar peer-intervention for a given child with autism.

Before proceeding further, it is worthwhile noting that it was not necessary to reject any potential participants on the basis of the profiling and screening. The typically developing children were representative of the usual range of children of their background (their background is described in the next section). Two of the children with autism were relatively high-functioning, compared to the other three; one of these two perhaps only had borderline mild autism.

## 6.2 Participants

In total, nineteen children—five children with autism and fourteen typically developing peers—participated in the research reported in this thesis.

The five children diagnosed with autism were all boys, aged from three years and one month to six years and nine months at the time of their participation. These children with autism were recruited from two Special Education Developmental Units (SEDU-A and SEDU-B) and one Special Education School (SES) associated with SEDU-A. They were all Caucasian and from families where English was the only language spoken at home. All the five children with autism had been diagnosed by a local psychologist prior to the current research. Four of them (CA1, CA2, CA4, and CA5) attended their SEDU on a part-time basis for special educational services with other children with developmental delay. The other boy with autism (CA3) was enrolled in the SES on a full-time basis with other students with special needs. A brief summary of the participating children with autism is given in table 6.1

Table 6.1: Summary of participants: Children with autism

Designation	Gender	Age
CA1	male	3 years, 1 month
CA2	male	5 years, 5 months
CA3	male	6 years, 9 months
CA4	male	4 years, 8 months
CA5	male	5 years, 9 months

Fourteen typically developing peers (seven boys and seven girls, aged eight to nine years, designated P1 through to P14, with boys being the odd-numbered peers, and girls the even-numbered peers) were recruited from three grade three (year three) classes in two state primary schools (SPS-A and SPS-B). All of the children who acted as typically developing peers volunteered to take part in the study. Apart from one girl (P8) who was non-Caucasian of unknown background (possibly Maori or other Polynesian), all other peers were Caucasian. One boy (P7) had mild paraplegia.

Of these fourteen cross-aged peer players, ten acted as regular peer players (two for each child with autism). The other four students (P6, P7, P12, and P13)

were substitute or reserve peers, to replace regular peers who were not present for a scheduled session or withdrew their participation. In the event, P13 did not participate in any of the play sessions. Therefore, no details on P13 are reported in this study. Since the other reserve peers (P6, P7, and P12) did have contact with the children with autism, their profile and screening results are reported here. A brief summary of the typically developing peers is given in table 6.2 (excluding P13).

Table 6.2: Summary of participants: Typically developing peers

Designation	Gender	Age
P1	male	7 years, 11 months
P2	female	8 years, 9 months
P3	male	8 years, 8 months
P4	female	7 years, 10 months
P5	male	7 years, 6 months
P6	female	8 years
P7	male	7 years, 8 months
P8	female	8 years, 2 months
P9	male	7 years, 11 months
P10	female	7 years, 11 months
P11	male	8 years, 4 months
P12	female	7 years, 10 months
P14	female	8 years, 4 months

All schools and special education settings had similar Index of Relative Socio-economic Disadvantage (IRSED) scores (McLennan, 1998) from 952 to 1043, ranging from the 25% quantile to the 75% quantile, which places them in medium disadvantage areas. The socio-economic background of students in these two SPS was identified by school staff as mostly working class.

### 6.3 Procedure

Initially, ethical clearance was obtained for the project from The University of Queensland through the university's standard procedure, and also from Education Queensland, the state government department responsible for educational facilities and institutions controlled by the state government.

Next, the researcher approached most special education settings for early childhood at the start of the academic year and access was requested to children with autism to participate in the study. Two groups of participants, a group of typically developing children and a group of low-functioning children with autism, not Asperger syndrome, were searched in integrated early childhood education settings in a major Australian city. Integrated childhood education centres were defined as centres where typically developing children are placed together with children with disabilities. Integrated centres were targeted; a) for

ease of access to both groups of children, b) to minimise the impact of lack of familiarity with play partners causing unnecessary distress to both groups of children.

Unfortunately, most children with autism were typically located in segregated settings (e.g., special education schools) in the local educational system. This segregated education system for children with disabilities prevails in Queensland, which has been evaluated as the least inclusive Australian state (Seymour, 2001; Wills & Jackson, 2001). Some children with autism in local preschools (integrated settings) were located. However, it was not possible to implement this study in each local preschool due to limitations of time and budget.

Finally, young children with autism who were in segregated settings, the SEDUs and SES, were obtained for this research. As mentioned in the introduction (chapter 1), a number of strictures for practical reasons were imposed in the process of obtaining school supports.

When the researcher approached the SEDUs and SES, two state primary schools (SPS) were also contacted by the researcher to recruit typically developing peers to act as play partners. The special education settings were located adjacent to the primary schools. In accordance with APA ethical requirements, gatekeeper approval to conduct the study was obtained from the school authorities via the Teachers-in-Charge of the SEDUs and the principal of the SES. Consent for participation in the research was obtained from the parents of all children according to the principles of the American Psychological Association, and the human ethics research guidelines of The University of Queensland as well as obtaining ethical clearance from Education Queensland (the state government education department).

After support was obtained from the institutions, further consent was obtained from parents for individual child participation in the research. Parents were informed about this research (e.g., safety preparation for risk, minimization of disruption to school programs) and were informed of their and their children's rights to withdraw from the research. Parents were also informed, and consent was obtained, that their children would be observed playing by the researcher and that information relating to their children would be collected from the gatekeeper, and the child's teacher. Consent was obtained for the participation of both children with autism and typically developing peers. All participants were able to withdraw at any time. No parents withdrew consent during the course of the study.

Information letters and consent forms are presented in appendix D.

### 6.3.1 Screening play behaviour and social interaction

### 6.3.2 Children with autism

The school-held data (school records) relating to the children with autism provided a profile of participants. School records of the five children with autism in the SEDU-A, SEDU-B, and SES were examined to identify what data, if any, the school had collected relating to the child's play behaviour and interaction with peers on his general behaviour descriptions. There were two main considerations in examining the children's school records. One was that general data could be used as a component of the screening process to eliminate children from the study with documented behaviour or discipline problems that were extreme or atypical within the constraints of the cohort. It was also hoped that school records might also contain some additional references to the child's performance level or patterns of play which might serve as a baseline in Study 2 in this research.

Instruments such as Childhood Autism Rating Scale (CARS) (Schopler, Reichler, & Renner, 1988), and a Play History Inventory (PHI) were employed for obtaining descriptive quantitative data for each child with autism. The Childhood Autism Rating Scale (CARS) (Schopler et al., 1988) was employed as the first step to assess the level of autism of the five children with autism in the SEDUs. Although CARS does not provide a total diagnosis, as noted in the manual, it was chosen for two reasons: firstly, it is an easy and fast tool for special teachers to evaluate the child's behaviours, and secondly, the general outline of social and behaviour information about the child may be screened, rather than focussing on single behaviours. Teachers completed the CARS instrument to provide a profile of behaviour overview in each child with autism.

The Play History Inventory (PHI), was designed for this research by the researcher to provide a profile of the participants' cognitive and social behaviours in play settings. The PHI was distributed to parents as they dropped their children off at the SEDU at the start of the teaching day. The aim of the PHI was to collect information about play behaviours in their children with autism before the peer-mediated play intervention (Study 2) in this research. Completed instruments were collected after two weeks. There was a 100% response rate. The PHI is presented in appendix E.

In addition, teachers were informally interviewed to determine if there were any particular problems identified in particular children with autism and to identify any characteristics of each child with autism not captured by the screening instrument. While paper instruments were being completed, each child with autism was observed in the SEDU and SES for two to three hours.

### 6.3.3 Typically developing peers

For peer players, the pool from which the participants were selected consisted of volunteers from the three classes. All students in the classes were given the opportunity to volunteer, and most did so. Therefore, the participants cannot be regarded as highly motivated atypical students on the basis of their volunteerism.

Since the number of volunteers greatly exceeded the required number of participants, the fourteen peers comprising the peer player group were chosen on the basis of recommendations by the class teachers during the orientation phase of this research. Students described as “good”, “compliant”, and of “easy-going personality rather than serious character”, and without any history of aggression were selected. Ten students from the pool of fourteen potential peer player members were selected as regular peer players. The other four students were reserved as substitutes to replace regular peer player in the event of absence over the study period. However, only three reserve peers were needed during the whole period of this research; one of the reserve peers did not participate in any of the dyad play sessions; results for this peer, therefore, are not included in the results of the peer screening described in this chapter. Teachers’ recommendations and the school program schedules for each peer player were considered in order to minimize disruptions in the school activities of the peers.

Thirteen typically developing peers, therefore, eventually participated as trained and untrained peers in this peer-mediated play intervention research. A gender balance (half female and half male in the original group of fourteen peers, of the thirteen who participated in play sessions, seven were female and six were male) was maintained. As a precautionary screening, the classroom behaviours of the peer players were observed by the researcher during the orientation phase.

Moreover, a subset of a standardized, norm-referenced scale—the Social Skills Rating System (SSRS) (Gresham & Elliott, 1990), including both teacher-rating and elementary self-rating—was used to screen the peers in terms of their measured social behaviours or prosocial skills, potential problem behaviours and academic competence in these peer players.

The Social Skills Rating System (SSRS) (Gresham & Elliott, 1990) was given to the class teachers so that the self-rating portion could be conducted in their classrooms. While the students were completing their forms for SSRS, the researcher provided the class teachers with minimal assistance such as distributing the forms to the students and collecting the forms in their classrooms. The students were asked to ask about any new or unfamiliar words in the form. In addition, the class teachers were asked to complete the SSRS teacher-rating forms to provide information about the peers’ social behaviours.

Informal discussion with the class teachers were also conducted to determine if there were any possible difficulties to support and implement this peer-

mediated play intervention of this research, as well as to identify any possible characteristics of the peers not captured by the screening instrument. Furthermore, social behaviour of the peers was observed for a couple of hours in their school activities during this orientation phase.

## 6.4 Instruments

### 6.4.1 The Childhood Autism Rating Scale (CARS)

Since 1971, the Child Autism Rating Scale (CARS) has been developed to identify children with autism, and to distinguish them from children with other developmental disabilities without autism. The usage of the CARS has been broadened from trained diagnosticians in specific psychological test sessions to other professionals including special educators in classroom observation and parent reports (Schopler et al., 1988). Despite its age, CARS is still the best available and most widely used standard instrument for the identification of children with autism.

In the Childhood Autism Rating Scale (CARS) (Schopler et al., 1988), the 15-item behavioural rating scale covers:

- Relating to people
- Imitation
- Emotional response
- Body use
- Object use
- Adaptation to change
- Visual response
- Listening response
- Taste, smell, and touch response and use
- Fear or nervousness
- Verbal communication
- Nonverbal communication
- Activity level
- Level and consistency of intellectual response
- General impressions

The reliability and validity of CARS have been evaluated (Schopler et al., 1988). For internal consistency reliability, coefficient alpha obtained was 0.94. An average inter-rater reliability of 0.71 (indicating good agreement between the raters), as well as test-retest reliability of 0.88 ( $p < 0.01$ ) and the means (second evaluation  $\bar{x} = 31.5$ ; third evaluation  $\bar{x} = 31.9$ ) (indicating the stability of the CARS score over time) were obtained. In validity evaluation of the CARS, criterion-related validity was  $r = 0.84$  ( $p < 0.001$ ) (indicating high validity

through a comparison of total rating scores between clinical and diagnostic sessions) (Schopler et al., 1988).

Recognising the inconsistent use of diagnostic criteria and resulting confusion in the diagnosis of autism, it has been noted that other factors, such as individual behaviour problems, medical symptoms, and any other unique characteristics must be also be considered; perhaps evaluated by additional instruments (Schopler et al., 1988).

#### **6.4.2 The Play History Inventory (PHI)**

The Play History Inventory (PHI) was devised to provide a profile of the behaviour of children with autism in play settings. The PHI was designed for this research as a checklist to provide an overview of the child's functioning over four domains that are considered in the literature to be key characteristics for the assessment of children's play. It is comprised of two parts: part one consisting of 25 dichotomous items that asked parents or teachers to evaluate the child's play according to characteristics spread over the five elements of the cognitive dimension of play (six items), negative interaction (three items) and passive interaction (two items), positive and active social interaction (seven items), and play micro-skills (seven items) (see table 6.3). The remainder of the instrument contains items related to children's play with family members, and any past experiences with play therapy or interventions. The questionnaires related to this instrument are available in appendix E.

#### **6.4.3 The Social Skills Rating System (SSRS)**

The Social Skills Rating System (SSRS) was designed to ensure social competence and adaptive functioning of preschool, elementary (primary), and secondary students at school and at home. Focusing on positive behaviours or prosocial skills, the SSRS has been used a tool for screening, classification and intervention planning (Gresham & Elliott, 1990).

The SSRS consists of the three domains of social skills, problem behaviours, and academic competence. The Social Skills domain has five subscales:

- Cooperation
- Assertion
- Responsibility
- Empathy
- Self-Control

The Problem Behaviour domain includes three subscales:

- Externalising problems
- Internalising problems
- Hyperactivity



Table 6.3: Domains of the Play History Inventory (PHI) test instrument.

Domain	Element	Description	Item numbers (total)
Cognitive dimension of play	Exploratory	Investigatory behaviour using sensorimotor	1–6 (6)
	Functional play	Physically appropriate using objects in repetitive manner	
	Constructive play	Using object in some spatial format to create or design something	
	Symbolic play	Using self or object in make-believe manner	
	Rule-governed play	Using objects with some rules with other people	
Negative interaction	Solitary play	No interaction	9, 14, 16 (3)
	Challenging behaviour	Negative interaction	
	Onlooker	Social awareness	
	Parallel play	Passive imitation	
Positive and active interaction	Group play	Involvement in a small group with others	8, 11–13, 15, 17, 18 (7)
	Positive interaction	Active verbal and non-verbal interaction with others to suggest (initiate) and accept (respond)	
Play micro-skills	Getting attention	Calling name or eye-contact	19–25 (7)
	Eye-contact	Maintained eye-contact for interaction	
	Verbal and/or motor interaction skills	Showing, sharing, turn-taking, and asking	
	Prosocial skill	Praising	

Finally, the Academic Competence domain rates student academic functioning through measurement of reading and mathematics performance, motivation, parental support, and general cognitive functioning.

The SSRS has demonstrated a relatively high degree of scale homogeneity for internal consistency, with median coefficient alpha reliability (also known as the Cronbach alpha estimate) of 0.90 for the Social Skills Scale, 0.84 for the Problem Behaviours Scale, and 0.95 for the Academic Competence Scale. The SSRS also shows good to excellent temporal stability for Teacher forms and the Parent Social Skills and Subscales, with test-retest reliability of 0.85 (teacher) and 0.87 (parents) for social skills, 0.84 (teacher) and 0.65 (parents) for Problem Behaviour, and 0.93 (teacher) for Academic Competence, with retesting four weeks after the original testing. A test-retest reliability coefficient of 0.68 was obtained for Student self-ratings of Social Skills (Gresham & Elliott, 1990).

## **6.5 Children with autism**

### **6.5.1 School records**

Each special educational setting (SEDU-A, SEDU-B and SES) maintains records profiling their students. While the intent of these records was not to collect data on the play behaviour of children with autism or their interaction with peers, it is still useful and worthwhile to search these records for such data. In particular, it was hoped that general data could be used as a component of the screening process to eliminate children from the study with documented behaviour or discipline problems that were extreme or atypical within the constraints of the cohort.

Play behaviours of the five children with autism who participated in this study were not specifically recorded but generally distributed with other behavioural characteristics in their school record files. Furthermore, information on interaction behaviours with other peers was scarce or absent. The data in the files regarding play and peer social interaction was relatively unenlightening for the purposes of this study. Data in special education settings were primarily focused on self-help skills such as eating and toileting, and communication skills with adults. They also included references to pre-academic skills (e.g., the ability to discriminate different colours), and gross and fine motor skills (e.g., gripping a pencil). On the basis of play-based curriculum, a limited amount of information on the play and peer social interaction of the five children with autism was available in the existing data files kept by the special educational settings. These data are summarized below.

### **Child with autism CA1**

The school reports in the files contained the following details about CA1 (this is a condensed paraphrase of relevant portions of the school records):

He plays by himself. He loves to listen to music tapes and dance. He also loves to watch the “Wiggles” videotape and laughs at the right time. He does not show any language. He shows babbling with no identified words. He is interested in books that make sound, but shows no interest in toys for fun. He enjoys playing peek-a-boo games at home. He screams if his brother cries because he is not tolerant of loud noise. He requests things by biting his parents on the leg, but does not take them to what he wants. He may show some aggression or tantrum such as pinching, scratching, and screaming when he cannot control a situation. He has great difficulty remaining seated in one spot because he prefers wandering around. He exhibits self-stimulatory behaviours such as twirling and rolling any object available to him in his hands.

The report relating to CA1 was relatively superficial and described general interests rather than play behaviours. No records about interaction with other peers appeared in his file. This paucity was at least partly due to the very short period of time (about three months) that CA1 had been receiving special education services. Two main issues were outlined. Firstly, verbal and non-verbal communication skills in CA1 were not appropriate for his age (three years and one month). For example, biting behaviour would be unlikely to be recognised for its communicative intent by people other than his parents or others already familiar with his behaviour. CA1’s use of challenging behaviour including aggression and tantrum seemed to intended to express his feelings or to communicate with others in order to control a situation. His interaction partner may be required to guess the cause of such behaviour in order to understand the communicative intent. Secondly, CA1 seemed to be a typical “active wandering” child with autism who has difficulty remaining seated or in one spot for toy play.

### **Child with autism CA2**

He (CA2) is interested in trains, blocks, drawing, and some numbers and letters, and prefers toys that are brought from home. In particular, he obsessively plays with trains, especially Thomas the Tank Engine, all day long if allowed. He only wears clothes with Thomas the Tank Engine and Friends or Bananas in Pyjamas characters or logos. When bored or distressed, he tends to obsessively engage in counting and numbering. He can play alone for a short time without intermittent adult contact, but not with peers. He also plays with his

brother or mother. He appears to enjoy gross motor activities and plays well on familiar outdoor equipment, but requires prompting to explore alternatives to the swings and trampoline. He has markedly impaired communication skills associated with poorly developed language. He demonstrates echolalic speech and self stimulatory repetitive behaviour such as flicking and rocking. His spontaneous and personal speech is mostly incomprehensible, but some isolated words and songs are clear. He is likely to use non-verbal means of communication such as pointing. He can express himself appropriately when he is motivated by using gestures and words but does not do so consistently. He has little concept of turn-taking, waiting, or sharing. Generally, he is very self-contained and passive unless others are insistent on interaction.

Little information about indoor play behaviours in CA2 was noted on his general behaviour descriptions. CA2 appeared as a typical boy who showed typical autistic behaviours (echolalia, pointing, and remarkable obsessive behaviour with some particular objects) and no play with other peers (solitary play). It was indicated that CA2 might show some social skills such as turn-taking and sharing, but only when adults' prompts were provided. Useful information on his outdoor play was obtained.

### **Child with autism CA3**

He (CA3) spends a lot of time spinning and tapping with objects, and jumping or running around. He enjoys dressing-ups, and likes to wear army camouflage pants and football boots. He is very wary of being enclosed in an environment such as a tunnel, cubby house, or under a "parachute". However, he enjoys independently bike riding, scooter riding, swinging on the swing, and climbing. He skates well with good balance without assistance and shows no fear of falling. He prefers to move away from others in the playground. He can respond by smiling to familiar classmates. He has no verbal communication, but can communicate simple needs by gestures (by physically handing an adult what he wants or by leading by the hand), crying and growling to express his frustration or displeasure. He has excellent observation skills; he is able to find a desired object or toy across the room.

According to CA3's school records, he seemed to show little appropriate indoor toy play, with toy play consisting mainly of repetitive stereotyped behaviour with some objects. CA3 was likely to be an outdoor player with excellent gross mo-

tor skills and balance. In relation to interaction with other peers, his predominant “socially alone” behaviour was reported, along with some indications of social awareness (e.g., smiling). Like other children with autism, CA3 interacted with adults (e.g., non-verbal communication such as hand leading to get what he wanted).

#### **Child with autism CA4**

He (CA4) is interested in blocks, puzzles, dolls, and kitchen toys. He can play with blocks for a long time and shows a reasonable attention span in self-selected tasks. He has a tendency to line things up or stack items together but rarely builds anything recognizable. He is able to complete a tower of seven bricks and can build a three-brick bridge spontaneously. However, he shows limited symbolic play, imagination, and fantasy play. “Some delay” was indicated on a Symbolic Play Test according to the occupational therapist. He is “happy to play by himself” (sic). He occasionally joins in with others although his eye contact skill is poor. However, he does not share items of interest or display any intentional spontaneous communication. His self-care and gross motor skills are normal, but his fine motor skills are limited by the difficulty of engaging him in them. His language skill is very limited. He sometimes brings things to show. He attends a local preschool for two days per week in the afternoon. At home, he usually plays with siblings, but very occasionally played with other children.

For CA4, his cognitive skills shown during toy play (e.g., functional and constructive usage of some toys) and ability to interact with peers seemed to be higher than in CA1, CA2 and CA3, although details were not clearly reported in his school records. He appeared to be interested in various toys, rather than being obsessive about particular items. Moreover, symbolic play behaviour, although it was described as being limited, was reported. In relation to interaction with other peers, CA4 seemed to show parallel play (proximity) among other children, rather than only solitary play. However, the level or kind of his social interaction with peers was very superficially described in his file and could not be clearly determined.

#### **Child with autism CA5**

He (CA5) is interested in blocks, cars, trains, trucks, play dough, and painting (although his drawing, writing, and painting skills are limited). He prefers to build with Lego by himself rather than with others. He shows some repetitive play behaviours such as talking on the

phone. His fine motor skill is poor and gross motor skill is delayed. Sometimes, he plays with other kids and his uncle, but does not like it when the other person dominates the game. He has difficulty sharing and taking turns. Parents report that they obey most directions given by him. He often appears to observe rather than act as a participant. He uses his mimic skill to learn new words and gestures. He copies teacher's and other children's actions. He has some understanding of humour, with occasional appropriate laughing. He needs verbal and physical prompts to apply himself to tasks that are not self-initiated. He attends a local preschool for two days per week in the afternoon. The regular preschool teacher points out that he accepts one peer into his play with construction activity, although he is not seen in a group play situation with other children.

Like CA4, CA5 seemed to have relatively higher play skills and social interaction with peers than CA1, CA2 and CA3. His observation (e.g., onlooker behaviour) and imitation possibly suggest his learning style. However, no firm conclusion about his level of play behaviour and interaction with peers could be drawn from the general descriptive information about his activities. For example, his talking on the phone might be either functional play, interpreted as simple repetitive play behaviour, or might be symbolic play, interpreting as carrying on imaginary conversations. In relation to interaction with peers, CA5 did sometimes interact with them, both in his SEDU and local preschool settings. However, the degree of interaction was not clear.

### **Summary**

In summary, four results may be drawn from the school records kept by the special education settings. First, in spite of generally delayed play behaviours, heterogeneous abilities were noted in the five children with autism in this research. They seemed to have various usages of play materials in both indoor settings (from simple twirling to appropriate talking on the phone) and outdoor settings (from exploring some equipment to appropriate use of them). Second, although a degree of stereotyped behaviour or challenging behaviour is expected, and was indicated for most of the five children with autism, it was not universal in this sample, with none reported for CA4, and very little for CA5. Thirdly, these five children with autism were reported as usually "being alone" at the special educational settings, although CA4 and CA5 did sometimes spend time with or among peers (physical proximity). Otherwise, they seemed to mainly interact with adults. This social difficulty with other peers was a common element in all of the children. Finally, CA4 and CA5 were relatively high-functioning when compared with CA1, CA2 and CA3.

There were no systematic procedure or criteria for recording the play behaviour and interaction with other peers in these special education settings. The records consisted of an ad hoc collection of observations on play activities. Play behaviour of children with autism was broadly subsumed with other general behaviour descriptions on the play-based curriculum. Interaction with other peers was randomly and vaguely described. Therefore, more systematic screening instruments focussed on play and interaction skills were required for this research.

### **6.5.2 Profile from CARS**

Although all of the five subjects in this study had been diagnosed as having autism by local psychologists, it is worthwhile to test subjects using a standard instrument—in this case, Childhood Autism Rating Scale (CARS) (Schopler et al., 1988)—to obtain a uniform and standard assessment of the subjects. CARS is a brief retrospective rating of fifteen behavioural domains. CARS is scored as a simple summation of 15 four point scales, and as such, scores can range from 15 to 60 points. A score of 15 indicates no detectable autistic behaviours while a score of 60 indicates quite aberrant behaviour typically associated with severe autism.

Special education teachers completed the CARS instrument to provide a profile of their perceptions of the children's classroom behaviour in the SEDUs and SES. Four out of five children with autism (CA1, CA2, CA3, and CA5) in this study were scored as having severe autistic behaviours by special education teachers. Unexpectedly, one of child with autism, CA4, received a score indicating borderline mild autism at worst (see table 6.4). However, as noted in the CARS manual (Schopler et al., 1988), CARS is insensitive as a sole indicator of autism and needs to be used in conjunction with other procedures. Therefore, this test result cannot be read as a diagnosis of non-autism. Certainly CA4 appears to at least exhibit some of the characteristics of a child with autism. In addition, considering that children with autism who are only marginally autistic would be more likely to obtain early benefit from, and would be more likely to be included in inclusive education sooner, this test result is inadequate reason to exclude CA4 from further participation. Therefore, CA4 was retained as a subject.

### **6.5.3 Profile from the Play History Inventory (PHI)**

The Play History Inventory (PHI), a behavioural checklist marked on a dichotomous scale, was devised to provide a profile of play behaviour of the children with autism in this study. This instrument was particularly designed to provide an overview of the child's functioning in assessing children's play. It consisted of two parts. Part one was designed to evaluate the child's play according to char-

Table 6.4: CARS results

Designation	Age	Autistic behaviours (CARS)	
	Y/M	Score	Level
CA1	3/01	50.0	Severely autistic
CA2	5/05	51.0	Severely autistic
CA3	6/09	41.5	Severely autistic
CA4	4/08	28.0	Non-autistic
CA5	5/09	41.0	Severely autistic
Score range			
15–29.5		Non-autistic	
30–36.5		Mildly-moderately autistic	
37–60.0		Severely autistic	

acteristics spread over the five domains of cognitive dimensions of play, negative interaction, passive interaction, positive and active interaction, and play micro-skills. The remainder of the instrument was designed to collect information related to children's play with family members, and any past experiences with play therapy or interventions. The PHI was described in subsection 6.4.2.

### Play History Inventory (PHI) part 1

In order to obtain a simple quantitative value for each of the four dimensions of play included in part one of PHI (see subsection 6.4.2), responses of “yes” and “sometimes” for questions in the positive dimensions were assigned a value of one, “yes” and “sometimes” responses for questions in the negative dimension (negative–passive interaction) a value of  $-1$ , and “no” responses a value of zero. Higher scores indicate higher functioning. Scores for the five children with autism are given in table 6.5.

Table 6.5: PHI part 1 results

Domain	CA1	CA2	CA3	CA4	CA5
Cognitive dimension of play	3	2	2	5	5
Negative–passive interaction	–4	–3	–3	–4	–1
Positive–active interaction	2	1	5	3	4
Play micro-skills	1	1	1	2	1
Total PHI part 1 score	2	1	5	6	9

Using part one of PHI, scores for play and interaction characteristics in children with autism varied from one to nine out of a total range of  $-5$  to 20. The total PHI part one scores is compared with the CARS scores for the children with autism in figure 6.1. In order to compare the CARS and PHI scores directly, the scores can be normalised so that both cover a range from zero to one (instead of 15 to 60 for CARS, and  $-5$  to 20 for PHI). Since higher CARS scores indicate a higher level of symptoms of autism, while higher PHI scores indicate a higher level of play and interaction skills, the PHI scores are also reversed, so that the



extreme scores of  $-5$  and  $20$  on the original PHI scale correspond to the normalised scores one and zero, respectively. The formulae used for computing the normalised scores are

$$\text{CARS}_{\text{normalised}} = (\text{CARS}_{\text{original}} - 15)/45 \quad (6.1)$$

and

$$\text{PHI}_{\text{normalised}} = (20 - \text{PHI}_{\text{original}})/25. \quad (6.2)$$

The normalised scores for the two instruments are similar.

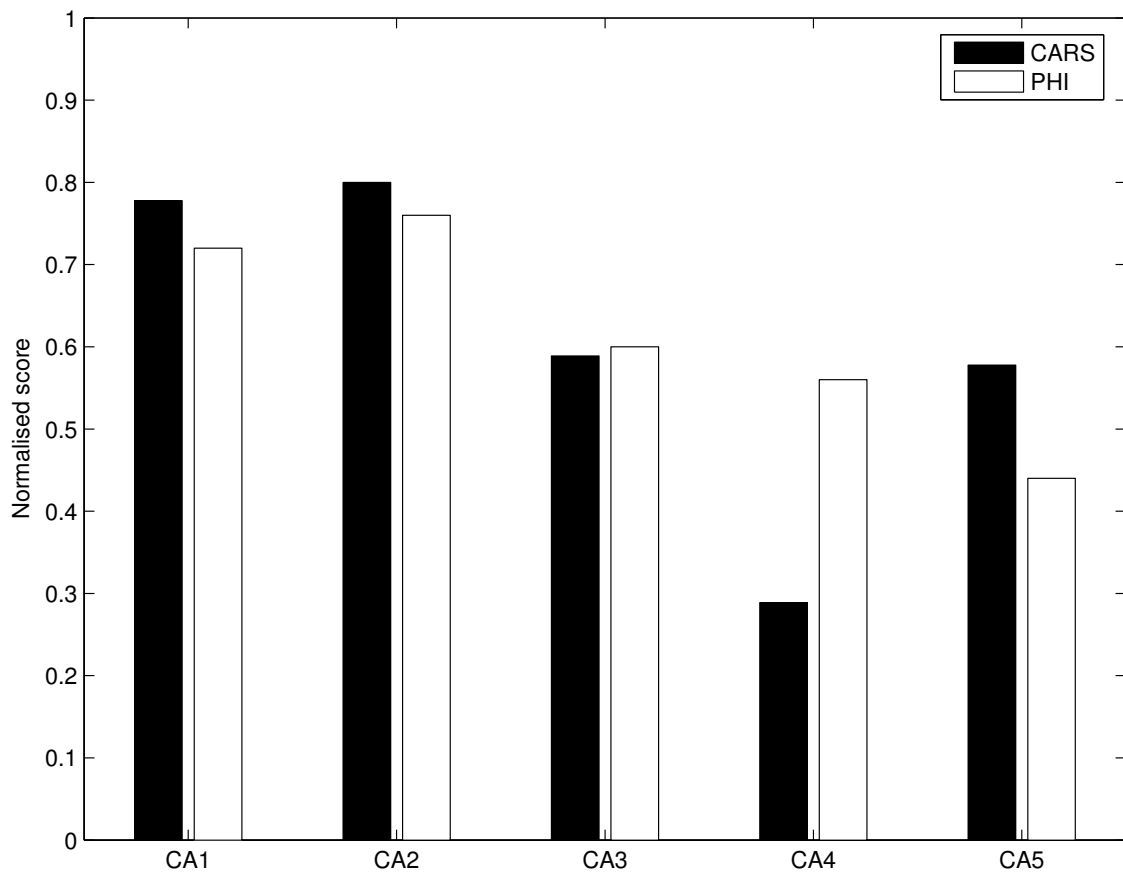


Figure 6.1: Normalised CARS and PHI scores

### Play History Inventory (PHI) part 2

Four out of five sets of parents with the children with autism in this study answered positively that their children with autism could play, with the parents of CA2 answering negatively because his play behaviours were not age appropriate, indicating that this answer should actually be read as positive, but with the additional information that CA2's play behaviour is not age appropriate. Parents gave details of play behaviours and social interactions of each child with autism in PHI part two. These parents' reports are briefly summarised below.

**Child with autism CA1**

CA1 mouths, touches, twirls, or throws toys but does not use them in either a functional or symbolic manner, although he sometimes likes to roll a ball or play with musical toys. His favourite place to be is outside. He often runs around outside and touches leaves, trees, and so on. He also loves playground equipment, especially swings and trampolines. He sometimes shows a positive response to family when he is invited to play with. He sporadically watches others' play activities but does not join them when he does. He sometimes displays positive interaction (e.g., hugging, holding hands). He also exhibits aggressive tendencies includes hitting, pinching, kicking, running away, screaming, and throws objects when he is either angry or excited. He occasionally makes eye-contact to get attention. At home, he chases his brother, and they roll around together, and he laughs a lot as they play. His play duration can be from a few minutes to 10–15 minutes with his brother at home. When he is excited about play at home, he laughs a lot and flaps his arms more than usual. When he gets upset, he screams, hits out, and throws things. He also spends a lot of time jumping on the trampoline and playing on the swings. He has not participated in any other play intervention before.

As the youngest child with autism in this study, play in CA1 was likely to be simple. CA1 seemed to mainly engage in exploratory behaviour with objects (e.g., mouthing), except rolling a ball and using musical toys. He could use some playground equipment in outdoor settings (e.g., swing and trampoline). In relation to social interaction, his family were his main interaction partners to play with. CA1 and his brother engaged in rough-and-tumble play at home. Due to his lack of verbalization, he seemed to use non-verbal communicative expression in both positive and negative ways. For example, he threw objects not only for anger but also to show excitement. It may imply that, as his parents' indicated, this communicative interaction behaviour in CA1 should be judged according to the situation, rather than simply being interpreted as challenging behaviour.

**Child with autism CA2**

CA2 touches and twirls toys. His play is not age appropriate. He is obsessive about his Thomas the Tank Engine toy train. If he wants others to play his way with his train toy, he could show them how to use it appropriately, although this is rare. He sometimes talks loudly and unintelligibly. He plays with his train or toy car in the sandpit and sometimes plays on the swings outside. He watches others' play activities but does not join them, and ignores others' interactions. He

responses to only family—no one else—to play with. He can engage in play for five to ten minutes at home. He prefers to play with his mother or brother. When he plays with his mother at home, it is usually chasing, tickling, or reading a story. He displays rocking behaviour and flapping of his hands when he enjoys the play. Usually, he does not express anger when playing. He has participated in other research on autism before, but not in any play intervention.

As described in school records earlier, CA2 shows obsessive behaviour about Thomas the Tank Engine. His mother reported that he is able to use some outdoor play equipment. Other types of cognitive play behaviours such as symbolic play were not observed. In addition, he usually avoids social interaction with other people (solitary play), except for his mother and brother. However, there was one distinctive social behaviour of CA2 reported by his mother; when CA2 wanted to play with others, he could demonstrate how to use the object properly. This may indicate possible self-motivated initiation without prompts to interact with others.

### **Child with autism CA3**

CA3 usually licks, mouths, touches, twirls, and taps toys by himself. However, he does not show any functional or symbolic use of them. He is sometimes near or among other children in outdoor settings, but does not interact with them. He plays by himself or with family (especially with his brother and sister) by using a trampoline or swings or chasing at home. He exhibits positive interaction (e.g., holding hands) and negative interaction (e.g., hitting, pinching, running away). He has no verbal behaviour but does produce a little vocalization. He can suggest and respond to play. When he enjoys playing at home, he smiles, laughs, jumps up and down, and when he is angry, he growls and cries. He can play for a long time on a trampoline at home, as long as a family member stays with him. He has participated in a play program in a hospital before which was designed with different activities, textures, and toys in occupational therapy.

CA3 was the oldest child with autism in this study. Behaviours reported by his parents, such as self-stimulatory or exploratory behaviour with toys (e.g., licking, mouthing, tapping) and the lack of appropriate toy agreed with the school records. His challenging behaviour (negative interaction) was also reported. His parents reported that the effects of his past play therapy on his play skill were not clear, but it would be good experience for CA3 to engage in this kind of therapy. In relation to social interaction, he interacted with his family members in gross

motor play (e.g., jumping on the trampoline and chasing). Like other children with autism, he rarely interacts with other peers.

#### **Child with autism CA4**

CA4 shows some exploratory behaviours with toys (e.g., mouthing, twirling). He also shows functional usage of toys such as building block castles, bouncing balls, running a cars backwards and forwards, filling buckets with sand, jumping on a trampoline, swinging, biking, watching videotapes, and so on. He also engage in doll play with his sister at home. He sometimes plays some games such as soccer with others. He demonstrates some unintelligible verbalization. He sometimes shows tantrums such as screaming, shouting, and crying. He sometimes shows interactive behaviours such as eye-contact to get attention, sharing toys, and taking turns at home. He mostly plays by himself or near others. Otherwise, he prefers to play with his sister. He shows from an average of 30 minutes to “obsessively” long periods of play with one toy at home. He and his sister copy each other doing naughty and destructive things when they play together. His emotional expression of excitement and anger is very clear and typical at home. He has not participated any other play intervention before.

Compared to the other children with autism in this study, CA4 seemed to have more appropriate play skills, using various play materials in functional, constructive, or symbolic manners. As described earlier, these play skills in CA4 was also indicated in the records of the SEDU. Also, he seemed to have more social skills although they were shown “sometimes”. Even reciprocal imitation in play with his sister for fun, like typically developing children do in their play, was pointed out. These abilities in CA4 might be reflected on his borderline range of mild autism in his CARS score. However, his social interaction seemed to be limited to his family members. The deficit of social interaction with peers in CA4 was similar to other children with autism.

#### **Child with autism CA5**

CA5 shows simple play skills in functional and symbolic manners with various play materials such as toy trucks and cars, blocks, dolls, balls, bikes, swings, and sandpit toys, by himself or near others. He does not exhibit self-stimulative behaviours with toys. He can engage in doctor and patient play, as well as chasing games with his sister. He sometimes showed immediate echolalia, and could simply communicate with others to show his play, although he sometimes displayed a tantrum with screaming, shouting, and crying. He and his sister play

together by chasing each other, riding bikes, and playing with a doll house at home. He can engage in play from 10 to 30 minutes. He has not participated any other play intervention before, and attends a local preschool on a part-time basis.

CA5's play skills in both functional and symbolic manners were recognized by his parents. Like CA4, CA5 seemed to be able to use various play materials, as well as play with his sister at home. Although he attended a local preschool, he did not seem to interact with other peers. His playmates seemed to be limited to family members.

### **Summary**

In summary, more details of behaviour functioning, focussing on play and interaction skills, were collected for each child with autism through parents' reports using PHI part two. The main results from the PHI were similar to those obtained from the records kept by the special education settings, and assessment via CARS. The five children with autism in this study showed various patterns and levels in terms of play and interaction skills. However, the deficits of social interaction, especially with other peers, appeared as a common factor in their play activities. Although these children with autism played with their siblings at home, they mostly played alone among or apart from other peers.

## **6.6 Typically developing peers**

### **6.6.1 SSRS and classroom observation of peers**

The Social Skills Rating System (SSRS) (Gresham & Elliott, 1990), was used to screen social positive behaviours, prosocial skills, adaptive functioning, and social competence in typically developing children (see 6.4.3). Typically developing peers volunteered to play with children in the SEDU. From these volunteers, fourteen peers were chosen as participants, being recommended as "good and complying" students by their class teachers. The peers were divided in two groups, a trained peer group who would receive training during the peer training phase of Study 2, and an untrained group, who would receive no training. These peers were described in section 6.2.

Since the peers were not randomly selected from the class, but were chosen on the basis of volunteerism and recommendations by teacher, they might be expected to have higher than average social skills. This, in itself, does not reduce the validity or generalizability of results from Study 2, since even in a fully inclusive setting, there will be a degree of volunteerism in peers' choosing to play with or otherwise interact with children with autism or other disabilities. However, it

Table 6.6: SSRS ratings for peers

The SSRS ratings columns show which category the peers fell into:

**more** — more than average

**average** — average

**fewer** — fewer than average

**above** — above average.

The numbers show the total behaviour or confidence level score, and the corresponding percentile rank (score/rank).

Peer	Sex	Age (Y/M)	Teacher-rating				Self-rating	
			Social skills	Problem behaviours	Academic competence	Social skills		
UP1	M	7/11	more (123/94)	fewer (< 85/ < 16)	above (> 115/ > 84)	more (> 130/ > 98)		
TP2	F	8/09	more (117/87)	fewer (< 85/ < 16)	average (101/53)	average (114/82)		
TP3	M	8/08	average (109/73)	fewer (< 85/ < 16)	average (97/42)	more (> 130/ > 98)		
TP4	F	7/10	average (108/70)	fewer (< 85/ < 16)	above (> 115/ > 84)	average (105/63)		
UP5	M	7/06	average (115/84)	fewer (< 85/ < 16)	average (106/66)	more (124/95)		
TP6	F	8/00	average (95/37)	average (100/50)	average (114/82)	more (> 130/ > 98)		
UP7	M	7/08	average (113/81)	fewer (< 85/ < 16)	average (109/73)	more (> 130/ > 98)		
UP8	F	8/02	average (106/66)	fewer (< 85/ < 16)	average (94/34)	more (> 130/ > 98)		
TP9	M	7/11	more (117/87)	average (100/50)	average (89/23)	more (126/96)		
TP10	F	7/11	more (> 130/ > 98)	average (88/21)	average (106/66)	more (> 130/ > 98)		
UP11	M	8/04	average (110/75)	average (102/55)	average (89/23)	more (121/92)		
TP12	F	7/10	average (96/39)	average (112/79)	average (101/53)	more (128/97)		
UP14	F	8/04	more (> 130/ > 98)	average (88/21)	average (106/66)	more (> 130/ > 98)		

is necessary to measure the peers' level of social skills. Apart from enabling the comparison of results from Study 2 with other studies, it would also be undesirable to include peers who have exceptionally high or low level of social skills. Therefore, SSRS was used to evaluate their level of social skills.

In the teacher-rating portion of SSRS, the typically developing peers all fell in the ranges average (61.5%) and more than average (38.5%) in social skills. No peer (0%) was rated in the range of fewer than average in social skills. In the problem behaviours scale, they fell into the fewer than average (53.8%) and average (46.2%) ranges only. Finally, most of them scored average (84.6%) and above average (15.4%) in the academic competence level. In the self-rating portion of the SSRS, the typically developing peer fell into the more than average (84.6%) and average (15.4%) ranges in social skills. The SSRS scores are given in table 6.6.

In addition, the typically developing peers were observed by the researcher in their state primary schools in this orientation phase. No abnormal behaviour warranting withdrawal of a participant was observed. In addition, no particularly frequent contacts between these peers were found in their school activities during this classroom observation period.

## 6.7 Conclusion

Data on behaviour shown by the children with autism and the social behaviour of the typically developing peers were collected as part of a screening process to eliminate any participant from the study if he or she proved to be extreme or atypical within the constraints of the cohort. None of participants fell into the extreme or atypical range. Although CA4's score on CARS, with scoring by CA4's special educator, indicates only borderline mild autism, CA4 appeared to at least exhibit some of the characteristics of a child with autism. Considering that children with mild or borderline autism are perhaps the most promising of children with autism for placement in inclusive settings, this in no way reduces the value of CA4's participation. Therefore, CA4 was retained as a subject.

From the investigation of the records kept by the SEDUs and SES, and the results obtained using such as CARS and PHI, the five children with autism appeared to possess quite heterogeneous play skills. It was reported by special educators and parents that the children with autism used play materials in various ways including sensorimotor, functional, symbolic, and other manners, in indoor and outdoor settings. However, difficulty in social interaction, particularly with other peers, was clearly and consistently indicated from both special educators and parents for all five children with autism. These children with autism were commonly or mostly described as "being alone" or "doing things by himself" with or without stereotyped behaviours most of time. This is unsurprising

considering that difficult socialization is a primary issue in autism, as noted in chapters 3 and 4.

Using SSRS to screen social skills in thirteen typically developing peers, most of them were in average and more than average ranges. None scored fewer than average in social skills or below average in academic confidence level. In addition, observation of the peers in their classroom activities revealed no aggressive behaviours in them, or particularly frequent contacts among them.



# Chapter 7

## Study 2—Impact of peer training

Any collection of related facts is difficult to grasp when expressed by figures in tabular form, but the same may be seen at a glance when presented by one of the many graphic representations of those ideas.

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Gardner C. Anthony (Anthony, 1922, p. iii)

### 7.1 Purpose of Study 2

Study 2 is an experimental determination of the effect of peer training on the ability of children with autism and typically developing peers to interact with each other.

The degree of interaction is measured by the cognitive aspect of play displayed by the children with autism and by the level of social interaction shown by the children with autism. The former, consisting of the classification of observed play behaviour into Piaget–Smilansky-type categories is typical of measurements made to determine the success of interventions involving children with autism. The latter is a much more direct measurement of the level of interaction, and is the best available indicator of expected long-term benefit for the children with autism.

The answers to three main questions were sought:

1. Does peer training enable typically developing children to interact more successfully with children with autism?
2. Do typically developing children learn from experience alone to interact more successfully with children with autism?
3. Does the relative advantage of peer training versus learning from experience alone justify the resources demanded by training?

In addition, evidence of generalization of social skills learned by children with autism from trained peers to interaction with untrained peers was sought.

## 7.2 Introduction to Study 2 results

The data recorded in the coding procedure described in chapter 5 consists of the cognitive and social behavioural categories displayed by the child with autism as a function of time for the sessions. The total durations of each category of behaviour are of greatest interest; these were calculated for each session, and are hereafter given as proportions of the total session. The data that is analysed here consists of the proportional of the total time for each six minute (360 second) play session occupied by each cognitive and social category. That is, each category has a duration of between 0 and 1, where 0 indicates a complete absence of the behaviour, and 1 would indicate that it was the only behaviour displayed during that entire session. For example, a duration of 0.4 would mean that a total of  $0.4 \times 360 = 144$  seconds was occupied by that behaviour. Note that the sum of the proportions of all of the cognitive or social categories for a single session must be equal to 1, and an increase in one category must be accompanied by decreases in other categories.

The cognitive and social behavioural data of the children with autism obtained during the (quasi-)experiment described in chapter 5 is described and analysed here. This consists of:

- Firstly, *overall quantitative results* for cognitive play behaviours and the level of social interaction of four children with autism (CA1, CA2, CA3, and CA5) when paired with trained peers (Trained Dyads, TD) and untrained peers (Untrained Dyads, UD) are shown in section 7.3. The data are examined to see whether or not there is a difference in the improvement in cognitive play and social interaction behaviours between TD and UD dyads. As noted in chapter 3, improvements in the social interaction are the best indicator available to estimate potential long-term benefits. This is the primary test of the effectiveness of, and the necessity of, the training program for typically developing peers (peer players), and, is the most important result contained in this thesis.
- Secondly, *deviations from the overall trends in TD and UD* are exhibited with statistical significance of each behaviour in four children with autism, CA1, CA2, CA3, and CA5. In section 7.4 the mean and the standard error in the mean of the behaviours for the individual dyads are compared to determine whether or not there was a statistically significant change—and whether any such change was an increase or a decrease—after peer training. As well as being a valuable check as to whether all of the matched pairs of dyads conform to the overall trend, the degree of variation between the different children with autism can also be observed. The observed behaviour and changed are described in light of qualitative observations made by the researcher during the study.

- Thirdly, the *correlation between cognitive and social development* in the four children with autism, CA1, CA2, CA3, and CA5, is measured for TD and UD. In section 7.5, the cognitive play behaviour and social interaction behaviours are examined together to determine the relationship between them in each trained and untrained dyad by comparing all measured behaviours at once.
- Fourthly, an *analysis of the behaviour in an extra dyad, CA4*, is made. In section 7.6, the data for the unmatched dyads (the dyads with CA4—recall that the original trained peer withdraw from acting as a regular peer player) are presented (data from the CA4–TP10 dyad during the pre-training phase, and data from the CA4–TP12 dyad during the post-training phase). Although the data for the unmatched dyads cannot provide conclusive evidence of improvement due to training, whether or not these data support the conclusions drawn from the matched dyads is an important check.
- Finally, *conclusions* regarding the effectiveness of, and necessity for, peer training in order to promote positive social interaction with children with autism are drawn and summarized from these results.

### 7.3 Overall quantitative results

In general, the observed behaviour in children with autism showed much variation over the sessions, for both cognitive and social categories. This is to be expected—it would be highly unusual if the children with autism displayed identical behaviour in each session, given that children with autism have sufficient cognitive abilities to engage in a wide range of behaviours, despite general intellectual deficits (Sadock et al., 2003; American Psychiatric Association, 2000). It is possible that children with autism might well show greater variation in their behaviour than typically developing children due to frequent and unpredictable shifts in attentiveness between on-task and off-task (Pelios, MacDuff, & Axelrod, 2003; Field et al., 1997). In addition, the play sessions in this study were conducted over a period of six months, so extraneous confounding factors at home and school beyond experimental control may well influence the behaviour of not only the children with autism but also peer players. The play sessions were conducted in naturalistic settings at the participating SPSs and SEDUs, without artificial constraints that might restrict the range of behaviour. All of these factors might have contributed to the observed large variation in behaviour.

While the observed behaviour was quite variable, this session-to-session variation is actually of little importance—what is most important are the overall level of social interaction and the overall level of cognitive play behaviour, which are determined from the weighted mean durations for each category, as described in section 5.10. In particular, the use of overall scores is useful for the small sample

size in this study to obtain greater statistical power. In this study, it is the difference in the level of social interaction and cognitive play behaviour between the pre-training and post-training play sessions that is crucial.

To determine whether or not the difference between the behaviour in the pre-training and post-training sessions is statistically significant, the mean behaviour and the standard error in the mean were calculated; this allows, firstly, a simple visual comparison of pre-training and post-training behaviour on graphs presenting the data, and secondly, testing of the statistical significance of the change from the pre-training to the post-training behaviour by determining the 95% confidence intervals for the differences in the means. This is done for both the total cognitive play scores and social interaction scores, and for each cognitive and social category for each dyad.

The transition from the pre-training phase to the post-training phase is indicated on the graphs by the vertical dotted lines, with the pre-training phase on the left of the dotted line, and the post-training phase on the right.

On figures 7.1 to 7.4, the means and the interval specified by the standard error (that is, the interval  $\bar{x} - \Delta\bar{x}$  to  $\bar{x} + \Delta\bar{x}$ ) is shown by the grey bars—the bar itself shows the interval specified by the mean and standard error, and the line through the centre shows the mean. If the pre-training and post-training gray bars overlap, then there is no statistically significant difference. If the vertical separation between the bars is large compared to their widths, then the difference is clearly statistically significant. If the two bars almost touch, then tables 7.2 to 7.14 giving the changes, the standard errors in the changes, the  $p$  values, and whether or not the change is statistically significant at the  $\alpha = 0.05$  level should be consulted.

### 7.3.1 Cognitive play behaviour (indoor setting)

Overall, in indoor settings, the trained dyads (TD) showed a significant increase in cognitive play, while untrained dyads (UD) showed a significant decrease.

Of the individual dyads (see table 7.2), CA1 (with TP3) showed a large and clearly statistically significant increase in cognitive play. The results for the other trained dyads suggest a possible increase (especially for CA3), although, since the changes were not significant at the  $\alpha = 0.05$  level, any such conclusion must be considered tentative. In the untrained dyads, however, the opposite trend was seen, with large and statistically significant decreases in cognitive play in CA3 and CA5 (with no statistically significant changes in CA1 and CA2 (table 7.2)). As noted above, when averaged across all trained and untrained dyads, these changes result in statistically significant and moderate increases and decreases in the trained dyads and untrained dyads respectively.

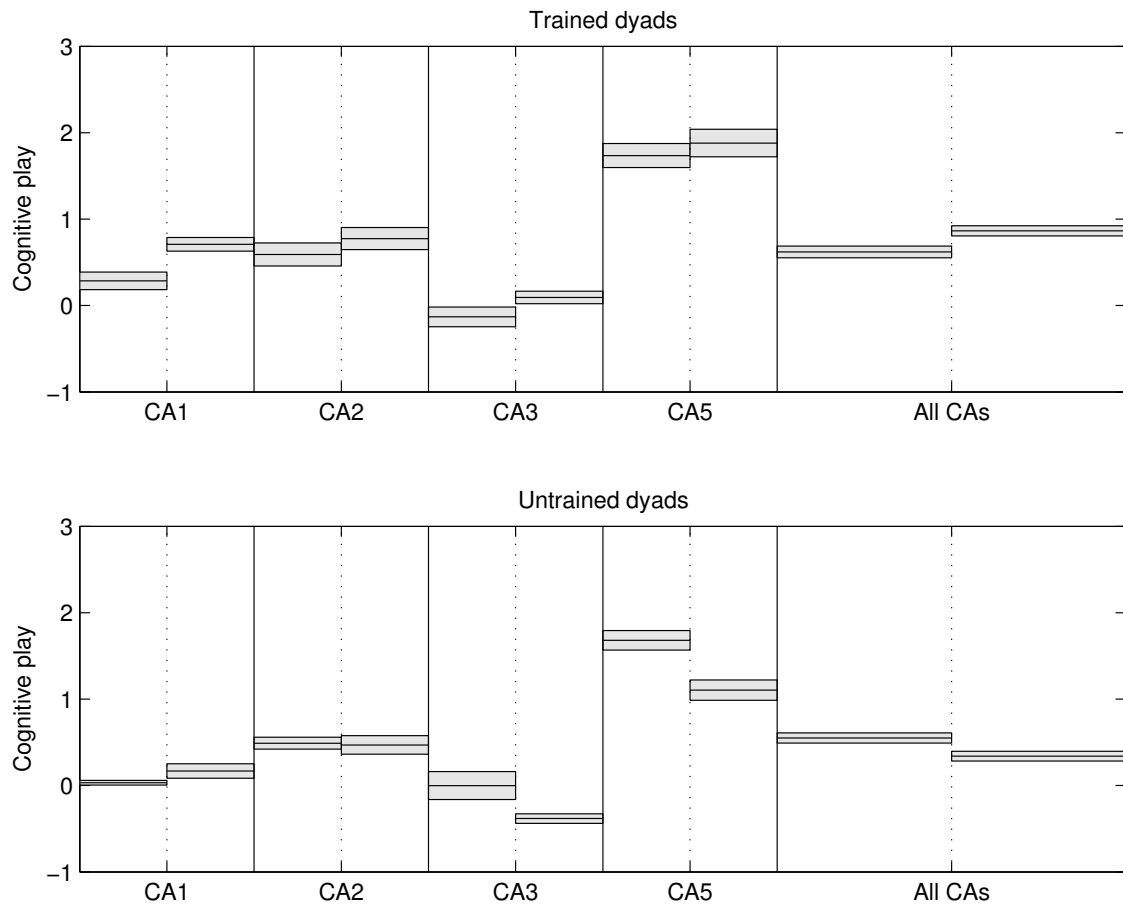


Figure 7.1: Cognitive play behaviour (indoor setting)

Table 7.1: Indoor cognitive play

CA	Trained		Untrained	
	Pre	Post	Pre	Post
CA1	0.286 ± 0.102	0.709 ± 0.079	0.033 ± 0.027	0.168 ± 0.084
CA2	0.591 ± 0.134	0.775 ± 0.128	0.490 ± 0.069	0.470 ± 0.107
CA3	-0.131 ± 0.114	0.094 ± 0.072	-0.001 ± 0.162	-0.382 ± 0.056
CA5	1.735 ± 0.139	1.881 ± 0.159	1.680 ± 0.114	1.103 ± 0.118
all	0.620 ± 0.068	0.864 ± 0.059	0.550 ± 0.059	0.340 ± 0.056

The pre- and post-training durations of individual behaviours, averaged over all trained and untrained dyads, are shown in table 7.3.

As seen in table 7.4, the children with autism in trained dyads in the indoor setting showed significant increases in two cognitive play behaviours: constructive and rule-governed play. While the increases in these behaviours were relatively large (for example, the post-training level of constructive play was approximately four times the pre-training level), the time spent in these behaviours, even in the post-training phase, was still only a small fraction of the total time. Therefore, no large decrease in other categories is to be expected, and, in the event, no statistically significant decreases in other categories were seen. Noting that general (and appropriate) social interaction in the absence of clear play activity was

Table 7.2: Change in indoor cognitive play

CA	Trained			Untrained		
	Change	$p$		Change	$p$	
CA1	$0.423 \pm 0.133$	0.007	↑	$0.135 \pm 0.155$	0.328	—
CA2	$0.184 \pm 0.238$	0.453	—	$-0.020 \pm 0.193$	0.934	—
CA3	$0.225 \pm 0.141$	0.133	—	$-0.382 \pm 0.146$	0.027	↓
CA5	$0.145 \pm 0.235$	0.545	—	$-0.577 \pm 0.186$	0.024	↓
all	$0.244 \pm 0.080$	0.004	↑	$-0.211 \pm 0.071$	0.004	↓

Table 7.3: Indoor cognitive play

Cat.	Trained		Untrained	
	Pre	Post	Pre	Post
NON	$0.492 \pm 0.041$	$0.481 \pm 0.026$	$0.553 \pm 0.036$	$0.583 \pm 0.033$
STE	$0.081 \pm 0.020$	$0.049 \pm 0.012$	$0.079 \pm 0.025$	$0.134 \pm 0.012$
EXP	$0.207 \pm 0.038$	$0.139 \pm 0.018$	$0.161 \pm 0.021$	$0.139 \pm 0.024$
FUN	$0.151 \pm 0.037$	$0.201 \pm 0.023$	$0.143 \pm 0.036$	$0.093 \pm 0.016$
CON	$0.013 \pm 0.014$	$0.050 \pm 0.026$	$0.008 \pm 0.009$	$0.005 \pm 0.007$
SYM	$0.055 \pm 0.034$	$0.066 \pm 0.021$	$0.056 \pm 0.025$	$0.046 \pm 0.013$
R-G	$0.000 \pm 0.000$	$0.015 \pm 0.008$	$0.000 \pm 0.000$	$0.000 \pm 0.000$

Cognitive play category abbreviations

NON	Non-play	CON	Constructive play
STE	Stereotyped behaviour	SYM	Symbolic play
EXP	Exploratory behaviour	R-G	Rule-governed play
FUN	Functional play		

Table 7.4: Change in indoor cognitive play

Cat.	Trained			Untrained		
	Change	$p$		Change	$p$	
NON	$-0.011 \pm 0.048$	0.819	—	$0.030 \pm 0.043$	0.488	—
STE	$-0.033 \pm 0.023$	0.165	—	$0.054 \pm 0.031$	0.082	—
EXP	$-0.069 \pm 0.046$	0.138	—	$-0.022 \pm 0.026$	0.394	—
FUN	$0.050 \pm 0.044$	0.258	—	$-0.050 \pm 0.044$	0.261	—
CON	$0.037 \pm 0.016$	0.028	↑	$-0.003 \pm 0.011$	0.774	—
SYM	$0.011 \pm 0.040$	0.790	—	$-0.010 \pm 0.031$	0.756	—
R-G	$0.015 \pm 0.000$	0.000	↑	$0.000 \pm 0.000$	1.000	—

classified as non-play in cognitive play behaviour categories, this is uninformative about the social interaction (which is examined separately below).

Although the decrease in stereotyped behaviour was not statistically significant at the  $\alpha = 0.05$  level, the amount of stereotyped behaviour in the trained dyads approximately halved, and since for this change,  $p = 0.165$ , this is 83.5% likely to be a genuine decrease. Meanwhile, the amount of stereotyped behaviour in the untrained dyads almost doubled, and this increase was 91.8% likely to be a genuine increase ( $p = 0.082$ ). This is worth noting in light of claims (e.g., Lee & Odom, 1996) of decrease in stereotyped behaviour in children with autism as a collateral effect of peer training.

The improvement in the higher categories of cognitive play, with the associated decrease in lower categories, seen in the children with autism in the trained dyads is most likely to have resulted from increased opportunities to play because trained peers cooperated better and provided appropriate modelling and guidance for the use of the play materials; these elements were included in the peer training program. Therefore, this improvement can be seen to be a result of improved social interaction. Since only play behaviours were measured by the cognitive play score, the actual level of social interaction could have been higher, since general social interaction behaviour without play activities (coded as non-play) would not result in any increase in the cognitive play score.

In untrained dyads in the indoor setting, there were no statistically significant changes in any of the sub-categorical cognitive play behaviours (and, with a more relaxed criterion of statistical significant, only the increase in stereotyped behaviour would be likely to be significant). The untrained peers did in fact occasionally try to play with the children with autism, but mostly played by themselves, and did not offer major or consistent support for the cognitive play activities of the children with autism. The children with autism would have been bored or frustrated when they were paired with untrained peers in indoor settings, which may be the cause of the increase in stereotyped behaviour.

These contrasting results on cognitive play behaviour shown by the same children with autism depending on whether they were paired with a trained peer or an untrained peer appears to indicate the importance and the necessity of peer training provided to typically developing peers who are to be play interaction partners. When peers are systematically trained, they can recognize children with autism as part of the diversity of people, notice difficulties that children with autism have, and acquire skills enabling them to support them in play activities. They can then act as positive interaction partners to facilitate cognitive play in children with autism. Without systematic peer training, the behaviour of peers in play with children with autism tends to be consistent and unsupportive. Although they might show some kinds of initiation, such as greetings or even invitations to play together, they might not proceed further due to lack of response from the children with autism, or due to inability to recognize or understand any such response.

### **7.3.2 Cognitive play behaviour (outdoor setting)**

Surprisingly, all children with autism, in both trained dyads and untrained dyads, showed an unexpectedly similar large increase in cognitive play in outdoor setting. While the increase in trained dyads was about 25% greater, this is within the range of variation indicated by the standard errors in the changes. The increase shown in the trained dyads was even larger in outdoor setting than

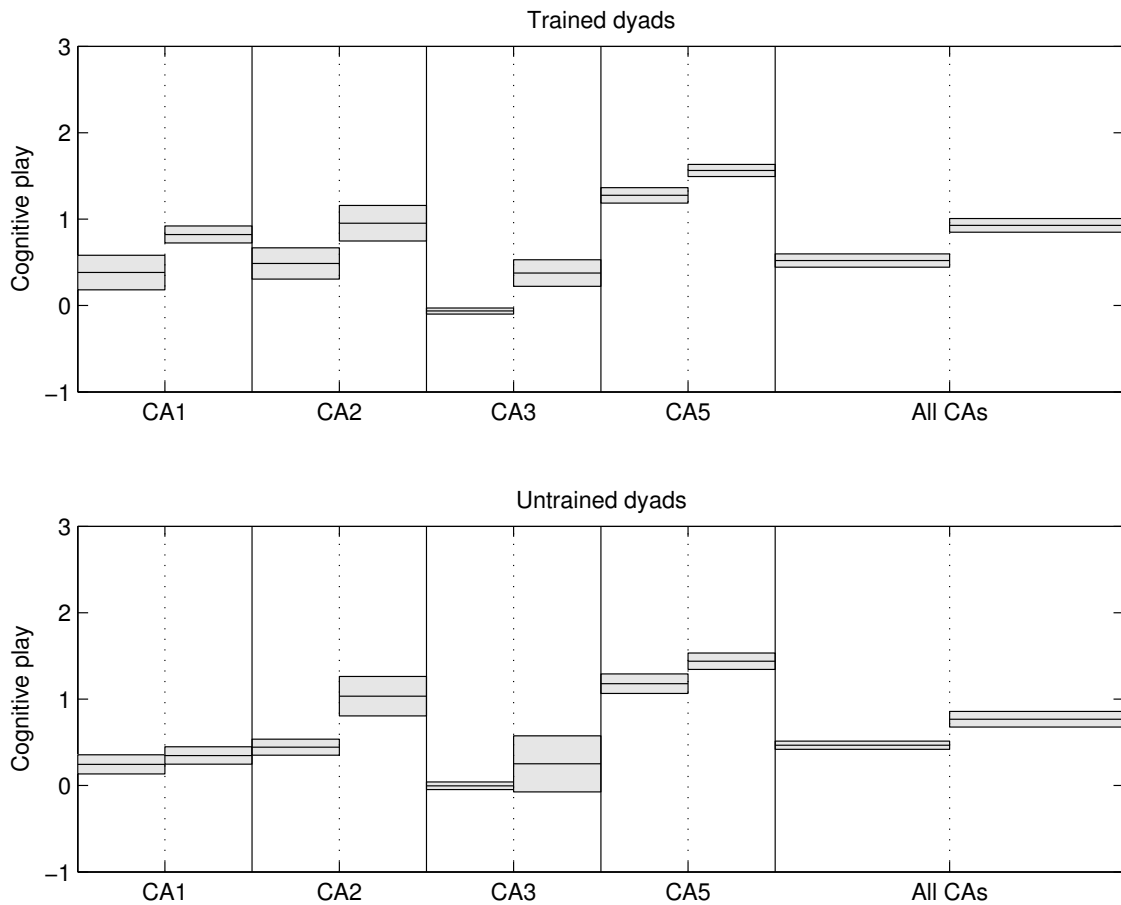


Figure 7.2: Cognitive play behaviour (outdoor setting)

Table 7.5: Outdoor cognitive play

CA	Trained		Untrained	
	Pre	Post	Pre	Post
CA1	$0.382 \pm 0.200$	$0.822 \pm 0.099$	$0.245 \pm 0.110$	$0.347 \pm 0.101$
CA2	$0.486 \pm 0.181$	$0.953 \pm 0.205$	$0.443 \pm 0.093$	$1.033 \pm 0.228$
CA3	$-0.063 \pm 0.035$	$0.376 \pm 0.154$	$-0.003 \pm 0.043$	$0.251 \pm 0.325$
CA5	$1.275 \pm 0.089$	$1.563 \pm 0.070$	$1.178 \pm 0.113$	$1.439 \pm 0.096$
all	$0.520 \pm 0.077$	$0.928 \pm 0.079$	$0.466 \pm 0.047$	$0.767 \pm 0.091$

in indoor setting. This larger improvement of cognitive play might have been due to the initial novelty of outdoor playground facilities and apparatus, compared to the more familiar indoor toys. Since the outdoor setting was located in the regular state primary school (SPS-A) for CA1, CA2 and CA3, the change might indicate learning to these unfamiliar playground facilities. Although they would have had many opportunities to use these playground facilities located in the primary school before, they might have observed other children playing with similar playground facilities before.

Overall, children with autism seemed to be quite interested in the playground facilities. In the trained dyads, CA1 actively played with TP3 in sandpit play and with other playground facilities. Sometimes, CA1 (who was the youngest



Table 7.6: Change in outdoor cognitive play

CA	Trained			Untrained		
	Change	<i>p</i>		Change	<i>p</i>	
CA1	0.440 ± 0.212	0.063	—	0.102 ± 0.176	0.640	—
CA2	0.466 ± 0.377	0.236	—	0.590 ± 0.374	0.143	—
CA3	0.439 ± 0.250	0.105	—	0.254 ± 0.262	0.340	—
CA5	0.288 ± 0.115	0.025	↑	0.260 ± 0.161	0.037	↑
all	0.408 ± 0.095	0.000	↑	0.302 ± 0.060	0.000	↑

Table 7.7: Outdoor cognitive play

Cat.	Trained		Untrained	
	Pre	Post	Pre	Post
NON	0.657 ± 0.050	0.454 ± 0.037	0.703 ± 0.030	0.473 ± 0.050
STE	0.034 ± 0.017	0.029 ± 0.010	0.019 ± 0.010	0.066 ± 0.018
EXP	0.064 ± 0.015	0.078 ± 0.019	0.072 ± 0.020	0.089 ± 0.023
FUN	0.245 ± 0.034	0.437 ± 0.042	0.206 ± 0.022	0.372 ± 0.041
CON	0.000 ± 0.000	0.003 ± 0.003	0.000 ± 0.000	0.000 ± 0.000
SYM	0.000 ± 0.000	0.000 ± 0.000	0.000 ± 0.000	0.000 ± 0.000
R-G	0.000 ± 0.000	0.000 ± 0.000	0.000 ± 0.000	0.000 ± 0.000

Table 7.8: Change in outdoor cognitive play

Cat.	Trained			Untrained		
	Change	<i>p</i>		Change	<i>p</i>	
NON	−0.203 ± 0.062	0.002	↓	−0.230 ± 0.039	0.000	↓
STE	−0.005 ± 0.020	0.798	—	0.047 ± 0.013	0.001	↑
EXP	0.014 ± 0.019	0.453	—	0.017 ± 0.025	0.506	—
FUN	0.192 ± 0.041	0.000	↑	0.166 ± 0.029	0.000	↑
CON	0.003 ± 0.000	0.000	↑	0.000 ± 0.000	1.000	—
SYM	0.000 ± 0.000	1.000	—	−0.000 ± 0.000	0.534	—
R-G	0.000 ± 0.000	1.000	—	0.000 ± 0.000	1.000	—

participant, at three years and one month of age) was too excited in his attempts to try larger playground equipment intended for older children that care was needed to maintain safety. CA2 was especially interested in the monkey bars after watching TP2 using them (e.g., swinging from bar to bar using hands only). With TP2's guidance, CA2 sometimes used them for most of the session. When TP2 suggested using other equipment, CA2 often insisted on staying with the monkey bars. TP2 then added further skills to use it (e.g., skipping one bar when swinging from bar to bar, swinging on it, jumping down, etc.) to encourage CA2. CA3 avoided and ran away from sandpit play whenever TP4 tried to involve CA3 in sandpit play at the beginning of the post-training play phase. TP4 then followed CA3 to the playground equipment area to play and interact.

While trained peers interacted with children with autism using the “play interaction skills” that they learned during peer training, untrained peers mainly played by themselves. Occasionally, especially at the beginning of the pre-

training play phase (i.e., the earliest play sessions), untrained peers asked children with autism to use playground equipment together. However, when they could not get appropriate responses (e.g., no response) from the children with autism, they simply played by themselves. Sometimes, untrained peers and children with autism were far apart from each other, with, for example, the untrained peer in the sandpit area and the child with autism using other playground equipment. Untrained peers also seemed to be embarrassed when children with autism suddenly initiated without verbalization. For example, CA1 suddenly put some sand onto UP8's leg and smiled at her. UP8 smiled back to CA1. CA1 kept doing this and UP8 soon left the sandpit area. CA2 suddenly joined UP1 in playing with the sand-turned wheels without any verbal cue. CA2 occupied the sand-turned wheels toy and UP1 soon left. CA3 suddenly put his face in front of any very close to UP5's face. When UP5 smiled back to CA3, CA3 ran away screaming. CA5 did not take turns appropriately and interrupted UP14's skittle play despite UP14 asking him to wait for his turn. UP14 then left and kept ignoring CA5. In these kinds of "awkward" situations, untrained peers were not likely to know how to interact with children with autism, and chose the easiest path for them—leaving the area or ignoring the child with autism.

Therefore, the improvement in untrained dyads does not appear to result from any improvement in social interaction with the untrained peers. It could possibly be due to the children with autism having been taught by the trained peers how to use the available playground facilities and equipment; since the improvement occurred after the peer-training phase, this is certainly a possible explanation, and would demonstrate a generalization of cognitive play skills. However, since the "higher" categories of cognitive play were almost completely absent, the improvement in outdoor cognitive play does not represent any significant cognitive gains by the children with autism.

Since the improvement could be due to this possible carryover effect, or could be due to the children with autism learning from experience with the facilities and equipment, without assistance from the peers, little can be concluded.

As shown in table 7.8, the children with autism showed similar patterns of change in individual cognitive play categories in both trained dyads and untrained dyads. The major changes were an increase in functional play, and a decrease in non-play. However, it should be noted that the initial level of functional play was moderately high, indicating that the children with autism could already appropriately use at least some of the facilities and equipment. The only notable difference between the trained dyads and untrained dyads was that stereotyped behaviour showed a statistically significant increase in untrained dyads, perhaps due to boredom or frustration resulting from lack of interaction with the untrained peers. There was also a statistically significant increase in constructive play in trained dyads, but this behaviour only occupied a small portion of the

time.

These results were surprising and unexpected. It appears that there is no primary cognitive deficit in children with autism preventing appropriate use of outdoor playground facilities or equipment, and such play behaviour can be readily learned by children with autism.

### 7.3.3 Social interaction behaviour (indoor setting)

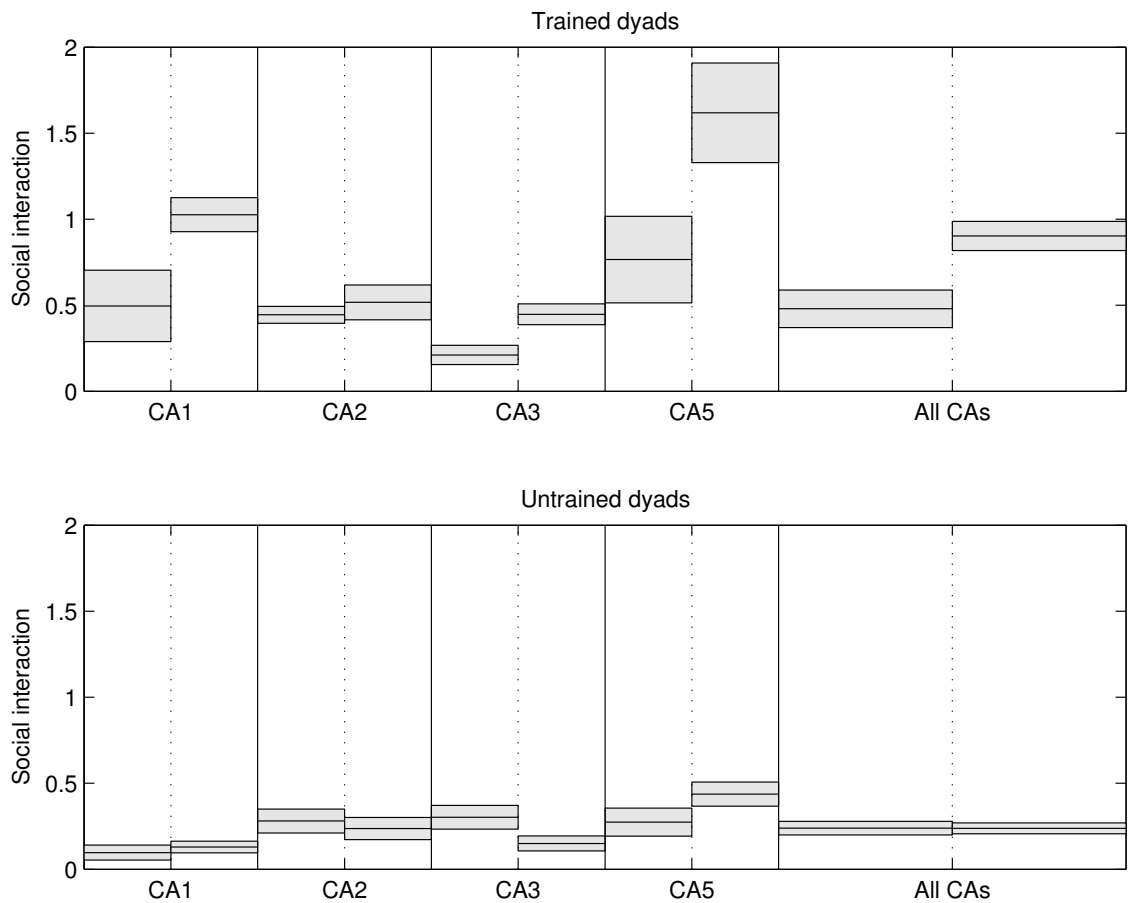


Figure 7.3: Social interaction behaviour (indoor setting)

Table 7.9: Indoor social interaction

CA	Trained		Untrained	
	Pre	Post	Pre	Post
CA1	0.496 ± 0.208	1.026 ± 0.099	0.097 ± 0.043	0.129 ± 0.034
CA2	0.444 ± 0.049	0.517 ± 0.101	0.281 ± 0.070	0.237 ± 0.064
CA3	0.211 ± 0.056	0.448 ± 0.060	0.303 ± 0.069	0.150 ± 0.043
CA5	0.766 ± 0.252	1.619 ± 0.289	0.275 ± 0.081	0.437 ± 0.070
all	0.479 ± 0.109	0.902 ± 0.085	0.239 ± 0.039	0.238 ± 0.032

Overall, in the indoor settings, the children with autism showed a large increase of social interaction in trained dyads. The increase was both clearly statistically significant ( $p = 0.002$ ) and large, with the mean social interaction score

Table 7.10: Change in indoor social interaction

CA	Trained			Untrained		
	Change	<i>p</i>		Change	<i>p</i>	
CA1	$0.530 \pm 0.200$	0.020	↑	$0.032 \pm 0.067$	0.875	—
CA2	$0.073 \pm 0.181$	0.695	—	$-0.044 \pm 0.120$	0.813	—
CA3	$0.237 \pm 0.111$	0.050	—	$-0.153 \pm 0.077$	0.204	—
CA5	$0.853 \pm 0.427$	0.062	—	$0.162 \pm 0.115$	0.708	—
all	$0.423 \pm 0.129$	0.002	↑	$-0.001 \pm 0.047$	0.991	—

Table 7.11: Indoor social interaction

Cat.	Trained		Untrained	
	Pre	Post	Pre	Post
NEG	$0.004 \pm 0.001$	$0.053 \pm 0.011$	$0.001 \pm 0.001$	$0.006 \pm 0.004$
NOI	$0.656 \pm 0.039$	$0.343 \pm 0.025$	$0.781 \pm 0.029$	$0.782 \pm 0.029$
P-L	$0.278 \pm 0.026$	$0.380 \pm 0.025$	$0.201 \pm 0.025$	$0.186 \pm 0.026$
P-H	$0.026 \pm 0.009$	$0.153 \pm 0.016$	$0.002 \pm 0.003$	$0.002 \pm 0.002$
UNI	$0.004 \pm 0.004$	$0.001 \pm 0.000$	$0.012 \pm 0.015$	$0.019 \pm 0.007$
A-L	$0.009 \pm 0.004$	$0.041 \pm 0.012$	$0.004 \pm 0.002$	$0.006 \pm 0.002$
A-H	$0.024 \pm 0.017$	$0.029 \pm 0.015$	$0.000 \pm 0.000$	$0.000 \pm 0.000$

Social interaction category abbreviations

NEG	Negative interaction	UNI	Unilateral
NOI	No interaction	A-L	Active-low
P-L	Passive-low	A-H	Active-high
P-H	Passive-high		

Table 7.12: Change in indoor social interaction

Cat.	Trained			Untrained		
	Change	<i>p</i>		Change	<i>p</i>	
NEG	$0.049 \pm 0.002$	0.000	↑	$0.005 \pm 0.001$	0.000	↑
NOI	$-0.313 \pm 0.046$	0.000	↓	$0.001 \pm 0.035$	0.982	—
P-L	$0.102 \pm 0.031$	0.002	↑	$-0.015 \pm 0.030$	0.615	—
P-H	$0.127 \pm 0.010$	0.000	↑	$-0.001 \pm 0.004$	0.898	—
UNI	$-0.003 \pm 0.004$	0.478	—	$0.007 \pm 0.018$	0.683	—
A-L	$0.032 \pm 0.005$	0.000	↑	$0.002 \pm 0.003$	0.416	—
A-H	$0.005 \pm 0.021$	0.818	—	$0.000 \pm 0.000$	1.000	—

approximately doubling. In the untrained dyads, on the other hand, there was no change, with the predominant feature of the indoor social behaviour shown by children with autism in untrained dyads being uniformity.

This clearly demonstrates the success of the peer training, and the lack of both measurable learning how to socially interact with children with autism by the untrained peers and any crossover effect in social interaction of children with autism.

Interestingly negative interaction was significantly increased in both trained and untrained dyads (table 7.12). While the total duration of negative behaviour was still small, its degree of increase was surprisingly larger in trained dyads than

in untrained dyads. In the trained dyads, this increase was counterbalanced by a large decrease in no interaction, and increases in appropriate social behaviour. This increase did not appear to be a problem, and at least partly represents failed attempts by the trained peers to initiate to and interact with the children with autism. Similar increases in negative behaviour have been noted by others. Guralnick et al. (1996) reported such an increase, and assumed that it was due to the higher activity levels in inclusive setting. In the study presented in this thesis, it was observed that when trained peers started to interact, children with autism resisted against the interaction. “Being alone” time (no-interaction behaviour) of the children with autism was constantly interrupted in the trained dyads because trained peers kept initiating and responding to play together (“desirable” interruption by the trained peer) despite resistance (negative interaction) from the children with autism.

Occasionally, this negative interaction in children with autism was also caused by “immature” interaction delivered from trained peers. Although trained peers have learnt how to interact with the children with autism, it did not mean they always know how to handle uncooperative interaction such as rejecting, ignoring, and avoiding behaviours shown by children with autism. They did not seem to know when was the best time to interact again after strong resistance from children with autism. Sometimes, trained peers missed the time when the children with autism were ready, or could not notice the best time to interact again. This indicates that one more component—observing and waiting skill—for play interaction skills may be required in the peer training program.

In spite of the difficulties in interacting with the children with autism, trained peers were sufficiently enthusiastic so as to keep interacting with them. With this consistent interaction provided by trained peers, the children with autism significantly increased their social interactions by showing appropriate responses (passive-low and passive-high interactions). Initiation (active-low interaction) in children with autism was also significantly increased by positive or non-negative responses from trained peers. These results, increases of social interaction in children with autism by interacting with trained peers, support other studies on peer-mediated interventions (e.g., Goldstein et al., 1992; Pierce & Schreibman, 1997b).

With the untrained peers, there was almost no change in the pattern of social interactions in the children with autism other than the increase in negative interaction noted above. Essentially, and especially when compared to the intensive interaction trials shown by the trained peers as the result of peer training, untrained peers did not interact with children with autism. It does not mean that untrained peers did not try to play with or interact with the children with autism—untrained peers occasionally showed some general social conventional manners such as greeting, smiling, suggesting sandpit play, providing toys, and

so on—but when untrained peers received no response or unfamiliar interaction behaviour from children with autism, they showed fewer and fewer further attempts to do so.

Compared to the trained peers, untrained peers were naïve about the “bizarre” behaviour shown by children with autism. When untrained peers faced such “bizarre” interaction from children with autism (e.g., abruptly joining the peer’s play activity, the child with autism suddenly pushing his own face (with a big smile) right in front of the peer’s face), untrained peers seemed to be embarrassed and did not know what to do. Sometimes, untrained peers watched stereotyped behaviours shown by children with autism for a while, but did not interact with them. Rather, untrained peers kept playing by themselves or kept a distance from children with autism. Therefore, when paired with untrained peers, children with autism mainly showed no interaction and passive-low interaction such as watching the untrained peer’s play.

Contrasting the result on social interaction in children with autism when paired with trained peers versus untrained peers, the importance or the necessity of peer training is clearly evident. Without play training that includes proper information about autism, practical interaction skills, and so on, these naïve (untrained) peers would not try to interact with children with autism because they cannot understand the social responses and cues shown by the children with autism. In addition, uncorrected stereotypical notions or prejudice about children with disabilities cannot help.

#### **7.3.4 Social interaction behaviour (outdoor setting)**

The overall pattern of change in social interaction in outdoor settings was very similar to that seen in indoor settings—a large and statistically significant improvement in trained dyads, and no change in untrained dyads. For the trained dyads, this increase was even larger than in the indoor settings, with a post-training social interaction score over three times larger than the pre-training score.

This even larger increase may have resulted from the playground facilities and apparatus being more familiar and age-appropriate for the peers than the indoor setting toys (which were chosen to be suitable for the children with autism). The peers could then concentrate on social interaction to play with children with autism in outdoor setting, rather than being distracted by novel toys. The children with autism may have also been interested in learning how to play with new equipment, and been more willing to listen to and follow the peers.

However, compared to the indoor settings, a smaller proportion of time was spent in social interaction. This is likely to be due to the wide-open setting in the playground—it was easier for the two children to play without interaction, and if

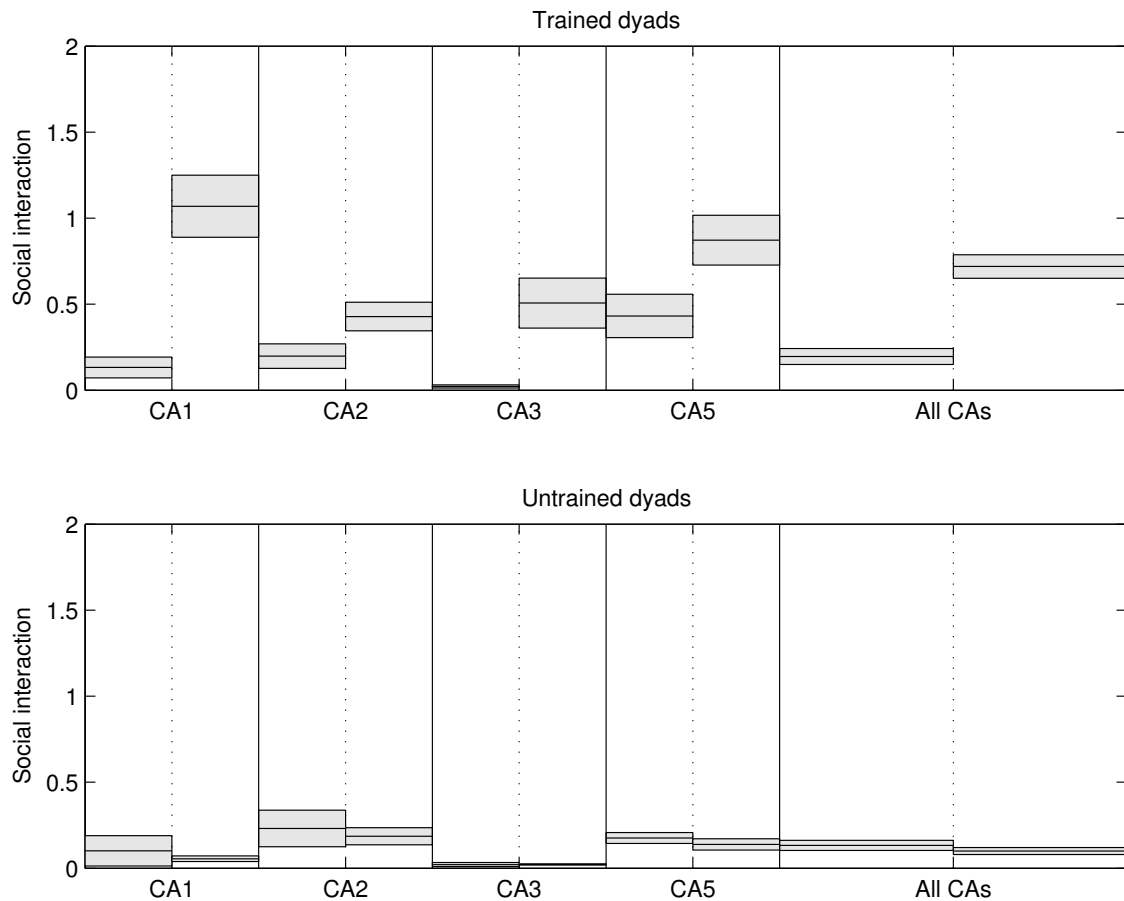


Figure 7.4: Social interaction behaviour (outdoor setting)

Table 7.13: Outdoor social interaction

CA	Trained		Untrained	
	Pre	Post	Pre	Post
CA1	0.132 ± 0.060	1.069 ± 0.181	0.101 ± 0.089	0.055 ± 0.016
CA2	0.199 ± 0.071	0.428 ± 0.083	0.231 ± 0.107	0.186 ± 0.050
CA3	0.022 ± 0.009	0.507 ± 0.146	0.021 ± 0.012	0.022 ± 0.004
CA5	0.431 ± 0.126	0.872 ± 0.145	0.176 ± 0.032	0.138 ± 0.033
all	0.196 ± 0.046	0.719 ± 0.069	0.132 ± 0.029	0.100 ± 0.020

the children with autism wished to avoid interaction, they had much more space and opportunity to do so. The availability of such easy “escape” from unwanted interaction may explain the lower level of negative interaction compared to the indoor settings. Generally, it was more difficult for trained peers to establish and maintain social interaction with children with autism. However, the post-training social interaction score for the trained dyads was almost as high as in the indoor settings, despite the pre-training score being much lower, so the trained peers were clearly able to overcome such difficulties.

This increased area in which to avoid one’s play partner is also likely to be the cause of the lower level of interaction seen in the untrained dyads—avoidance could appear to be a “safe” strategy for both the children with autism and the

Table 7.14: Change in outdoor social interaction

CA	Trained			Untrained		
	Change	<i>p</i>		Change	<i>p</i>	
CA1	$0.937 \pm 0.204$	0.001	↑	$-0.046 \pm 0.058$	0.825	—
CA2	$0.230 \pm 0.152$	0.154	—	$-0.045 \pm 0.103$	0.772	—
CA3	$0.484 \pm 0.236$	0.062	—	$0.001 \pm 0.015$	0.997	—
CA5	$0.441 \pm 0.218$	0.062	—	$-0.038 \pm 0.053$	0.865	—
all	$0.523 \pm 0.056$	0.000	↑	$-0.032 \pm 0.038$	0.398	—

Table 7.15: Outdoor social interaction

Cat.	Trained		Untrained	
	Pre	Post	Pre	Post
NEG	$0.004 \pm 0.002$	$0.007 \pm 0.002$	$0.008 \pm 0.006$	$0.000 \pm 0.000$
NOI	$0.817 \pm 0.037$	$0.492 \pm 0.040$	$0.851 \pm 0.029$	$0.901 \pm 0.020$
P-L	$0.162 \pm 0.031$	$0.289 \pm 0.029$	$0.141 \pm 0.029$	$0.098 \pm 0.019$
P-H	$0.016 \pm 0.011$	$0.204 \pm 0.030$	$0.000 \pm 0.000$	$0.000 \pm 0.000$
UNI	$0.000 \pm 0.000$	$0.000 \pm 0.000$	$0.000 \pm 0.000$	$0.000 \pm 0.000$
A-L	$0.002 \pm 0.003$	$0.008 \pm 0.004$	$0.000 \pm 0.000$	$0.000 \pm 0.001$
A-H	$0.000 \pm 0.000$	$0.001 \pm 0.001$	$0.000 \pm 0.000$	$0.000 \pm 0.000$

Table 7.16: Change in outdoor social interaction

Cat.	Trained			Untrained		
	Change	<i>p</i>		Change	<i>p</i>	
NEG	$0.003 \pm 0.003$	0.308	—	$-0.008 \pm 0.008$	0.292	—
NOI	$-0.325 \pm 0.046$	0.000	↓	$0.049 \pm 0.037$	0.189	—
P-L	$0.127 \pm 0.038$	0.002	↑	$-0.042 \pm 0.037$	0.251	—
P-H	$0.189 \pm 0.013$	0.000	↑	$0.000 \pm 0.000$	0.000	↑
UNI	$0.000 \pm 0.000$	1.000	—	$0.000 \pm 0.000$	0.000	↑
A-L	$0.005 \pm 0.004$	0.134	—	$0.000 \pm 0.000$	0.000	↑
A-H	$0.001 \pm 0.000$	0.000	↑	$0.000 \pm 0.000$	1.000	—

untrained peers.

In the trained dyads, three sub-categories (passive-low, passive-high, and active-high interaction) of social interaction showed statistically significant increases, accompanied by a corresponding large and statistically significant decrease of no-interaction (see table 7.16). The children with autism and trained peers were able to interact in a simple and clear manner in outdoor setting. For example, despite occasional distractions such as PE sessions held nearby in the playground, children with autism successfully using playground equipment and sandpit toys with the trained peers. The trained peers then guided and encouraged the children with autism to try another equipment (sometimes, as mentioned earlier, perhaps to excess).

While statistically significant changes were seen in some categories of social interaction in untrained dyads, both the pre-training and post-training durations, and the change in them were less than 0.0005, and only made a negligible con-



tribution to the overall social behaviour. These changes cannot be regarded as important.

### 7.3.5 Summary of overall results

The overall results, summarised in tables 7.17 and 7.18, strongly support the hypothesis that the peer training was both effective and necessary, particularly to promote positive social interaction in children with autism in both indoor and outdoor play settings. This result was clearly evidenced by comparing the lack of change in social interaction in children with autism when paired with untrained peers with the large and clearly statistically significant improvements seen with trained peers ( $p = 0.002$  for indoor settings, and  $p < 0.0005$  for outdoor settings). Indeed, the improvement of social interaction in children with autism is sufficiently large to justify the effort demanded by peer training. When typically developing peers were trained, they showed supportive interaction behaviour to play with children with autism because they learnt how to do it. After peer training, trained peers could consistently provide useful and positive interaction behaviours, rather than avoiding or ignoring the children with autism.

Table 7.17: Cognitive play and social interaction for trained and untrained dyads

Setting		Trained		Untrained	
		Pre	Post	Pre	Post
cog	in	$0.620 \pm 0.068$	$0.864 \pm 0.059$	$0.550 \pm 0.059$	$0.340 \pm 0.056$
cog	out	$0.520 \pm 0.077$	$0.928 \pm 0.079$	$0.466 \pm 0.047$	$0.767 \pm 0.091$
soc	in	$0.479 \pm 0.109$	$0.902 \pm 0.085$	$0.239 \pm 0.039$	$0.238 \pm 0.032$
soc	out	$0.196 \pm 0.046$	$0.719 \pm 0.069$	$0.132 \pm 0.029$	$0.100 \pm 0.020$

Table 7.18: Change in cognitive play and social interaction for trained and untrained dyads

Setting		Trained			Untrained		
		Change	$p$		Change	$p$	
cog	in	$0.244 \pm 0.080$	0.004	↑	$-0.211 \pm 0.071$	0.004	↓
cog	out	$0.408 \pm 0.095$	0.000	↑	$0.302 \pm 0.060$	0.000	↑
soc	in	$0.423 \pm 0.129$	0.002	↑	$-0.001 \pm 0.047$	0.991	—
soc	out	$0.523 \pm 0.056$	0.000	↑	$-0.032 \pm 0.038$	0.398	—

However, the effectiveness of peer training for increasing cognitive play in children with autism remained somewhat undecided. While there was a clear improvement in trained dyads, with no improvement in untrained dyads, in indoor settings, both trained and untrained dyads showed a striking improvement in the outdoor settings. This may well have been a result of the children with autism being unfamiliar with the playground equipment at the primary school outdoor setting used in this study. The children with autism do not appear to have had to

overcome any major cognitive hurdles to learn how to use that equipment, and, in the event, appear to have done so readily. This, then, may indicate that social difficulty is primary deficit in children with autism.

Conclusively, systematic training would be essential for typically developing peers to improve positive and appropriate social interaction in children with autism. Considering the reciprocity of social interaction in typical human relationships, the peer training enables the trained peer to provide at least their portion of this reciprocity while the untrained peers were unable to do so. Therefore, such peer training can be regarded as necessary, since without systematic peer training, improvement of social interaction with typically developing peers cannot be expected in children with autism.

## 7.4 Behaviour in individual dyads over sessions

In this section, the behaviours in the individual cognitive play and social interaction sub-categories shown by the children with autism in each dyad are examined in order to verify and explain the above conclusions, and to explore possible reasons for the extraordinary pattern of each sub-category of behaviour in the trained and untrained dyads. In addition, qualitative observations on distinctive cognitive play and social interaction behaviours in individual child with autism are described, where appropriate.

Looking over figures 7.5–7.27 one sees that there is, at least for some dyads, a clear difference between the pre-training play and post-training play sessions. There are also no obvious *consistent* changes over time within either the pre-training or the post-training phases; there was, of course, some random variation, as expected to result from session-to-session variation of the children's moods, interests, excitability, and so on. Therefore, it is appropriate to compare the pre- and post-training play sessions simply by using the mean durations over the group of sessions, as was done in the previous section.

In the figures, the mean of each set of data is indicated by the (horizontal) solid line in the centre of each shaded regions; the left side shows the data for the pre-training phase of study, and the right side shows the data for the post-training phase. The sessions for each child with autism are shown in sequence over time. The sessions are connected by a line to enable the sequence to be easily seen; this line is not intended to represent a trend. As before, the horizontal lines bounding the shaded regions show the standard errors in the means.

### 7.4.1 Cognitive play in indoor setting

Overall, and over all dyads, there was little change in non-play (figure 7.5). CA1 showed a small decrease (that was not statistically significant at the  $\alpha = 0.05$

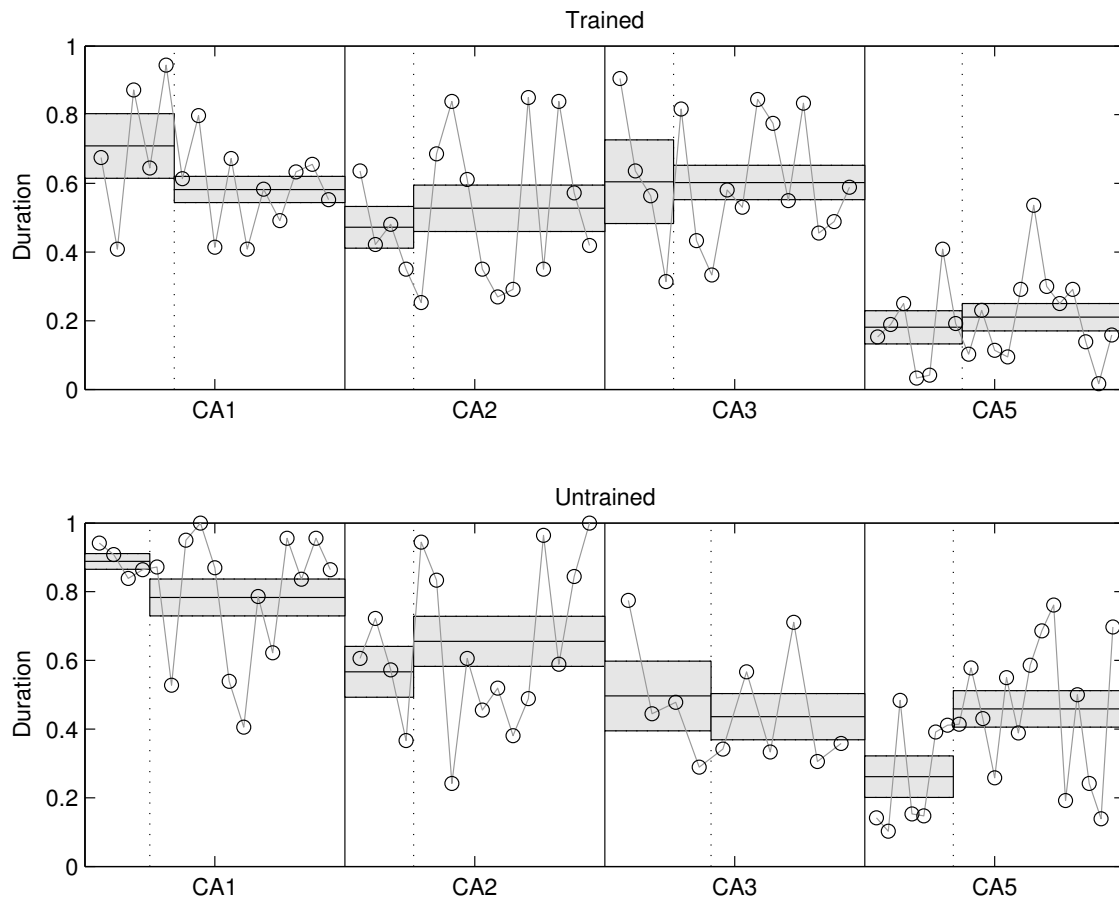


Figure 7.5: Cognitive play in indoor setting: Non-play

level); this may be due to CA1 being the youngest child in this study, just starting to have special educational services (see chapter 6), and therefore being more susceptible if provided with appropriate programs. In particular, it was apparent that after the start of post-training play sessions there was more variation of non-play behaviour in CA1 who during the pre-training play phase was observed to maintain steady high levels of non-play behaviour. This might possibly indicate a carryover effect from the trained dyad. However, his (CA1's) variation in non-play behaviour was also not maintained in the latter part of the post-training play phase and seemed to settle at a level similar to that seen in the pre-training play phase.

In the untrained dyad, CA5 showed an increase in non-play behaviour.

Little stereotyped behaviour was seen in CA1 and CA2, and none in CA5. The stereotyped behaviour seen in CA1 and CA2 was decreased in the trained dyads, and unchanged in the untrained dyads. CA3 showed a much higher level of stereotyped behaviour, and the overall results of a decrease in trained dyads, and an increase in untrained dyads, when averaged over all dyads, is primarily a reflection of the behaviour of CA3.

Multiple functions of stereotyped behaviour (Kennedy et al., 2000) may be seen in various occurrences here, particularly in CA3. In the trained dyad, CA3

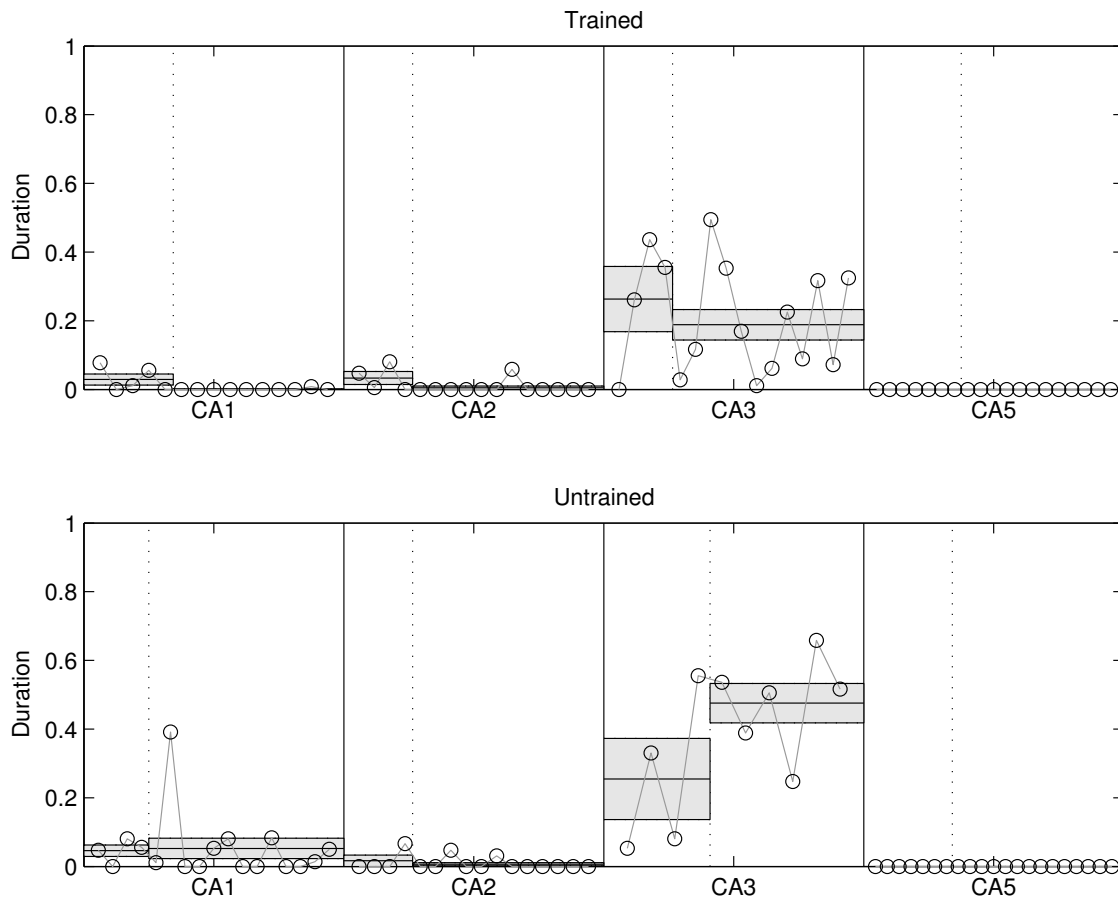


Figure 7.6: Cognitive play in indoor setting: Stereotyped behaviour

showed a consistent moderate level of stereotyped behaviour with a large variation in both pre- and post-training play phases, although there was a possible small decrease in the latter half of the post-training play phase. The large variation of it in CA3 was possibly caused by his irregular attendance due to illness and school excursions. Whenever CA3 came back to the play sessions, increased stereotyped behaviour appeared. Then, as the play sessions were continued, CA3's stereotyped behaviour started to decrease. Unfortunately, this interruption was repeated. Therefore, the increasing trend of stereotyped behaviour after middle of the post-training play phase may be quite independent of interaction with the trained peer. In the untrained dyad, CA3 showed a consistent increase in stereotyped behaviour across the length of the study, and the level of stereotyped behaviour significantly increased during post-training play sessions. Since there was little interaction with the untrained peer, there was little to distract CA3 from engaging in stereotyped behaviour such as self-stimulation; CA3 seemed to be fascinated just by doing it.

CA1 showed a sudden substantial amount of stereotyped behaviour (occupying about 40% of the play session) in post-training session two with the untrained peer, and the cause was not known. It may have been intended to relieve boredom.

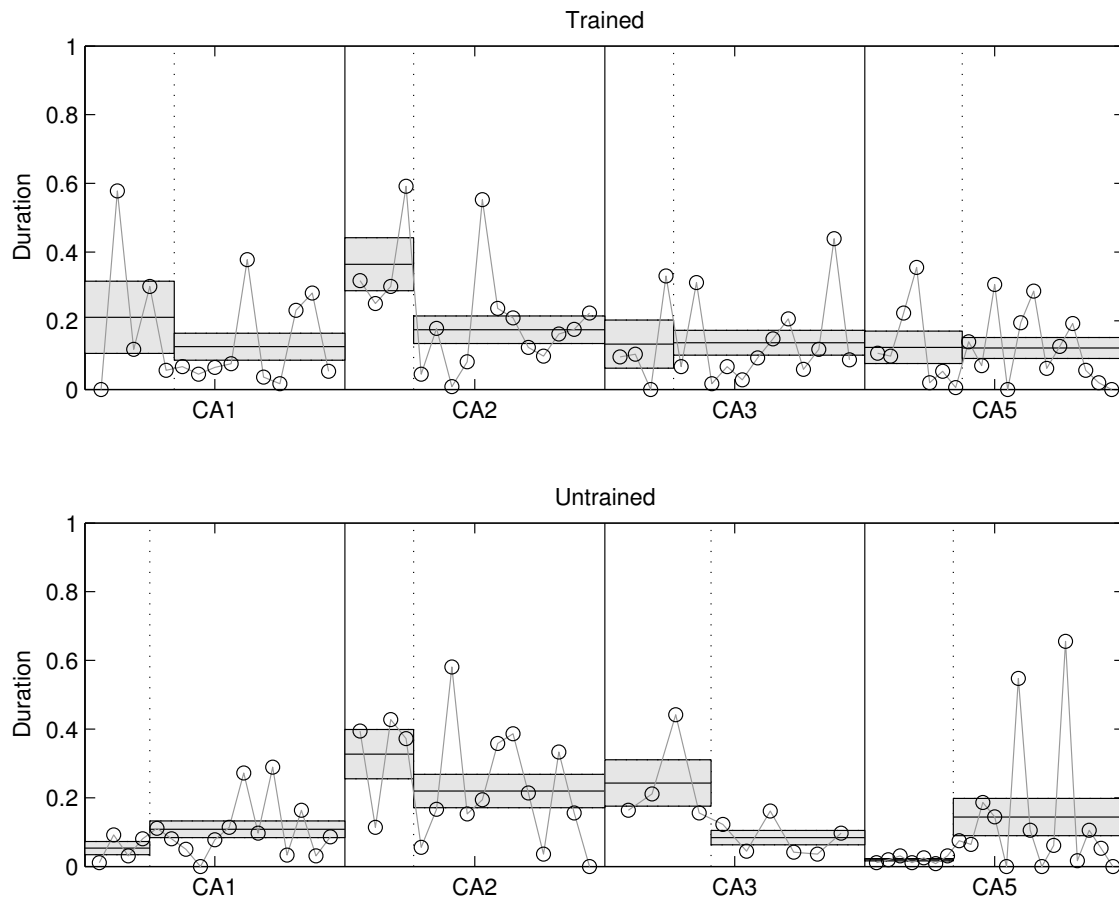


Figure 7.7: Cognitive play in indoor setting: Exploratory behaviour

In the trained dyads, only CA2 showed a significant decrease in exploratory behaviour, even though this was accompanied by a temporary large increase in post-training play session five. This temporary high increase may be related to either of two possibilities. Firstly, CA2 was absent before this session due to illness and had just returned. Another possibility is the absence of the teacher aide who was usually present from the indoor play setting during this play session. TP2, who was regular trained peer player for CA2, had complained more than once that she could not play properly when the teacher aide watched her (although the teacher aide who escorted CA2 read a paper in the corner while waiting). Finally, the teacher aide was removed from the play session. TP2's play behaviour was then much more natural, with a louder voice and clear gestures. After this session, the teacher aide continued to be absent from CA2's indoor play sessions. This may also have influenced the stereotyped behaviour of CA2, which also reappeared briefly at this time (but, overall, still maintained a decreased level during the post-training play sessions). This indicates that even people who are not active participants can influence the behaviour of both children with autism and typically developing peers.

The large variation in exploratory behaviour in post-training sessions seen in CA5 in the untrained dyad may indicate a possible carryover effect, with CA5

being influenced by the sessions with the trained peer.

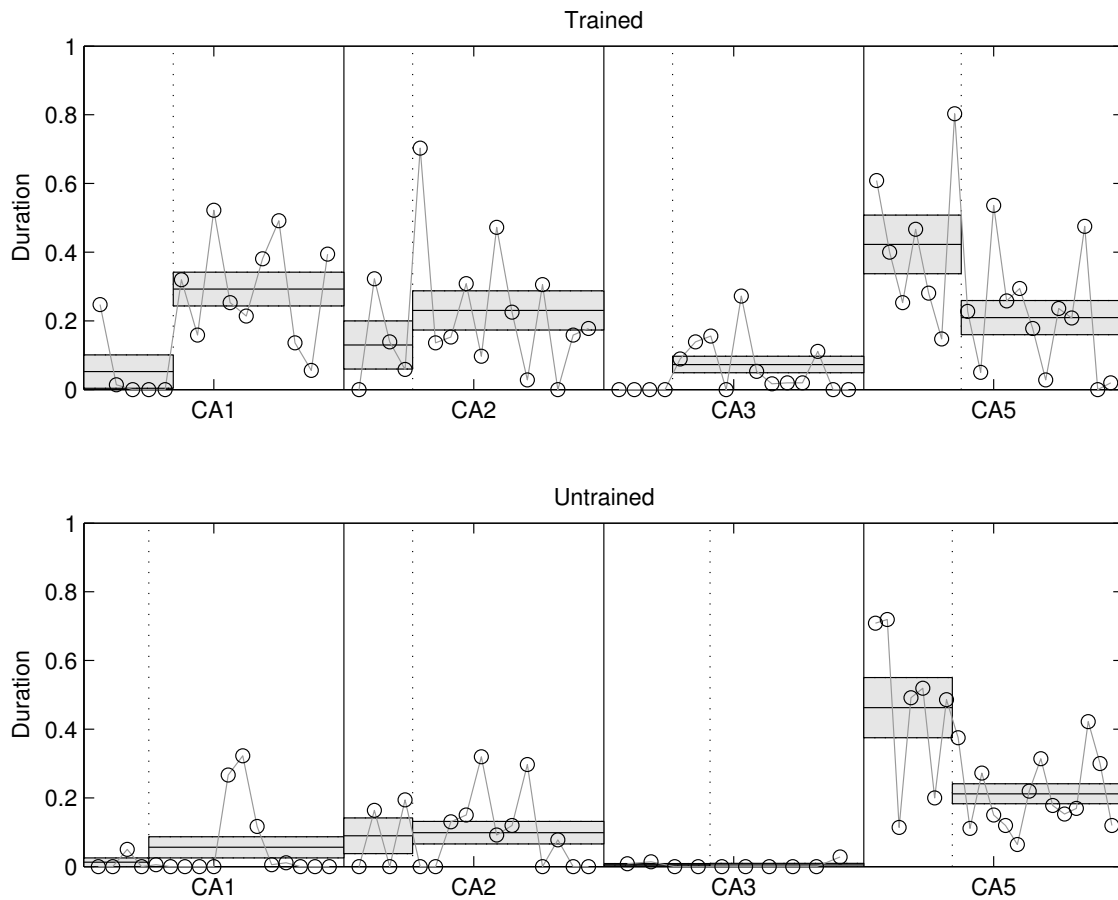


Figure 7.8: Cognitive play in indoor setting: Functional play

Changes in functional play behaviour were quite varied, with CA1 and CA3 showing significant increases in trained dyads. In light of these two children being low-functioning, and non-verbal, with severe autism (see Study 1 in chapter 6, these changes might be quite meaningful. Meanwhile, CA5 showed a decrease in functional play, in both the trained and untrained dyad. In the case of the trained dyad, this seems to have been accompanied by a shift to constructive play (see figure 7.9) and rule-governed play (see figure 7.11). This shift in play might be indicative of CA5 being relatively high-functioning, with verbalization. With the trained peer's supports, CA5 was more easily able to keep playing or to expand his play skills. In the untrained dyad, there was no corresponding increase in higher level behaviours, and this may be a good demonstration for how peer training can influence on development of children with autism.

Although CA1, CA2 and CA3 showed little change in functional play in the untrained dyads, CA1 displayed much higher levels in a few post-training play sessions. This sudden (and brief) increase involved the use of a sphygmometer which had also been used with the trained peer; this seems to be caused by the carryover effect from trained dyad.

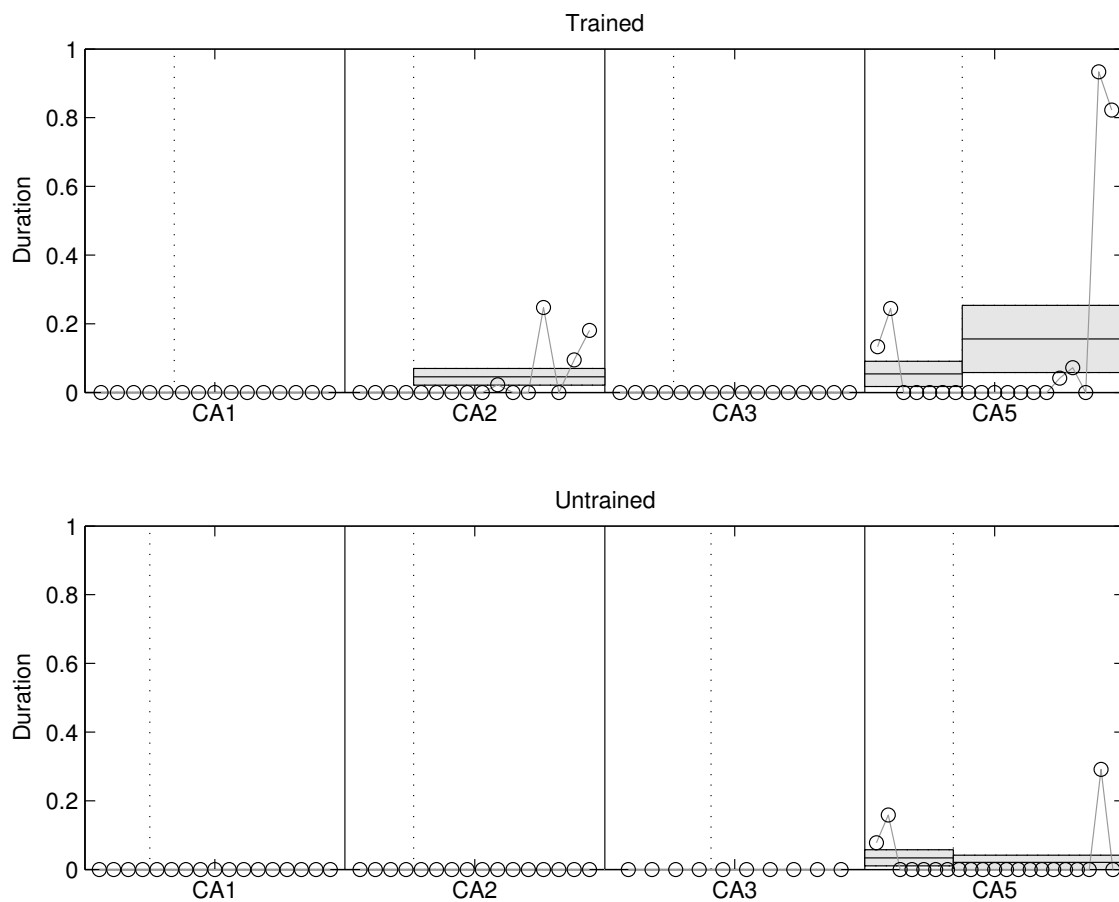


Figure 7.9: Cognitive play in indoor setting: Constructive play

CA1 and CA3 did not show any constructive play behaviour in either the pre-training or post-training play sessions. CA5 showed very high levels with the trained peer, but only in a small number of sessions (with the result that the change in the mean level of constructive play was not statistically significant). CA2 also showed relatively high levels in some of the late post-training play sessions. While it would be quite unreasonable to claim that CA2 and CA5 acquired constructive play from the trained peer, it is possible that the display of such play skills might be encouraged by the trained peer. The apparent sudden appearance of skills (“sudden ability”) had been previously noted in CA2 by his class teacher in the SEDU.

There were no significant changes in constructive play in the untrained dyads, with a low occurrence being maintained throughout both pre- and post-training play phases. As constructive play can be viewed as a creativity ability, somewhat intermediate between play and intellectual work, as reviewed in chapter 2, constructive play may well be a difficult task for many children with autism to acquire or demonstrate if there is no assistance or prompt.

As discussed in chapter 2, there is a confused debate in the literature about symbolic play in children with autism (although it is more related to its spontaneity and language skills rather than its absence versus presence). In relation

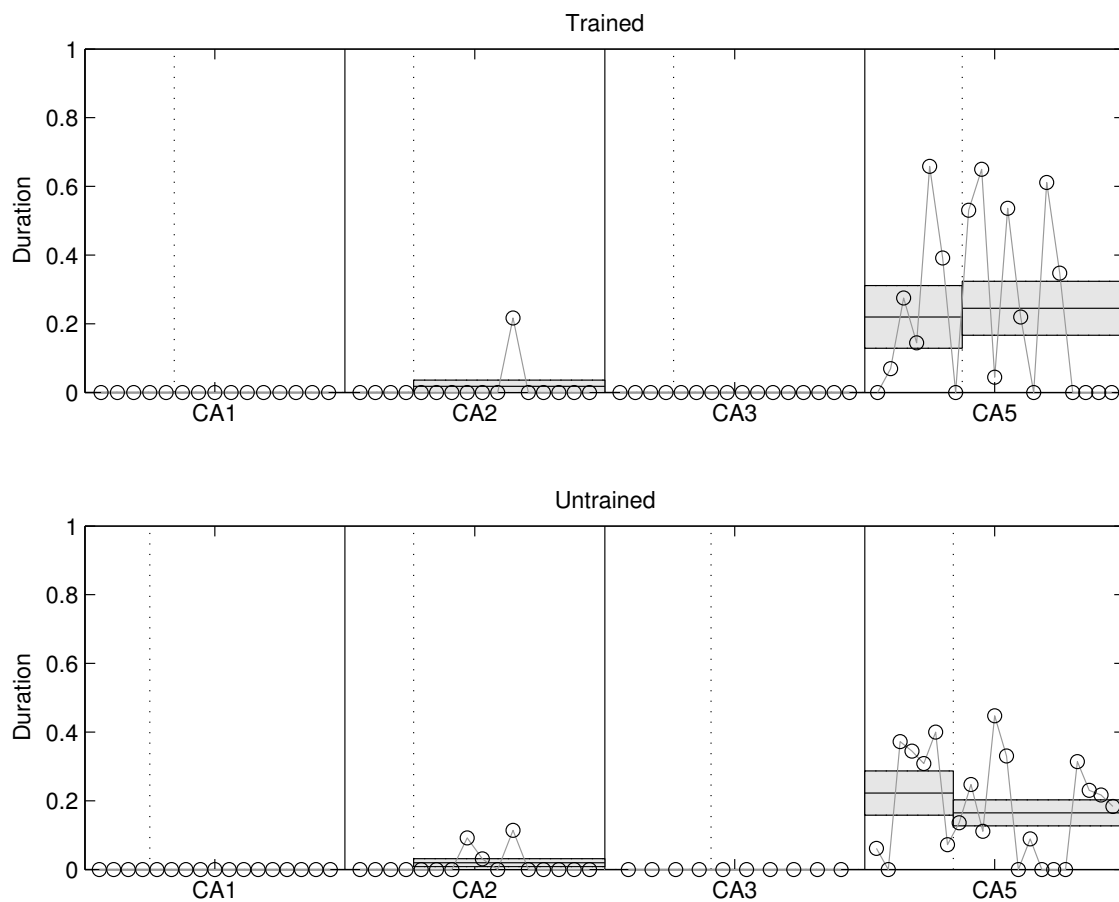


Figure 7.10: Cognitive play in indoor setting: Symbolic play

to language skills in particular, the presence or absence of symbolic behaviour can become quite sensitive to exactly what definition is used. Certainly CA5, who has language skills, showed clear symbolic play, although it was limited to play with some particular toys such as kitchen sets or a doll. In the trained dyad, CA5 maintained similar pattern of symbolic play throughout most play sessions, with a sudden cessation near the end of the post-training play sessions (due to a shift to rules-governed play (see figure 7.11)), indicating a shift in favourite play activity.

Interestingly, neither parents nor special educators had reported any symbolic play behaviour in CA2. In this study, however, CA2 displayed symbolic play behaviour with the trained peer consisting of using a stethoscope (putting a stethoscope on the trained peer's ear for 21 seconds and listening, and applying the stethoscope to a doll, putting it on a doll's body and listening for 29, 13 and 15 seconds on different occasions), for a total of 78 seconds, or 22% of the play session, in post-training play session seven. In fact, the appearance of this behaviour was not sudden because CA2 had been already shown such doll and stethoscope play when paired with the untrained peer in earlier post-training play sessions, with 33 seconds in post-training play session four, 11 seconds in session five, and 41 seconds in session seven. Such doll and stethoscope play in CA2 had also



been observed by the researcher in his classroom in the SEDU. The addition of stethoscope play to his more usual doll play may be a display of his expanded skill with the trained peer, rather than the acquisition of a new skill. However, there may well be qualitative differences in CA2's stethoscope play in the trained and untrained dyads, as it was only solitary play (play by himself), limited to the doll, with the untrained peer, whereas it was interactive play with the trained peer, with the stethoscope applied to the trained peer.

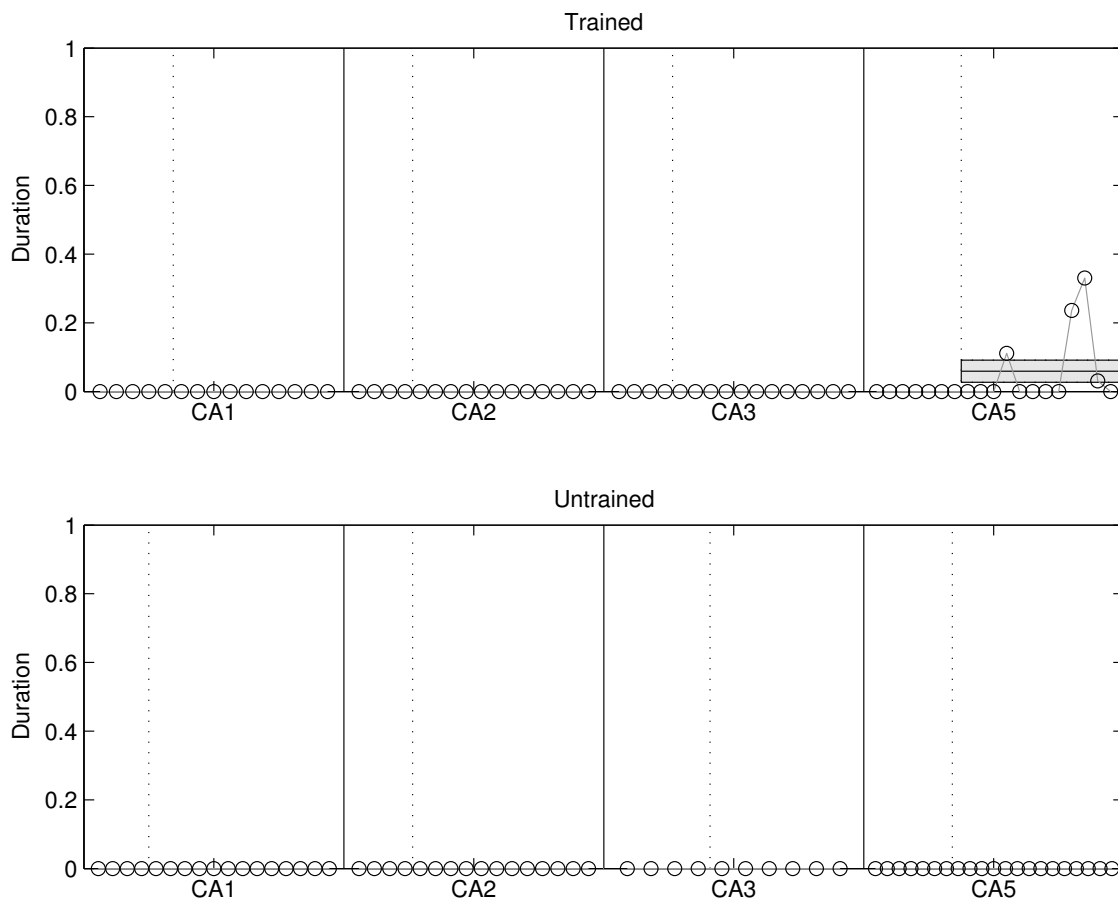


Figure 7.11: Cognitive play in indoor setting: Rule-governed play

Rule-governed play behaviour was mostly absent, with only CA5 showing any, with a sudden increase to high levels of rule-governed play late in the post-training play phase with the trained peer. With the close direction and support from TP9, CA5 started to learn a card-matching game. CA5 was relatively high-functioning, although rated as belonging to the severe autism group by CARS (see chapter 6). CA5 was verbal and did not show any stereotyped behaviour. As noted above, CA5 engaged in a range of cognitive play such as functional, constructive, symbolic play, and rule-governed play although the play displayed was sometimes limited to particular play materials.

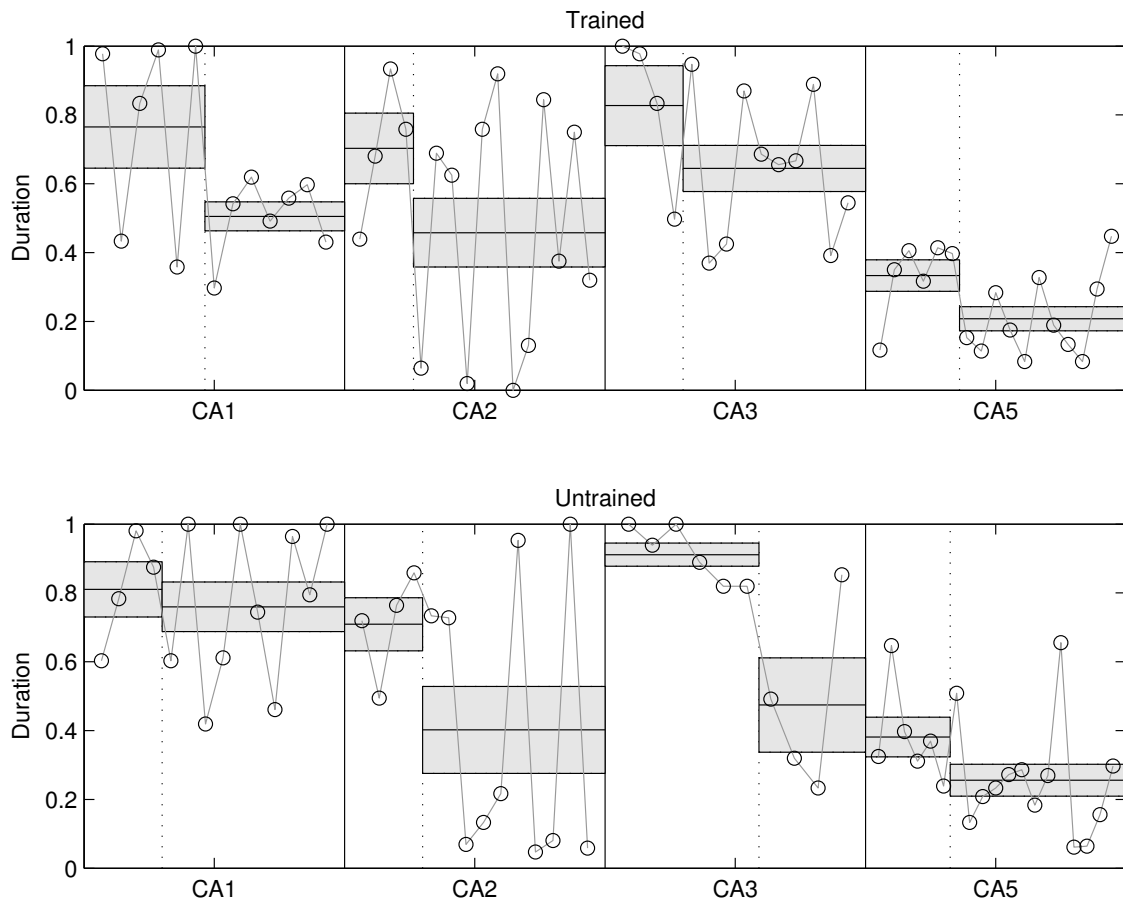


Figure 7.12: Cognitive play in outdoor setting: Non-play

#### 7.4.2 Cognitive play in outdoor setting

Non-play behaviour in the four children with autism was significantly decreased in both trained and untrained dyads. Notably, CA1 also showed much less variation in the trained dyad during the pre-training play phase, while CA2 showed extremely large variation in non-play from the beginning of the post-training play session, in both the trained and untrained dyad, mainly alternating between non-play and functional play (see figures 7.12 and 7.15).

CA5 showed a possible increase in non-play in the last two post-training sessions, following a general decreased level during the earlier post-training sessions. While this is barely apparent in figure 7.12, it is noteworthy in light of the unexpected appearance of whispering behaviour that appeared after post-training play session five. Parents and teachers also reported unusual behaviours including whispering in CA5. This whispering behaviour involved using quiet whispering to talk to others, including parents and SEDU teachers, at the SEDU and other public places (but not at home). His SEDU teacher reported that CA5 exhibited tantrums more often at the SEDU. The suspected reason for the occurrence of this unusual behaviour was not known until the end of the year—CA5's local preschool teacher found that a girl at his preschool told CA5 that

his voice was too loud and disgusting, and CA5 appears to have decided not to talk loudly. This behaviour might have influence the late post-training play sessions (although, since both the trained and untrained dyad would have been equally affected, the comparison between trained and untrained dyads remains unaffected). In addition, CA5 showed more unusual behaviours, perhaps due to illness (e.g., stopping moving, closed eyes, frowning, and possible dizziness) in post-training play session twelve.

As mentioned earlier, the decrease seen in the untrained dyads is possibly a carryover effect from the trained dyads. CA3's regular untrained play partner (UP5) missed about half of the post-training play sessions due to a broken arm. After the first two post-training play sessions (post-training data points 1 and 2 for CA3 in figures 7.12 to 7.15), another five post-training play sessions were conducted with a reserve peer (UP7). Near the end of the post-training phase, UP5 returned to the post-training play sessions (post-training data points 3 and 4 for CA3 in figures 7.12 to 7.15).

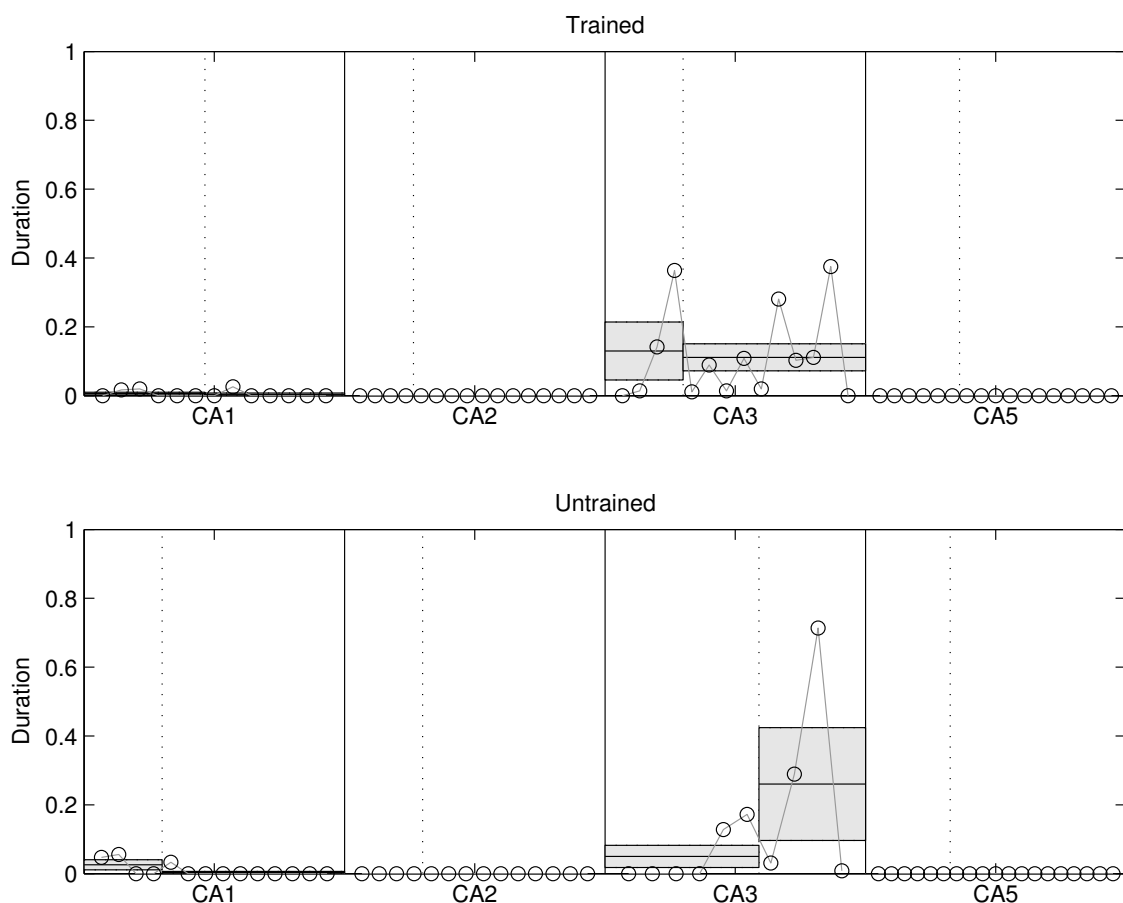


Figure 7.13: Cognitive play in outdoor setting: Stereotyped behaviour

Stereotyped behaviour was absent or almost absent for CA2 and CA5 in both trained dyads and untrained dyads. CA1 showed very little in the trained dyad, and somewhat more (but still little) in the untrained dyad in the pre-training sessions. CA3 showed an approximately constant level in the trained dyad, and

a large increase in the post-training sessions, with stereotyped behaviour occupying the majority of one of the post-training play sessions. The high level of stereotyped behaviour (also seen in the indoor sessions) appeared to be partly due to a need for re-adjustment after CA3 returned to the play sessions after a break due to illness or school excursions. CA3 seemed to try to avoid play with the trained peer by engaging in stereotyped behaviour. This functional usage of stereotyped behaviour (e.g., for avoiding tasks, expressing frustration, etc.) in children with autism has been reported in the literature (see chapter 2).

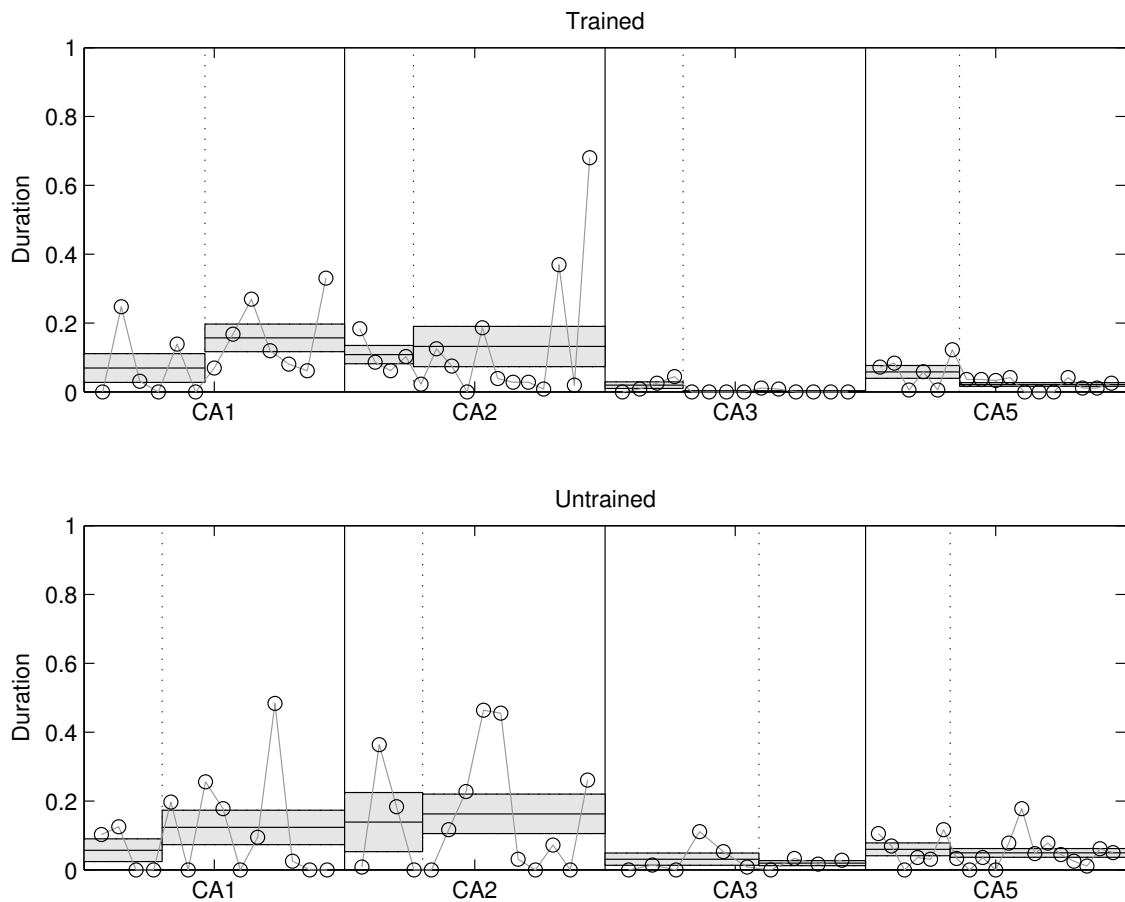


Figure 7.14: Cognitive play in outdoor setting: Exploratory behaviour

Exploratory behaviour varied across the children with autism, with CA1 showing a small increase in both dyads, CA2 showing an approximately constant level in both dyads, and CA3 and CA5 showing low levels. In the trained dyad, exploratory behaviour dominated two post-training sessions (occupying about 40% of session ten and 70% of session twelve) for CA2—this consisted of watching TP2 digging a large hole in the sandpit to sit inside of.

All four children with autism in showed increases in functional play in trained dyads, and all except CA1 in untrained dyads. In the trained dyad, CA1 displayed large fluctuations of functional play in the pre-training phase, and a more stable (and higher) level in the post-training play phase. CA2 showed the largest fluctuations (associated with variations in non-play) during the post-training

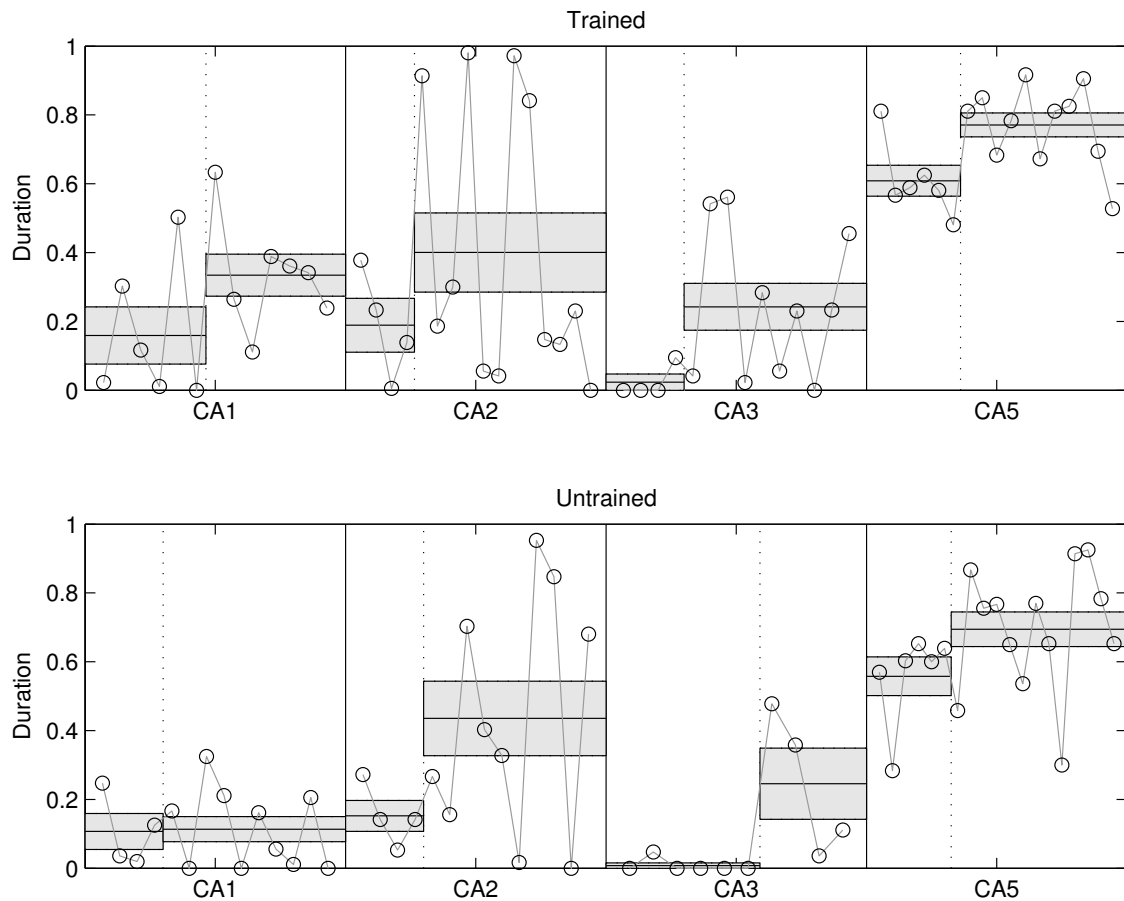


Figure 7.15: Cognitive play in outdoor setting: Functional play

play phase until before the late phase of post-training play phase. This wide variation in behaviour might be typical for CA2, according to his SEDU class teacher. CA3 showed the lowest level of functional play in the pre-training play phase, with a quite dramatic increase from almost zero to moderate levels in the post-training phase.

Again, the increases in functional play in the untrained dyads are possibly due to carryover effect from the trained dyads. Alternatively, it could be simply due to increasing familiarity with the outdoor settings, although this would not explain the rapidity of the change and the relative stability of the pre- and post-training levels, which appear to fluctuate about stable mean values.

Other cognitive play behaviours such as constructive, symbolic, and rule-governed play in children with autism were almost completely absent in both trained and untrained dyads. As noted in chapter 2, given that constructive play is related with creativity and abstract thinking skills, it may not be easy for children with autism who may have cognitive delays to acquire constructive play skills in this study. The nature of the play setting, as compared with the indoor setting with toys usable for constructive play in obvious ways, also undoubtedly contributed. Only CA5 showed constructive play (digging a tunnel in sand to build a bridge) for about 13% of one post-training play session.

### 7.4.3 Social interaction in indoor setting

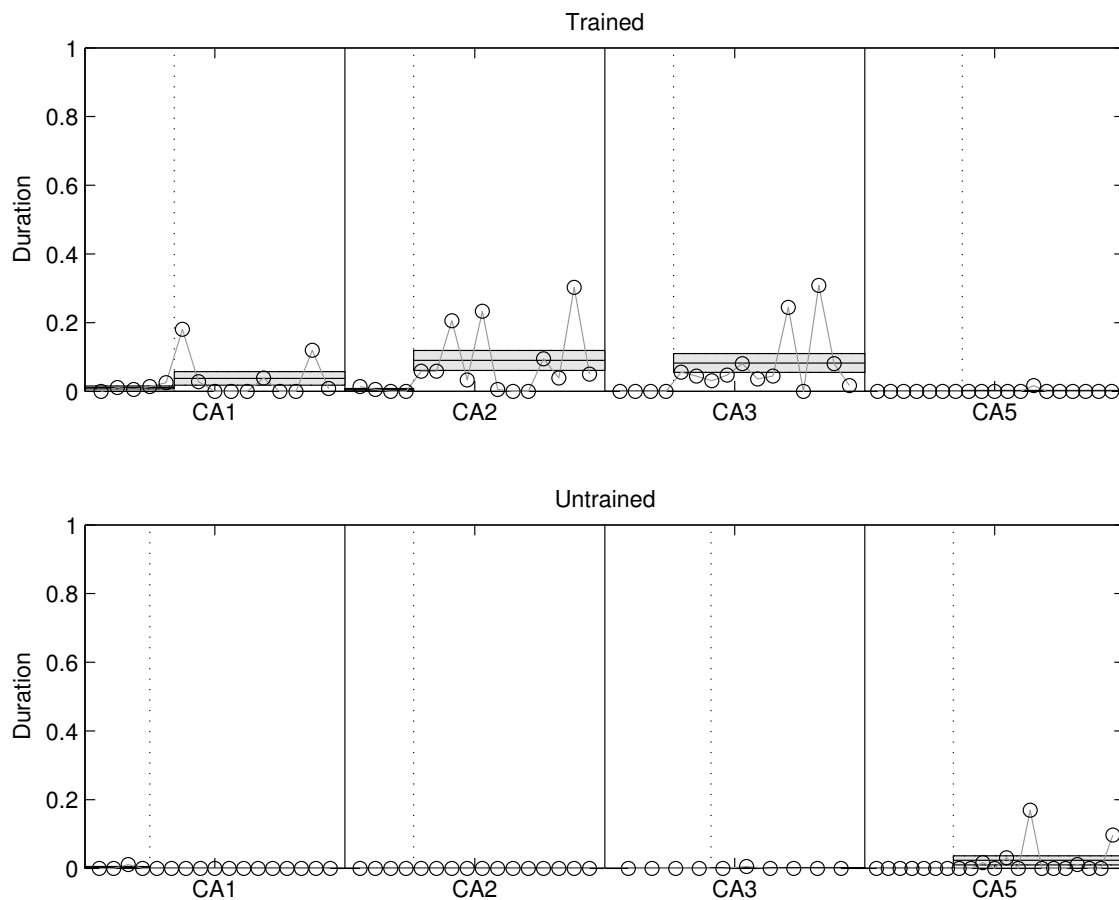


Figure 7.16: Social interaction in indoor setting: Negative interaction

Typically, when behavioural interventions are given to children with autism, it is reported that negative behaviour rapidly and significantly decreases. This indicates that behavioural intervention is highly effective, although possibly limited to the specific experimental settings. However, it may also indicate that the occurrence of negative behaviour is neglected or under-reported, possibly due to an overly wide definition of negative behaviour that may include challenging behaviour (see chapter 2). Bearing this caution in mind, negative behaviour in this study should be carefully interpreted.

In this study, three of the children with autism (CA1, CA2, and CA3) showed significantly increased negative interaction in trained dyads. What can be stated is that the increased negative interaction results from an increased level of social interaction—with no interaction, there are no opportunities for negative interaction. The small size of the indoor play setting allowed little opportunity for the children with autism to avoid interaction passively, so the moderately high level of active avoidance (some, but not all, of the negative interaction behaviour observed) is not entirely unexpected. Although the proportion of the time for negative interaction in CA1, CA2, and CA3 was low, it clearly increased, after peer

training, when trained peers started to interact. This appears to be resistance against interaction with the trained peers. After the peer training, the trained peers more frequently and consistently attempted interaction (initiations) with the children with autism. From the viewpoint of the children with autism, the trained peers interrupted their accustomed “alone world”, leading to a reaction opposing the change, especially early in the post-training play phase.

However, there may be some more particular circumstances (confounding factors) to be considered in relation to the increase of negative interaction in individual children with autism. For CA1, the reoccurrence of it in post-training play session nine (about 12% of the time) might have been related his involvement in a “diet therapy” program (wheat-free diet) at this time. For CA2, negative behaviour seemed to occur when the trained peer (TP2) monopolised toys and did not provide him with enough opportunities when he wanted to play with them. Although TP2 was trained, she was still a child player, not an adult player, and such events are not entirely unexpected. It can be noted that when TP2 was occupied in a play activity, she used two play skills, demonstration of and narration about her play activity, and perhaps this motivated CA2 to demand to play with the same toys. The increase of negative interaction shown by CA3 in post-training play sessions five, eight, and ten seemed to be caused by his returning from the breaks due to his illness or school excursions as mentioned earlier. While these factors did not cause or contribute to an increase in negative interaction in CA1, CA2 or CA3 in the untrained dyad, the opportunities for negative interaction were greatly reduced by the lower level of interaction with the untrained peers.

Interestingly, CA5, who was relatively high-functioning and verbal, showed a completely different pattern of negative interaction from the other three children with autism. CA5’s negative interaction behaviour was unchanged in the trained dyad, but significantly increased in the untrained dyad. Indeed, the impact of negative interaction behaviour in CA5 on the untrained peer was serious enough for the last play session to be stopped (session 14). CA5 expressed his feeling (e.g., “Disgusting!”) from time to time as his interaction trials were ignored or rejected by the untrained peer (UP14). CA5 finally threw his toy towards UP14, and UP14 started to weep. Although this negative interaction only occupied a small portion of the time, the impact was large in comparison, and if this had not been the final play session, it might have caused further difficulties for CA5 and UP14 to interact together. This negative interaction appeared to be an expression of his frustration and anger. Clearly negative interactions can be of great qualitative consequence, although quantitatively small. The circumstances of how and why the negative interaction occurs in children with autism (environmental factors) should be considered.

In trained dyads, no-interaction behaviour of all children with autism was

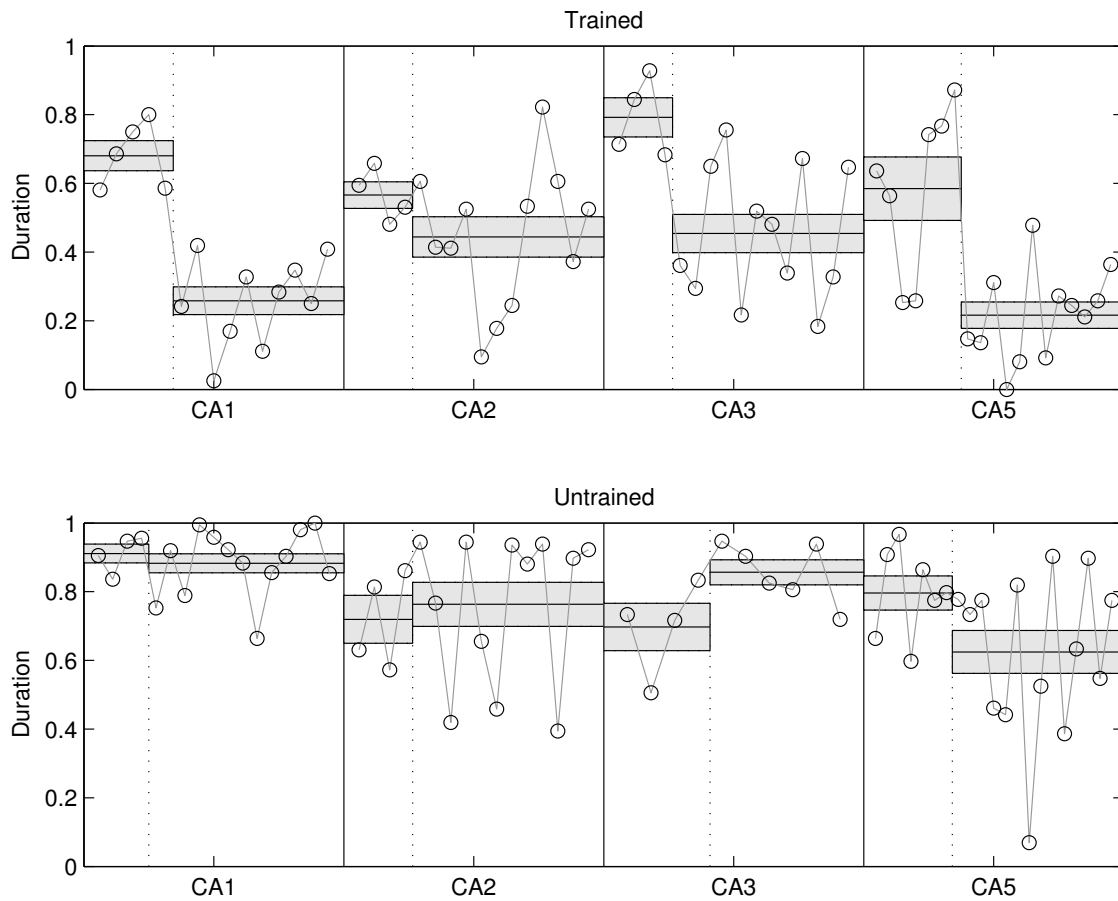


Figure 7.17: Social interaction in indoor setting: No interaction

significantly decreased, while, overall, in untrained dyads, there was no change when averaged over the children with autism (CA3 showed an increase, and CA5 showed a similar decrease). This strongly supports the conclusion that the peer training program was effective, and that such a training program is necessary for increased social interaction.

Notably, CA2 showed a smaller significant decrease in the trained dyad than the other children with autism. In the earlier post-training play sessions, there was a large and clear decrease in no-interaction behaviour. CA2 showed his interest in TP2's play by an increase in passive-low interaction in post-training play sessions five to seven (see figure 7.18). However, TP2 did not provide enough opportunities for CA2 to use play materials even though he was ready and willing (as mentioned above), resulting in CA2 apparently deciding to play by himself in post-training play sessions eight to eleven, with an increase in no-interaction (ignoring TP2's interaction) that is displayed in post-training play sessions nine and ten, and even increasing negative interaction (rejecting offered toys, taking TP2's toy and refusing giving it back, not allowing TP2 to touch his toys, etc.) in post-training play session eleven (see figure 7.16). This suggests the usefulness of including additional components, such as careful observation of toy preference in the child with autism, intermittent breaks rather than constant demands



to interact) in the peer training.

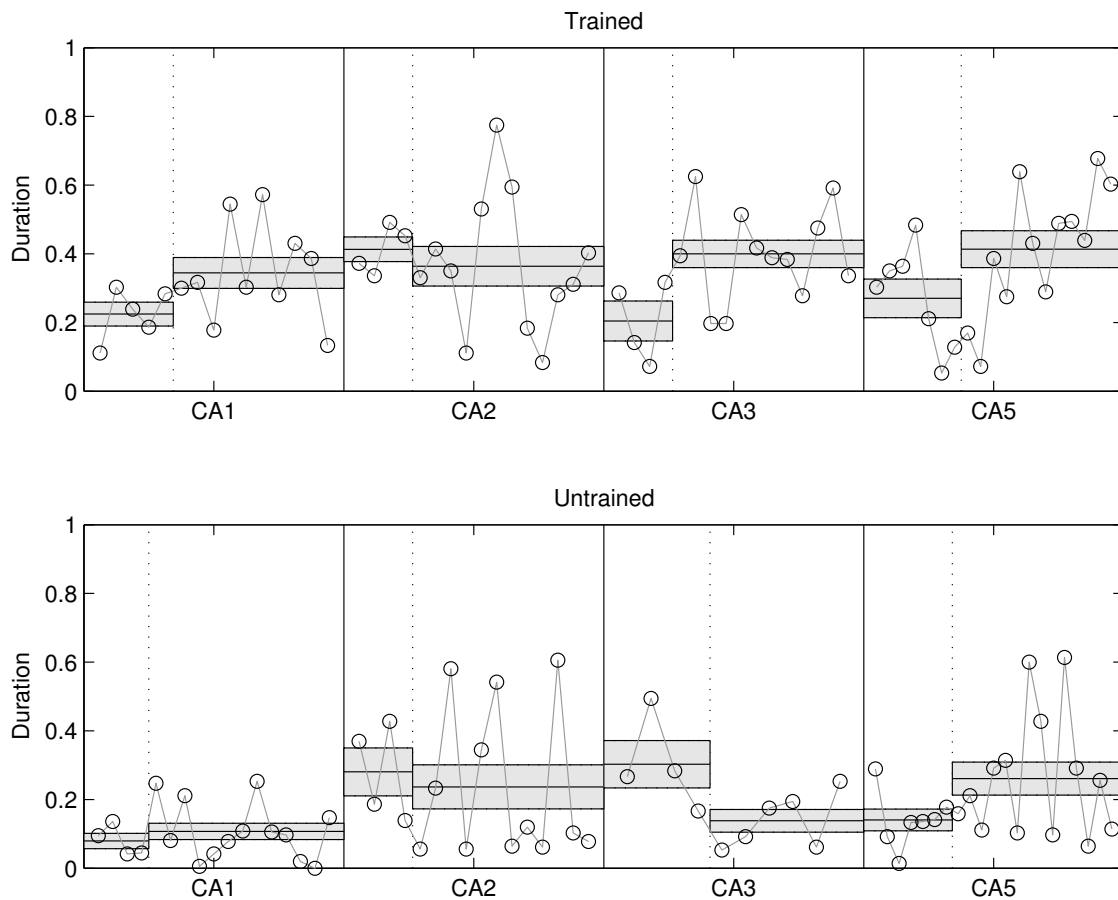


Figure 7.18: Social interaction in indoor setting: Passive-low

In the trained dyads, passive-low interaction behaviour in three children with autism (CA1, CA3, and CA5) was significantly increased. The children with autism seemed to be interested in the trained peers' play activity and sometimes imitated the trained peers' play activity.

In the untrained dyads, there was no significant change for CA1 and CA2, a significant decrease in CA3, and a significant increase in CA5.

In the trained dyads, all children with autism showed significant increases in passive-high interaction behaviour. Although it was only a minor behaviour for CA2 and CA3 in the post-training play phase, the increase when compared to the very low levels in the pre-training phase was considerable. These increases indicate that when the trained peers initiate frequently and appropriately, the children with autism are able to respond in an appropriate manner (reciprocal interaction). Similar effects have been reported in many other peer-mediated intervention studies (see chapter 4), where initiation by peers was met by appropriate response by children with autism as a result of successful intervention. Skills in appropriately responding, rather than initiation skills, may be the most common training for children with autism in special education programs. Therefore, when trained peers interacted with children with autism in peer tutoring

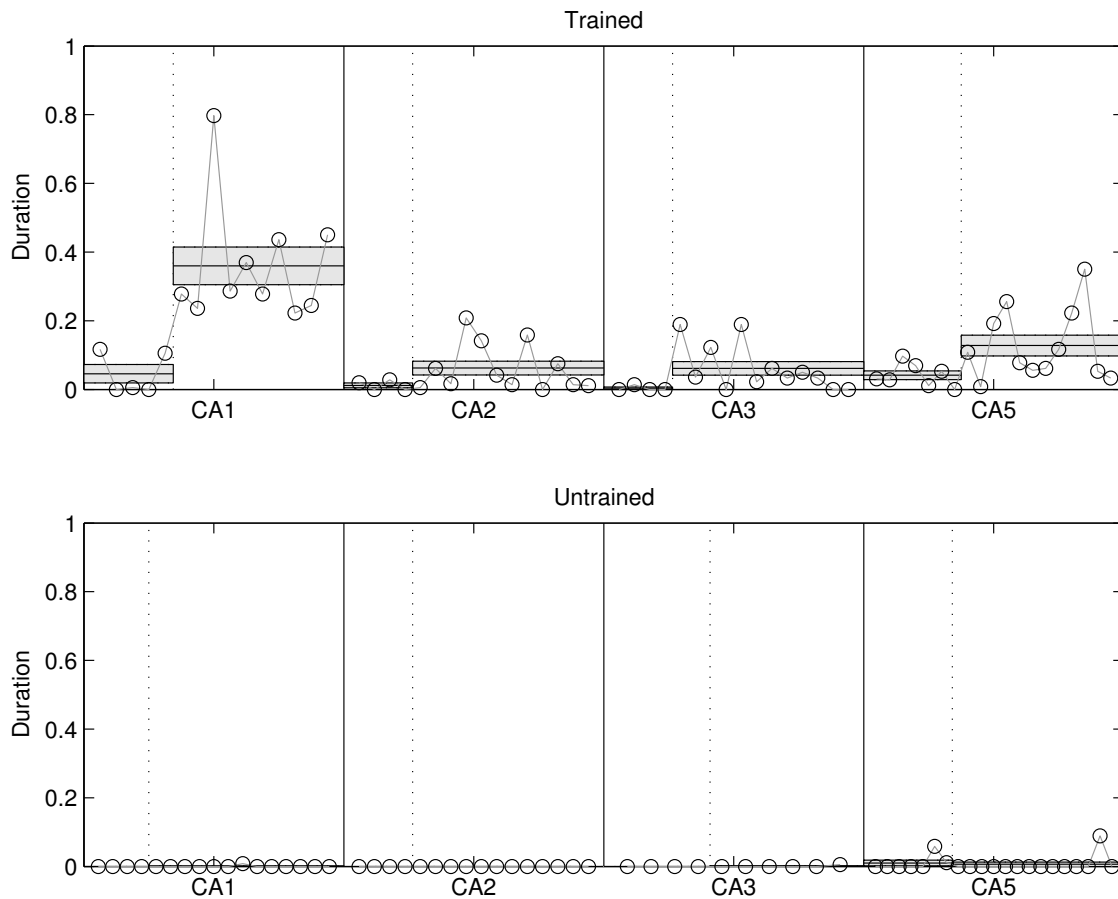


Figure 7.19: Social interaction in indoor setting: Passive-high

approaches, it would be familiar and easier for children with autism to maintain their play activities.

In contrast, passive-high interaction behaviour of children with autism was almost absent in untrained dyads.

Unilateral interaction behaviour is recognized by Volkmar et al. (2003) as a “one-side active but idiosyncratic” social style in high-functioning children with autism. Although the occurrence of unilateral interaction behaviour may be quantitatively low, the qualitative meaning of the behaviour may be extremely important in terms of development of social interaction in children with autism.

In the trained dyad, CA5, who is relatively high functioning and verbal, showed a low level of unilateral interaction behaviour during the pre-training play sessions, with a decrease leading to lower levels in the post-training play sessions. In the untrained dyad, the initial low level increased to a higher level (although it should be noted that this increase was not statistically significant at the  $\alpha = 0.05$  level due to the large variations in both the pre-training and post-training phases). As trained peer was able to recognise and respond to CA5’s initiation in the post-training phase, transformation what would have been unilateral interaction into a reciprocal form of interaction behaviour, such as active-low and active-high interaction (see figures 7.21 and 7.22), and the untrained peer

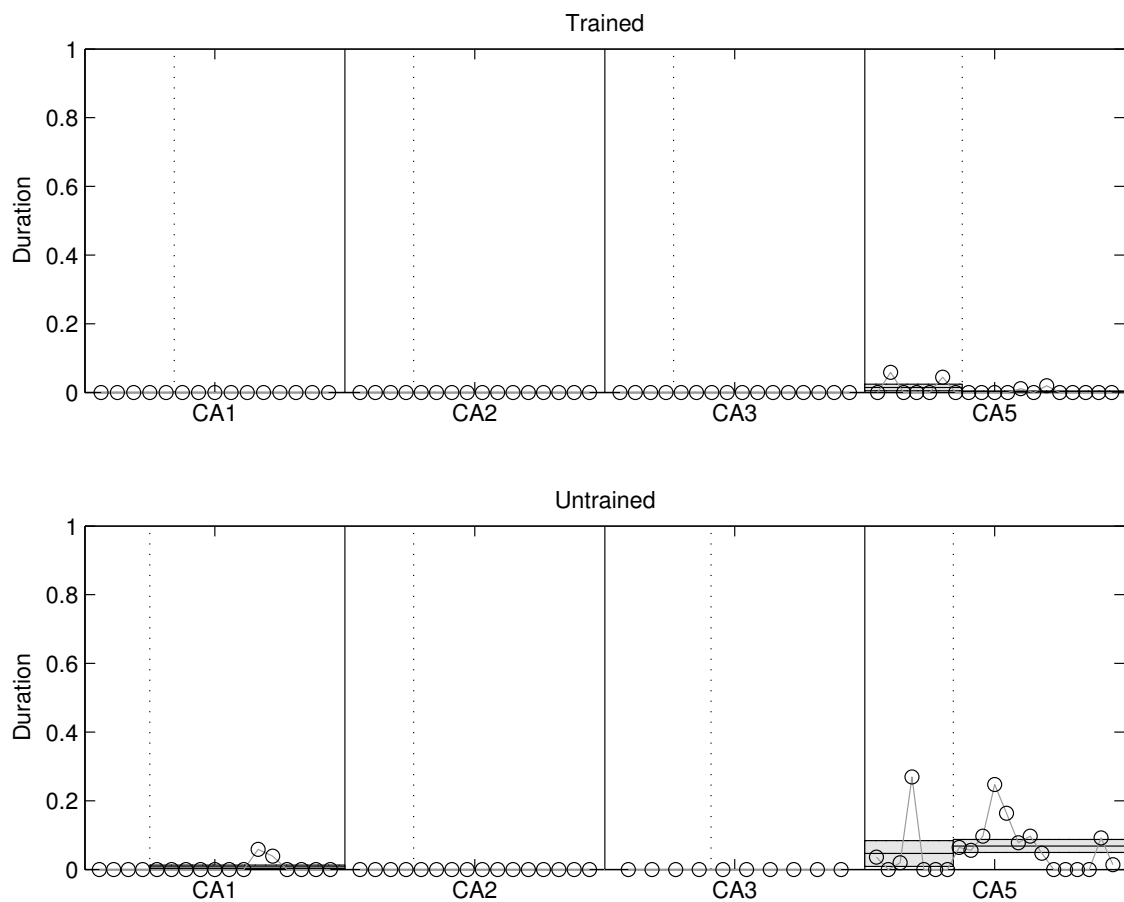


Figure 7.20: Social interaction in indoor setting: Unilateral interaction

(UP14) was unable to, this pattern is not surprising. In addition, in the untrained dyad, continued lack of appropriate response from the untrained peers resulted in negative interaction due to frustration and anger (see figure 7.16). Considering these extremely different end-points of unilateral interaction behaviour, a scaffolding approach should perhaps be emphasised more for social interaction in children with autism (see chapter 3).

CA1 also showed a small amount of unilateral interaction in the post-training phase, with the untrained peer only, abandoning these attempts when there was no appropriate response.

Some children with autism, particularly high-functioning children with autism, report their strong desire for social interaction with others, but find it very difficult to establish and maintain such social interaction (see chapter 3). This social disability causes children with autism to be lonely, feel themselves to be outsiders, and often, to feel frustrated.

In the trained dyads, CA2 (relatively low-functioning) and CA5 (relatively high-functioning with better verbal skills) showed a significant increase in active-low interaction. They often watched the peers, indicating that they were interested in the peers or the peers' play activities. Active-low interaction behaviour in CA2 and CA5 was clearly increased as their initiation was acknowledged by

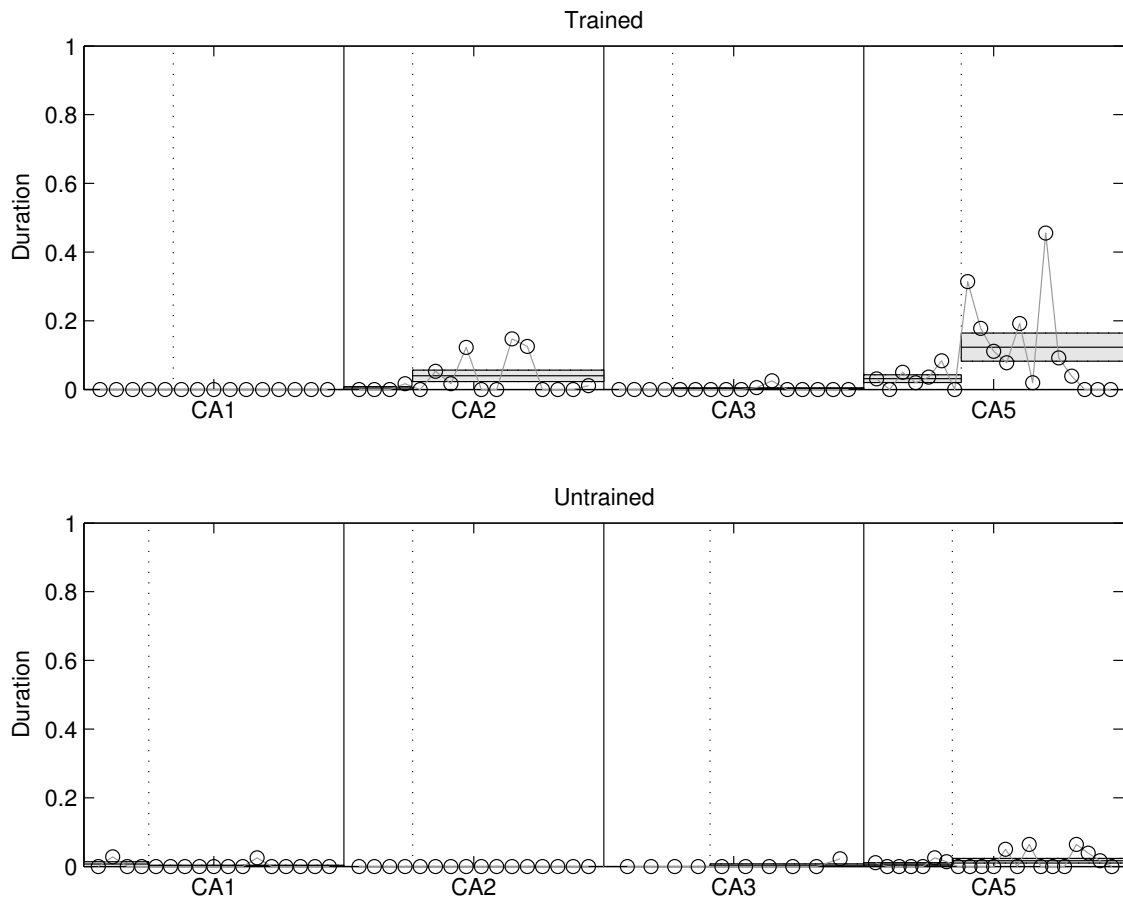


Figure 7.21: Social interaction in indoor setting: Active-low

trained peers. The lack of interaction initiated by children with autism may not only be caused by a lack of initiation by children with autism, but also by the lack of recognition of and appropriate response to such initiations. Recognition of and appropriate response to initiations by children with autism would be very important components of peer training.

In the untrained dyads, on the other hand, active-low interaction behaviour of the children with autism was notably small or almost absent. CA5 showed some for short periods of time (less than 10%) in a couple of post-training play sessions (as compared with a *mean* level of over 10% in post-training play sessions with the trained peer, with a peak level of over 40%).

None of these four children with autism showed statistically significant changes in active-high interaction with either the trained peers or the untrained peers. However, it is worth noting that CA1 showed a high level (about 20%) in the first pre-training play session, with CA1 and the peer throwing a ball to each other. This ball was not present in later sessions, and no other active-high interaction was seen in CA1. CA5 showed active-high interaction behaviour in both pre- and post-training play sessions with the trained peer, with a decrease late in the post-training phase, with a corresponding increase in passive-high interaction. This change in social interaction was associated with changing and

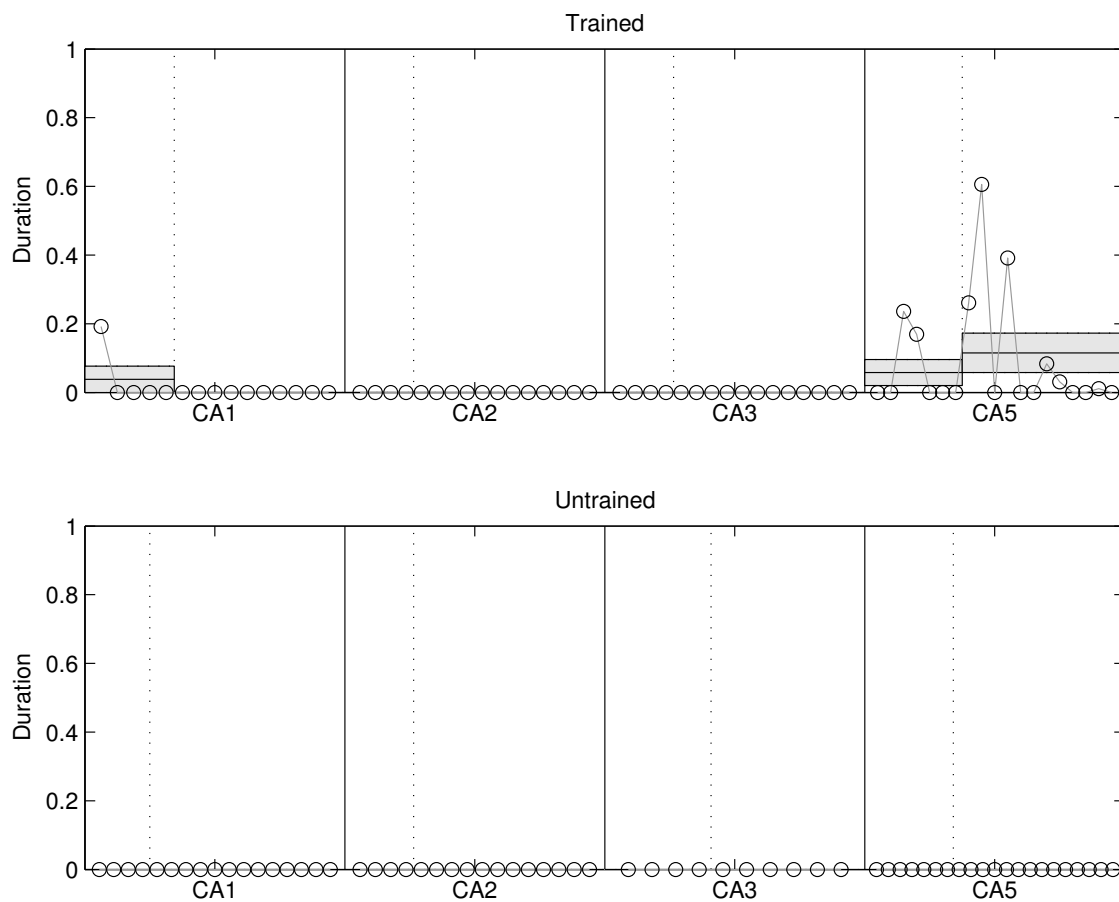


Figure 7.22: Social interaction in indoor setting: Active-high

expanding his main play activity from cooking play (symbolic play) to various other play activities such as rolling a dice and counting the dots, identifying and grouping different colour of straws (functional play to prepare for rule-governed play), and a card-matching game (rule-governed play). When the trained peer (TP9) introduced these new games, with new ways and rules for using the dice and cards, CA5 started to engage in different play activities that he did not play before. While CA5 was learning these rules, the social interaction was changed from active-high through active-low to passive-high interaction. In this sense, the levels of social interaction used in this study are not strictly hierarchical.

#### 7.4.4 Social interaction in outdoor setting

In the outdoor setting, the occurrence of negative interaction in the children with autism was low. When compared with the indoor setting, the relatively large increase seen in the trained dyads in the indoor setting did not occur in the outdoor setting. This difference reflects the different sizes of the settings—in the larger outdoor settings, children with autism have more opportunities to passively avoid unwanted interaction, by escaping from trained peers. It may also indicate that children with autism prefer such passive avoidance to active con-

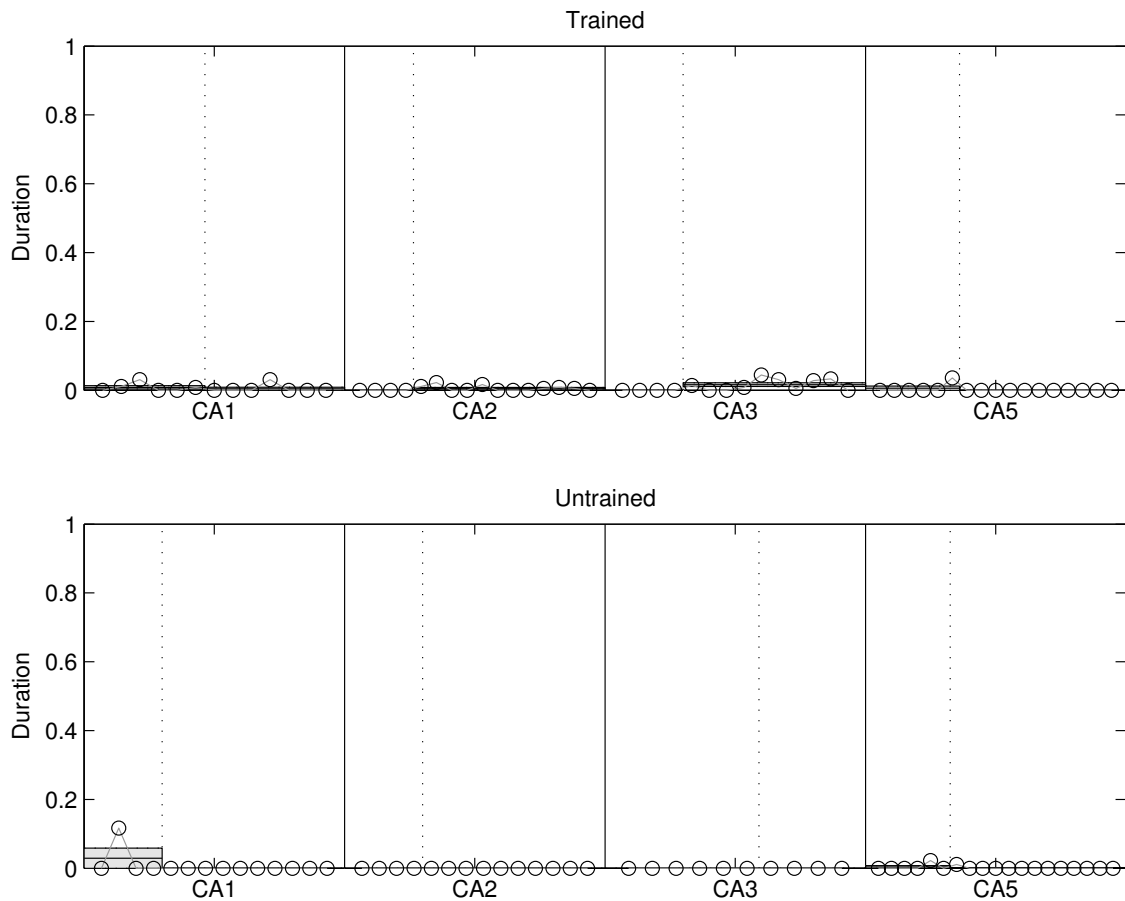


Figure 7.23: Social interaction in outdoor setting: Negative interaction

frontation.

No-interaction behaviour was the dominant behaviour in the pre-training play phase. All of the children with autism showed a large decrease in the post-training play phase, while in the trained dyads, if anything, there was a small increase. The level shown in the trained dyads in the post-training sessions was typically about 50% (the mean duration was  $0.492 \pm 0.040$ ), with large variations from session-to-session. At least some of the variation can be explained readily—compared to the indoor settings, children with autism had more space to run around in, and there were more distractions such as physical education sessions being held nearby, noisy public transport on the adjacent road along the playground fence, school assemblies, and so on. With such distractions, it would be harder for trained peers to get attention from children with autism. In fact, not only the children with autism but also the trained peers occasionally paid attention on these other nearby events.

The high level of no-interaction in the untrained dyads may imply that when children with autism could not interact with untrained peers, they become bored and lose their interest in untrained peers and their play activities. Although they may be more familiar with the untrained peers and their play activities through involvement in the play sessions, they may not be more interested in playing

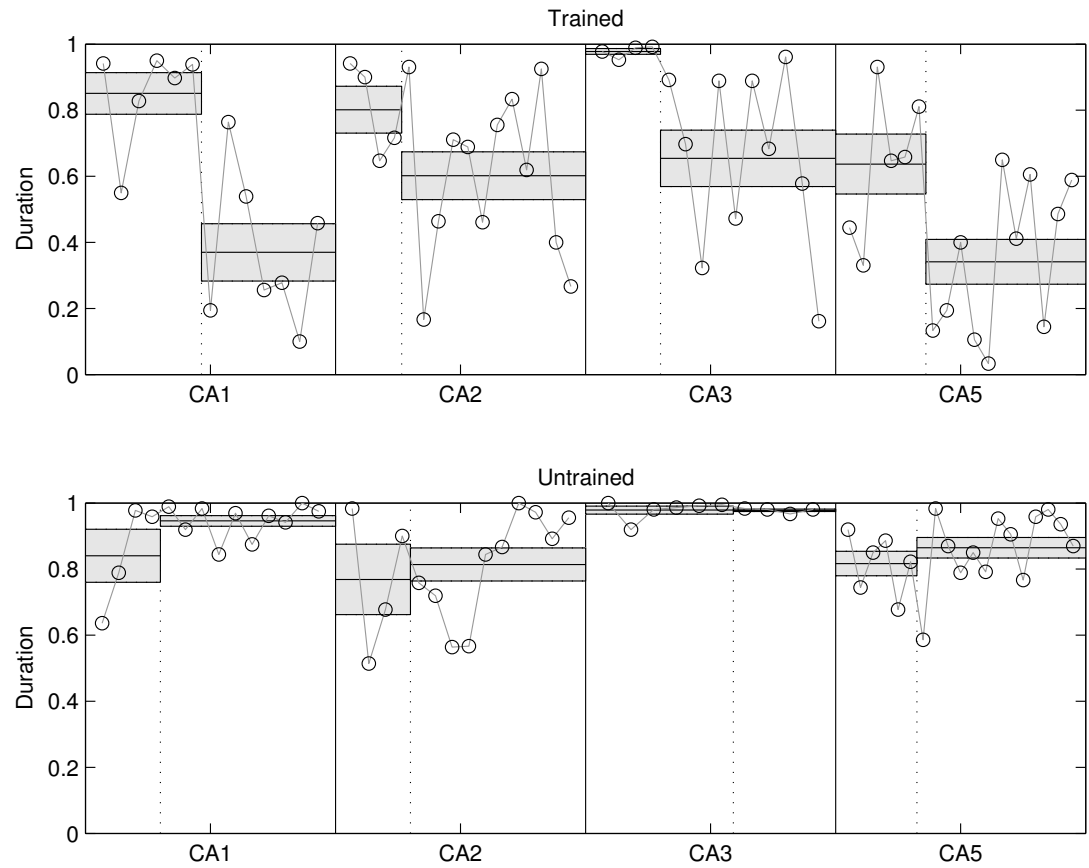


Figure 7.24: Social interaction in outdoor setting: No interaction

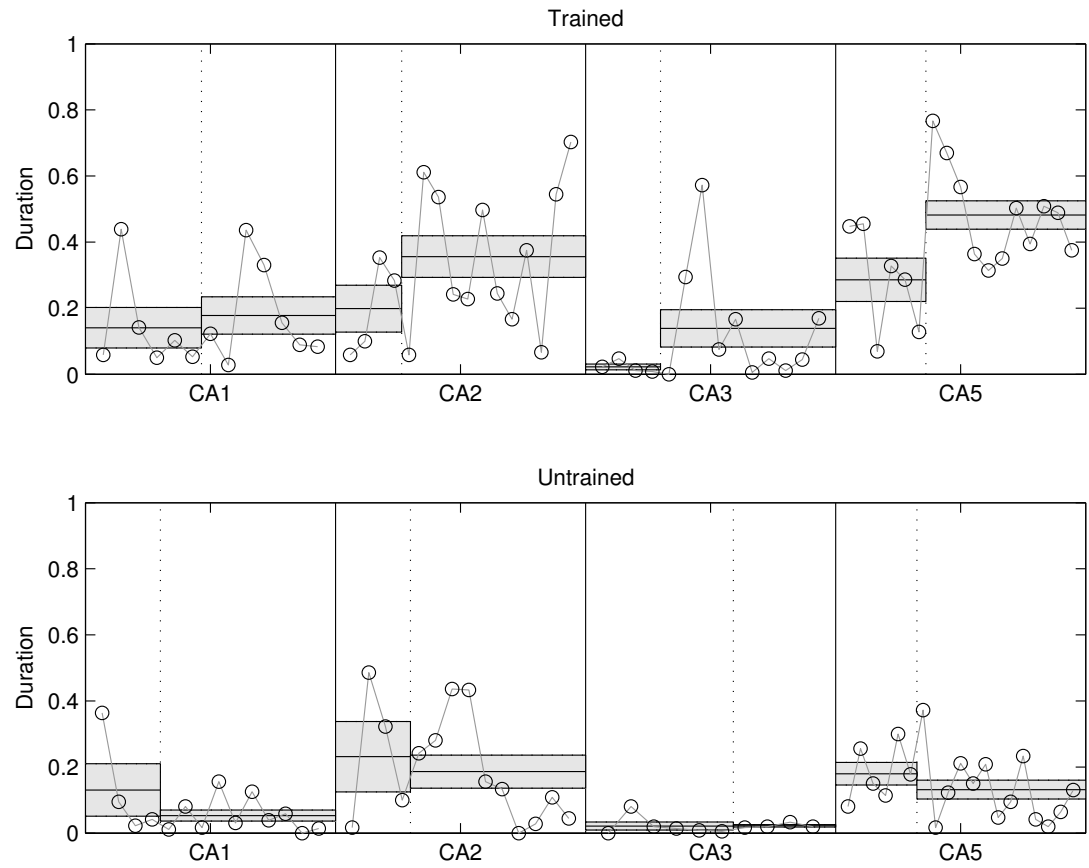


Figure 7.25: Social interaction in outdoor setting: Passive-low

with untrained peers.

In the trained dyads, the children with autism increased their passive-low interaction. Trained peers guided children with autism to watch the trained peers' play demonstrations. Children with autism were encouraged by trained peers to try the play equipment or to use sandpit toys in different ways. When using playground equipment, if children with autism showed successful use a piece of playground equipment, they were guided to another. Often, the increased level of passive-low interaction (observing peers' demonstration) alternated with an increased level of passive-high interaction from session-to-session. For example, when CA1 showed appropriate use of a slide, he was guided to other equipment such as a climbing net and a tyre tunnel. The resulted in the peak in passive-low interaction in the middle of the post-training play phase. After observing the TP's performance, CA1 used the other equipment, and showed in significant increase in passive-high interaction (see figure 7.26).

In contrast, no statistically significant change was seen in the untrained dyads (although, generally, the data indicate a possible decrease)—a low level of passive-low interaction was maintained throughout all play sessions.

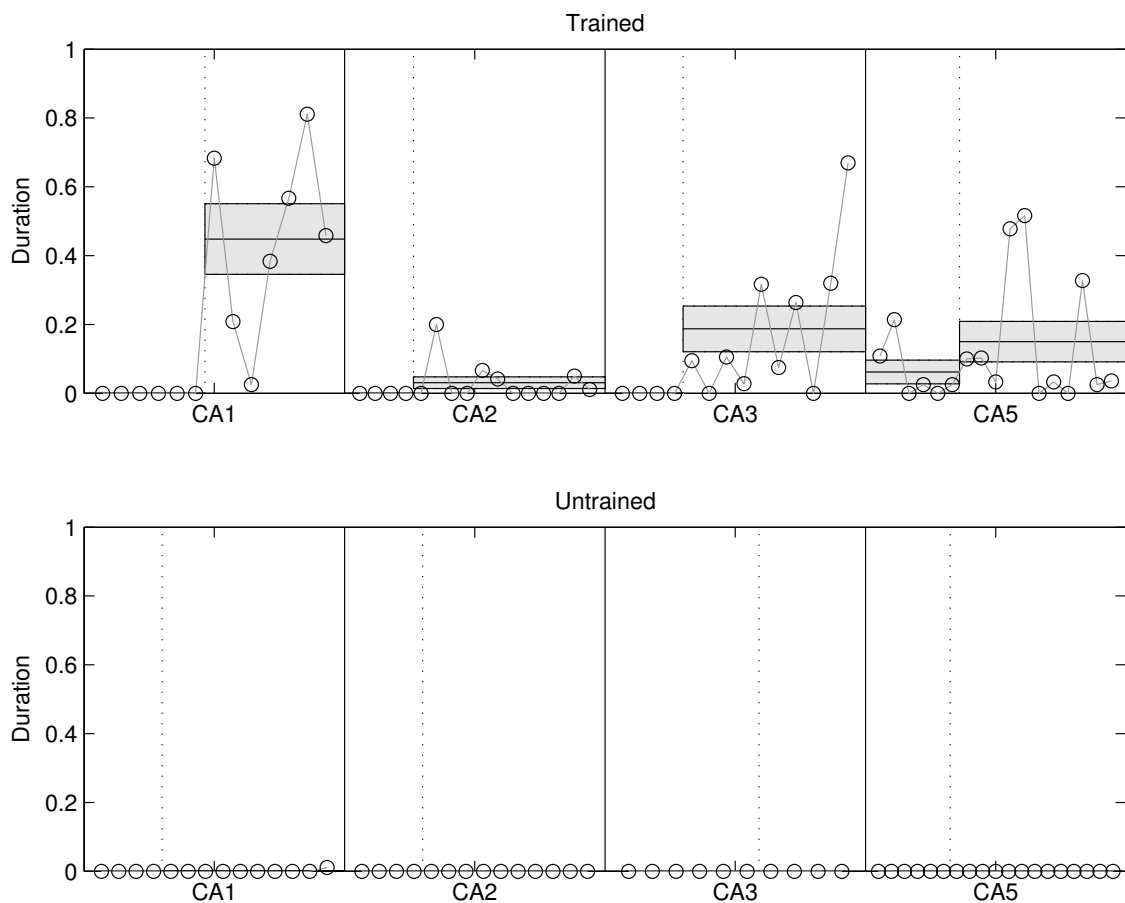


Figure 7.26: Social interaction in outdoor setting: Passive-high

In the trained dyads, passive-high interaction was significantly increased in all of the children with autism. This indicates that more opportunities for chil-



dren with autism to use various playground equipment was provided with guidance and assistance from trained peers. In fact, this increase in interaction, accompanied with the increase in passive-high interaction, resulted in excited play, with both children with autism and the trained peers being excited about trying outdoor play equipment, with both children climbing and jumping (with children with autism typically attempted to jump or climb down from higher equipment after trained peers had done so). This necessitated careful supervision in order to maintain adequate safety (this supervision being carried out by both the researcher and a teacher aide). This may suggest the importance of a teacher’s role as a supervisor for both children groups in inclusive education, as well as a facilitator in peer-mediated interventions, rather than as a player for children with autism in segregated education. In contrast, passive-high interaction was absent or almost absent in untrained dyads in outdoor settings.

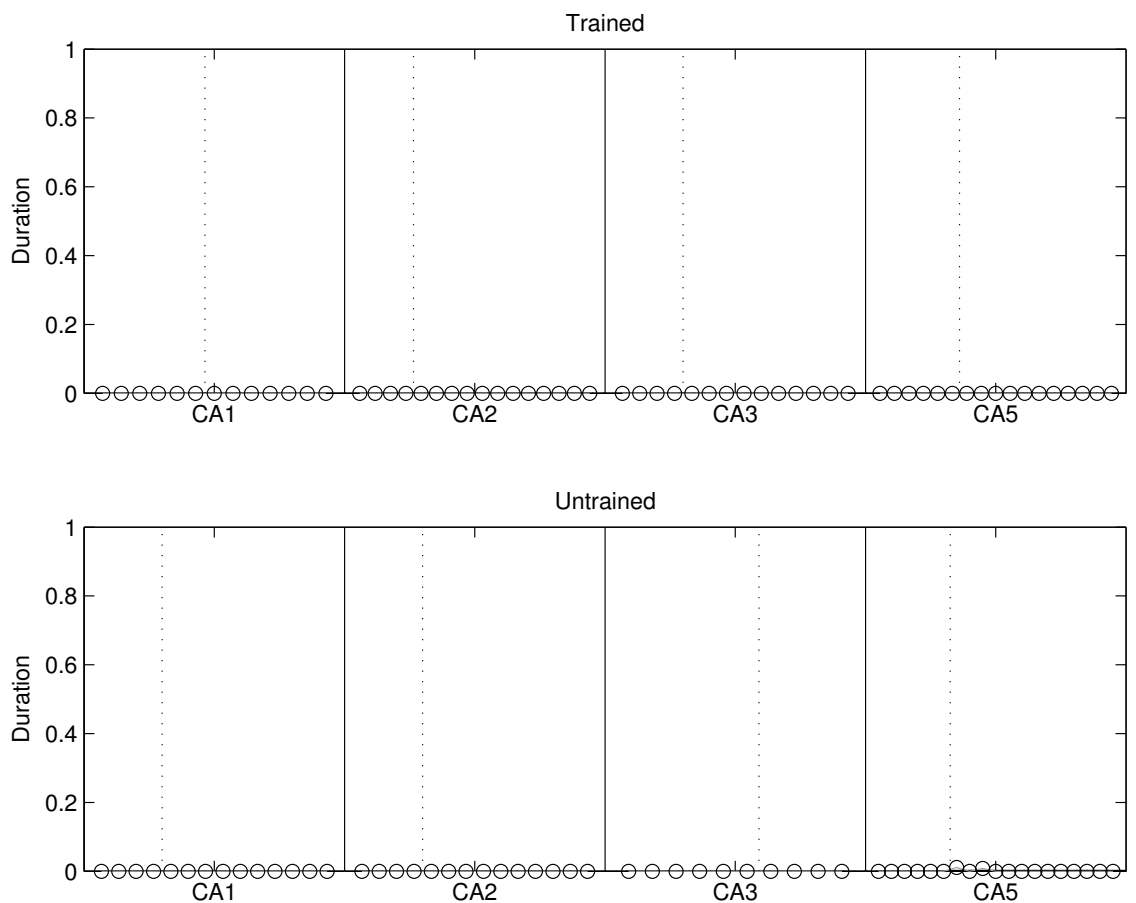


Figure 7.27: Social interaction in outdoor setting: Unilateral interaction

Unilateral behaviour of children with was absent in all children with autism except CA5, who showed a small amount of unilateral behaviour towards UP14. The amount of unilateral behaviour was much lower than in the indoor setting, and the lower level seems to at least partly result from UP14 making use of the larger area to avoid CA5.

Very little active-high and active-low interaction behaviour was observed in the outdoor setting. Although the levels shown in the trained dyads by CA5 and CA2 were greater than in the untrained dyads, the levels were so low that no conclusion can be safely drawn from it.

## 7.5 Correlation between cognitive and social behaviours

In this section, the correlation (relationship) between cognitive and social behaviours is examined in trained and untrained dyad groups. The value of  $r$  (the correlation coefficient) required for the correlation to be statistically significant at the  $\alpha = 0.05$  level depends on the number of data points (Stockburger, 2001). The correlations are shown in table 7.19; the statistically significant correlations are boxed.

Table 7.19: Correlation coefficients

The correlation coefficients  $r$  for correlation between cognitive play and social interaction scores for each dyad are shown. Statistically significant correlations are boxed.

Dyad	Indoor		Outdoor	
	Pre-training	Post-training	Pre-training	Post-training
CA1-TP3	0.249	0.772	0.563	0.601
CA1-UP8	0.482	0.206	0.928	-0.000
CA2-TP2	-0.272	-0.009	-0.929	-0.558
CA2-UP1	-0.727	0.306	0.299	-0.106
CA3-TP4	0.933	0.787	0.798	0.662
CA3-UP5	0.188	0.470	0.578	-0.957
CA5-TP9	-0.237	0.361	0.463	0.572
CA5-UP14	0.429	0.353	-0.506	-0.769

As seen in table 7.19, there was little clear correlation. No significant correlation appeared in the pre-training phase in any dyad, whether trained or untrained. Since no peer training had been given to the trained peers at that stage, this result may not be surprising. After peer training, there was some significant correlations, but only in five dyads. It is notable that only significant positive correlations and no negative correlations were seen in the three trained dyads with significant correlations, and only negative correlation was seen in the two untrained dyads with significant correlations. These negative correlations were seen in the outdoor settings, where a significant increase in cognitive play was seen in the untrained dyads, without any increase in social interaction.

The scatterplots for the individual dyads are shown in figures 7.28–7.35. Dotted lines indicate the line of best fit where correlations were significant.

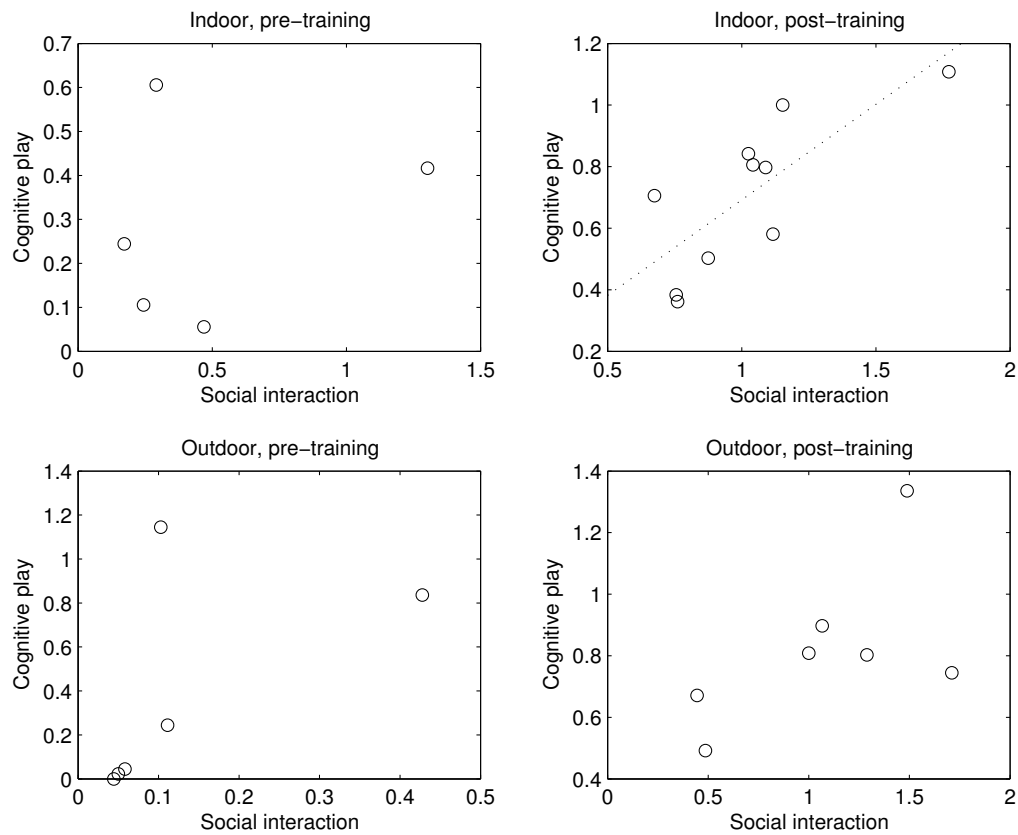


Figure 7.28: CA1 trained dyad (CA1-TP3): Correlation between cognitive play and social interaction

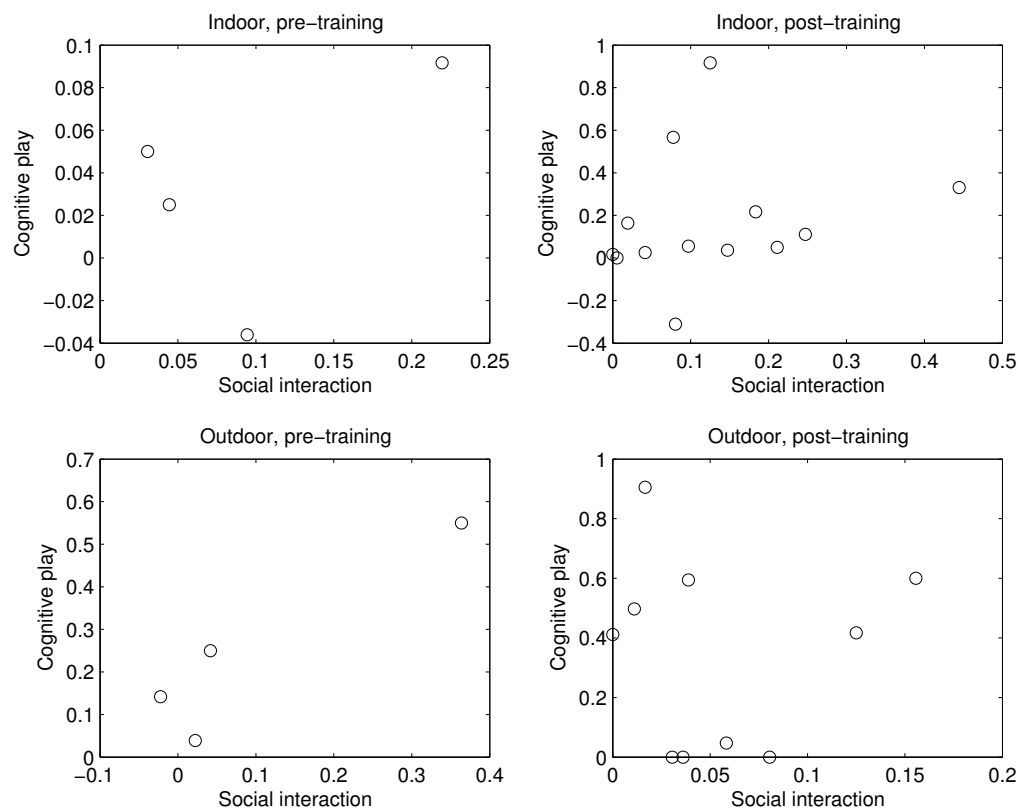


Figure 7.29: CA1 untrained dyad (CA1-UP8): Correlation between cognitive play and social interaction

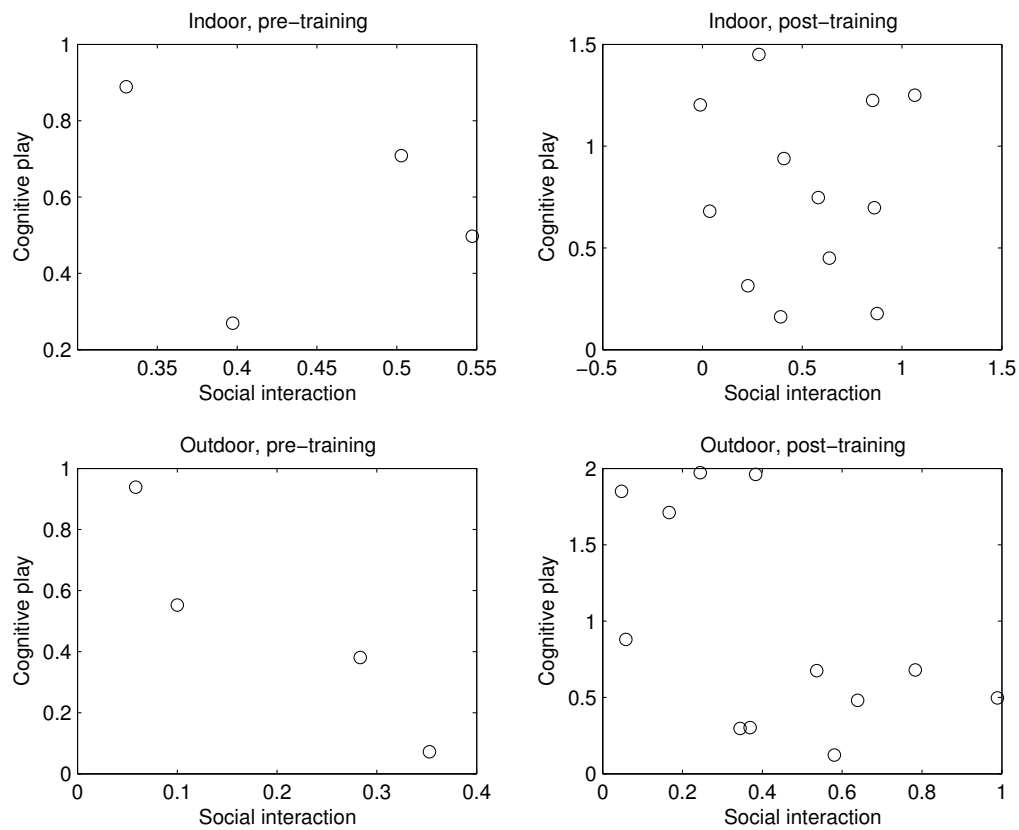


Figure 7.30: CA2 trained dyad (CA2-TP2): Correlation between cognitive play and social interaction

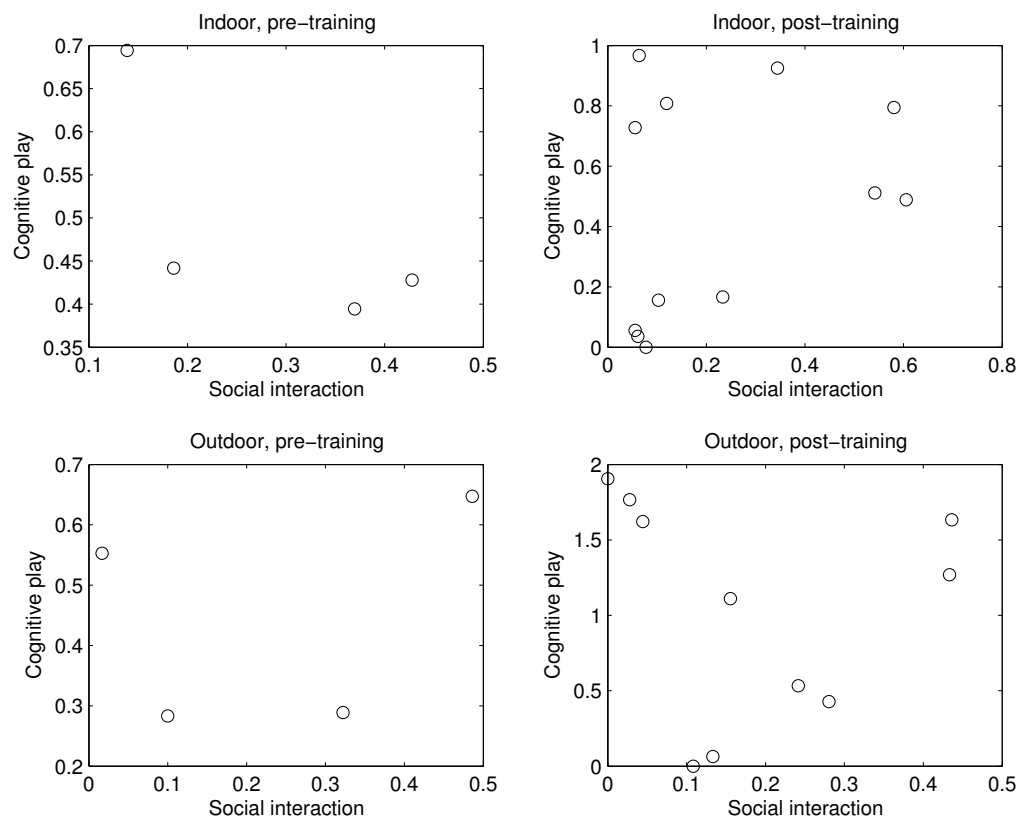


Figure 7.31: CA2 untrained dyad (CA2-UP1): Correlation between cognitive play and social interaction

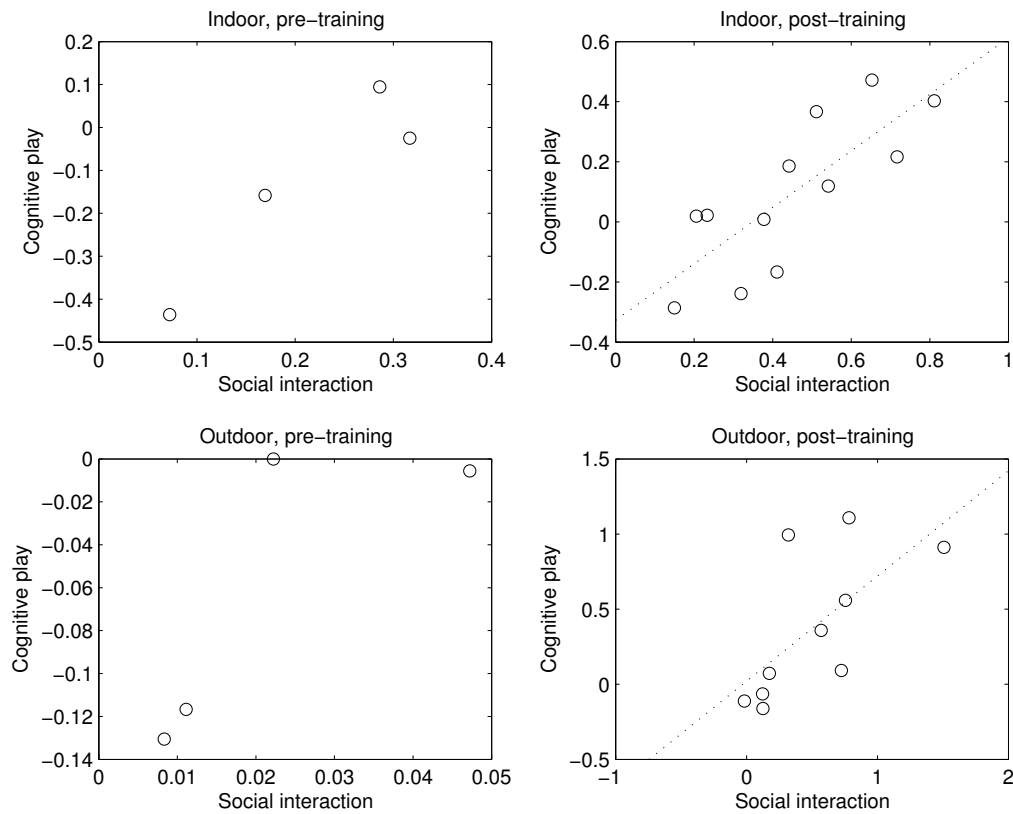


Figure 7.32: CA3 trained dyad (CA3-TP4): Correlation between cognitive play and social interaction

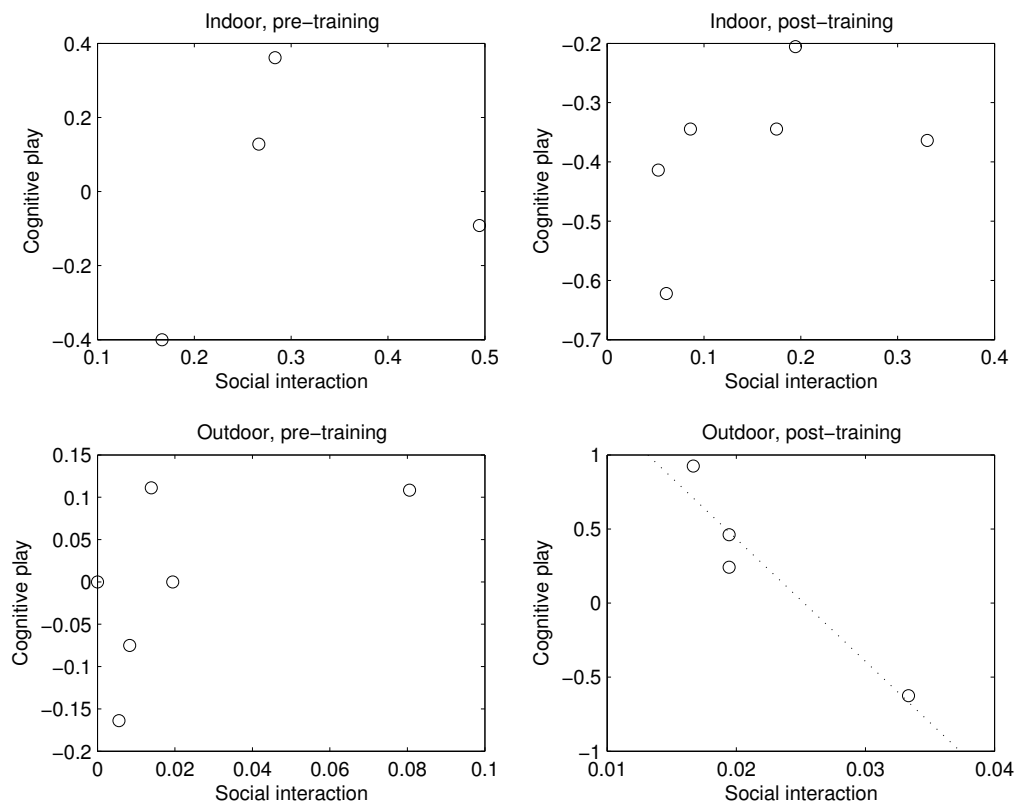


Figure 7.33: CA3 untrained dyad (CA3-UP5): Correlation between cognitive play and social interaction

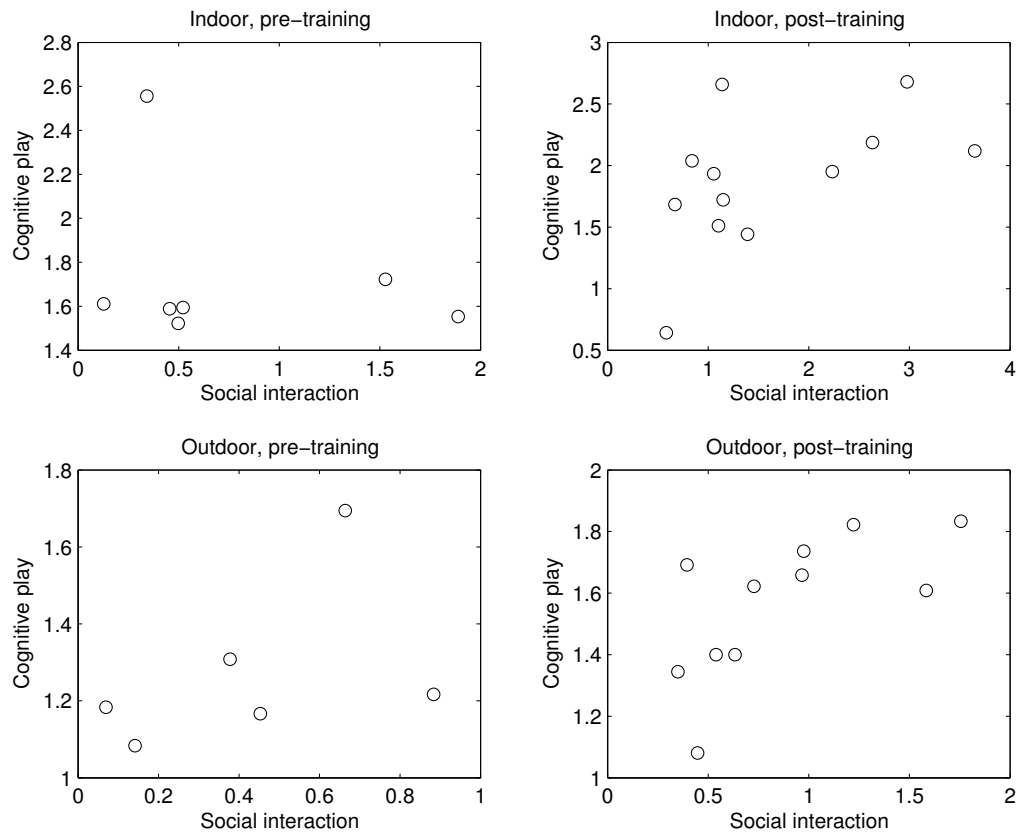


Figure 7.34: CA5 trained dyad (CA5-TP9): Correlation between cognitive play and social interaction

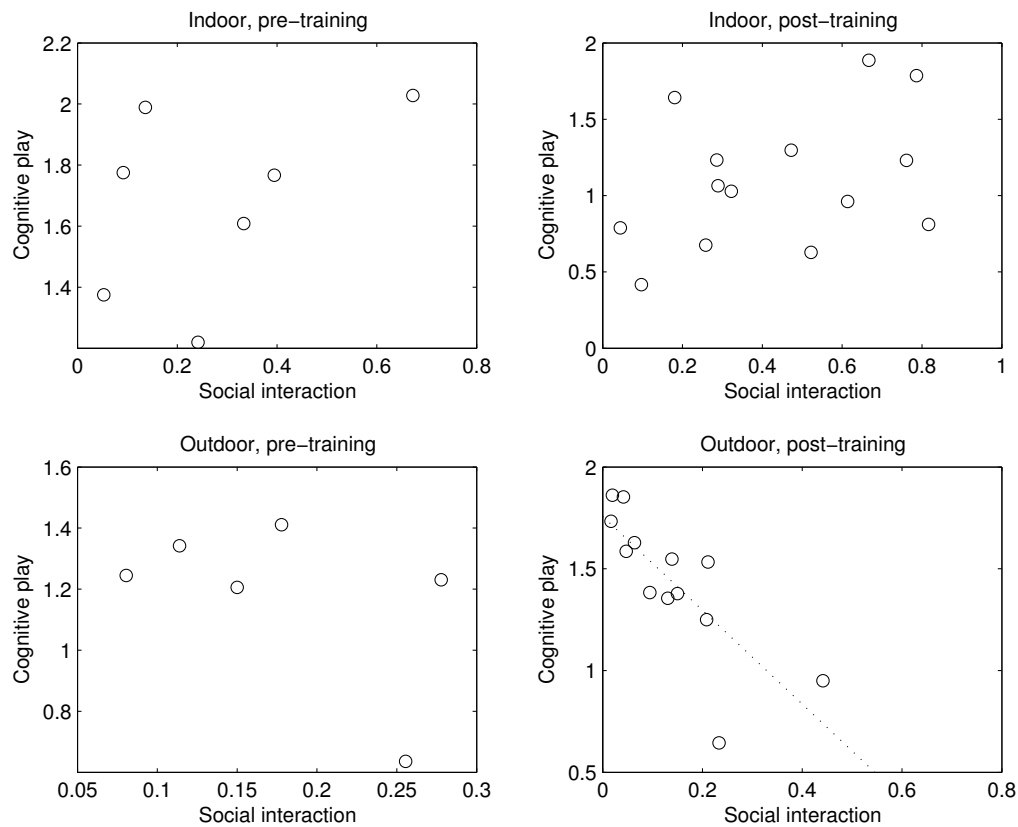


Figure 7.35: CA5 untrained dyad (CA5-UP14): Correlation between cognitive play and social interaction

### 7.6 Analysis of behaviour in the CA4 dyads

Due to the withdrawal of CA4’s regular trained peer (TP10) immediately after the peer training phase, CA4’s trained peer was replaced with TP12. Therefore, no firm conclusion can be arrived at based on the data from CA4, since changes in the trained dyad could be due to the change in trained peer. However, it is worthwhile examining the cognitive play and social interaction behaviour data for the CA4 dyads, so see whether or not these data support the conclusions drawn from the matched dyads.

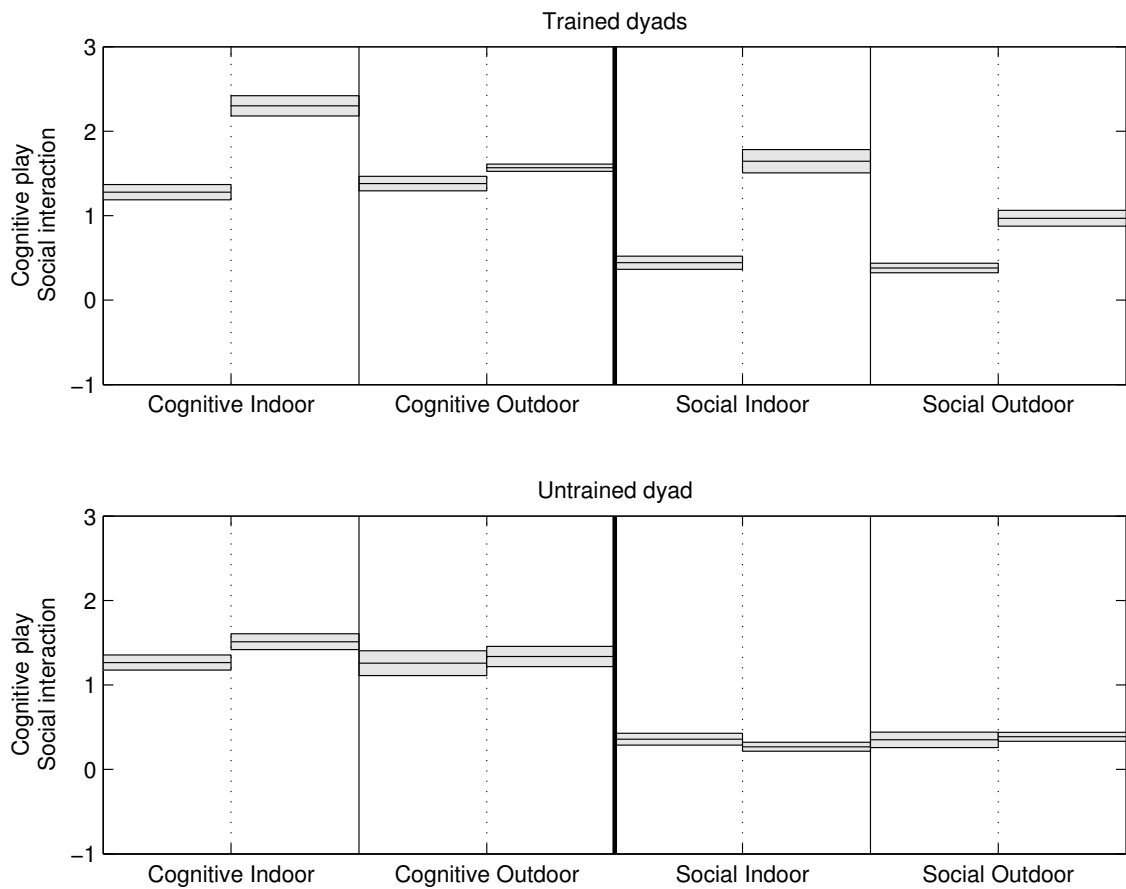


Figure 7.36: Cognitive play and social interaction for CA4

Interestingly, the changes in behaviours seen in the CA4 dyads were not much different from the overall changes in behaviour for the other four sets of dyads. There was an overall increase in cognitive play and social interaction in both indoor and outdoor settings for the trained dyad, and no overall statistically significant changes for the untrained dyad. The lack of an increase in outdoor cognitive play in CA4 in the untrained dyad might imply that CA4 was already very familiar with the outdoor play materials and apparatus, and was therefore able to play with them in his usual way from the beginning of the play sessions.

The levels of and changes in individual cognitive play and social interaction sub-categorical behaviours are shown in tables 7.22–7.29.

Table 7.20: Cognitive play and social interaction for CA4

Setting		Trained		Untrained	
		Pre	Post	Pre	Post
cog	in	$1.278 \pm 0.091$	$2.299 \pm 0.120$	$1.266 \pm 0.090$	$1.512 \pm 0.094$
cog	out	$1.379 \pm 0.086$	$1.567 \pm 0.043$	$1.257 \pm 0.147$	$1.337 \pm 0.120$
soc	in	$0.443 \pm 0.078$	$1.644 \pm 0.137$	$0.358 \pm 0.070$	$0.268 \pm 0.054$
cog	in	$0.381 \pm 0.056$	$0.969 \pm 0.094$	$0.351 \pm 0.091$	$0.387 \pm 0.053$

Table 7.21: Change in cognitive play and social interaction for CA4

Setting		Trained			Untrained		
		Change	<i>p</i>		Change	<i>p</i>	
cog	in	$1.021 \pm 0.165$	0.000	↑	$0.246 \pm 0.135$	0.151	—
cog	out	$0.188 \pm 0.086$	0.040	↑	$0.080 \pm 0.194$	0.361	—
soc	in	$1.201 \pm 0.180$	0.000	↑	$-0.090 \pm 0.086$	0.624	—
cog	in	$0.589 \pm 0.137$	0.000	↑	$0.036 \pm 0.098$	0.794	—

Table 7.22: Indoor cognitive play for CA4

Cat.	Trained		Untrained	
	Pre	Post	Pre	Post
NON	$0.224 \pm 0.039$	$0.134 \pm 0.021$	$0.236 \pm 0.037$	$0.204 \pm 0.029$
STE	$0.000 \pm 0.000$	$0.000 \pm 0.000$	$0.000 \pm 0.000$	$0.000 \pm 0.000$
EXP	$0.276 \pm 0.056$	$0.090 \pm 0.018$	$0.283 \pm 0.071$	$0.140 \pm 0.031$
FUN	$0.363 \pm 0.079$	$0.193 \pm 0.040$	$0.342 \pm 0.073$	$0.181 \pm 0.055$
CON	$0.136 \pm 0.072$	$0.208 \pm 0.051$	$0.117 \pm 0.061$	$0.448 \pm 0.087$
SYM	$0.001 \pm 0.001$	$0.235 \pm 0.044$	$0.021 \pm 0.011$	$0.011 \pm 0.007$
R-G	$0.000 \pm 0.000$	$0.140 \pm 0.029$	$0.000 \pm 0.000$	$0.016 \pm 0.011$

Table 7.23: Change in indoor cognitive play for CA4

Cat.	Trained		Untrained	
	Change	<i>p</i>	Change	<i>p</i>
NON	$-0.090 \pm 0.040$	0.036	$-0.033 \pm 0.046$	0.429
STE	$0.000 \pm 0.000$	1.000	$0.000 \pm 0.000$	1.000
EXP	$-0.186 \pm 0.050$	0.001	$-0.142 \pm 0.070$	0.010
FUN	$-0.170 \pm 0.080$	0.045	$-0.162 \pm 0.090$	0.056
CON	$0.072 \pm 0.086$	0.411	$0.331 \pm 0.115$	0.001
SYM	$0.234 \pm 0.054$	0.000	$-0.010 \pm 0.013$	0.849
R-G	$0.140 \pm 0.035$	0.001	$0.016 \pm 0.013$	0.650

Table 7.24: Outdoor cognitive play for CA4

Cat.	Trained		Untrained	
	Pre	Post	Pre	Post
NON	$0.269 \pm 0.037$	$0.180 \pm 0.020$	$0.347 \pm 0.070$	$0.309 \pm 0.059$
STE	$0.000 \pm 0.000$	$0.000 \pm 0.000$	$0.000 \pm 0.000$	$0.000 \pm 0.000$
EXP	$0.088 \pm 0.026$	$0.089 \pm 0.022$	$0.048 \pm 0.013$	$0.045 \pm 0.010$
FUN	$0.628 \pm 0.052$	$0.716 \pm 0.024$	$0.605 \pm 0.077$	$0.646 \pm 0.061$
CON	$0.009 \pm 0.009$	$0.000 \pm 0.000$	$0.000 \pm 0.000$	$0.000 \pm 0.000$
SYM	$0.005 \pm 0.005$	$0.016 \pm 0.008$	$0.000 \pm 0.000$	$0.000 \pm 0.000$
R-G	$0.000 \pm 0.000$	$0.000 \pm 0.000$	$0.000 \pm 0.000$	$0.000 \pm 0.000$



Table 7.25: Change in outdoor cognitive play for CA4

Cat.	Trained			Untrained		
	Change	<i>p</i>		Change	<i>p</i>	
NON	$-0.089 \pm 0.038$	0.031	↓	$-0.038 \pm 0.095$	0.331	—
STE	$0.000 \pm 0.000$	1.000	—	$0.000 \pm 0.000$	1.000	—
EXP	$0.001 \pm 0.036$	0.985	—	$-0.003 \pm 0.017$	0.926	—
FUN	$0.087 \pm 0.050$	0.094	—	$0.042 \pm 0.100$	0.411	—
CON	$-0.009 \pm 0.007$	0.176	—	$0.000 \pm 0.000$	1.000	—
SYM	$0.011 \pm 0.012$	0.387	—	$0.000 \pm 0.000$	1.000	—
R-G	$0.000 \pm 0.000$	1.000	—	$0.000 \pm 0.000$	1.000	—

Table 7.26: Indoor social interaction for CA4

Cat.	Trained		Untrained	
	Pre	Post	Pre	Post
NEG	$0.000 \pm 0.000$	$0.002 \pm 0.001$	$0.000 \pm 0.000$	$0.000 \pm 0.000$
NOI	$0.560 \pm 0.078$	$0.217 \pm 0.046$	$0.644 \pm 0.069$	$0.771 \pm 0.040$
P-L	$0.439 \pm 0.078$	$0.205 \pm 0.042$	$0.355 \pm 0.068$	$0.217 \pm 0.041$
P-H	$0.000 \pm 0.000$	$0.459 \pm 0.061$	$0.000 \pm 0.000$	$0.001 \pm 0.001$
UNI	$0.000 \pm 0.000$	$0.001 \pm 0.001$	$0.001 \pm 0.001$	$0.000 \pm 0.000$
A-L	$0.001 \pm 0.001$	$0.028 \pm 0.008$	$0.001 \pm 0.001$	$0.001 \pm 0.001$
A-H	$0.000 \pm 0.000$	$0.087 \pm 0.036$	$0.000 \pm 0.000$	$0.009 \pm 0.009$

Table 7.27: Change in indoor social interaction for CA4

Cat.	Trained			Untrained		
	Change	<i>p</i>		Change	<i>p</i>	
NEG	$0.002 \pm 0.002$	0.265	—	$0.000 \pm 0.000$	1.000	—
NOI	$-0.343 \pm 0.085$	0.000	↓	$0.127 \pm 0.075$	0.147	—
P-L	$-0.234 \pm 0.081$	0.009	↓	$-0.137 \pm 0.075$	0.106	—
P-H	$0.459 \pm 0.076$	0.000	↑	$0.001 \pm 0.002$	0.986	—
UNI	$0.001 \pm 0.002$	0.426	—	$-0.001 \pm 0.001$	0.607	—
A-L	$0.027 \pm 0.010$	0.017	↑	$0.001 \pm 0.001$	0.952	—
A-H	$0.087 \pm 0.045$	0.065	—	$0.009 \pm 0.011$	0.845	—

Table 7.28: Outdoor social interaction for CA4

Cat.	Trained		Untrained	
	Pre	Post	Pre	Post
NEG	$0.000 \pm 0.000$	$0.002 \pm 0.001$	$0.000 \pm 0.000$	$0.000 \pm 0.000$
NOI	$0.619 \pm 0.056$	$0.364 \pm 0.050$	$0.649 \pm 0.091$	$0.660 \pm 0.047$
P-L	$0.381 \pm 0.056$	$0.365 \pm 0.037$	$0.351 \pm 0.091$	$0.315 \pm 0.050$
P-H	$0.000 \pm 0.000$	$0.221 \pm 0.044$	$0.000 \pm 0.000$	$0.000 \pm 0.000$
UNI	$0.000 \pm 0.000$	$0.000 \pm 0.000$	$0.000 \pm 0.000$	$0.004 \pm 0.003$
A-L	$0.000 \pm 0.000$	$0.037 \pm 0.013$	$0.000 \pm 0.000$	$0.022 \pm 0.013$
A-H	$0.000 \pm 0.000$	$0.010 \pm 0.007$	$0.000 \pm 0.000$	$0.000 \pm 0.000$

Table 7.29: Change in outdoor social interaction for CA4

Cat.	Trained			Untrained		
	Change	<i>p</i>		Change	<i>p</i>	
NEG	0.002 ± 0.002	0.304	—	0.000 ± 0.000	1.000	—
NOI	−0.255 ± 0.080	0.005	↓	0.011 ± 0.092	0.896	—
P-L	−0.016 ± 0.065	0.812	—	−0.036 ± 0.096	0.590	—
P-H	0.221 ± 0.061	0.001	↑	0.000 ± 0.000	1.000	—
UNI	0.000 ± 0.000	1.000	—	0.004 ± 0.004	0.000	↑
A-L	0.037 ± 0.019	0.057	—	0.022 ± 0.018	0.258	—
A-H	0.010 ± 0.010	0.328	—	0.000 ± 0.000	1.000	—

## 7.7 Conclusions

In total, the data presented above show a very clear trend—children with autism in trained dyads showed a large and significant improvement in social interaction in both indoor and outdoor play settings. Their cognitive play was also underwent a statistically significant increase, although the relative increase in cognitive play was smaller than the increase in social interaction.

Untrained dyads, in contrast, showed no statistically significant change in the level social interaction. Cognitive play in indoor settings significantly decreased.

Interestingly, children with autism in untrained dyads showed a significant increase of cognitive play in outdoor settings (although the increase was smaller than in trained dyads). This indicates that the children with autism rapidly learned how to make appropriate use of the outdoor play equipment, possibly from being taught by the trained peers, in which case this would be a carryover effect, or by experience over the play sessions. Since the change appeared to be rapid, the former seems to be the more likely. This may imply that social difficulty, rather than cognitive delay, is the primary deficit in children with autism.

Therefore, it can be concluded that the peer training program used in this study is clearly effective. In particular, peer training is necessary to promote positive and higher level social interaction in children with autism.

It can be further concluded that it is highly desirable to measure the level of social interaction as directly as possible when evaluating the success of an intervention program intended to enhance social interaction. An indirect attempt to measure social interaction via the commonly-used Piaget–Smilansky cognitive play categories may not closely reflect that which it is intended to measure. Furthermore, some caution needs to be exercised even in the case where a measurement of cognitive *ability* is intended, since rapid and dramatic changes in the level of cognitive play displayed *during a short measurement session* can occur even with no background improvement in cognitive ability.

## Chapter 8

### Study 3—Ideas and attitudes towards disabilities in peer players

Experience is the best of schoolmasters, only  
the school-fees are heavy

---

Thomas Carlyle (Carlyle, 1888, p. 137)

#### 8.1 Purpose of Study 3

The goal of Study 3 was to find out whether typically developing peer players change their ideas and attitudes towards children with disabilities either positively or negatively after participation in the peer-mediated play program.

Both the change in ideas and attitudes seen over all peers, both trained and untrained, and the difference in change in ideas and attitudes between the trained and untrained groups are of interest—the latter to answer the question posed in chapter 1: does peer training build positive ideas about and attitudes towards their playmates with autism in typically developing peers?

#### 8.2 Participants

The thirteen typically developing peers who acted as trained and untrained players in Study 2 were the participants in Study 3. These typically developing children were described in Study 1.

#### 8.3 Procedure

A questionnaire, Ideas about and Attitudes towards Disability Inventory (IADI) (see appendix F for a facsimile reproduction), was developed by the researcher and used to determine ideas and attitudes towards disabilities held by the peer

players. The questionnaire was completed by the peer players both before (during the orientation phase) and after (during the follow-up phase) their contact with and involvement with the children with autism.

In the orientation phase, the group of typically developing peer players filled out the questionnaires in their classrooms. The researcher was present and assisted the class teachers by distributing and collecting the IADI forms; the class teacher conducted the sessions. Each question was read to the peer players, and the meaning of words such as “cooperative”, “uncooperative”, and “generous” was explained to them.

During the follow-up phase, after the play sessions for Study 2 had been completed, the researcher conducted the IADI for the peer players in the indoor play rooms in the SEDU or the SPS, because the peer players were familiar with the researcher and the rooms where the indoor play sessions were held. In addition, each peer player was briefly interviewed by the researcher during a lunch break; each interview took approximately eight minutes. The peer players were asked (see appendix F):

- how he or she felt about himself or herself as a play partner (question 8),
- when they were excited or frustrated in the play sessions (question 9), and
- what they learned while they were playing with their play partner (with autism) (question 10).

Notes were taken by the researcher, using the interview form (see section F.2) as an aid.

The results were analyzed to determine if there had been any significant change in the reporting of ideas and attitudes after participation in the peer-mediated play intervention, and if changes depended on whether or not the peer player had been trained.

## **8.4 Ideas about and Attitudes towards Disability Inventory (IADI)**

The Ideas about and Attitudes toward Disability Inventory (IADI) was designed to collect information about ideas (how the peer players think about children with disabilities) and attitudes (how do the peer players believe they want to act (or should act) towards children with disabilities, what kinds of activities they would like to do together with a classmate with a disability, etc.) of typically developing peers. This questionnaire was devised as a checklist to provide an overview of the typically developing peers’ perception of and acceptance towards children with disabilities before and after participating in the peer-mediated play intervention in this research.

Table 8.1: Domains of the IADI instrument

Domain	Sub-domain	Description	Item numbers	Total
Ideas	Positive	Positive notions about children with disabilities	2, 4, 8, 10, 11, 13, 16, 18, 19, 21, 22, 24	12
	Negative	Negative notions about children with disabilities	7, 3, 12, 23, 17, 5, 20, 14, 9, 1, 15, 6	12
Attitudes	Involvement	Activities with a child with a disability	1-10	10

Using the IADI, peer players were asked questions in two parts. Part one (Ideas domain) included 24 items (12 positive and 12 negative) that asked typically developing peers to evaluate notions about children with disabilities (what they thought about children with disabilities). Negative notions were composed as opposite concepts against positive notions. Both positive and negative notions were randomly distributed among the questions to encourage peers to think about the questions and answer honestly rather than “automatically” choosing “good” answers. Part two (Attitude domain) consisted of 10 items (10 positive activities) to assess willingness for involvement in activities with a child with a disability (what they wanted to do if a child with a disability was in their class). The structure of the IADA instrument is summarised in table 8.1, and the questionnaire is reproduced in appendix F.

To obtain a quantitative score for statistical analysis of the results, questions in the Ideas domain were scored as +1 for “yes” answers to positive questions, –1 for “no” answers to positive questions, and –1 and +1 for “yes” and “no” answers respectively to negative questions. “Don’t know” was scored as zero. In the Attitudes domain (in which all questions were positive), answers of “yes” were scored as +1, “no” as –1, and “sometimes” as zero. The total score on the Ideas domain could vary from –24 to +24, and total score on the Attitudes domain could vary from –10 to +10.

## 8.5 Change in ideas and attitudes towards disability

The Ideas and Attitudes scores for each peer player before and after participation in the peer-mediated play intervention are shown in table 8.2.

Table 8.2: Change in IADI scores

Peer	Ideas score		Attitudes score	
	Before	After	Before	After
UP01	+5	+9	+5	+2
TP02	+6	+19	+5	–1
TP03	+18	+14	+9	+10
TP04	+5	+11	–3	–9
UP05	–12	+8	+4	–1
TP06	+6	+17	+6	+3
UP07	0	+6	+3	+5
UP08	+15	+14	+10	–5
TP09	+6	+6	+3	+6
TP10	+10	+6	+8	+3
UP11	+3	+10	+3	+3
TP12	+14	+15	+8	+5
UP14	+9	+13	+9	+6

The before-after test scores were compared using the Wilcoxon signed-ranks

test, a standard non-parametric (that is, distribution-free, not assuming that the test scores are normally distributed) test for paired scores (the before and after scores of each peer). The test scores of the trained group and the untrained group test were compared using the Wilcoxon rank-sum test, a standard non-parametric test for independent samples. These tests test for differences in the median. Since the ideas and attitudes of the majority of the peer players is of most interest, the median is the most representative measure—the median provides a robust measure of the central tendency of data, even in the case of highly non-normal distributions.

The median test scores and their spread are shown in figures 8.1–8.5. The notched box-whisker plots in these figures show the median (the central line joining the notches on the two sides together), the uncertainty in the median (the vertical extent of the notch), and the spread of the data. The box shows the data that lies between the 25th and 75th percentiles (the central half of the data), with the whisker showing the spread of the rest of the data.

The change of overall ideas and attitudes of typically developing peers before and after the peer-mediated play sessions is shown in figure 8.1. The medians, whether or not the change was statistically significant at the  $\alpha = 0.05$  level, and  $p$  are given in table 8.3.

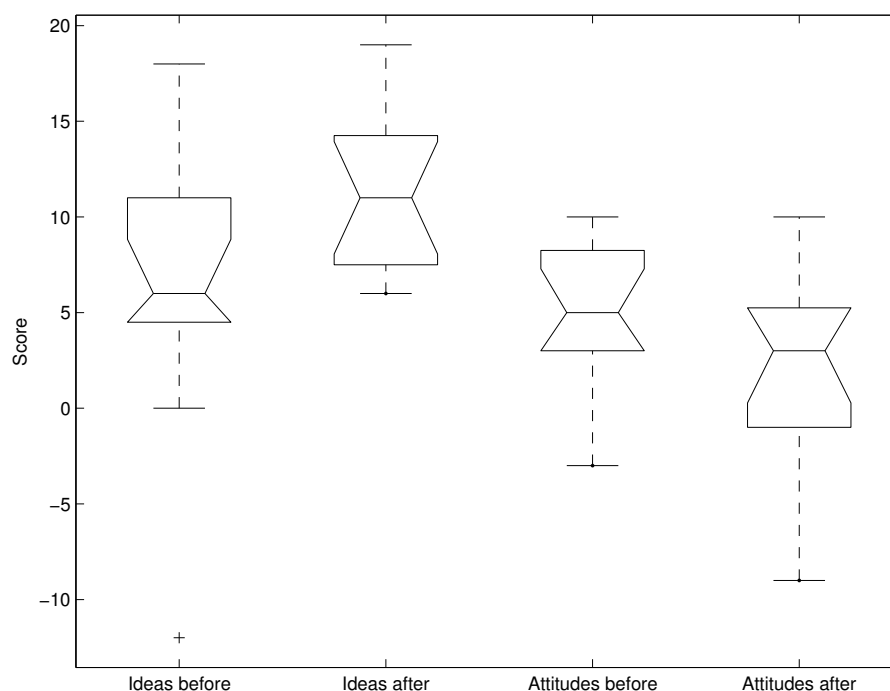


Figure 8.1: Ideas and attitudes scores for all peers

The initial ideas score was lower than the final one; the change was statistically significant. Similar results—positive changes in acceptance of disability after interaction—have been reported in other studies (Shevlin & O'Moore, 2000; Favazza & Odom, 1997; Favazza et al., 2000). It is reasonable to assume that the

Table 8.3: Ideas and attitudes scores for all peers

	Before	After	Significant	<i>p</i>
Ideas	6	11	yes	0.019
Attitudes	5	3	yes	0.011

initial negative ideas are strongly influenced by (mostly negative) stereotypes about individuals with disabilities since the typically developing peers began with little or no experience of children with autism. After interaction with the children with autism over the course of the play sessions, peers would have been able to develop their own ideas about children with disabilities, based on genuine and practical experience. This can be interpreted as an argument in favour of integration—if typically developing peers have contact with children with disabilities, unfounded negative stereotypes will be replaced by the more positive impression from real experience.

In contrast, the attitudes score was significantly decreased ( $p = 0.011$ ), indicating a negative change. This negative change in peers' attitudes might be akin to the indication of peers' hesitance for continuing involvement reported by Shevlin and O'Moore (2000) or reported "good" intentions but no direct involvement (Cook & Semmel, 1999; Hall & McGregor, 2000) for interact with children with disabilities. There are three probable explanations of the decrease of the attitudes test score in this study. Firstly, the researcher gained the definite impression that the peers' chose answers that they thought they were expected to give or would reflect well upon them. After acting as play partners, their responses were more likely to reflect their actual attitudes, instead of the attitudes they believed they should display in order to gain approval. Secondly, some of the peer players displayed noticeable frustration due to their "inability" to interact satisfactorily with children with autism; the reduction in the attitude scores may well reflect this frustration. Finally, peer player could not get "direct and tangible" benefits for themselves to keep interacting with children with autism. In other studies, peers' voluntary re-involvement in peer-mediated interventions was likely because they felt beneficial achievements for themselves (Whitaker et al., 1998; Kamps et al., 1994, 1998).

The changes seen in the trained and untrained groups are very similar to those seen for all peers, as indeed they should be if the peer training did not significantly affect their ideas and attitudes, since the trained and untrained groups are statistically identical. However, the changes were mostly (in three of four cases) not statistically significant at the  $\alpha = 0.05$  level; this is due to the small sample sizes of the separated groups, rather than any difference in the magnitude of the effect (see figures 8.2–8.5 and tables 8.4 and 8.5).

When trained and untrained groups were compared, there were no significant differences in ideas and attitudes scores. This similarity in ideas and atti-



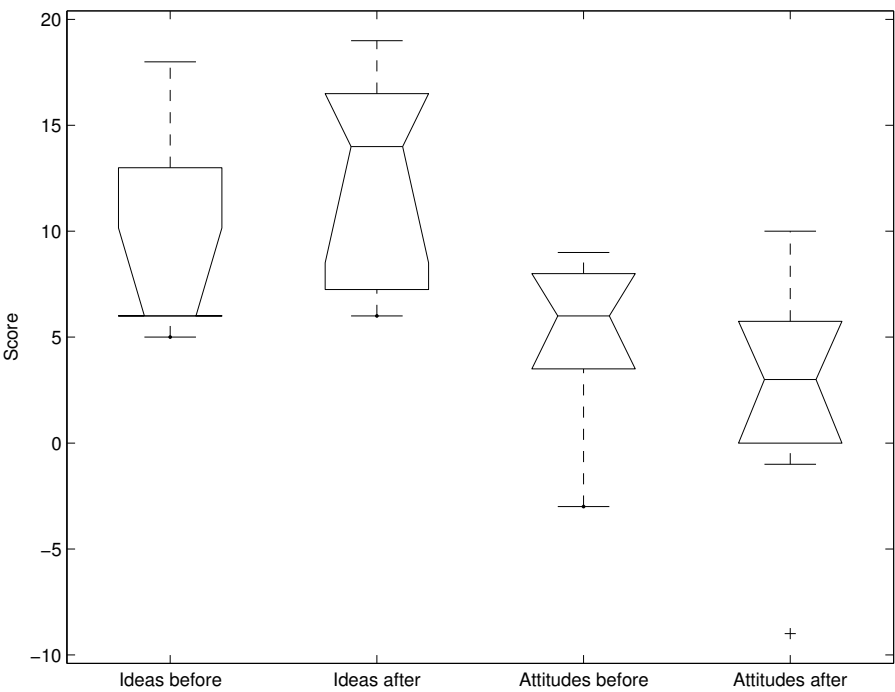


Figure 8.2: Ideas and attitudes scores for trained peers

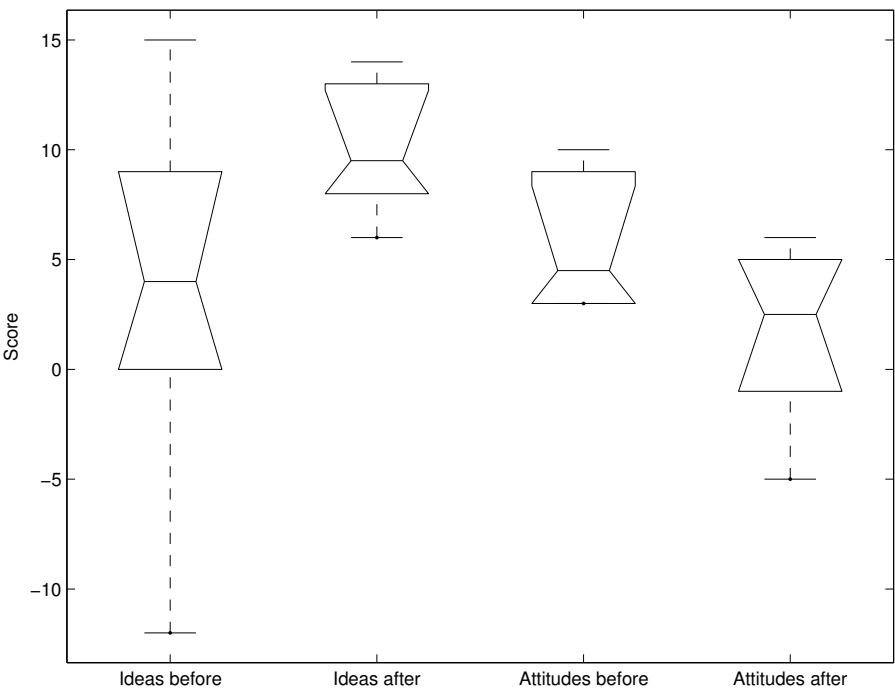


Figure 8.3: Ideas and attitudes scores for untrained peers

tudes, both before and after, suggests that a similar similarity existed during the play sessions, supporting the earlier conclusion in Study 2 that the improvement in social interaction with trained peers after the training was due to the training rather than any intrinsic difference between the trained and untrained groups. It also implies that the improvement of the ideas score and the decrease of the attitudes score was not due to either the training or lack of training, but are at-

Table 8.4: Ideas and attitudes scores for trained and untrained peers—comparison of scores before and after

		Before	After	Significant	<i>p</i>
Trained	Ideas	6	14	no	0.266
Trained	Attitudes	6	3	no	0.094
Untrained	Ideas	4	9.5	yes	0.047
Untrained	Attitudes	4.5	2.5	no	0.094

tributable to contact with children with disabilities, replacing stereotypes with genuine experience, because the changes were the same in both groups.

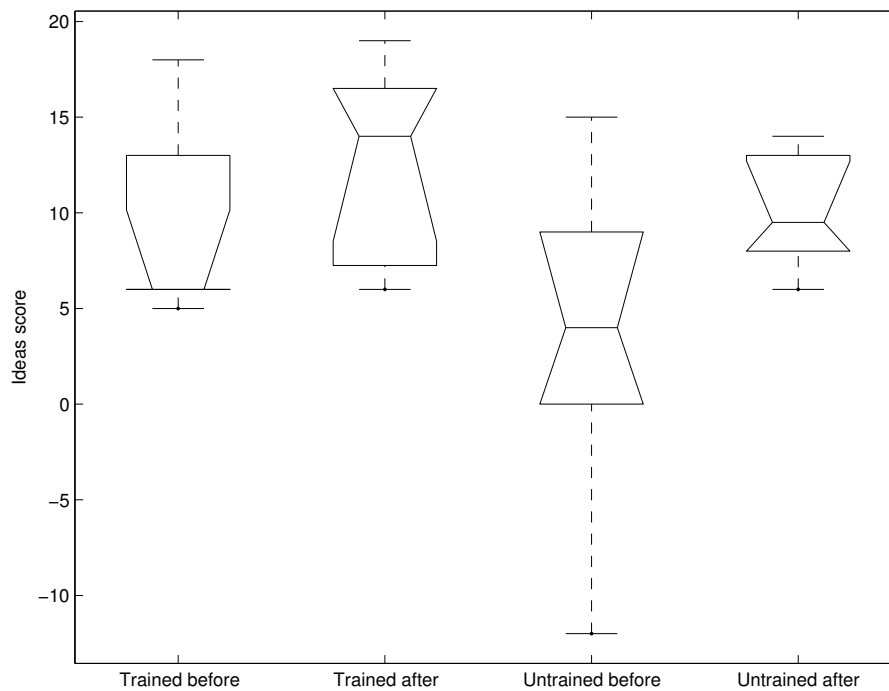


Figure 8.4: Ideas scores for trained and untrained peers

This result of no statistical difference in ideas and attitudes, and changes therein, between trained and untrained groups before and after participating in the peer-mediated play intervention should not be interpreted as opposing results found in other studies (Shevlin & O'Moore, 2000; Favazza & Odom, 1997; Favazza et al., 2000) which suggest that positive acceptance of disability is increased after a certain amount of systematic interaction or by a more effective multiple components program compared with individual component programs. Firstly, the sample size in this study was too small to detect small differences between these two groups on this matter. Secondly, compared to a two-year period of intervention in the study by Shevlin and O'Moore (2000), this peer-mediated play intervention lasted only about six months, with interaction with children with autism only occurring during the brief play sessions. Finally, the predominant effect seen here—the replacement of initial stereotypes with real experience—would be expected to be similar for both trained and untrained

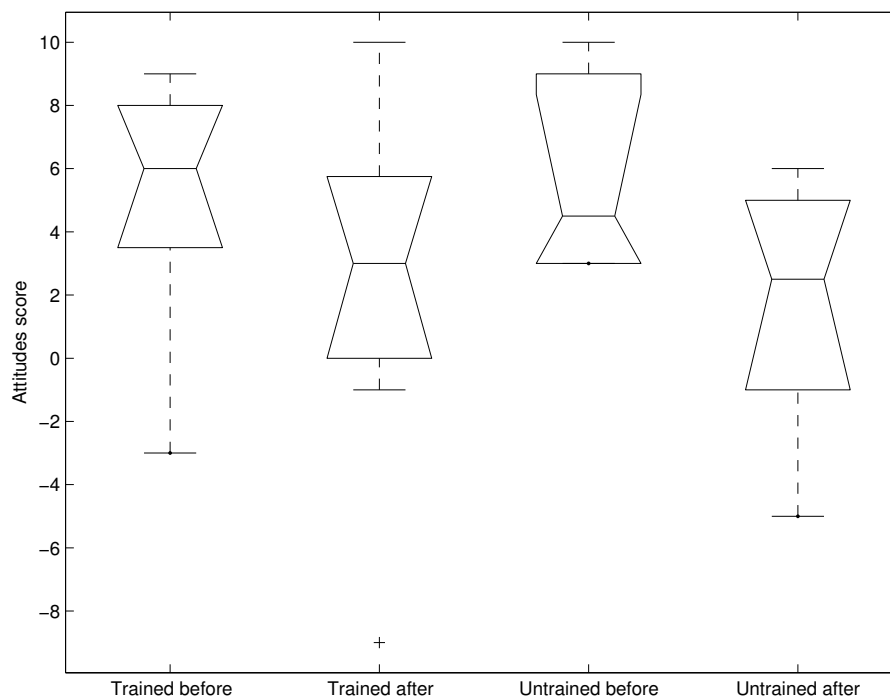


Figure 8.5: Attitudes scores for trained and untrained peers

Table 8.5: Ideas and attitudes scores for trained and untrained peers—comparison between trained and untrained groups

		Trained	Untrained	Significant	<i>p</i>
Ideas	Before	6	4	no	0.138
Ideas	After	14	9.5	no	0.295
Attitudes	Before	6	4.5	no	0.945
Attitudes	After	3	2.5	no	0.628

peers, and it is no surprise that this large change resulting from experience where there was none before is observed, and possible small differences due to peer training, or resulting differences in success, are not.

## 8.6 Interviews

Differences correlated with training, however, were apparent in the interviews, which were a more flexible way to investigate attitudes and responses. All six untrained peers (100%) answered that they were happy all of the time or most of time in play sessions and had fun while they were acting as peer players. Typical reasons given for this positive answer were: “I was happy” (UP11), “He (the child with autism) is a nice boy” (UP14), “It’s fun to play with him” (UP8), “They (the children with autism) are good at playing. I’m getting to know them” (UP7), “Nice toys” (UP5), and “Even though they didn’t understand, it’s just fun to play with them” (UP1).

In comparison, answers from trained peers were not always positive. Four

out of the seven trained peers (57%—TP2, TP3, TP9 and TP12) answered this question positively in a similar manner to the untrained peers. However, two (29%) trained peers hesitated, saying “I can’t answer that, sometimes happy and sometimes not” (TP4), and “Sometimes I like it because you get to know other people” (TP10). In addition, the last TP (TP6—14%) answered that sometimes she was happy because she could miss school, and sometimes she was unhappy she was missing a two minute test that she liked doing it at school.

For the untrained peers, even though they could not interact much with the children with autism, play activity with various play materials seemed to be still attractive and enjoyable. The untrained peers might well have had lower expectations about playing with children with autism, and the level of interaction with them. Trained peers, on the other hand, might have felt that they were expected to successfully interact with the children with autism. While the trained peers did show a higher level of interaction than the untrained peers, this might not have met their expectations of success. In particular, unsuccessful attempts to apply specific skill or methods taught to them in the peer training might have resulted in confusion and frustration. This suggests that it is important to convey realistic expectations to prevent feelings of failure reducing motivation or causing “burn-out”.

For the question about when they were excited in the play sessions, qualitative and quantitative differences appeared in answers from trained and untrained peers. Trained peers reported that they were excited “all the time” (TP12) or “sometimes” (TP2, TP3 and TP4) in relation to successful interaction using the play skills acquired in peer training. In addition, other responses were also given such as “the first time when I met him” (TP9), “the first couple of sessions when I had got into knowing children with autism” (TP6), and “no excitement except having fun sort of” (TP10).

Compared to wide and various range of excitement during play interaction with children with autism reported by trained peers, only two of the untrained peers (UP5 and UP7) reported brief experiences of excitement in relation to interaction with the same children with autism (in car play and talking). Some untrained peers (UP8 and UP14) reported excitement not associated with play with children with autism—they were excited in relation to the outdoor play setting. The others (UP1 and UP11) reported no real excitement. Although all untrained peers were happy in all or most play sessions, it is not surprising to find far fewer exciting experiences since they had no or little interaction with their play partners with autism in their dyad play sessions.

All six untrained peers reported no frustration whereas trained peers reported wide ranges of it from “no frustration” (TP3 and TP9), “my first teaching time” (TP2), “the first time when I met him” (TP6 and TP12), “sometimes when he was angry or grumpy” (TP4) and “frustration” (TP10).

It should be noted that TP10 reported the least satisfaction, fun, and excitement, and the most frustration. TP10 experienced a great deal of frustration in the pre-training sessions, when she did not know how to interact with her play partner with autism before peer training. Immediately after the peer training, TP10 did not wish to keep acting as a regular peer player, and became a reserve peer player instead. As a result, TP10 had much less post-training contact with the children with autism than the other regular trained peer play partners, and correspondingly less successful interaction. This may well have influenced her responses. In later sessions, when TP10 participated in some play sessions as a reserve player, she seemed to realize that it might be possible to successfully interact with children with autism, using the skill she had learned during the training. TP10 then expressed her willingness to play with children with autism whenever required.

For the question about what they learned about their play partner with autism in the play sessions, three out of the six untrained peers (50%) answered “nothing” (although it should be noted that the change in the Ideas score on IADI indicates otherwise). The others (50%), although they did not answer negatively, did not have clear ideas about how to interact with children with autism. Responses included “If you play with them in the right way, there can be real fun” (UP1), “They could talk a lot more than I thought and they share toys” (UP7), and “play with others nicely” (UP14).

Only one trained peer (14%) reported learning “nothing” (TP6). The other six trained peers answered positively, referring to interaction skills that they learned as “play skills” in peer training. Some trained peers reported observations about children with autism that were neither clearly positive nor negative, such as “They don’t talk that well but they are smart” (TP3), “They can’t do everything that we can do” (TP4), and “I have to be nice to everyone if I want to play with them” (TP12).

It must also be kept in mind that typically developing peers, including both trained and untrained peers, may give responses that they believe will cause involved adults to see them as being “good”. For example, UP8 did not indicate any non-positive opinion in the interview, although she demonstrated the most extreme change among untrained peers in IADI scores, from the highest attitude score before to the lowest attitude score afterwards. As noted in chapter 4, other studies have reported that typically developing peers verbally report their prosocial behaviours towards children with disabilities, but matching behaviours are often not observed. Therefore, answers from both trained and untrained peers should be interpreted with some caution.

In summary, although the interview was informal and very brief, some differences between trained and untrained peers were noted. Untrained peers were mostly positive about being peer play partners, and although they reported little

excitement, they also reported no frustration. This may result from, firstly, being unable to meaningfully interact with the children with autism, and secondly, from not expecting to be able to. It was observed during the play session that when untrained peers did not obtain appropriate responses from children with autism, they simply playing by themselves.

In contrast, trained peers gave a more complex set of answers. Even though trained peers were excited about successful interaction achieved by using play skills learned during training, they also experienced frustration in attempting to interact with children with autism. This was most likely due to high expectations of success not being met by matching results in practice. It may be important to convey a realistic idea of expected success during peer training. On the other hand, it should also be noted that high expectations can elicit a high level of effort.

## 8.7 Conclusion

Through experience of children with autism, both trained and untrained peers showed a significant increase in positive ideas about children with disabilities, as initial (usually negative) stereotypes were overcome by contact with the children with autism. At the same time, however, a significant increase in negative attitudes towards disabilities was seen. This may also reflect the replacement of initial stereotype with experience; in this case, after discovering that it can be difficult to interact with children with autism, they had a more realistic attitude. Then, unless they can achieve direct and tangible benefits for themselves, they may be more cautious about involvement with children with autism.

There were no statistically significant differences seen in the IADI scores between the trained and untrained peers. There were no statistically significant differences seen in the IADI scores between the trained and untrained peers. This strengthens the conclusion drawn from Study 2—that the training package was effective—as it suggests that the improvement in social interaction with trained peers after the training, in Study 2, was due to the training rather than any intrinsic difference between the trained and untrained groups.

# Chapter 9

## Study 4—Responses from parents and teachers

It is a curious thing that of the triad Faith, Hope, and Love, so little has been said in defense of Hope.

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Karl A. Menninger  
(Menninger & Menninger, 1942, p. 214)

### 9.1 Purpose of Study 4

The primary goal of Study 4 is to investigate the possible generalization of play behaviours in children with autism before and after the peer-mediated play intervention, based on observations by parents and special educators. In addition, Study 4 also presents opinions on the impact of the peer-mediated play intervention, collected from parents, special educators, and regular teachers.

### 9.2 Participants

There were three groups of participants in Study 4:

- four parents of the children with autism who participated in Study 2,
- four special educators for the five children with autism in from SEDU-A, SEDU-B, and the SES,
- two regular teachers for the peer players in SPS-B.

### 9.3 Procedure

During the middle of post-training phase of the peer-mediated play intervention (Study 2), parents, special educators of the children with autism, and regular

teachers of the typically developing peers watched play sessions on videotape. Due to the varying time schedules of the participants, this viewing session was conducted individually for parents and special educators in SEDU-A and SEDU-B. The regular teacher in SPS-A was not available. A joint viewing session was held for the two regular teachers in SPS-B. Each session lasted approximately 30 minutes. One session of the pre-training phase and one session of the post-training phase for each child with autism were viewed to compare different play behaviours in the untrained and trained dyads. Details of the “play skills” shown by trained peers were not told to parents, special educators, or regular teachers.

After the play sessions were finished, three questionnaires, “Play History-follow-up Questionnaire for Parents” (PHQP) for parents of the children with autism, “Play History-follow-up Questionnaire for Teachers” (PHQT) for special educators of the children with autism, and “Play History-follow-up Questionnaire for Regular Teachers” (PHQR) for the regular class teachers of peer players were distributed. These questionnaires were developed by the researcher, and are reproduced in appendix G.

### **9.3.1 Parents and special educators of children with autism**

The questionnaires for parents (PHQP) contained 28 questions, and for the special educators (PHQT), 27 questions. These asked about:

- any observable play behaviour change in children with autism
- choice of play partner
- preference for play settings
- preference for play materials
- duration of play activities
- playful emotion
- experience of other play programs
- opinions about the peer-mediated play intervention conducted in Study 2.

Stamped self-addressed envelopes were provided for parents to return the questionnaire. A brief telephone interview was conducted for double-checking their responses. If the questionnaire was not returned (parents of CA1 and CA3), a telephone interview covering the items in the questionnaire was conducted at a time convenient for the parents. The parents of CA2 did not return the questionnaire and did not wish to be interviewed.

### **9.3.2 For regular teachers of peer players**

A short questionnaire (PHQR) for the regular class teachers of peer players, consisting of six questions, was designed to allow regular class teachers to report any observed changes either in the level of understanding about disabilities shown by the peer players. In addition, their opinions about advantages and disadvan-



tages for typically developing peers from participation in the peer-mediated play intervention were asked for.

## 9.4 Generalized play behaviours of children with autism

Four questionnaires out of five were responded to by parents of children with autism (the parents of CA2 were not available for the questionnaire or interview). There was no clear evidence of generalization of play behaviour in the parents' reports of children with autism. Two parents (parents of CA1 and CA3) reported no change in the play behaviour of their children with autism. Another two parents (parents of CA4 and CA5) reported that their children with autism showed more social interaction (such as suggestion and response) and were involved in more play with other children (including siblings). No change in preference for play materials and duration of play activities was reported. In addition, parents of CA4 mentioned improvements in coping skill in CA4. However, this improvement of social skills in CA4 and CA5 cannot be regarded as convincing evidence for generalization, due to observer bias, but they do suggest the possibility.

Whether these parents perceived genuine changing play behaviour of children with autism due to the peer-mediated play intervention or not, they believed that their children with autism would have advantages in developing social skills and play skills with typically developing peers if they participated in such programs. The parents of CA5 said "It (PMPI) teaches other children (typically developing peers) how to interact and play with my son". The parents of CA4 commented that "learning to be around other children and the benefits of interacting with someone else rather than playing alone" were important. Most parents (three out of the four who responded) answered positively that they would be willing to participate in other play intervention programs for their children with autism. The other parents (of CA5) answered that it depended on time available.

Parents reported no sign of disadvantage for their children from participation in the peer-mediated play intervention. However, some issues related to practical usage of such programs were raised. The parents of CA3 were concerned about differences in play materials used in this program from those used at home. In fact, for practical usage of PMPI, individual preference should be reflected in the choice of play materials. Considering the effectiveness of child-preferred play activities for reducing social avoidance in children with autism (Koegel, Dyer, & Bell, 1987), this suggestion for manipulation of preferred play materials should be taken into account in practice. The parents of CA5 were also concerned about a long period of time being needed for training all children to interact with CA5.

Solutions for this concern may be found by using classwide peer tutoring approaches to train as many peers as possible simultaneously.

All five questionnaires were returned by four special educators (the special educator was the same for both CA4 and CA5). There was no clear evidence in the reports from special educators for generalization of play behaviour in children with autism. No change was reported in play behaviour for four of the children with autism. For CA1, while parents reported no change of play behaviour, CA1's special educator reported positive increases of play behaviour in CA1 after PMPI. CA1 showed exploratory play with toys and functional play after the PMPI. The number of play materials was also changed or increased in both indoor (before the program, playing only with a ball, and afterwards playing with puzzles, collage, blocks, and cars) and outdoor settings (showing more skills in sandpit play afterwards). Regarding social interaction, CA1 was more aware of others' play activities (e.g., watching other's play) and demonstrated parallel play, rather than solitary play. A reduction in challenging behaviours (e.g., throwing) and more cooperative responses toward other's suggestion for play were also reported. These improvements of play behaviour indicate a likelihood of generalization.

Special educators expressed opinions about PMPI similar to those given by parents. They believed that there would be more advantages than disadvantage from PMPI for children with autism. They said "I feel (CA1) bonded nicely with his play partner during sessions" (special educator of CA1), "(CA2) appeared happy to be part of the Peer Play Program—no anxiety or crying ... No signs of regression in SEDU behaviour" (special educator of CA2), "Even when there seems to be no change, it must be very valuable to expose autistic children to a play program" (special educator of CA3), and "Same individual time with peer for structured play" (special educator of CA4 and CA5).

In particular, special educators emphasised increase of tolerance skills for both groups of children with and without autism in PMPI. The special educator of CA3 believed that children with autism could have opportunities to learn to cope with their surroundings through social interaction with typically developing peers. The special educator of CA2 also pointed out increasing tolerance for typically developing peers in PMPI. The possibility of increasing tolerance skills would be associated with acquiring familiarity with each other as these two groups of children play together.

Furthermore, for practical usage of PMPI, special educators suggested inclusive settings where both children with disabilities and typically developing peers attend together to apply this kind of PMPI. Special educators of CA4 and CA5 commented that PMPI would be more beneficial for children with autistic spectrum disorders (ASD) in inclusive settings because appropriate peer modelling from typically developing peers could be provided to children with ASD. The

special educator of CA1 said “It empowers the regular children and teachers with skills and awareness of ‘playing’ with children with autism. Once they are empowered and confident, everyone reaps the benefits including the autistic child”.

In summary, the reports by parents and special educators suggest the possibility of generalization of play behaviour in the children with autism, although there was no clear evidence. Both parents and special educators viewed the PMPI in which the children with autism participated because they believed it could benefit social skills, tolerance skills, and play skills of the children with autism.

## **9.5 The level of understanding about disabilities in peer players**

The regular class teachers of peer players were able to report any observed changes of the level of understanding about disabilities shown by the peer players via the short PHQR questionnaire. The class teacher in SPS-A was not available (due to leave). Two class teachers in SPS-B completed and returned the form.

From the reports of these two regular teachers in SPS-B, acting as peer players in PMPI did not affect the level of understanding of disabilities displayed in their regular classes. The regular teachers did not notice that any peer players mentioned disabilities either during and after the PMPI. Essentially, the level of understanding could not be judged from observation by the regular teachers in the context of regular classes.

Regarding participation in PMPI, regular teachers answered that peer player could have opportunities to be exposed to children with special needs. However, they were concerned that peer players missed out on school work, and did not share their experiences with their classmates. One of the regular teachers pointed out that peer tutor’s needs should be also considered in this kind of inclusive program. Indeed, these concerns and needs can be solved if PMPI is systematically organized in school curriculum such as human difference in social science. However, more tangible and direct benefits for the peers from interacting with children with special needs still remains as an issue to be investigated.

## **9.6 Conclusion**

Parents and special educators reported some improvement of play behaviour in some children with autism. However, it was impossible to determine the degree of observer bias in their reports. Since passive-low interaction with untrained peers was already seen as major part of interaction in the children with autism in Study 2, the reported social interaction behaviours do not necessarily mean that generalization occurred. Whether or not there were real improvements in play

behaviour in the children with autism or not, they had positive views of PMPI in terms of social benefits. In addition, peer players did not show any change but maintained a lack of showing their level of understanding about disabilities in their regular classes. Considering the short term of the PMPI in this study, it may well be overly optimistic to expect any visible improvement. Thus, further research, with longer, more intensive interventions, may be required in the future for proper investigation of generalization of play skills from PMPI.

# Chapter 10

## Discussion and conclusion

There is a bit of homely philosophy, quoted by Squire Bill Widener, of Widener's Valley, Virginia, which sums up one's duty in life: "Do what you can, with what you've got, where you are."

---

Theodore Roosevelt (Roosevelt, 1916, p. 350)

In view of the trend towards increased inclusion, the placement of children with autism into inclusive educational settings is likely to increase. An important benefit of such inclusive placement is the opportunity for the children with autism to socially interact with typically developing peers. However, such social interaction fails to result—physical proximity is insufficient. The lack of social interaction is usually explained as a result of deficits of social skills in the children with autism. However, social interaction is a reciprocal process, and it is reasonable to expect that the difficulty that children with autism experience in social interaction with typically developing children is partly due to the typically developing children being unable to recognize or understand social cues and responses used by the children with autism.

Accordingly, a training program to teach typically developing children how to interact with children with autism was developed. The experimental test of this training program was the primary focus of the research described in this thesis. A modified subjects-as-their-own-controls design was used, with the same children with autism each playing with a trained peer and an untrained peer in dyads. This models a peer-mediated play intervention, and the difference in success between trained and untrained dyads allows the effectiveness of the peer training to be determined. The levels of cognitive play and social interaction displayed by the children with autism were measured. The level of social interaction provides a direct measurement of the immediate success of the peer-mediated play intervention, and is the best available indicator of possible long-term benefit for the children with autism. While the level of cognitive play provides a more indi-

rect measurement, it is widely used, using the Piaget–Smilansky categories, as a measure of the effectiveness of various interventions.

In addition, the impact of participation as peer-players on the typically developing children—in particular, changes in ideas about disabilities and attitudes towards children with disabilities—was investigated. Finally, responses from parents and teachers were examined for information about their opinions and ideas about the peer-mediated play intervention and its effect.

## **10.1 General discussion**

It is worthwhile to review the five research questions originally posed in the introduction (chapter 1) and explicitly state what has been determined. The first four research questions were addressed by Study 2 (chapter 7), while the last was the subject of Study 3 (chapter 8).

### **10.1.1 Does peer training positively affect the cognitive play behaviours of children with autism?**

Contrary to initial expectations, no clear answer was obtained from this study. Because there appears to be a widely accepted assumption in the literature that an improvement in cognitive play behaviour would result from a successful play-based peer intervention program for children with autism, it was initially expected that such an improvement would be seen in this study.

However, as noted in Study 2 (chapter 7), the measurement of cognitive play provided, at best, an ambiguous result. While the measurement of the level of social interaction shown by the children with autism found a large and statistically significant improvement in social interaction in trained dyads in both indoor and outdoor settings, and no change in the level of social interaction in untrained dyads, the measurement of the level of cognitive play did not provide clear answers about the effectiveness of the peer training program.

In indoor settings, there was a small but statistically significant increase in the level of cognitive play in trained dyads, and a decrease of similar magnitude, also statistically significant, in the untrained dyads. In the outdoor setting, however, there was a large increase in the level of cognitive play in both trained and untrained dyads. Although this was unexpected and surprising, it is also an easily understood result, most probably resulting from the children with autism learning how to more effectively play with previously unfamiliar outdoor playground equipment (novelty effect). As the increase was sudden and coincident with the training phase, it is possible that the learning how to play with the equipment occurred in the trained dyads as a result of the improved social interaction with the trained peers, and was applied to the untrained dyads (cross-over effect).

While this may imply that children with autism may be motivated to engage in play activity by positive social supports—the Vygotskian “scaffolding approach” for children with disabilities (see chapter 3)—showing that supportive and able peers can facilitate development of children with autism, this is not informative about the impact of peer training on cognitive play behaviours of children with autism.

However, there is one clear conclusion that can be drawn from these otherwise ambiguous results—the Piaget–Smilansky categories seem to a poor indicator of success of peer interventions for children with autism. As reviewed in chapter 2, the Piaget–Smilansky categories are applicable and usable for children with autism, but, as seen in this study, they appear to poorly correlate with success of play-based interventions. Three distinct points need to be considered here:

1. The primary impairments of children with autism are social, rather than cognitive. For this reason, it was considered that improvement in social interaction would be a more direct measure of success than cognitive improvement.
2. While the Piagetian categories may well represent a developmental sequence, in that children first display functional play, then constructive play, followed by symbolic play and games with rules in turn, this does not mean that, for example, all constructive play is in some sense “cognitively inferior” to all symbolic play. Indeed, it is trivial to imagine examples of sophisticated constructive play that are profoundly cognitively advanced in comparison to basic examples of symbolic play or games with rules. The important point appears to be whether or not a particular type of play is displayed *at all* by the children in question, rather than the duration or frequency of such play behaviours.
3. As noted below in subsection 10.1.3, no strong correlation was observed between cognitive and social play behaviours.

At best, the Piaget–Smilansky categories provide an indirect measure of success of interventions for children with autism. This is perhaps a special case, considering the unique features of autistic spectrum disorders, and the situation may well be quite different for other disabilities. However, when considering children with autism, a more direct measure of social interaction, social skills, or social competence appears to be of much greater value.

On the other hand, a classification that divides cognitive play behaviours into categories that relate directly to the *level* of cognitive skills displayed rather than to the *developmental sequence* of the Piagetian categories could provide a method of measuring cognitive development within each of the Piagetian stages that could provide useful data on children with autism.

### **10.1.2 Does peer training contribute to increased social interaction with peers in children with autism?**

Unlike the first research question, it was possible to clearly and unambiguously provide an answer: *yes!* It was demonstrated clearly and conclusively that when typically developing peers were systematically trained (peer training), they were able to more effectively and consistently able to play and interact with children with autism. Untrained peers, on the other hand, were not able to interact effectively with the children with autism, and the level of social interaction did not improve over time, indicating that practice alone is ineffective.

The main results found here in this peer-mediated play intervention suggest that social skill training for only children with autism may have little or no effect on the facilitation of positive interaction with peers, in the absence of training of peers. Although children with autism can improve their social skills when carefully trained by educators, this does not mean that their expression of these social skills is such that typically developing peers generally understand or accept—their social behaviour is still often regarded as bizarre and incomprehensible by untrained peers.

Through systematic peer training, typically developing peers are able to realize diversity in people, and recognize abilities, rather than only disabilities, in children with disabilities including autism. Trained peers can appreciate the similarities between themselves and children with autism as well as their differences. They can learn how to play and interact with children with autism.

Without systematic peer training, typically developing peers may not know how to play or interact with children with autism, and cannot easily learn to do so through experience alone. With untrained peers, social development as a result of social interaction in children with autism cannot be expected.

Therefore, systematic interaction training should be provided not only to children with autism but also to typically developing peers. When both groups of children are trained, the optimal outcome for positive social interaction between them results because social interaction can be maintained in a reciprocal way with initiation followed by appropriate response in human relationships. With no, or insufficient, initiation, then response will not occur or will be infrequent. If interaction is initiated, but the initiation is not recognized by the recipient, no response occurs. If the initiation is perceived negatively, the response is likely to be negative. Such failures of interaction were observed in this study. For example, when CA1 did not get any response from UP12, despite several attempts, CA1 stopped trying to interact with UP12. Untrained peers also showed a similar pattern of behaviour, with unsuccessful attempts at initiation followed by a cessation of such attempts. For example, P7 stated that when he could not any response from CA3, he stopped greeting CA3 because P7 had no reason to continue



initiating to CA3.

Furthermore, given that social interaction is reciprocal, individualistic, and relative (Rubin, Bukowski, & Parker, 1998), aggressive behaviour in children with autism should be examined in the context of reciprocal interaction, investigating environmental factors and the circumstances leading up to the violent display. For example, in this study, from time to time CA5 invited UP14 to join in his play activities, but UP14 kept ignoring or rejecting him without any explanation. Finally, CA5 used aggressive behaviour to express his anger, throwing toys towards UP14 in the last play session. The reasons why P14 kept ignoring or rejecting CA5's invitations are not known. According to her class teacher, she was somewhat shy but compliant, getting along with her classmates. Does this mean that P14 should have had no difficulty to play with other children, and that the lack of successful interaction is solely due to CA5 having no appropriate social skills to interact with typically developing peers? Would it be reasonable to describe CA5 as an aggressive boy with autism? The answers to both questions are clearly no, as evidenced by CA5 showing positive interaction and successfully playing with the trained peer, TP9. Therefore, social behaviour in children with autism should be interpreted from the viewpoint of *reciprocal* human interaction.

### **10.1.3 Do cognitive and social play skills acquired during trained peer play sessions transfer to untrained peer play sessions?**

It is possible that some transfer of cognitive and social play skills acquired during trained peer play sessions to untrained peer play sessions or other situations was seen. Firstly, the result noted above that the improvement in the cognitive level of play in outdoor settings in play sessions with untrained peers coincided with the training of trained peers suggests that the training may well have been responsible. Secondly, some parents reported improved social/play skills after the peer intervention program (Study 4). However, tempting though it may be, can be considered conclusive, due to the uncertainty of the cause of the former effect, and the inability to rule out observer bias for the latter.

Therefore, it would be premature to make any firm statement on the matter, and it is perhaps best to simply suggest this as a matter deserving of future study.

### **10.1.4 To what extent are social play skills associated with cognitive play skills in the PMI?**

Some statistically significant correlations (at the  $\alpha = 0.05$  level) between social interaction skills and cognitive play skills in children with autism in pre- and post-training indoor and outdoor play sessions were seen five dyads (three pos-

itive and two negative correlations). Interestingly, after peer training, three positive correlations (two indoor and one outdoor) occurred in only trained dyads whereas two negative correlations (two outdoor) occurred in only untrained dyads. Before peer training, no correlations were seen in either trained or untrained dyads in either indoor or outdoor sessions.

Notably, the negative correlations occurred in untrained dyads in post-training outdoor settings, where the anomalous improvement in cognitive play was seen, accompanied by a decrease in social interaction. These negative correlations are therefore likely to be a result of the specific circumstances of this study, and, in the absence of these, one would be more likely to see positive correlations (although, in large part due to small sample sizes, only three statistically significant cases were seen in this study).

In any case, the absence of clear correlation between the cognitive and social behaviour might support that idea that the primary difficulty for children with autism is socialization rather than cognitive deficit (see chapter 3).

### **10.1.5 Does peer training build positive ideas about and attitudes towards their playmates with autism in typically developing peers?**

No difference between trained and untrained peers was seen in the change in ideas and reported attitudes. Thus, peer training, per se, does not appear to contribute. However, for both trained and untrained peers, there was a positive change in ideas, which seems to be the result of the replacement of initially-held negative stereotypes by ideas gained from actual experience.

On the other hand, reported attitudes were more negative after participation in the peer-mediated play intervention. This may result from the peers having underestimated the difficulties they might face beforehand, and then having realized the difficulty of playing and interacting with children with autism through their experience. They may then have become more cautious and hesitant about further involvement in activities with children with autism. It is also possible that the initial reported attitudes, in the absence of any previous experience, were based on what peers thought would be regarded as “good” attitudes, and final reported attitudes reflected actual attitudes. Class teachers did not observe any change in understanding about disabilities shown by the peers after participation, but it must be noted that peers simply did not behave in such a way as to reveal their level of understanding of disability in their typical and normal classroom activities that were observed.

### 10.1.6 Summary

Overall, the peer training was effective, and resulted in a large enough improvement in social interaction to justify the effort required for implementation. In particular, no improvement was seen in the absence of peer training. Therefore, it can be concluded that the peer training program was both effective and necessary.

Little or no correlation was seen between the cognitive level of play (as measured using the Piaget–Smilansky categories) and the degree of social interaction. This strongly suggests that, at least for children with autism, a more direct measure of success of intervention programs, as used here, is more useful.

The peer training itself did not appear to contribute to improved ideas about or attitudes towards children with disabilities, as similar changes were seen in untrained peers. However, participation in the peer-mediated play program resulted in perhaps more positive, and at least more realistic, ideas and attitudes.

Although responses from parents and teachers were positive, there was no clear evidence of changed play behaviour in the children with autism (while there were some reported possible positive changes in behaviour, observer bias cannot be excluded). Considering the short period of the intervention in this study (about six months), with only a few short play sessions every week, this is not surprising. Significant learning by the children with autism is expected to be a long-term process.

## 10.2 Implications

These results have implications for the practical implementation of social interaction intervention, peer-mediated intervention, and inclusive education. Poor social skills in children with moderate or severe disabilities including autism are sometimes presented as major obstacles towards inclusion. For example, it was reported by Forlin (2001) that over 40% of children with intellectual disabilities in regular classes in Queensland exhibited physical abuse towards their typically developing peers. Although many “effective” social skills interventions for children with autism have been demonstrated, generalization of the results in practice has not been convincing. Failure of generalization is often interpreted as a characteristic of children with autism, implying that it is beyond the capability of educational interventions (e.g., Barry et al., 2003).

However, given that social interaction is fundamentally reciprocal, both parties involved in the interaction should be regarded as appropriate targets for social skill training—trained can be given not only to children with autism but also to typically developing peers. As shown in this study, when typically developing peers know how to interact with children with autism, positive social inter-

action can be realistically achieved between these two groups of children in practice. The likelihood of long-term learning of and generalization of social skills by children with autism can be maximized in this way. Moreover, successful social interact with typically developing peers can even grow into positive long-term relationships such as friendship in later life. Systematic peer training may well be an essential factor for the achievement of successful inclusive education—that is, social inclusion as well as physical inclusion.

This then brings us to the question of how and by whom peer-mediated play interventions of this type should be implemented, as both children with autism and typically developing peers are involved. The answer is not clear in current situation, with the paucity of inclusive setting, and the difficulties experienced by educational institutions and individual educators struggling to deal with inclusion. Regular teachers may well be the best candidates because they may have the primary responsibility in inclusive education. The ability to teach social skills to typically developing peers may enable regular teachers to be empowered as professionals. Furthermore, they may realize how to practically promote inclusion when they use this kind of peer-mediated intervention. However, special educators may also be suited for such a role, because they would be familiar with behaviour modification strategies that were broadly used in the peer training program in this study. Otherwise, such peer-mediated play interventions can be implemented in the form of educational support services by outside agencies such as itinerant teachers, therapists, or other professional supporters.

Moreover, the peer-mediated play intervention developed in this study may provide benefits to not only the children with autism but also to the typically developing peers. Trained peers acquired appropriate social skills through training and used them to interact with children with autism in this study. The social skills for typically developing peers includes prosocial behaviours such as helping others, leadership ability, management skills for interpersonal relationships, and better understanding of human behaviour, diversity, and culture.

### **10.3 Limitations of the research**

There are methodological issues in relation to the experimental design used in this research. It is highly desirable to mitigate the fundamental weakness of the (short baseline) AB design, even if the usual methods for doing so cannot be used. An alternative method is to use a comparison group comprised of dyads of the same children with autism paired with peers who remain untrained, as done in this study. If the trained dyads show improved social interaction in the post-training play sessions as compared with their pre-training play sessions, and the dyads which remain untrained show no improvement, training is unambiguously and conclusively shown to result in improved cognitive play and social

interaction. On the other hand, if the trained and untrained dyads show equal, or at least similar, improvements in social interaction, this would render void any possibility of properly answering the primary research question of this study, that is, whether or not the peer training program improves social interaction in children with autism in the dyads. However, in this case, such an improvement in untrained dyads would be truly remarkable and unprecedented. Such a finding would be of sufficient value, even if not fully explained or understood, so as to compensate for the loss of the primary research question about the effectiveness and necessity of peer training. Nonetheless, it is worthwhile making this limitation explicit.

Although there was no indication that any of the children with autism involved in this study were atypical in any way that might have affected the results, and it is noteworthy that all of the children with autism showed a strikingly similar pattern of change in social interaction and cognitive play, it is still possible (but highly unlikely) that the participants do not adequately represent typical children with autism, due to the small number of participants. This limitation is distinct from the other problem commonly associated with a small number of participants, namely the achievement of an adequate level of statistical significance—in this study, clear statistical significance was obtained by measurements being made over multiple sessions so that the session-to-session variation was well-known.

Another factor that must be considered is that the peer players were all volunteers. This does not affect any comparison made of trained peers versus untrained peers, as the participants were randomly assigned to the two groups. The issue is how well such a group of volunteers represents the group of children who would participate as peer players in peer-mediated play interventions, and the group of children who would choose to play with children with autism in inclusive settings. Not only were the peer players volunteers, their parents also needed to consent to their participation, and the choice of participants from the pool of volunteers was partly based on recommendations made by the class teachers, with peers described as “good” and “compliant” being preferred. However, a similar selection procedure can be expected if peers are chosen for participation as peer players in peer-mediated play interventions in practice, and there is no reason to expect that such peer players would be different enough from those in this study for a major difference in results to be expected. The case is less clear when considering which typically developing children would choose to play with children with autism in an inclusive setting. A degree of volunteerism is still to be expected in that situation, and the participants in this study are still likely to adequately represent such peer-players-by-choice. Age, socioeconomic, and cultural differences are more likely to be important limitations for the generalization of the results obtained here.

The ideal setting for a peer-mediated play interventions as investigated here would be an inclusive educational setting where typically developing children and children with disabilities are educated together. Thus, issues such as safety during travel between two schools would not arise. It would also be easier and quicker for both groups of children to become familiar with each other, if they were not already. Even though typically developing peers were trained how to interact and play together with children with autism, they may find it difficult to apply the skills they have been taught when trying to play with unfamiliar children with autism when they first meet. An example seen in this study was when one of the reserve trained peers (TP6) acted as a replacement for TP2 when TP2 was absent. Despite completing the play training, TP6 burst into tears and could not play with CA2 on meeting CA2 for the first time. TP6 could not adequately use the learned skills until she was more familiar with CA2 (and, in later sessions as a replacement for TP2, TP6 could and did successfully apply the training). Shorter baseline and familiarization phases are clearly beneficial for such research.

The novelty of play materials may have altered the social interaction between children with autism and their typically developing peers. Indoor play materials were chosen from those available at the participating SEDUs, including those described by special educators as usual teaching materials. The familiarity and novelty of play materials was balanced during the pre-training phase; for example, the plastic Lego blocks were removed when CA4 and CA5 used them only. However, some changes in the play materials for indoor play sessions occurred occasionally throughout the study when particular materials were not available for the day. If a play material was not available, it was replaced with other play material likely to be used for play in the same cognitive categories. Although this only occurred occasionally, the influence of the familiarity or novelty of the toys on the performances of both children with autism and typically developing peers would not be clear. However, since such changes occurred equally for both trained and untrained dyads, the comparison of trained and untrained dyads, and the primary conclusions drawn from the study, are in no way jeopardized.

In some cases, the effect of unfamiliarity with some play materials was observed in both children with autism and typically developing peers. For example, during the pre-training phase, when doll's clothes were placed on the floor, CA4 spent most of the session time determining how to deal with the clothes and doll (exploratory behaviour and functional play/no interaction). UP11 also played intensively with new play materials such as the doll and the doll's clothes until he became familiar with them. While the children were exploring new play materials, they did not show any clear interactions, as their attention was directed towards the play material rather than their play partner. Conversely, some play materials seemed to be very familiar to or preferred by children with autism. For

example, CA4 showed very appropriate use of plastic blocks, and used only them in play, necessitating their removal for later sessions. CA5 used kitchen materials far more often than any other materials. These behaviours of children with autism can be interpreted as their play material preference. It is not clear, therefore, how unfamiliarity and preference in both children with autism and typically developing peers affect their play activities in this research.

Since the intervention was implemented at school settings, it was sometimes necessary to use a room other than the regular indoor playroom in SPS-A, when that room was used for other school functions. However, both untrained and trained dyads experienced the same room changes, and therefore any effect of room changes would not affect the comparison between untrained and trained dyads.

The influence of teacher-aides who were present for sessions for dyads with CA1, CA2, and CA3 may need to be considered. The teacher-aides were present due to safety concerns, taking the children with autism to the state primary school (SPS-A), and sitting on a chair in the corner of the room during the indoor sessions, to monitor and intervene if any fighting or aggressive behaviour occurred between the child with autism and the peer player. For outdoor sessions, the teacher-aides stood in the corner of the playground, because a main road was next the playground. As a part of their teaching duty in general, the teacher-aides provided the children with autism with verbal prompts when the children with autism showed challenging behaviours (for example, "No, stop pushing, CA3") or with physical assistance when they left the play area (for example, returning the child with autism to the play area if he ran away).

As children with autism and typically developing peers became more familiar with each other, fewer interruptions by the teacher-aides were needed. However, their presence might still have affected participants' play behaviours somewhat. In particular, TP2 stated that she was not comfortable playing when someone (the teacher aide) was watching her, even though she was informed of the necessity for safety reasons. In the next session, even though the teacher-aide was sitting and reading a newspaper in the indoor session, TP2 confessed that she was still not comfortable. Finally, when the teacher-aide was removed, TP2 was more confident in her interaction with CA2. TP2 used more obvious verbalization (louder voice), gestures, and more actively approached CA2. Also, when the teacher-aides were removed, more compliance and responsive behaviour were likely to be shown by CA3 towards TP4. CA3 seemed to resist less against attempts by TP4 to interact. When the teacher-aides were present, CA3 sometimes hugged the teacher-aides and cried when peers attempted interaction. When the teacher-aides were removed, CA3 exhibited the same behaviours such as clinging to the researcher and crying. The researcher ignored these behaviours shown by CA3, and soon CA3 started to interact with TP4. Compared to dyads with CA2 and

CA3, the dyads with CA1 did not seem to be much influenced by the presence of teacher-aides or interruptions by them. Peer players for CA1 did not state any uncomfortable feelings about it.

The influence of the researcher, who recorded all play sessions with a hand-size video camera, also needs to be considered. Although the video camera was compact, it might still have caused the children in the dyad to display unnatural play behaviours and interactions. Some typically developing peers and children with autism were aware of the video camera, and watched it rather than playing at the beginning of pre-training session. However, after a couple of play sessions, they did not seem to pay attention to the researcher and video camera. On the other hand, while CA4 was waiting for the next peer to play with, he occasionally became bored and did not want to stay in the play setting, and it was necessary to distract him by showing the recording of his play session on the screen of the video camera. No additional information about his play was not provided to him.

## **10.4 Directions for future research**

### **10.4.1 Assessing and training peer's behaviours**

In a general play context, peers play a role as a source of information and socialization. Peers function as reinforcers of desired behaviours, models, guides, instructors, and for the development of the self (Hetherington et al., 1999). Typically developing peers have effectively functioned as a behavioural and instructional agent in much empirical research. Peer-mediated interventions, as reviewed in chapter 4, are likely to be promising. Does this mean that peers are able to function in supporting positive behaviour like adult carers? Furthermore, the question arises whether allocating the role of supporting positive behaviour to peers is ethical. The immediate answer is unclear. However, responses to these questions may be positive in the sense of formulating supportive stakeholder groups (Ruef & Turnbull, 2001) and promoting inclusion for all children (Kohler, Strain, & Shearer, 1996).

One way of promoting inclusion would be through training peers to interact positively with children with disabilities including autism. As shown in this research, peers function either positively or negatively for social interaction with children with autism. Therefore, positive and negative behaviours from typically developing peers should be investigated in relation to behaviour impact on children with autism. One effective way to do this may be a functional assessment on behaviour support plan (Harrower, 1999). The efficacy of functional assessment has already been recognized in challenging behavioural research (McEvoy & Reichle, 2000). Functional assessment may provide information about how peers'



(or children with autism's) behaviours can contribute to positive interaction ability in children with autism (or typically developing peers) and under what kind of circumstances.

In functional assessment of challenging behaviours such as stereotyped and problem behaviours, the antecedents and consequences of challenging behaviours in children with autism can be illustrated in relation to other people's behaviours. In the study by Hastings and Brown (2000), it was revealed that careers' behaviours cause challenging behaviours in individuals with developmental disabilities. It has been realized that since carers act as mediators and are a major environmental factor, their behaviours should be analysed to facilitate positive behaviours and to discourage challenging behaviours from occurring in functional assessment. Effective training for mediators' behaviours becomes an issue on the basis of functional assessment.

Careers' behaviour training in community settings may be linked with peers' training at school settings on the sequential social line of our society. In this sense, carers' and peers' behaviour training can be delineated together in terms of behaviour training for inexperienced tutors. This is not to say that carers and typically developing peers are the same, but that they both play a role as interaction partners for individuals with autism, and that behaviours in both carer and peer groups should be investigated. In turn, identifying "appropriate" peer behaviours to produce positive social interaction with children with autism can be attempted through functional assessment.

However, there is a lack of research on the systematic peer training for typically developing peers even though a variety of peer training methods have been implemented (see chapter 4). Different disability groups would have different abilities and disabilities, as well as sharing some similarities. Peer training content and strategies may need to be designed with due attention paid to these different and similar requirements in different disability groups (Mastropieri & Scruggs, 2000). Also, different ages should be considered. In other words, if a peer training program similar to that designed for this research is applied to other groups of typically developing peers, some strategies may not need to be used or other strategies (such as teaching peers to imitate play behaviour of children with autism to get their attention) may need to be added.

To develop effective peer-training programs, strategies for motivating peers may be the most important element along with multiple variables in peer-mediated interventions such as the frequency and duration of the intervention sessions, the amount of training for tutors, the sex, socioeconomic status, race, academic performance, and psychological maturity of tutors, the motivational level of tutee, mastery level of the task, and so on.

However, there seems to be a lack of studies on how to motivate typically developing peers to interact with children with disabilities. In this study, TP4

faced negative interaction from CA3 and was very disappointed during the pre-training play phase. However, when TP4 used the play-interaction skills and got positive responses at the beginning of the post-training play phase, she was excited. She would have felt successful, confident, and motivated to continue playing with CA3. Discontinuation of play and interaction was decreased by the positive response of CA3 to TP4's initiation. She was eager to see CA3 while he was absent due to school excursions and illness. However, when CA3 returned after such absences, resistance behaviour (such as tantrums) of CA3 was more frequent and even stronger. Whenever CA3 came back to the play session with TP4, TP4 had to deal with CA3's resistance behaviours again. Finally, TP4 was exhausted and showed the lowest attitude score towards disabilities on the post assessment using the Ideas about and Attitudes towards Disability Inventory (see Study 3).

Strategies to motivate typically developing peers may be the teacher's new role in peer-mediated interventions. It was suggested by Strain (1981) that the teacher's role and responsibility in order to manage learning process in peer-mediated interventions could be as varied as instructor, monitor, facilitator, and model, with different degrees of his or her involvement, beyond the mere "knowledge dispenser" of the traditional teaching model. Training and education for typically developing peers may become a core issue in relation to the teacher's new role to promote inclusive education and professional development.

#### **10.4.2 Identifying play behaviours in children with autism**

More rigorous research on play behaviours in children with autism is needed. In particular, the identification of exploratory, play, and stereotyped behaviours is an important, and perhaps critical, issue in behaviour research involving children with autism. Currently, little empirical research has addressed this issue, especially when compared to the much larger body of research on symbolic or pretend play. Accompanied by paradoxical descriptions of sensory-perceptual abnormalities in autism—sources of pain and distress versus sources of pleasure and safety (O'Neill & Jones, 1997)—'playful' stereotyped behaviours in children with autism are often and carelessly excluded from consideration as play, and appear to be judged from a viewpoint based on social values and described as maladaptive. This is related to the biased towards the notion of impaired play competence in children with autism (e.g., Huebner, 2001). Given that stereotyped behaviour is a part of typical development in young children (repetitive behaviours are a feature of locomotor development in young children) and it is not clear yet how stereotyped behaviour is associated with other developmental areas (Berkson & Tupa, 2000), sensory-motor behaviours of children with autism that are usually simply described as "stereotyped" should be evaluated on a more

scientific basis (Baranek, 2002); this especially the case for playful stereotyped behaviour and other developmental areas such as emotion in a play context.

## 10.5 Closing comments

A quasi-experimental design, such as the one adopted for the experiment described in this thesis, might often be the best, or even an unavoidable, choice of method for the experimental study of prototype or trial peer-mediated play intervention programs. Notably, the applicability of rigidly controlled experimental studies is frequently disputed by practitioners, who, for example, argue that the observed results depend on the controlled laboratory conditions and would not be obtained in a practical implementation. A quasi-experimental study, using more naturalistic settings, provides a result that can be more transparently applied in teaching practice in the real classroom. Despite the relaxation of degree of control over experimental settings, clear and clearly statistically significant results can still be obtained, allowing unambiguous analysis and interpretation of the findings.

However, there were many unexpected difficulties, such as delays in the process of obtain ethical clearance from the University of Queensland and difficulty in obtaining participants. The difficulty was mostly on an institutional level; once participating schools were involved, individual participants were readily obtained. To a large extent, this was due to worries about aggressive behaviour in children with autism towards typically developing peers, and concerns about responsibility for any adverse effects resulting from such behaviour. When participant institutions were obtained, limitations on the duration and conduct of the research were imposed. Additional difficulties along these lines are rarely given the attention in discussions of research methodology or design that their practical effects deserve.

While many of the concerns expressed by staff at special education and regular education facilities are understandable—for example, staff in special education settings complained about unpleasant past experiences in involvement in research projects, tiredness of the teacher and teacher aide, disruption of class time schedules due to participation of children in research sessions, difficulty of behaviour management of other children during sessions, worries about aggressive behaviours in children with autism, safety of typically developing peers while travelling from their classroom to the study setting, academic benefits for typically developing peers—the end result was obstacles in the path to successful research. With no administrative obligation to be involved in research (and research by a postgraduate student at that), and no tangible reward or recognition for the staff, it is not surprising that such concerns may frequently outweigh

any positive interest in participation. Fortunately, this is not universal, and one encounters interested and supportive individuals.

While the above issues arose as a result of involvement in a research project, it is all too clear that the same, or similar, concerns would be all too readily voiced in relation to actual intervention programs in practice. Although a planned intervention might have been demonstrated to be effective, support for implementation thereof, and a supportive atmosphere in the event of implementation, may well be sorely lacking. Similarly, the attitudes described above would likely result in opposition to inclusive programs.

There also seems to be a lack of awareness about the importance of communication between research and practice. In particular, without collaborative communication between research and practice, practical interventions for positive social interaction between children with autism and typically developing peers are less likely to result. Clichéd though it might sound, collaborative communication between practitioners and researchers can certainly develop a synergy that can result in concrete benefits for practice.

With these obstacles in mind, and also considering the current low levels of inclusion, how can peer-mediated play interventions such as the one investigated here in this thesis be applied in practice at the current stage? One possibility is in the form of a *reverse integration model*, cross-aged peers or same-aged peers, depending on training time and availability of space, travel to the educational settings where the children with disabilities attend. Of course, if the trend towards inclusion follows the hopes of its advocates, such interventions would be a natural, even integral, part of a socially inclusive environment.

# Bibliography

- Akshoomoff, N., Pierce, K., & Courchesne, E. (2002). The neurobiological basis of autism from a developmental perspective. *Development and Psychopathology*, 14(3), 613-634.
- Aldis, O. (1975). *Play-fighting*. New York: Academic Press.
- Allodi, M. W. (2000). Self-concept in children receiving special support at school. *European Journal of Special Needs Education*, 15(1), 69-78.
- Amato, Jr., J., Barrow, M., & Domingo, R. (1999). Symbolic play behavior in very young verbal and nonverbal children with autism. *Infant Toddler Intervention*, 9(2), 185-194.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR* (4th, with text revision, ed.). Washington, DC: American Psychiatric Association.
- Anderson, A., Moore, D. W., Godfrey, R., & Fletcher-Flinn, C. M. (2004). Social skills assessment of children with autism in free-play situations. *Autism*, 8(4), 369-385.
- Anthony, G. C. (1922). *An introduction to the graphic language*. New York: D. C. Heath.
- Arnold, A., Semple, R. J., Beale, I., & Flinn, C. M. F. (2000). Eye contact in children's social interactions: What is normal behavior? *Journal of Intellectual and Developmental Disability*, 25(3), 207-216.
- Ashman, A. F., & Elkins, J. (2002). *Educating children with diverse abilities* (1st ed.). Frenchs Forest, N.S.W.: Pearson Education.
- Avramidis, E., & Norwich, B. (2002). Teachers' attitudes towards integration/inclusion: A review of the literature. *European Journal of Special Needs Education*, 17(2), 129-147.
- Bakeman, R., & Brownlee, J. R. (1980). The strategic use of parallel play: A sequential analysis. *Child Development*, 51(3), 873-878.

- Baker, M. J. (2000). Incorporating the thematic ritualistic behaviors of children with autism into games: Increasing social play interactions with siblings. *Journal of Positive Behavior Interventions*, 2(2), 66-84.
- Baker, M. J., Koegel, R. L., & Koegel, L. K. (1998). Increasing the social behavior of young children with autism using their obsessive behaviors. *Journal of the Association for Persons with Severe Handicaps*, 23(4), 300-308.
- Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice Hall.
- Bandura, A., & Rockville National Institute of Mental Health, Md, US. (1986). *Social foundations of thought and action: A social cognitive theory*. Upper Saddle River, NJ: Prentice-Hall.
- Baranek, G. T. (1999). Autism during infancy: A retrospective video analysis of sensory-motor and social behaviors at 9-12 months of age. *Journal of Autism and Developmental Disorders*, 29(3), 213-224.
- Baranek, G. T. (2002). Efficacy of sensory and motor interventions for children with autism. *Journal of Autism and Developmental Disorders*, 32(5), 397-422.
- Barlow, D. H., & Hersen, M. (Eds.). (1984). *Single case experimental designs: strategies for studying behavior change* (2nd ed.). New York: Pergamon Press.
- Barnes, K. E. (1971). Preschool play norms: A replication. *Developmental Psychology*, 5(1), 99-103.
- Barnett, L. A. (1990). Playfulness: Definition, design, and measurement. *Play and Culture*, 3(4), 319-336.
- Baron Cohen, S. (1987). Autism and symbolic play. *British Journal of Developmental Psychology*, 5(2), 139-148.
- Baron Cohen, S. (1990). Instructed and elicited play in autism: A reply to Lewis & Boucher. *British Journal of Developmental Psychology*, 8(2), 207.
- Baron Cohen, S. (1995). *Mindblindness: An essay on autism and theory of mind*. Cambridge, MA: The MIT Press.
- Baron Cohen, S. (2001). Theory of mind and autism: A review. In L. M. Glidden (Ed.), *Autism* (Vol. 23, p. 169-184). San Diego, CA: Academic Press.
- Baron Cohen, S., Flusberg, H. T., & Cohen, D. J. (Eds.). (1994). *Understanding other minds: Perspectives from autism*. London: Oxford University Press.
- Barrow, R. (2000). 'Include me out': a response to John Wilson. *European Journal of Special Needs Education*, 15(3), 305-307.

- Barrows, P. (2002). Becoming verbal: Autism, trauma and playfulness. *Journal of Child Psychotherapy*, 28(1), 53-72.
- Barry, T. D., Klinger, L. G., Lee, J. M., Palardy, N., Gilmore, T., & Bodin, S. D. (2003). Examining the effectiveness of an outpatient clinicbased social skills group for high-functioning children with autism. *Journal of Autism and Developmental Disorders*, 33(6), 685-701.
- Bauminger, N. (2002). The facilitation of social-emotional understanding and social interaction in high-functioning children with autism: Intervention outcomes. *Journal of Autism and Developmental Disorders*, 32(4), 283-298.
- Bauminger, N., & Kasari, C. (2000). Loneliness and friendship in high-functioning children with autism. *Child Development*, 71(2), 447-456.
- Beckman, P. J., & Lieber, J. (1994). The social strategy rating scale: An approach to evaluating social competence. *Journal of Early Intervention*, 18(1), 1-11.
- Bee, H., & Boyd, D. (2002). *Lifespan development* (3rd ed.). Boston, MA: Allyn and Bacon.
- Bee, H. L. (2000). *The developing child* (9th ed.). Boston: Allyn and Bacon.
- Bekoff, M. (1977). Three areas of classical ethology. In B. A. Hazlett (Ed.), *Quantitative methods in the study of animal behaviour* (p. 1-46). New York: Academic Press.
- Belchic, J. K., & Harris, S. L. (1994). The use of multiple peer exemplars to enhance the generalization of play skills to the siblings of children with autism. *Child and Family Behavior Therapy*, 16(2), 1-25.
- Bell, S. H., & Barnett, D. W. (1999). Peer micronorms in the assessment of young children: Methodological review and examples. *Topics in Early Childhood Special Education*, 19(2), 112-122.
- Berk, L. E. (1999). Children's private speech: An overview of theory and the status of research. In P. Llyod & C. Fernyhough (Eds.), *Lev Vygotsky: Critical assessments: Thought and language, Vol. II* (p. 33-70). Florence, KY: Taylor & Francis/Routledge.
- Berk, L. E. (2001). *Development through the lifespan* (2nd ed.). Boston: Allyn and Bacon.
- Berk, L. E., & Winsler, A. (1999). *Scaffolding children's learning: Vygotsky and early childhood education*. Washington, DC, US: National Association for the Education of Young Children.

- Berkeley, S. L., Zittel, L. L., Pitney, L. V., & Nichols, S. E. (2001). Locomotor and object control skills of children diagnosed with autism. *Adapted Physical Activity Quarterly*, 18(4), 405-416.
- Berkson, G., & Tupa, M. (2000). Early development of stereotyped and self-injurious behaviors. *Journal of Early Intervention*, 23(1), 1-19.
- Bernabei, P., Camaioni, L., & Levi, G. (1998). An evaluation of early development in children with autism and pervasive developmental disorders from home movies: Preliminary findings. *Autism*, 2(3), 243-258.
- Bierly, C., & Billingsley, F. F. (1983). An investigation of the educative effects of overcorrection on the behavior of an autistic child. *Behavioral Disorders*, 9(1), 11-21.
- Bolich, B. J. (2001). Peer tutoring and social behaviors: A review. *International Journal of Special Education*, 16(2), 16-29.
- Boucher, J., & Lewis, V. (1990). Guessing or creating? A reply to Baron-Cohen. *British Journal of Developmental Psychology*, 8(2), 205-206.
- Boucher, J., & Wolfberg, P. (2003). Editorial. *Autism*, 7(4), 339-346. (editorial for special issue)
- Boyer, W. A. R. (1998). Enhancing playfulness with sensorial stimulation. *Journal of Research in Childhood Education*, 12(1), 78-87.
- Brabeck, M. M., & Rogers, L. (2000). Human rights as a moral issue: lessons for moral educators from human rights work. *The Journal of Moral Education*, 29(2), 167-182.
- Brady, M. P., Shores, R. E., McEvoy, M. A., Ellis, D., & Fox, J. J. (1987). Increasing social interactions of severely handicapped autistic children. *Journal of Autism and Developmental Disorders*, 17(3), 375-390.
- Brendgen, M., Bowen, F., Rondeau, N., & Vitaro, F. (1999). Effects of friends' characteristics on children's social cognitions. *Social Development*, 8(1), 41-51.
- Brookman, L., Boettcher, M., Klein, E., Openden, D., Koegel, R. L., & Koegel, L. K. (2003). Facilitating social interactions in a community summer camp setting for children with autism. *Journal of Positive Behavior Interventions*, 5(4), 249-252.
- Brophy, K., & Zukowski, D. S. (1984). Social and play behaviour of special needs and non-special needs toddlers. *Early Child Development and Care*, 13(2), 137-154.



- Brown, J., & Whiten, A. (2000). Imitation, theory of mind and related activities in autism: An observational study of spontaneous behaviour in everyday contexts. *Autism*, 4(2), 185-204.
- Bruner, J. (1983). Play, thought, and language. *Peabody Journal of Education*, 60(3), 60-69.
- Bugental, D. B., & Goodnow, J. J. (1998). Socialization processes. In W. Damon (Ed.), *Handbook of child psychology* (5th ed., p. 389-462). New York: John Wiley.
- Buggey, T., Toombs, K., Gardener, P., & Cervetti, M. (1999). Training responding behaviors in students with autism: Using videotaped self-modeling. *Journal of Positive Behavior Interventions*, 1(4), 205-214.
- Bundy, A. C. (1997). Play and playfulness: What to look for. In L. D. Parham & L. S. Fazio (Eds.), *Play in occupational therapy for children* (p. 52-66). St. Louis, MO: Mosby.
- Burns, R. B. (2000). *Introduction to research methods* (4th ed.). Frenchs Forest, N.S.W.: Pearson Education.
- Buyse, V., Goldman, B. D., & Skinner, M. L. (2002). Setting effects on friendship formation among young children with and without disabilities. *Exceptional Children*, 68(4), 503-517.
- Buyse, V., Nabors, L., Skinner, D., & Keyes, L. (1997). Playmate preferences and perceptions of individual differences among typically developing preschoolers. *Early Child Development and Care*, 131, 1-18.
- Campbell, D. T., Stanley, J. C., & Gage, N. L. (1966). *Experimental and quasi-experimental designs for research*. Chicago: R. McNally.
- Campbell, J. M., Ferguson, J. E., Herzinger, C. V., Jackson, J. N., & Marino, C. A. (2004). Combined descriptive and explanatory information improves peers' perceptions of autism. *Research in Developmental Disabilities*, 25(4), 321-339.
- Carlyle, T. (1888). *Miscellaneous essays* (Vol. 1). London: Chapman and Hall.
- Carpenter, M., Pennington, B. E., & Rogers, S. J. (2002). Interrelations among social-cognitive skills in young children with autism. *Journal of Autism and Developmental Disorders*, 32(2), 91-106.
- Carpenter, M., Pennington, B. F., & Rogers, S. J. (2001). Understanding of others' intentions in children with autism. *Journal of Autism and Developmental Disorders*, 31(6), 589-599.

- Carpenter, M., & Tomasello, M. (2000). Joint attention, cultural learning, and language acquisition: Implications for children with autism. In A. M. Wetherby & B. M. Prizant (Eds.), *Autism spectrum disorders: A transactional developmental perspective* (p. 31-54). Baltimore, MD: Paul H. Brookes Publishing Co.
- Carr, E. G., & Darcy, M. (1990). Setting generality of peer modeling in children with autism. *Journal of Autism and Developmental Disorders*, 20(1), 45-59.
- Carter, C. M. (2001). Using choice with game play to increase language skills and interactive behaviors in children with autism. *Journal of Positive Behavior Interventions*, 3(3), 131-151.
- Charlop, M. H., Schreibman, L., & Tryon, A. S. (1983). Learning through observation: The effects of peer modeling on acquisition and generalization in autistic children. *Journal of Abnormal Child Psychology*, 11(3), 355-366.
- Charlop, M. H., & Walsh, M. E. (1986). Increasing autistic children's spontaneous verbalizations of affection: an assessment of time delay and peer modeling procedures. *Journal of Applied Behavior Analysis*, 19(3), 307-314.
- Charman, T., & Baron Cohen, S. (1997). Brief report: Prompted pretend play in autism. *Journal of Autism and Developmental Disorders*, 27(3), 325-332.
- Charman, T., Swettenham, J., Cohen, S. B., Cox, A., Baird, G., & Drew, A. (2000). An experimental investigation of social-cognitive abilities in infants with autism: Clinical implications. In D. Muir & A. Slater (Eds.), *Infant development: The essential readings. Essential readings in development psychology* (p. 343-363). Malden, MA: Blackwell Publishers.
- Cheyne, J. A., & Rubin, K. H. (1983). Playful precursors of problem solving in preschoolers. *Developmental Psychology*, 19(4), 577-584.
- Chiu, S., & Alexander, P. A. (2000). The motivational function of preschoolers' private speech. *Discourse Processes*, 30(2), 133-152.
- Choi, S. H.-J., Nieminen, T. A., Bahr, M., & Bahr, N. (2002). Improving behaviour classification consistency: a technique from biological taxonomy. In AARE—Australian Association for Research in Education Conference 2002. Brisbane, Australia. (Published online at <http://www.aare.edu.au/02pap/cho02101.htm>)
- Clawson, M. A. (2002). Play of language-minority children in an early childhood setting. In J. L. Roopnarine (Ed.), *Conceptual, social cognitive, and contextual issues in the fields of play* (Vol. 4, p. 93-110). Westport, CT: Ablex Publishing.
- Cohen, D. (2001). *How the child's mind develops*. New York: Routledge.

- Coleman, S. L., & Stedman, J. M. (1974). Use of a peer model in language training in an echolalic child. *Journal of Behavior Therapy and Experimental Psychiatry*, 5(3-4), 275-279.
- Connolly, J. A., & Doyle, A. B. (1984). Relation of social fantasy play to social competence in preschoolers. *Developmental Psychology*, 20(5), 797-806.
- Cook, B. G. (2001). A comparison of teachers' attitudes toward their included students with mild and severe disabilities. *Journal of Special Education*, 34(4), 203-213.
- Cook, B. G., & Semmel, M. I. (1999). Peer acceptance of included students with disabilities as a function of severity of disability and classroom composition. *Journal of Special Education*, 33(1), 50-61.
- Cook, B. G., Tankersley, M., Cook, L., & Landrum, T. J. (2000). Teachers' attitudes toward their included students with disabilities. *Exceptional Children*, 67(1), 115-135.
- Cook, T., & Swain, J. (2001). Parents' perspectives on the closure of a special school: Towards inclusion in partnership. *Educational Review*, 53(2), 191-198.
- Cooney, M. H. (2004). Is play important? Guatemalan kindergartners' classroom experiences and their parents' and teachers' perceptions of learning through play. *Journal of Research in Childhood Education*, 18(4), 261-277.
- Courchesne, E., Courchesne, R. Y., & Pierce, K. (1999). Biological and behavioral heterogeneity in autism: Roles of pleiotropy and epigenesis. In S. H. Broman & J. M. Fletcher (Eds.), *The changing nervous system: Neurobehavioral consequences of early brain disorders* (p. 292-338). New York: Oxford University Press.
- Craig, J., & Baron Cohen, S. (1999). Creativity and imagination in autism and Asperger syndrome. *Journal of Autism and Developmental Disorders*, 29(4), 319-326.
- Croll, P., & Moses, D. (2000). Ideologies and utopias: education professionals' views of inclusion. *European Journal of Special Needs Education*, 15(1), 1-12.
- Crossley, R. (1994). *Facilitated communication training*. New York: Teachers College Press.
- D'Ateno, P., Mangiapanello, K., & Taylor, B. A. (2003). Using video modeling to teach complex play sequences to a preschooler with autism. *Journal of Positive Behavior Interventions*, 5(1), 5-11.

- Davis, C. A., Brady, M. P., Hamilton, R., McEvoy, M. A., & Williams, R. E. (1994). Effects of high-probability requests on the social interactions of young children with severe disabilities. *Journal of Applied Behavior Analysis*, 27(4), 619-637.
- De Lisi, R., & Golbeck, S. L. (1999). Implications of Piagetian theory for peer learning. In A. M. O'Donnell & A. King (Eds.), *Cognitive perspectives on peer learning* (p. 3-37). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.
- DeMyer, M. K., Barton, S., & Norton, J. A. (1972). A comparison of adaptive, verbal, and motor profiles of psychotic and non-psychotic subnormal children. *Journal of Autism and Childhood Schizophrenia*, 2(4), 359-377.
- DeMyer, M. K., Hingtgen, J. N., & Jackson, R. K. (1981). Infantile autism reviewed: A decade of research. *Schizophrenia Bulletin*, 7(3), 388-451.
- Denham, S. A. (1998). *Emotional development in young children*. New York: Guilford Press.
- Dewey, D., Lord, C., & Magill, J. (1988). Qualitative assessment of the effect of play materials in dyadic peer interactions of children with autism. *Canadian Journal of Psychology*, 42(2), 242-260.
- Dewey, J. (1929). *The quest for certainty*. New York: Minton, Balch & Co.
- Dillenbourg, P. (1999). *Collaborative learning : cognitive and computational approaches*. New York: Pergamon.
- DiSalvo, C. A., & Oswald, D. P. (2002). Peer-mediated interventions to increase the social interaction of children with autism: Consideration of peer expectancies. *Focus on Autism and Other Developmental Disabilities*, 17(4), 198-207.
- Doherty, M. B., & Rosenfeld, A. A. (1984). Play assessment in the differential diagnosis of autism and other causes of severe language disorder. *Journal of Developmental and Behavioral Pediatrics*, 5(1), 26-29.
- Donne, J. (1975). *Devotions upon emergent occasions*. Montreal: McGill-Queen's University Press.
- Duhaney, L. M. G., & Salend, S. J. (2000). Parental perceptions of inclusive educational placements. *Remedial and Special Education*, 21(2), 121-128.
- Dunn, J., & Cutting, A. L. (1999). Understanding others, and individual differences in friendship interactions in young children. *Social Development*, 8(2), 201-219.

- Dunn, J., Cutting, A. L., & Fisher, N. (2002). Old friends, new friends: Predictors of children's perspective on their friends at school. *Child Development, 73*(2), 621-635.
- Edelson, M. G. (2005). A car goes in the garage like a can of peas goes in the refrigerator: do deficits in real-world knowledge affect the assessment of intelligence in individuals with autism? *Focus on Autism and Other Developmental Disabilities, 20*(1), 2-9.
- Egel, A. L., Richman, G. S., & Koegel, R. L. (1981). Normal peer models and autistic children's learning. *Journal of Applied Behavior Analysis, 14*(1), 3-12.
- Escalona, A., Field, T., Nadel, J., & Lundy, B. (2002). Brief report: Imitation effects on children with autism. *Journal of Autism and Developmental Disorders, 32*(2), 141-144.
- Evans, J., & Lunt, I. (2002). Inclusive education: Are there limits? *European Journal of Special Needs Education, 17*(1), 1-14.
- Farmer, T. W., Acker, R. M. V., Pearl, R., & Rodkin, P. C. (1999). Social networks and peer-assessed problem behavior in elementary classrooms: Students with and without disabilities. *Remedial and Special Education, 20*(4), 244-256.
- Farmer Dougan, V., & Kaszuba, T. (1999). Reliability and validity of play-based observations: Relationship between the play behaviour observation system and standardised measures of cognitive and social skills. *Educational Psychology, 19*(4), 429-440.
- Farran, D. C., & Son-Yarbrough, W. (2001). Title I funded preschools as a developmental context for children's play and verbal behaviors. *Early Childhood Research Quarterly, 16*(2), 245-262.
- Farrell, P. (2000). The impact of research on developments in inclusive education. *International Journal of Inclusive Education, 4*(2), 153-162.
- Favazza, P. C., & Odom, S. L. (1997). Promoting positive attitudes of kindergarten-age children toward people with disabilities. *Exceptional Children, 63*(3), 405-418.
- Favazza, P. C., Phillipsen, L., & Kumar, P. (2000). Measuring and promoting acceptance of young children with disabilities. *Exceptional Children, 66*(4), 491-508.
- Feeney, S., & Magarick, M. (1984). Choosing good toys for young children. *Young Children, 40*(1), 21-25.

- Feller, W. (1945). The fundamental limit theorems in probability. *Bulletin of the American Mathematical Society*, 51, 800-832.
- Fenson, L., & Schell, R. E. (1985). The origins of exploratory play. *Early Child Development and Care*, 19(1-2), 3-24.
- Fernyhough, C., & Russell, J. (1997). Distinguishing one's own voice from those of others: A function for private speech? *International Journal of Behavioral Development*, 20(4), 651-665.
- Ferrara, C., & Hill, S. D. (1980). The responsiveness of autistic children to the predictability of social and nonsocial toys. *Journal of Autism and Developmental Disorders*, 10(1), 51-57.
- Field, T., Lasko, D., Mundy, P., Henteleff, T., Kabat, S., Talpins, S., & Dowling, M. (1997). Brief report: Autistic children's attentiveness and responsivity improve after touch therapy. *Journal of Autism and Developmental Disorders*, 27(3), 333-338.
- Fiese, B. H. (1990). Playful relationships: A contextual analysis of mother-toddler interaction and symbolic play. *Child Development*, 61(5), 1648-1656.
- Filipek, P. A., Accardo, P. J., Ashwal, S., Baranek, G. T., E. H. Cook, J., Dawson, G., Gordon, B., Gravel, J. S., Johnson, C. P., Kallen, R. J., Levy, S. E., Minshew, N. J., Ozonoff, S., Prizant, B. M., Rapin, I., Rogers, S. J., Stone, W. L., Teplin, S. W., Tuchman, R. F., & Volkmar, F. R. (2000). Practice parameter: Screening and diagnosis of autism: Report of the quality standards subcommittee of the american academy of neurology and the child neurology society. *Neurology*, 55(4), 468-479.
- Finlinson, A. R., Austin, A. M. B., & Pfister, R. (2000). Cooperative games and children's positive behaviors. *Early Child Development and Care*, 164, 29-40.
- Fisher, D., Pumpian, I., & Sax, C. (1998). High school students' attitudes about and recommendations for their peers with significant disabilities. *Journal of the Association for Persons with Severe Handicaps*, 23(3), 272-82.
- Fisher, D., Roach, V., & Frey, N. (2002). Examining the general programmatic benefits of inclusive schools. *International Journal of Inclusive Education*, 6(1), 63-78.
- Foreman, P., & Arthur, M. (2002). Parental perspectives on educational programmes for students with high support needs. *European Journal of Special Needs Education*, 17(2), 175-184.

- Forlin, C. (2001). Inclusion: Identifying potential stressors for regular class teachers. *Educational Research*, 43(3), 235-245.
- Fox, J. E. (1996). Back-to-basics: Play in early childhood. *Early Childhood News*, 8(5), 19-24.
- Frederickson, N., & Cline, T. (2002). *Special educational needs, inclusion, and diversity : a textbook*. Buckingham, UK; Philadelphia: Open University Press.
- Freeman, S. F. N., & Alkin, M. C. (2000). Academic and social attainments of children with mental retardation in general education and special education settings. *Remedial and Special Education*, 21(1), 3-18.
- Gall, E. (1996). Baba Yaga and Vasalisa: Myth work with challenging behaviour. In J. Pearson (Ed.), *Discovering the self through drama and movement* (p. 232-240). London: Jessica Kingsley Publishers Ltd.
- Gallagher, D. J. (1998). The scientific knowledge base of special education: Do we know what we think we know? *Exceptional Children*, 64(4), 493-502.
- Gallagher, D. J. (2001). Neutrality as a moral standpoint, conceptual confusion and the full inclusion debate. *Disability and Society*, 16(5), 637-654.
- Galyer, K. T., & Evans, I. M. (2001). Pretend play and the development of emotion regulation in preschool children. *Early Child Development and Care*, 166, 93-108.
- Garrison Harrell, L., Kamps, D., & Kravits, T. (1997). The effects of peer networks on social-communicative behaviors for students with autism. *Focus on Autism and Other Developmental Disabilities*, 12(4), 241-254.
- Gay, L. R., & Airasian, P. W. (2000). *Educational research: competencies for analysis and application* (6th ed.). Upper Saddle River, NJ: Merrill.
- Gay, L. R., & Airasian, P. W. (2003). *Educational research: competencies for analysis and applications* (7th ed.). Upper Saddle River, NJ: Merrill/Prentice Hall.
- Gest, S. D., Bermann, S. A. G., & Hartup, W. W. (2001). Peer experience: Common and unique features of number of friendships, social network centrality, and sociometric status. *Social Development*, 10(1), 23-40.
- Gillham, J. E., Carter, A. S., Volkmar, F. R., & Sparrow, S. S. (2000). Toward a developmental operational definition of autism. *Journal of Autism and Developmental Disorders*, 30(4), 269-278.
- Gitlin-Weiner, K., Sandgrund, A., & Schaefer, C. (Eds.). (2000). *Play diagnosis and assessment* (2nd ed.). New York: John Wiley.

- Gittleman, J. L., & Decker, D. M. (1994). The phylogeny of behaviour. In P. J. B. Slater & T. Halliday (Eds.), *Behaviour and evolution* (p. 80-105). Cambridge, UK: Cambridge University Press.
- Gleason, J. B. (2001). *The development of language* (5th ed.). Boston: Allyn and Bacon.
- Goldberg, M. C., Lasker, A. G., Zee, D. S., Garth, E., Tien, A., & Landa, R. J. (2002). Deficits in the initiation of eye movements in the absence of a visual target in adolescents with high functioning autism. *Neuropsychologia*, 40(12), 2039-2049.
- Goldstein, H., & Cisar, C. L. (1992). Promoting interaction during sociodramatic play: Teaching scripts to typical preschoolers and classmates with disabilities. *Journal of Applied Behavior Analysis*, 25(2), 265-280.
- Goldstein, H., Kaczmarek, L., Pennington, R., & Shafer, K. (1992). Peer-mediated intervention: Attending to, commenting on, and acknowledging the behavior of preschoolers with autism. *Journal of Applied Behavior Analysis*, 25(2), 289-305.
- Goldstein, H., & Wickstrom, S. (1986). Peer intervention effects on communicative interaction among handicapped and nonhandicapped preschoolers. *Journal of Applied Behavior Analysis*, 19(2), 209-214.
- Goodlad, S., & Hirst, B. (1989). *Peer tutoring: a guide to learning by teaching*. London: Kogan Page.
- Goodlad, S., & Hirst, B. (1990). *Explorations in peer tutoring*. Oxford: Blackwell.
- Goodman, S. H. (1999). The integration of verbal and motor behavior in preschool children. In P. Llyod & C. Fernyhough (Eds.), *Lev Vygotsky: Critical assessments: Thought and language, Vol. II* (p. 265-281). Florence, KY: Taylor & Francis/Routledge.
- Gray, K. M., & Tonge, B. J. (2001). Are there early features of autism in infants and preschool children? *Journal of Paediatrics and Child Health*, 37(3), 221-226.
- Green, D., Baird, G., Barnett, A. L., Henderson, L., Huber, J., & Henderson, S. E. (2002). The severity and nature of motor impairment in Asperger's syndrome: A comparison with specific developmental disorder of motor function. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 43(5), 655-668.
- Greenway, C. (2000). Autism and asperger syndrome: Strategies to promote prosocial behaviours. *Educational Psychology in Practice*, 16(4), 469-486.



- Gresham, F. M., & Elliott, S. N. (1990). *Social Skills Rating System*. Circle Pines, MN: American Guidance Service.
- Gunter, P., Fox, J. J., Brady, M. P., Shores, R. E., & Cavanaugh, K. (1988). Nonhandicapped peers as multiple exemplars: A generalization tactic for promoting autistic students' social skills. *Behavioral Disorders*, 13(2), 116-126.
- Guralnick, M. J., Connor, R. T., Hammond, M., Gottman, J. M., & Kinnish, K. (1996). Immediate effects of mainstreamed settings on the social interactions and social integration of preschool children. *American Journal on Mental Retardation*, 100(4), 359-377.
- Gutstein, S. E., & Sheely, R. K. (2001). *Relationship Development Intervention with young children: Social and emotional development activities for Asperger Syndrome, autism, PPD and NLD*. London: Jessica Kingsley Publishers Ltd.
- Hadwin, J., & Hutley, G. (1998). Detecting features of autism in children with severe learning difficulties: A brief report. *Autism*, 2(3), 269-280.
- Haennikaeinen, M. (2001). Playful actions as a sign of togetherness in day care centers. *International Journal of Early Years Education*, 9(2), 125-134.
- Hall, L. J., & McGregor, J. A. (2000). A follow-up study of the peer relationships of children with disabilities in an inclusive school. *Journal of Special Education*, 34(3), 114-126.
- Hallahan, D. P., & Kauffman, J. M. (2003). *Exceptional learners: introduction to special education* (9th ed.). Boston: Allyn and Bacon.
- Hammes, J. G., & Langdell, T. (1981). Precursors of symbol formation and childhood autism. *Journal of Autism and Developmental Disorders*, 11(3), 331-346.
- Hanson, M. J., Horn, E., Sandall, S., Beckman, P., Morgan, M., Marquart, J., Barnwell, D., & Chou, H.-Y. (2001). After preschool inclusion: Children's educational pathways over the early school years. *Exceptional Children*, 68(1), 65-84.
- Happe, F. (1999). Understanding assets and deficits in autism: Why success is more interesting than failure. *Psychologist*, 12(11), 540-546.
- Haring, T. G., & Breen, C. G. (1992). A peer-mediated social network intervention to enhance the social integration of persons with moderate and severe disabilities. *Journal of Applied Behavior Analysis*, 25(2), 319-333.
- Haring, T. G., & Lovinger, L. (1989). Promoting social interaction through teaching generalized play initiation responses to preschool children with autism. *Journal of the Association for Persons with Severe Handicaps*, 14(1), 58-67.

- Harrower, J. K. (1999). Educational inclusion of children with severe disabilities. *Journal of Positive Behavior Interventions*, 1(4), 215-230.
- Harrower, J. K., & Dunlap, G. (2001). Including children with autism in general education classrooms: A review of effective strategies. *Behavior Modification*, 25(5), 762-784.
- Hartshorn, K., Olds, L., Field, T., Delage, J., Cullen, C., & Escalona, A. (2001). Creative movement therapy benefits children with autism. *Early Child Development and Care*, 166, 1-5.
- Hartup, W. W. (1999). Peer experience and its developmental significance. In M. Bennett (Ed.), *Developmental psychology: Achievements and prospects* (p. 106-125). Philadelphia: Psychology Press.
- Hartup, W. W., & Laursen, B. (1999). Relationships as developmental contexts: Retrospective themes and contemporary issues. In W. A. Collins & B. Laursen (Eds.), *Relationships as developmental contexts* (Vol. 30, p. 13-35). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.
- Hartup, W. W., & Stevens, N. (1999). Friendships and adaptation across the life span. *Current Directions in Psychological Science*, 8(3), 76-79.
- Hastings, R. P., & Brown, T. (2000). Functional assessment and challenging behaviors: Some future directions. *Journal of the Association for Persons with Severe Handicaps*, 25(4), 229-240.
- Hauck, J. A., & Dewey, D. (2001). Hand preference and motor functioning in children with autism. *Journal of Autism and Developmental Disorders*, 31(3), 265-277.
- Hauck, M., Fein, D., Waterhouse, L., & Feinstein, C. (1995). Social initiations by autistic children to adults and other children. *Journal of Autism and Developmental Disorders*, 25(6), 579-595.
- Hehir, T. (2002). Eliminating ableism in education. *Harvard Educational Review*, 72(1), 1-32.
- Herbert, J., & Attridge, C. (1975). A guide for developers and users of observation systems and manuals. *American Educational Research Journal*, 12, 1-20.
- Hetherington, E. M., Parke, R. D., & Locke, V. O. (1999). *Child psychology: A contemporary viewpoint* (5th ed.). New York, NY: McGraw-Hill.
- Hill, T., & Reed, K. (1990). Promoting social competence at preschool: The implementation of a co-operative games programme. *Early Child Development and Care*, 59, 11-20.

- Hobson, R. P. (1999). Beyond cognition: A theory of autism. In P. Lloyd & C. Fernyhough (Eds.), *Lev Vygotsky: Critical assessments: Future directions, Vol. IV* (p. 253-281). Florence, KY: Taylor & Francis/Routledge.
- Honig, A. S., & McCarron, P. A. (1988). Prosocial behaviors of handicapped and typical peers in an integrated preschool. *Early Child Development and Care*, 33(1-4), 113-125.
- House, F. N. (1934). Measurement in sociology. *American Journal of Sociology*, 40(1), 1-11.
- Howard, J. (2002). Eliciting young children's perceptions of play, work and learning using the activity apperception story procedure. *Early Child Development and Care*, 172(5), 489-502.
- Huebner, R. A. (2001). *Autism: a sensorimotor approach to management*. Gaithersburg, MD: Aspen Publishers.
- Hughes, C. (2001). Executive dysfunction in autism: Its nature and implications for the everyday problems experienced by individuals with autism. In J. A. Burack & T. Charman (Eds.), *The development of autism: Perspectives from theory and research* (p. 255-275). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.
- Hughes, C. (2002). Executive functions and development: Emerging themes. *Infant and Child Development*, 11(2), 201-209.
- Hughes, C., Copeland, S. R., Wehmeyer, M. L., Agran, M., Cai, X., & Hwang, B. (2002). Increasing social interaction between general education high school students and their peers with mental retardation. *Journal of Developmental and Physical Disabilities*, 14(4), 387-402.
- Hughes, C., Rodi, M. S., Lorden, S. W., Pitkin, S. E., Derer, K. R., Hwang, B., & Cai, X. (1999). Social interactions of high school students with mental retardation and their general education peers. *American Journal on Mental Retardation*, 104(6), 533-544.
- Hughes, D. M., Cunningham, M. M., & Libretto, S. E. (2002). Risperidone in children and adolescents with autistic disorder and aggressive behaviour. *British Journal of Developmental Disabilities*, 48, 113-122.
- Hughes, L. A. (1991). A conceptual framework for the study of children's gaming. *Play and Culture*, 4(3), 284-301.
- Hwang, B., & Hughes, C. (2000a). Increasing early social-communicative skills of preverbal preschool children with autism through social interactive training. *Journal of the Association for Persons with Severe Handicaps*, 25(1), 18-28.

- Hwang, B., & Hughes, C. (2000b). The effects of social interactive training on early social communicative skills of children with autism. *Journal of Autism and Developmental Disorders*, 30(4), 331-343.
- Ihrig, K., & Wolchik, S. A. (1988). Peer versus adult models and autistic children's learning: Acquisition, generalization, and maintenance. *Journal of Autism and Developmental Disorders*, 18(1), 67-79.
- Innes, F. K., & Diamond, K. E. (1999). Typically developing children's interactions with peers with disabilities: Relationships between mothers' comments and children's ideas about disabilities. *Topics in Early Childhood Special Education*, 19(2), 103-11.
- Ivory, J. J., & McCollum, J. A. (1999). Effects of social and isolate toys on social play in an inclusive setting. *Journal of Special Education*, 32(4), 238-243.
- Iwanaga, R., Kawasaki, C., & Tsuchida, R. (2000). Brief report: Comparison of sensory-motor and cognitive function between autism and Asperger syndrome in preschool children. *Journal of Autism and Developmental Disorders*, 30(2), 169-174.
- Jackson, C. T., Fein, D., Wolf, J., Jones, G., Hauck, M., Waterhouse, L., & Feinstein, C. (2003). Responses and sustained interactions in children with mental retardation and autism. *Journal of Autism and Developmental Disorders*, 33(2), 115-121.
- Jahr, E., Eldevik, S., & Eikeseth, S. (2000). Teaching children with autism to initiate and sustain cooperative play. *Research in Developmental Disabilities*, 21(2), 151-169.
- Jarrold, C. (1997). Pretend play in autism: Executive explanations. In J. Russell (Ed.), *Autism as an executive disorder* (p. 101-140). Oxford: Oxford University Press.
- Jarrold, C. (2003). A review of research into pretend play in autism. *Autism*, 7(4), 379-390.
- Jarrold, C., Boucher, J., & Smith, P. K. (1996). Generativity defects in pretend play in autism. *British Journal of Developmental Psychology*, 14(3), 275-300.
- Jarrold, C., Smith, P., Boucher, J., & Harris, P. (1994). Comprehension of pretense in children with autism. *Journal of Autism and Developmental Disorders*, 24(4), 433-455.
- Jenkinson, J. C. (2001). *Special education: a matter of choice*. Camberwell, Vic.: ACER Press.

- Johnson, J. E., Christie, J. F., & Yawkey, T. D. (1999). *Play and early childhood development* (2nd ed.). New York: Addison Wesley Longman.
- Johnson, J. E., Christie, J. F., Yawkey, T. D., & Wardle, F. (1987). *Play and early childhood development*. Glenview, IL: Scott Foresman and Co.
- Jones, C. D., & Schwartz, I. S. (2004). Siblings, peers, and adults: Differential effects of models for children with autism. *Topics in Early Childhood Special Education, 24*(4), 187-198.
- Jones, E. A., & Carr, E. G. (2004). Joint attention in children with autism: theory and intervention. *Focus on Autism and Other Developmental Disabilities, 19*(1), 13-26.
- Jones, R. S. P., Quigney, C., & Huws, J. C. (2003). First-hand accounts of sensory perceptual experiences in autism: a qualitative analysis. *Journal of Intellectual and Developmental Disability, 28*(2), 112-121.
- Jones, R. S. P., Zahl, A., & Huws, J. C. (2001). First-hand accounts of emotional experiences in autism: A qualitative analysis. *Disability and Society, 16*(3), 393-401.
- Jones, V., & Prior, M. R. (1985). Motor imitation abilities and neurological signs in autistic children. *Journal of Autism and Developmental Disorders, 15*(1), 37-46.
- Josefi, O., & Ryan, V. (2004). Non-directive play therapy for young children with autism: A case study. *Clinical Child Psychology and Psychiatry, 9*(4), 533-551.
- Jurkovic, G. J. (1978). Relation of psycholinguistic development to imaginative play of disadvantaged preschool children. *Psychology in the Schools, 15*(4), 560-564.
- Kallenberg, O. (1997). *Foundations of modern probability*. New York: Springer.
- Kamps, D., Royer, J., Dugan, E., Kravits, T., Lopez, A. G., Garcia, J., Carnazzo, K., Morrison, L., & Kane, L. G. (2002). Peer training to facilitate social interaction for elementary students with autism and their peers. *Exceptional Children, 68*(2), 173-187.
- Kamps, D. M., Barbetta, P. M., Leonard, B. R., & Delquadri, J. (1994). Classwide peer tutoring: An integration strategy to improve reading skills and promote peer interactions among students with autism and general education peers. *Journal of Applied Behavior Analysis, 27*(1), 49-61.
- Kamps, D. M., Kravits, T., Lopez, A. G., Kemmerer, K., Potucek, J., & Harrell, L. G. (1998). What do the peers think? Social validity of peer-mediated programs. *Education and Treatment of Children, 21*(2), 107-134.

- Kamps, D. M., Leonard, B., Potucek, J., & Harrell, L. G. (1995). Cooperative learning groups in reading: An integration strategy for students with autism and general classroom peers. *Behavioral Disorders*, 21(1), 89-109.
- Kanner, L. (1943). Autistic disturbances of affective contact. *Nervous Child*, 2, 217-250.
- Kanner, L. (1946). Irrelevant and metaphorical language in early infantile autism. *American Journal of Psychiatry*, 103, 242-246.
- Katz, J., & Mirenda, P. (2002). Including students with developmental disabilities in general education classrooms: social benefits. *International Journal of Special Education*, 17(2), 26-35.
- Kauffman, J. M. (1999). Commentary: Today's special education and its message for tomorrow. *Journal of Special Education*, 32(4), 244-254.
- Kavale, K. A., & Forness, S. R. (2000). History, rhetoric, and reality: Analysis of the inclusion debate. *Remedial and Special Education*, 21(5), 279-296.
- Kavale, K. A., Forness, S. R., & Siperstein, G. N. (1999). *Efficacy of special education and related services*. Washington, DC: American Association on Mental Retardation.
- Kavanaugh, R. D., & Harris, P. L. (1994). Imagining the outcome of pretend transformations: Assessing the competence of normal children and children with autism. *Developmental Psychology*, 30(6), 847-854.
- Kazdin, A. E. (1989). *Behavior modification in applied settings* (4th ed.). Belmont, CA: Brooks/Cole.
- Kehoe, S. M. (1998). Evolution: From isolation to inclusion. *School Business Affairs*, 64(8), 3-7.
- Kelly-Vance, L., Ryalls, B. O., & Glover, K. G. (2002). The use of play assessment to evaluate the cognitive skills of two- and three-year-old children. *School Psychology International*, 23(2), 169-185.
- Kendrick, M. (2005). Playing house: A sideways glance at literacy and identity in early childhood. *Journal of Early Childhood Literacy*, 5(1), 5-28.
- Kennedy, C. H., Meyer, K. A., Knowles, T., & Shukla, S. (2000). Analyzing the multiple functions of stereotypical behavior for students with autism: Implications for assessment and treatment. *Journal of Applied Behavior Analysis*, 33(4), 559-571.

- Klin, A., Jones, W., Schultz, R., Volkmar, F., & Cohen, D. (2002). Visual fixation patterns during viewing of naturalistic social situations as predictors of social competence in individuals with autism. *Archives of General Psychiatry*, 59(9), 809-816.
- Koegel, L. K., Koegel, R. L., Frea, W. D., & Fredeen, R. M. (2001). Identifying early intervention targets for children with autism in inclusive school settings. *Behavior Modification*, 25(5), 745-761.
- Koegel, L. K., Koegel, R. L., Harrower, J. K., & Carter, C. M. (1999). Pivotal response intervention I: Overview of approach. *Journal of the Association for Persons with Severe Handicaps*, 24(3), 174-185.
- Koegel, L. K., Koegel, R. L., Shoshan, Y., & McNeerney, E. (1999). Pivotal response intervention II: Preliminary long-term outcomes data. *Journal of the Association for Persons with Severe Handicaps*, 24(3), 186-198.
- Koegel, R. L., Dyer, K., & Bell, L. K. (1987). The influence of child-preferred activities on autistic children's social behavior. *Journal of Applied Behavior Analysis*, 20(3), 243-252.
- Koegel, R. L., Koegel, L. K., & Carter, C. M. (1999). Pivotal teaching interactions for children with autism. *School Psychology Review*, 28(4), 576-594.
- Kohlberg, L., Yaeger, J., & Hjertholm, E. (1999). Private speech: Four studies and a review of theories. In P. Llyod & C. Fernyhough (Eds.), *Lev Vygotsky: Critical assessments: Thought and language, Vol. II* (p. 185-229). Florence, KY: Taylor & Francis/Routledge.
- Kohler, F. W., Anthony, L. J., Steighner, S. A., & Hoyson, M. (2001). Teaching social interaction skills in the integrated preschool: An examination of naturalistic tactics. *Topics in Early Childhood Special Education*, 21(2), 93-103.
- Kohler, F. W., Ezell, H. K., & Paluselli, M. (1999). Promoting changes in teachers' conduct of student pair activities: An examination of reciprocal peer coaching. *Journal of Special Education*, 33(3), 154-165.
- Kohler, F. W., & Strain, P. S. (1999). Maximizing peer-mediated resources in integrated preschool classrooms. *Topics in Early Childhood Special Education*, 19(2), 92-102.
- Kohler, F. W., Strain, P. S., Hoyson, M., & Jamieson, B. (1997). Merging naturalistic teaching and peer-based strategies to address the IEP objectives of preschoolers with autism: An examination of structural and child behavior outcomes. *Focus on Autism and Other Developmental Disabilities*, 12(4), 196-206.

- Kohler, F. W., Strain, P. S., Maretsky, S., & DeCesare, L. (1990). Promoting positive and supportive interactions between preschoolers: An analysis of group-oriented contingencies. *Journal of Early Intervention, 14*(4), 327-341.
- Kohler, F. W., Strain, P. S., & Shearer, D. D. (1996). Examining levels of social inclusion within an integrated preschool for children with autism. In L. K. Koegel & R. L. Koegel (Eds.), *Positive behavioral support: Including people with difficult behavior in the community* (p. 305-332). Baltimore, MD: Paul H.
- Kok, A. J., Kong, T. Y., & Opitz, V. B. (2002). A comparison of the effects of structured play and facilitated play approaches on preschoolers with autism: A case study. *Autism, 6*(2), 181-196.
- Kozulin, A. (1998). *Psychological tools a sociocultural approach to education*. Cambridge, MA: Harvard University Press.
- Krafft, K. C., & Berk, L. E. (1998). Private speech in two preschools: Significance of open-ended activities and make-believe play for verbal self-regulation. *Early Childhood Research Quarterly, 13*(4), 637-658.
- Kraft, R. E. (1983). Physical activity for the autistic child. *Physical Educator, 40*(1), 33-37.
- Krantz, P. J. (2000). Commentary: Interventions to facilitate socialization. *Journal of Autism and Developmental Disorders, 30*(5), 411-413.
- Krantz, P. J., & McClannahan, L. E. (1993). Teaching children with autism to initiate to peers: Effects of a script-fading procedure. *Journal of Applied Behavior Analysis, 26*(1), 121-132.
- Kravits, T. R., Kamps, D. M., Kemmerer, K., & Potucek, J. (2002). Brief report: Increasing communication skills for an elementary-aged student with autism using the picture exchange communication system. *Journal of Autism and Developmental Disorders, 32*(3), 225-230.
- LaBelle, C. A., & Christy, M. H. C. (2002). Individualizing functional analysis to assess multiple and changing functions of severe behavior problems in children with autism. *Journal of Positive Behavior Interventions, 4*(4), 231-241.
- Laursen, B., & Graziano, W. G. (Eds.). (2002). *Social exchange in development*. San Francisco, CA: Jossey-Bass/Pfeiffer.
- Laursen, B., & Hartup, W. W. (2002). The origins of reciprocity and social exchange in friendships. In B. Laursen & W. G. Graziano (Eds.), *Social exchange in development* (p. 27-40). San Francisco, CA: Jossey-Bass/Pfeiffer.



- Laushey, K. M., & Heflin, L. J. (2000). Enhancing social skills of kindergarten children with autism through the training of multiple peers as tutors. *Journal of Autism and Developmental Disorders*, 30(3), 183-193.
- Lawrence, D. (1996). *Enhancing self-esteem in the classroom* (2nd ed.). London: Paul Chapman.
- Lee, S., & Odom, S. L. (1996). The relationship between stereotypic behavior and peer social interaction for children with severe disabilities. *Journal of the Association for Persons with Severe Handicaps*, 21(2), 88-95.
- Leekam, S. R., Lopez, B., & Moore, C. (2000). Attention and joint attention in preschool children with autism. *Developmental Psychology*, 36(2), 261-273.
- Leslie, A., & Roth, D. (1993). What autism teaches us about metarepresentation. In S. B. Cohen, H. Tager-Flusberg, & D. J. Cohen (Eds.), *Understanding other minds: Perspectives from autism*. Oxford: Oxford University Press.
- Leslie, A. M. (1987). Pretense and representation: The origins of "theory of mind". *Psychological Review*, 94(4), 412-426.
- Leung, J. P., & Wu, K. I. (1997). Teaching receptive naming of Chinese characters to children with autism by incorporating echolalia. *Journal of Applied Behavior Analysis*, 30(1), 59-68.
- Levina, R. E. (1999). L. S. Vygotsky's ideas about the planning function of speech in children. In P. Llyod & C. Fernyhough (Eds.), *Lev Vygotsky: Critical assessments: Thought and language, Vol. II* (p. 71-83). Florence, KY: Taylor & Francis/Routledge.
- Levy, A. K. (1984). The language of play: The role of play in language development: A review of literature. *Early Child Development and Care*, 17(1), 49-61.
- Lewis, V. (2003). Play and language in children with autism. *Autism*, 7(4), 391-399.
- Lewis, V., & Boucher, J. (1988). Spontaneous, instructed and elicited play in relatively able autistic children. *British Journal of Developmental Psychology*, 6(4), 325-339.
- Lewis, V., & Boucher, J. (1995). Generativity in the play of young people with autism. *Journal of Autism and Developmental Disorders*, 25(2), 105-121.
- Libby, S., Powell, S., Messer, D., & Jordan, R. (1997). Imitation of pretend play acts by children with autism and Down syndrome. *Journal of Autism and Developmental Disorders*, 27(4), 365-383.

- Lieberman, J. N. (1965). Playfulness and divergent thinking: An investigation of their relationship at the kindergarten level. *Journal of Genetic Psychology*, 107(2), 219-224.
- Lieberman, J. N. (1966). Playfulness: An attempt to conceptualize a quality of play and of the player. *Psychological Reports*, 19(3), 1278.
- Lieberman, J. N. (1977). *Playfulness: its relationship to imagination and creativity*. New York: Academic Press.
- Lifter, K., Azaroff, B. S., Anderson, S. R., & Cowdery, G. E. (1993). Teaching play activities to preschool children with disabilities: The importance of developmental considerations. *Journal of Early Intervention*, 17(2), 139-159.
- Lim, L., Ko, C., Choi, S. H. J., & Ireland, R. (2003). Including students with disabilities within mainstream education. In M. Cherian & R. Y. Mau (Eds.), *Teaching large classes: Usable practices from around the world* (p. 102-116). Singapore: McGraw-Hill Education.
- Lim, S. E. A. (1998). Linking play and language in singapore preschool settings. *Early Child Development and Care*, 144, 21-38.
- Linder, T. W. (1993). *Transdisciplinary play-based assessment: A functional approach to working with young children* (Rev. ed.). Baltimore, MD: Paul H. Brookes.
- Lindley, D. (2004). *Degrees Kelvin: A tale of genius, invention, and tragedy*. Washington, DC: John Henry Press.
- Lloyd, B., & Howe, N. (2003). Solitary play and convergent and divergent thinking skills in preschool children. *Early Childhood Research Quarterly*, 18(1), 22-41.
- Logan, K. R., & Gast, D. L. (2001). Conducting preference assessments and reinforcer testing for individuals with profound multiple disabilities: Issues and procedures. *Exceptionality*, 9(3), 123-134.
- Logan, K. R., Jacobs, H. A., Gast, D. L., Murray, A. S., Daino, K., & Skala, C. (1998). The impact of typical peers on the perceived happiness of students with profound multiple disabilities. *Journal of the Association for Persons with Severe Handicaps*, 23(4), 309-318.
- Luria, A. R. (1999). Speech development and the formation of mental processes. In P. Llyod & C. Fernyhough (Eds.), *Lev Vygotsky: Critical assessments: Thought and language, Vol. II* (p. 84-122). Florence, KY: Taylor & Francis/Routledge.

- MacLeod, F. (2001). Toward inclusion-our shared responsibility for disaffected pupils. *British Journal of Special Education*, 28(4), 191-194.
- Malone, D. M., & Langone, J. (1998). Variability in the play of preschoolers with cognitive delays across different toy sets. *International Journal of Disability, Development and Education*, 45(2), 127-142.
- Malvy, J., Roux, S., Zakian, A., Debuly, S., Sauvage, D., & Barthelemy, C. (1999). A brief clinical scale for the early evaluation of imitation disorders in autism. *Autism*, 3(4), 357-369.
- Marcus, B. A., Vollmer, T. R., Swanson, V., Roane, H. R., & Ringdahl, J. E. (2001). An experimental analysis of aggression. *Behavior Modification*, 25(2), 189-213.
- Marshall, J., Ralph, S., & Palmer, S. (2002). 'I wasn't trained to work with them': mainstream teachers' attitudes to children with speech and language difficulties. *International Journal of Inclusive Education*, 6(3), 199-215.
- Mastropieri, M. A., & Scruggs, T. E. (2000). *The inclusive classroom: strategies for effective instruction*. Upper Saddle River, NJ: Merrill.
- MathWorks. (2004). *MATLAB 7*. Natick, MA: MathWorks.
- Mayes, S. D., & Calhoun, S. L. (2003). Ability profiles in children with autism: Influence of age and IQ. *Autism*, 7(1), 65-80.
- McConnell, S. R. (2002). Interventions to facilitate social interaction for young children with autism: Review of available research and recommendations for educational intervention and future research. *Journal of Autism and Developmental Disorders*, 32(5), 351-372.
- McDonough, L., Stahmer, A., Schreibman, L., & Thompson, S. J. (1997). Deficits, delays, and distractions: An evaluation of symbolic play and memory in children with autism. *Development and Psychopathology*, 9(1), 17-41.
- McElwain, N. L., & Volling, B. L. (2002). Relating individual control, social understanding, and gender to child-friend interaction: A relationships perspective. *Social Development*, 11(3), 362-385.
- McEvoy, M. A., & Brady, M. P. (1988). Contingent access to play materials as an academic motivator for autistic and behavior disordered children. *Education and Treatment of Children*, 11(1), 5-18.
- McEvoy, M. A., & Reichle, J. (2000). Further consideration of the role of the environment on stereotypic and self-injurious behavior. *Journal of Early Intervention*, 23(1), 22-23.

- McGrath, A. M., Bosch, S., Sullivan, C. L., & Fuqua, R. W. (2003). Training reciprocal social interactions between preschoolers and a child with autism. *Journal of Positive Behavior Interventions*, 5(1), 47-54.
- McHale, S. M. (1983). Social interactions of autistic and nonhandicapped children during free play. *American Journal of Orthopsychiatry*, 53(1), 81-91.
- McLennan, W. (1998). *Information paper: 1996 census of population and housing—Socio-economic indexes for areas*. Canberra: Australian Bureau of Statistics.
- McNamara, P. (2001). Religion and the frontal lobes. In J. Andresen (Ed.), *Religion in mind: Cognitive perspectives on religious belief, ritual, and experience* (p. 237-256). New York, NY: Cambridge University Press.
- Mellou, E. (1994). Play theories: A contemporary review. *Early Child Development and Care*, 102, 91-100.
- Meltzoff, J. (1998). *Critical thinking about research: psychology and related fields*. Washington, DC.: American Psychological Association.
- Menninger, K., & Menninger, J. L. (1942). *Love against hate*. New York: Harcourt, Brace, and Co.
- Metcalf, Z. P. (1954). The construction of keys. *Systematic Zoology*, 3, 38-45.
- Mitchell, M. L., & Jolley, J. M. (2001). *Research design explained* (4th ed.). Fort Worth, TX: Harcourt College Publishers.
- Mitteldorf, W., Hendricks, S., & Landreth, G. L. (2001). Play therapy with autistic children. In G. L. Landreth (Ed.), *Innovations in play therapy: Issues, process, and special populations* (p. 257-269). New York, NY, US: Brunner-Routledge.
- Morgan, S. B. (1986). Autism and Piaget's theory: Are the two compatible? *Journal of Autism and Developmental Disorders*, 16(4), 441-457.
- Morin, B., & Reid, G. (1985). A quantitative and qualitative assessment of autistic individuals on selected motor tasks. *Adapted Physical Activity Quarterly*, 2(1), 43-55.
- Mueller, R. A., Pierce, K., Ambrose, J. B., Allen, G., & Courchesne, E. (2001). Atypical patterns of cerebral motor activation in autism: A functional magnetic resonance study. *Biological Psychiatry*, 49(8), 665-676.
- Mundschenk, N. A., & Sasso, G. M. (1995). Assessing sufficient social exemplars for students with autism. *Behavioral Disorders*, 21(1), 62-78.

- Mundy, P., Sigman, M., Ungerer, J., & Sherman, T. (1987). Nonverbal communication and play correlates of language development in autistic children. *Journal of Autism and Developmental Disorders*, 17(3), 349-364.
- Murphy, G., Callias, M., & Carr, J. (1985). Increasing simple toy play in profoundly mentally handicapped children: I. Training to play. *Journal of Autism and Developmental Disorders*, 15(4), 375-388.
- Murphy, G., Macdonald, S., Hall, S., & Oliver, C. (2000). Aggression and the termination of "rituals": A new variant of the escape function for challenging behavior? *Research in Developmental Disabilities*, 21(1), 43-59.
- Nabors, L., Willoughby, J., & Badawi, M. A. (1999). Relations between activities and cooperative playground interactions for preschool-age children with special needs. *Journal of Developmental and Physical Disabilities*, 11(4), 339-352.
- Nakken, H., & Pijl, S. J. (2002). Getting along with classmates in regular schools: a review of the effects of integration on the development of social relationships. *International Journal of Inclusive Education*, 6(1), 47-61.
- Nasir, N. S. (2005). Individual cognitive structuring and the sociocultural context: Strategy shifts in the game of dominoes. *Journal of the Learning Sciences*, 14(1), 5-34.
- Neuman, S. B., & McCormick, S. (1995). *Single-subject experimental research: applications for literacy*. Newark, Del.: International Reading Association.
- Nicolopoulou, A. (1999). Play, cognitive development, and the social world: Piaget, Vygotsky, and beyond. In P. Llyod & C. Fernyhough (Eds.), *Lev Vygotsky: Critical assessments: Thought and language, Vol. II* (p. 419-446). Florence, KY: Taylor & Francis/Routledge.
- Niklasson, L., Rasmussen, P., Oskarsdottir, S., & Gillberg, C. (2002). Chromosome 22q11 deletion syndrome (CATCH 22): Neuropsychiatric and neuropsychological aspects. *Developmental Medicine and Child Neurology*, 44(1), 44-50.
- Ochs, E., Sadlik, T. K., Solomon, O., & Sirota, K. G. (2001). Inclusion as social practice: Views of children with autism. *Social Development*, 10(3), 399-419.
- Odom, S. L., Chandler, L. K., Ostrosky, M., McConnell, S. R., & al. et. (1992). Fading teacher prompts from peer-initiation interventions for young children with disabilities. *Journal of Applied Behavior Analysis*, 25(2), 307-317.
- Odom, S. L., Hoyson, M., Jamieson, B., & Strain, P. S. (1985). Increasing handicapped preschoolers' peer social interactions: Cross-setting and component analysis. *Journal of Applied Behavior Analysis*, 18(1), 3-16.

- Odom, S. L., & Strain, P. S. (1986). A comparison of peer-initiation and teacher-antecedent interventions for promoting reciprocal social interaction of autistic preschoolers. *Journal of Applied Behavior Analysis*, 19(1), 59-71.
- Odom, S. L., & Watts, E. (1991). Reducing teacher prompts in peer-mediated interventions for young children with autism. *Journal of Special Education*, 25(1), 26-43.
- Ohtake, Y., & Chadsey, J. G. (1999). Social disclosure among coworkers without disabilities in supported employment settings. *Mental Retardation*, 37(1), 25-35.
- Oke, N. J., & Schreibman, L. (1990). Training social initiations to a high-functioning autistic child: Assessment of collateral behavior change and generalization in a case study. *Journal of Autism and Developmental Disorders*, 20(4), 479-497.
- O'Neill, D. K., & Happe, F. G. E. (2000). Noticing and commenting on what's new: Differences and similarities among 22-month-old typically developing children, children with down syndrome and children with autism. *Developmental Science*, 3(4), 457-478.
- O'Neill, M., & Jones, R. S. P. (1997). Sensory-perceptual abnormalities in autism: A case for more research? *Journal of Autism and Developmental Disorders*, 27(3), 283-293.
- Overton, S., & Rausch, J. L. (2002). Peer relationships as support for children with disabilities: An analysis of mothers' goals and indicators for friendship. *Focus on Autism and Other Developmental Disabilities*, 17(1), 11-29.
- Parker, S. T., & Milbrath, C. (1994). Contributions of imitation and role-playing games to the construction of self in primates. In S. T. Parker & R. W. Mitchell (Eds.), *Self awareness in animals and humans: Developmental perspectives* (p. 108-128). New York, NY: Cambridge University Press.
- Parten, M. B. (1932). Social participation among pre-school children. *Journal of Abnormal and Social Psychology*, 27, 243-269.
- Patrick, E., & Abravanel, E. (2000). The self-regulatory nature of preschool children's private speech in a naturalistic setting. *Applied Psycholinguistics*, 21(1), 45-61.
- Paul, R. (2003). Promoting social communication in high functioning individuals with autistic spectrum disorders. *Child and Adolescent Psychiatric Clinics of North America*, 12(1), 87-106.

- Pavri, S. (2001). Loneliness in children with disabilities: How teachers can help. *Teaching Exceptional Children*, 33(6), 52-58.
- Payne, R. W., & Preece, D. A. (1980). Identification keys and diagnostic tables: a review. *Journal of Royal Statistical Society A*, 143, 253-292.
- Pedhazur, E. J., & Schmelkin, L. P. (1991). *Measurement, design, and analysis: An integrated approach*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Pelios, L. V., MacDuff, G. S., & Axelrod, S. (2003). The effects of a treatment package in establishing independent academic work skills in children with autism. *Education and Treatment of Children*, 26(1), 1-21.
- Pennington, D. C. (2000). *Social cognition*. London: Routledge.
- Phillips, R. D. (1994). A developmental perspective on emotions in play therapy. *International Journal of Play Therapy*, 3(2), 1-19.
- Piaget, J. (1952). *The origins of intelligence in children*. Oxford, UK: International Universities Press.
- Piaget, J. (1959). *The language and thought of the child* (3rd ed.). London: Routledge & Kegan Paul.
- Piaget, J. (1962). *Play, dreams and imitation in childhood*. London: Routledge & Kegan Paul.
- Piaget, J. (1973). *The child and reality: problems of genetic psychology*. New York: Grossman Publishers.
- Piaget, J. (1977). *The development of thought: Equilibration of cognitive structures*. Oxford, UK: Viking.
- Piaget, J. (1995). Problems of the social psychology of childhood. In L. Smith (Ed.), *Sociological studies* (p. 287-318). London: Routledge.
- Piaget, J. (1997). *The moral judgment of the child*. New York: Free Press.
- Piaget, J., & Maschler, C. (1970). *Structuralism*. New York: Basic Books.
- Pierce, K., Glad, K. S., & Schreibman, L. (1997). Social perception in children with autism: An attentional deficit? *Journal of Autism and Developmental Disorders*, 27(3), 265-282.
- Pierce, K., & Schreibman, L. (1995). Increasing complex social behaviors in children with autism: Effects of peer-implemented pivotal response training. *Journal of Applied Behavior Analysis*, 28(3), 285-295.

- Pierce, K., & Schreibman, L. (1997a). Multiple peer use of pivotal response training social behaviors of classmates with autism: Results from trained and untrained peers. *Journal of Applied Behavior Analysis*, 30(1), 157-160.
- Pierce, K., & Schreibman, L. (1997b). Using peer trainers to promote social behavior in autism: Are they effective at enhancing multiple social modalities? *Focus on Autism and Other Developmental Disabilities*, 12(4), 207-218.
- Piercy, M., Wilton, K., & Townsend, M. (2002). Promoting the social acceptance of young children with moderate-severe intellectual disabilities using cooperative-learning techniques. *American Journal on Mental Retardation*, 107(5), 352-360.
- Pivik, J., McComas, J., & LaFlamme, M. (2002). Barriers and facilitators to inclusive education. *Exceptional Children*, 69(1), 97-107.
- Power, T. G. (2000). *Play and exploration in children and animals*. Mahwah, NJ: L. Erlbaum Associates.
- Prizant, B. M. (1996). Brief report: Communication, language, social, and emotional development. *Journal of Autism and Developmental Disorders*, 26(2), 173-178.
- Prizant, B. M., & Rubin, E. (1999). Contemporary issues in interventions for autism spectrum disorders: A commentary. *Journal of the Association for Persons with Severe Handicaps*, 24(3), 199-208.
- Provost, M. A., & LaFreniere, P. J. (1991). Social participation and peer competence in preschool children: Evidence for discriminant and convergent validity. *Child Study Journal*, 21(1), 57-72.
- Pugmire-Stoy, M. C. (1992). *Spontaneous play in early childhood*. Albany, NY: Delmar Publishers.
- Putnam, J. W. (1998). *Cooperative learning and strategies for inclusion: celebrating diversity in the classroom* (2nd ed.). Baltimore, MD: P. H. Brookes.
- Rankin, D. H., Logan, K. R., Adcock, J., Angelucci, J., Pittman, C., Sexstone, A., & Straughn, S. (1999). Small group learning: Effects of including a student with intellectual disabilities. *Journal of Developmental and Physical Disabilities*, 11(2), 159-177.
- Rapin, I. (1997). Current concepts: Autism. *The New England Journal of Medicine*, 337(2), 97-104.
- Ray, W. J. (1997). *Methods toward a science of behavior and experience* (5th ed.). Pacific Grove, CA: Brooks/Cole.



- Readdick, C. A., & Chapman, C. W. (1992). Is play the centerpiece of your early childhood curriculum? *Early Child Development and Care*, 81, 123-129.
- Receveur, C., Lenoir, P., Desombre, H., Roux, S., Barthelemy, C., & Malvy, J. (2005). Interaction and imitation deficits from infancy to 4 years of age in children with autism. *Autism*, 9(1), 69-82.
- Reifel, S. (1984). Block construction: Children's developmental landmarks in representation of space. *Young Children*, 40(1), 61-67.
- Reinecke, D. R., Newman, B., Kurtz, A. L., Ryan, C. S., & Hemmes, N. S. (1997). Teaching deception skills in a game-play context to three adolescents with autism. *Journal of Autism and Developmental Disorders*, 27(2), 127-137.
- Rhode, M. (1999). Echo or answer? The move towards ordinary speech in three children with autistic spectrum disorder. In A. Alvarez & S. Reid (Eds.), *Autism and personality: Findings from the Tavistock Autism Workshop* (p. 79-92). Florence, KY: Taylor & Francis/Routledge.
- Rieffe, C., Terwogt, M. M., & Stockmann, L. (2000). Understanding atypical emotions among children with autism. *Journal of Autism and Developmental Disorders*, 30(3), 195-203.
- Riguet, C. B., Taylor, N. D., Benaroya, S., & Klein, L. S. (1981). Symbolic play in autistic, Down's, and normal children of equivalent mental age. *Journal of Autism and Developmental Disorders*, 11(4), 439-448.
- Rinehart, N. J., Bradshaw, J. L., Brereton, A. V., & Tonge, B. J. (2001). Movement preparation in high-functioning autism and Asperger disorder: A serial choice reaction time task involving motor reprogramming. *Journal of Autism and Developmental Disorders*, 31(1), 79-88.
- Robinson, C. C., Anderson, G. T., Porter, C. L., Hart, C. H., & Wouden-Miller, M. (2003). Sequential transition patterns of preschoolers' social interactions during child-initiated play: Is parallel-aware play a bidirectional bridge to other play states? *Early Childhood Research Quarterly*, 18(1), 3-21.
- Roeyers, H., & van Berckelaer Onnes, I. A. (1994). Play in autistic children. *Communication and Cognition*, 27(3), 349-359.
- Rogers, S. J. (1988). Cognitive characteristics of handicapped children's play: A review. *Journal of the Division for Early Childhood*, 12(2), 161-68.
- Rogers, S. J. (2000). Interventions that facilitate socialization in children with autism. *Journal of Autism and Developmental Disorders*, 30(5), 399-409.

- Rogers, S. J., Hepburn, S., & Wehner, E. (2003). Parent reports of sensory symptoms in toddlers with autism and those with other developmental disorders. *Journal of Autism and Developmental Disorders*, 33(6), 631-642.
- Rogoff, B. (1990). *Apprenticeship in thinking: cognitive development in social context*. New York: Oxford University Press.
- Roosevelt, T. (1916). *An autobiography*. New York: Macmillan.
- Ross, D. E. (2002). Replacing faculty conversational exchanges for children with autism by establishing a functionally equivalent alternative response. *Education and Training in Mental Retardation and Developmental Disabilities*, 37(4), 343-362.
- Roulstone, S., Loader, S., Northstone, K., Beveridge, M., & The Alspac Team. (2002). The speech and language of children aged 25 months: Descriptive data from the avon longitudinal study of parents and children. *Early Child Development and Care*, 172(3), 259-268.
- Rubin, K. H. (1998). Social and emotional development from a cultural perspective. *Developmental Psychology*, 34(4), 611-615.
- Rubin, K. H., Bukowski, W., & Parker, J. G. (1998). Peer interactions, relationship, and groups. In W. Damon & N. Eisenberg (Eds.), *Handbook of child psychology* (Vol. 3, 5th ed., p. 619-700). New York: John Wiley.
- Rubin, K. H., Fein, G. G., & Vandenberg, B. (1983). Play. In P. H. Mussen (Ed.), *Handbook of child psychology* (Vol. 4, 4th ed., p. 693-774). New York: John Wiley.
- Rubin, K. H., & Maioni, T. L. (1975). Play preference and its relationship to egocentrism, popularity and classification skills in preschoolers. *Merrill Palmer Quarterly*, 21(3), 171-179.
- Rubin, K. H., Maioni, T. L., & Hornung, M. (1976). Free play behaviors in middle- and lower-class preschoolers: Parten and Piaget revisited. *Child Development*, 47(2), 414-419.
- Ruble, L. A. (2001). Analysis of social interactions as goal-directed behaviors in children with autism. *Journal of Autism and Developmental Disorders*, 31(5), 471-482.
- Ruef, M. B., & Turnbull, A. P. (2001). Stakeholder opinions on accessible informational products helpful in building positive, practical solutions to behavioral challenges of individuals with mental retardation and/or autism. *Education and Training in Mental Retardation and Developmental Disabilities*, 36(4), 441-456.

- Ruffman, T., Garnham, W., & Rideout, P. (2001). Social understanding in autism: Eye gaze as a measure of core insights. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 42(8), 1083-1094.
- Russ, S. W., & Kaugars, A. S. (2001). Emotion in children's play and creative problem solving. *Creativity Research Journal*, 13(2), 211-219.
- Ryalls, B. O., Gul, R. E., & Ryalls, K. R. (2000). Infant imitation of peer and adult models: Evidence for a peer model advantage. *Merrill Palmer Quarterly*, 46(1), 188-202.
- Rydell, P. J., & Mirenda, P. (1994). Effects of high and low constraint utterances on the production of immediate and delayed echolalia in young children with autism. *Journal of Autism and Developmental Disorders*, 24(6), 719-735.
- Sadock, B. J., Kaplan, H. I., & Sadock, V. A. (2003). *Kaplan & Sadock's synopsis of psychiatry: Behavioral sciences, clinical psychiatry* (9th ed.). Philadelphia, PA: Lippincott Williams & Wilkins.
- Saracho, O. N. (1993). A factor analysis of young children's play. *Early Child Development and Care*, 84, 91-102.
- Saracho, O. N. (1998). What is stylish about play? In O. N. Saracho & B. Spodek (Eds.), *Multiple perspectives on play in early childhood education* (p. 240-254). Albany, NY: State University of New York Press.
- Saracho, O. N. (2002). Young children's creativity and pretend play. *Early Child Development and Care*, 172(5), 431-438.
- Saracho, O. N. (2004). Supporting literacy-related play: Roles for teachers of young children. *Early Childhood Education Journal*, 31(3), 201-206.
- Sarokoff, R. A., Taylor, B. A., & Poulson, C. L. (2001). Teaching children with autism to engage in conversational exchanges: Script fading with embedded textual stimuli. *Journal of Applied Behavior Analysis*, 34(1), 81-84.
- Sasso, G. M., Mitchell, V. M., & Struthers, E. M. (1986). Peer tutoring versus structured interaction activities: Effects on the frequency and topography of peer initiations. *Behavioral Disorders*, 11(4), 249-259.
- Sasso, G. M., Mundschenk, N. A., Melloy, K. J., & Casey, S. D. (1998). A comparison of the effects of organismic and setting variables on the social interaction behavior of children with developmental disabilities and autism. *Focus on Autism and Other Developmental Disabilities*, 13(1), 2-16.

- Sasso, G. M., & Rude, H. A. (1987). Unprogrammed effects of training high-status peers to interact with severely handicapped children. *Journal of Applied Behavior Analysis*, 20(1), 35-44.
- Schleien, S. J., Heyne, L. A., & Berken, S. B. (1988). Integrating physical education to teach appropriate play skills to learners with autism: A pilot study. *Adapted Physical Activity Quarterly*, 5(3), 182-192.
- Schleien, S. J., Mustonen, T., & Rynders, J. E. (1995). Participation of children with autism and nondisabled peers in a cooperatively structured community art program. *Journal of Autism and Developmental Disorders*, 25(4), 397-413.
- Schmidt, R. A., & Lee, T. D. (1999). *Motor control and learning: a behavioral emphasis* (3rd ed.). Champaign, IL: Human Kinetics.
- Schopler, E., Reichler, R. J., & Renner, B. R. (1988). *Childhood Autism Rating Scale (CARS) kit*. Los Angeles: Western Psychological Services.
- Schuler, A. L., & Wolfberg, P. J. (2000). Promoting peer play and socialization: The art of scaffolding. In A. M. Wetherby & B. M. Prizant (Eds.), *Autism spectrum disorders: A transactional developmental perspective* (Vol. 9, p. 251-277). Baltimore, MD: Paul H.
- Schunk, D. H. (1998). Peer modeling. In K. Topping & S. Ehly (Eds.), *Peer assisted learning* (p. 185-202). Mahwah, NJ: Lawrence Erlbaum Associates.
- Seymour, S. (2001). Inclusive education in Queensland : the UNESCO Education For All 2000 Assessment. *Interaction*, 14(2&3), 37-45.
- Shann, M. H. (1999). Academics and a culture of caring: The relationship between school achievement and prosocial and antisocial behaviors in four urban middle schools. *School Effectiveness and School Improvement*, 10(4), 390-413.
- Shayer, M. (2003). Not just Piaget; not just Vygotsky, and certainly not Vygotsky as *alternative* to Piaget. *Learning and Instruction*, 13, 465-485.
- Sherman, M., Shapiro, T., & Glassman, M. (1983). Play and language in developmentally disordered preschoolers: A new approach to classification. *Journal of the American Academy of Child Psychiatry*, 22(6), 511-524.
- Sherratt, D. (2002). Developing pretend play in children with autism: A case study. *Autism*, 6(2), 169-179.
- Sherrod, K. B., Siewert, L. A., & Cavallaro, S. A. (1984). Language and play maturity in preschool children. *Early Child Development and Care*, 14(1-2), 147-160.

- Shevlin, M., & O'Moore, A. M. (2000). Fostering positive attitudes: reactions of mainstream pupils to contact with their counterparts who have severe/profound intellectual disabilities. *European Journal of Special Needs Education, 15*(2), 206-271.
- Shulman, V. L. (1985). Introduction to chapter 5. In V. L. Shulman, L. C. R. Restaino-Baumann, & L. Butler (Eds.), *The future of Piagetian theory: The neo-Piagetians* (p. 95-97). New York: Plenum Press.
- Sigafoos, J. (1999). The wages of playing are fun and learning. *International Journal of Disability, Development and Education, 46*(3), 285-287.
- Sigafoos, J. (2001). An introduction to challenging behaviour in children with intellectual disabilities. *Special Education Perspectives, 10*(2), 37-46.
- Sigafoos, J., Pennell, D. R., & Graves, D. (1999). Longitudinal assessment of play and adaptive behavior in young children with developmental disabilities. *Research in Developmental Disabilities, 20*(2), 147-161.
- Sigman, M., & McGovern, C. W. (2005). Improvement in cognitive and language skills from preschool to adolescence in autism. *Journal of Autism and Developmental Disorders, 35*(1), 15-23.
- Singer, J. L., & Lythcott, M. A. (2002). Fostering school achievement and creativity through sociodramatic play in the classroom. *Research in the Schools, 9*(2), 43-52.
- Slater, P. J. B. (1978). Data collection. In P. W. Colgan (Ed.), *Quantitative ethology* (p. 7-24). New York: Wiley.
- Smilansky, S. (1968). *The effects of sociodramatic play on disadvantaged preschool children*. Oxford, UK: John Wiley.
- Smith, P. K. (1983). Training in fantasy play. *Early Child Development and Care, 11*(3-4), 217-25.
- Smith, P. K., & Hart, C. H. (Eds.). (2002). *Blackwell handbook of childhood social development*. Malden, MA: Blackwell.
- Smith, P. K., Takhvar, M., Gore, N., & Vollstedt, R. (1985). Play in young children: Problems of definition, categorisation and measurement. *Early Child Development and Care, 19*(1-2), 25-41.
- Smith, T., Lovaas, N. W., & Lovaas, O. I. (2002). Behaviors of children with high-functioning autism when paired with typically developing versus delayed peers: A preliminary study. *Behavioral Interventions, 17*(3), 129-143.

- Snow, C. W. (1998). *Infant development* (2nd ed.). Upper Saddle River, NJ: Prentice Hall.
- Solso, R. L. (2001). *Cognitive psychology* (6th ed.). Boston, MA: Allyn and Bacon.
- SPSS. (2001). *SPSS 11.0 for Windows*. Chicago: SPSS.
- Stagnitti, K., & Unsworth, C. (2000). The importance of pretend play in child development: An occupational therapy perspective. *British Journal of Occupational Therapy*, 63(3), 121-127.
- Stahmer, A. C. (1995). Teaching symbolic play skills to children with autism using pivotal response training. *Journal of Autism and Developmental Disorders*, 25(2), 123-141.
- Stahmer, A. C. (1999). Using pivotal response training to facilitate appropriate play in children with autistic spectrum disorders. *Child Language Teaching and Therapy*, 15(1), 29-40.
- Stockburger, D. W. (2001). *Introductory statistics: Concepts, models and applications* (2nd ed.). Cincinnati, Ohio: Atomic Dog.
- Stone, W. L., Ousley, O. Y., & Littleford, C. D. (1997). Motor imitation in young children with autism: What's the object? *Journal of Abnormal Child Psychology*, 25(6), 475-485.
- Strain, P. (1977). An experimental analysis of peer social initiations on the behavior of withdrawn preschool children: Some training and generalization effects. *Journal of Abnormal Child Psychology*, 5(4), 445-455.
- Strain, P. S. (1981). *The utilization of classroom peers as behavior change agents*. New York: Plenum Press.
- Strain, P. S. (1983). Generalization of autistic children's social behavior change: Effects of developmentally integrated and segregated settings. *Analysis and Intervention in Developmental Disabilities*, 3(1), 23-34.
- Strain, P. S. (2001). Empirically based social skill intervention: A case for quality-of-life improvement. *Behavioral Disorders*, 27(1), 30-36.
- Strain, P. S., Danko, C. D., & Kohler, F. (1995). Activity engagement and social interaction development in young children with autism: An examination of "free" intervention effects. *Journal of Emotional and Behavioral Disorders*, 3(2), 108-123.
- Strain, P. S., & Hoyson, M. (2000). The need for longitudinal, intensive social skill intervention: Leap follow-up outcomes for children with autism. *Topics in Early Childhood Special Education*, 20(2), 116-122.

- Strain, P. S., Kerr, M. M., & Ragland, E. U. (1979). Effects of peer-mediated social initiations and prompting/reinforcement procedures on the social behavior of autistic children. *Journal of Autism and Developmental Disorders*, 9(1), 41-54.
- Strain, P. S., Kohler, F. W., & Goldstein, H. (1996). Learning experiences . . . an alternative program: Peer-mediated interventions for young children with autism. In E. D. Hibbs & P. S. Jensen (Eds.), *Psychosocial treatments for child and adolescent disorders: Empirically based strategies for clinical practice* (p. 573-587). Washington, DC: American Psychological Association.
- Strain, P. S., Shores, R. E., & Timm, M. A. (1977). Effects of peer social initiations on the behavior of withdrawn preschool children. *Journal of Applied Behavior Analysis*, 10(2), 289-298.
- Suen, H. K., & Ary, D. (1989). *Analyzing quantitative behavioral observation data*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Suizzo, M. A. (2000). The social-emotional and cultural contexts of cognitive development: Neo-Piagetian perspectives. *Child Development*, 71(4), 846-849.
- Sutton-Smith, B. (1966). Piaget on play: A critique. *Psychological Review*, 73(1), 104-110.
- Sutton-Smith, B. (1967). The role of play in cognitive development. *Young Children*, 22, 361-370.
- Swaim, K. F., & Morgan, S. B. (2001). Children's attitudes and behavioral intentions toward a peer with autistic behaviors: Does a brief educational intervention have an effect? *Journal of Autism and Developmental Disorders*, 31(2), 195-205.
- Swain, M. (2000). Playfulness as mediation in communicative language teaching in a Vietnamese classroom. In J. P. Lantolf (Ed.), *Sociocultural theory and second language learning*. New York: Oxford University Press.
- Takhvar, M. (1988). Play and theories of play: A review of the literature. *Early Child Development and Care*, 39, 221-44.
- Takhvar, M., & Smith, P. K. (1990). A review and critique of Smilansky's classification scheme and the "nested hierarchy" of play categories. *Journal of Research in Childhood Education*, 4(2), 112-122.
- Talay-Ongan, A., & Wood, K. (2000). Unusual sensory sensitivities in autism: A possible crossroads. *International Journal of Disability, Development and Education*, 47(2), 201-212.

- Taylor, B. A., Levin, L., & Jasper, S. (1999). Increasing play-related statements in children with autism toward their siblings: Effects of video modeling. *Journal of Developmental and Physical Disabilities, 11*(3), 253-264.
- Taylor, H. (2002). The 'education system': a view from the inside. *Support for Learning, 17*(3), 104-109.
- Teece, C. (1976). Language and play: A study of the relationship between functions and structures in the language of five year old children. *Language and Speech, 19*(2), 179-192.
- Terpstra, J. E., Higgins, K., & Pierce, T. (2002). Can I play? Classroom-based interventions for teaching play skills to children with autism. *Focus on Autism and Other Developmental Disabilities, 17*(2), 119-126.
- Thomas, G. (1997). Inclusive schools for an inclusive society. *British Journal of Special Education, 24*(3), 103-107.
- Thomas, R. M. (1996). *Comparing theories of child development* (4th ed.). Belmont, CA: Brooks/Cole.
- Thorp, D. M., Stahmer, A. C., & Schreibman, L. (1995). Effects of sociodramatic play training on children with autism. *Journal of Autism and Developmental Disorders, 25*(3), 265-282.
- Toomey, J., & Adams, L. A. (1995). Naturalistic observation of children with autism: Evidence for intersubjectivity. In L. L. Sperry & P. A. Smiley (Eds.), *Exploring young children's concepts of self and other through conversation* (p. 75-89). San Francisco: Jossey-Bass/Pfeiffer.
- Topping, K. (1988). An introduction to peer tutoring. *Educational and Child Psychology, 5*(4), 6-16.
- Topping, K., & Ehly, S. (Eds.). (1998). *Peer-assisted learning*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Travis, L., Sigman, M., & Ruskin, E. (2001). Links between social understanding and social behavior in verbally able children with autism. *Journal of Autism and Developmental Disorders, 31*(2), 119-130.
- Travis, L. L., & Sigman, M. (1998). Social deficits and interpersonal relationships in autism. *Mental Retardation and Developmental Disabilities Research Reviews, 4*(2), 65-72.
- Travis, L. L., & Sigman, M. D. (2000). A developmental approach to autism. In A. J. Sameroff & M. Lewis (Eds.), *Handbook of developmental psychopathology* (2nd ed., p. 641-655). Dordrecht: Kluwer.



- Tudge, J., & Rogoff, B. (1999). Peer influences on cognitive development: Piagetian and Vygotskian perspectives. In P. Llyod & C. Fernyhough (Eds.), *Lev Vygotsky: Critical assessments: The zone of proximal development, Vol. III* (p. 32-56). Florence, KY: Taylor & Francis/Routledge.
- Twain, M. (1990). *Mark Twain's own autobiography*. Madison: University of Wisconsin Press.
- Ulrich, D. (1985). *Test of gross motor development*. Austin, TX: Pro-Ed.
- Ungerer, J. A., & Sigman, M. (1981). Symbolic play and language comprehension in autistic children. *Journal of the American Academy of Child Psychiatry*, 20(2), 318-337.
- Utley, C. A., Mortweet, S. L., & Greenwood, C. R. (1997). Peer-mediated instruction and interventions. *Focus on Exceptional Children*, 29(5), 1-23.
- Van Acker, R., & Wehby, J. H. (2000). Exploring the social contexts influencing student success or failure: Introduction. *Preventing School Failure*, 44(3), 93-96.
- van Berckelaer Onnes, I. A., van Loon, J., & Peelen, A. (2002). Challenging behaviour: A challenge to change. *Autism*, 6(3), 259-270.
- van der Geest, J. N., Kemner, C., Camfferman, G., Verbaten, M. N., & van Engeland, H. (2001). Eye movements, visual attention, and autism: A saccadic reaction time study using the gap and overlap paradigm. *Biological Psychiatry*, 50(8), 614-619.
- van der Geest, J. N., Kemner, C., Camfferman, G., Verbaten, M. N., & van Engeland, H. (2002). Looking at images with human figures: Comparison between autistic and normal children. *Journal of Autism and Developmental Disorders*, 32(2), 69-75.
- van der Geest, J. N., Kemner, C., Verbaten, M. N., & van Engeland, H. (2002). Gaze behavior of children with pervasive developmental disorder toward human faces: A fixation time study. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 43(5), 669-678.
- Vernazza-Martin, S., Martin, N., Vernazza, A., Lepellec-Muller, A., Rufo, M., Massion, J., & Assaiante, C. (2005). Goal directed locomotion and balance control in autistic children. *Journal of Autism and Developmental Disorders*, 35(1), 91-102.
- Volkmar, F. R., Klin, A., Schultz, R. T., Chawarska, K., & Jones, W. (2003). The social brain in autism. In M. Brüne, H. Ribbert, & W. Schiefenhövel (Eds.), *The social brain: evolution and pathology* (p. 167-196). Chichester: John Wiley.

- Voltz, D. L., Brazil, N., & Ford, A. (2001). What matters most in inclusive education: a practical guide for moving forward. *Intervention in School and Clinic*, 37(1), 23-30.
- Vygotsky, L. S. (1962). *Thought and language*. Oxford, UK: Wiley.
- Vygotsky, L. S. (1967). Play and its role in the mental development of the child. *Soviet Psychology*, 5(3), 6-18.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Oxford, UK: Harvard University Press.
- Vygotsky, L. S. (1987). *The collected works of L. S. Vygotsky, Vol. 2: The fundamentals of defectology*. New York: Plenum Press.
- Weiss, M. J., & Harris, S. L. (2001). Teaching social skills to people with autism. *Behavior Modification*, 25(5), 785-802.
- Werts, M. G., Caldwell, N. K., & Wolery, M. (1996). Peer modeling of response chains: Observational learning by students with disabilities. *Journal of Applied Behavior Analysis*, 29(1), 53-66.
- Wetherby, A. M., Prizant, B. M., & Schuler, A. L. (2000). Understanding the nature of communication and language impairments. In A. M. Wetherby & B. M. Prizant (Eds.), *Autism spectrum disorders: A transactional developmental perspective* (Vol. 9, p. 109-141). Baltimore, MD: Paul H. Brookes Publishing Co.
- Whitaker, P., Barratt, P., Joy, H., Potter, M., & Thomas, G. (1998). Children with autism and peer group support: "Using circles of friends". *British Journal of Special Education*, 25(2), 60-64.
- Whitley, B. E. (2002). *Principles of research in behavioral science* (2nd ed.). New York, NY: McGraw-Hill.
- Whitley, E., & Ball, J. (2002a). Statistics review 2: Samples and populations. *Critical Care*, 6(2), 143-148.
- Whitley, E., & Ball, J. (2002b). Statistics review 5: Comparison of means. *Critical Care*, 6(5), 424-428.
- Wieder, S., & Greenspan, S. I. (2003). Climbing the symbolic ladder in the dir model through floor time/interactive play. *Autism*, 7(4), 425-435.
- Willemsen Swinkels, S. H. N., Buitelaar, J. K., & Engeland, H. van. (1997). Children with a pervasive developmental disorder, children with a language disorder and normally developing children in situations with high- and

- low-level involvement of the caregiver. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 38(3), 327-336.
- Williams, E. (2003). A comparative review of early forms of object-directed play and parent–infant play in typical infants and young children with autism. *Autism*, 7(4), 361-377.
- Williams, E., Reddy, V., & Costall, A. (2001). Taking a closer look at functional play in children with autism. *Journal of Autism and Developmental Disorders*, 31(1), 67-77.
- Williams, J. H. G., Whiten, A., Suddendorf, T., & Perrett, D. I. (2001). Imitation, mirror neurons and autism. *Neuroscience and Biobehavioral Reviews*, 25(4), 287-295.
- Wills, D., & Jackson, R. (2001). Inclusive education in Western Australia : the UNESCO Education For All 2000 Assessment. *Interaction*, 14(2&3), 24-29.
- Wilson, J. (2000). Doing justice to inclusion. *European Journal of Special Needs Education*, 15(3), 297-304.
- Wing, L. (1981). Language, social, and cognitive impairments in autism and severe mental retardation. *Journal of Autism and Developmental Disorders*, 11(1), 31-44.
- Wing, L., Gould, J., Yeates, S. R., & Brierley, L. M. (1977). Symbolic play in severely mentally retarded and in autistic children. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 18(2), 167-178.
- Winsler, A., Carlton, M. P., & Barry, M. J. (2000). Age-related changes in preschool children's systematic use of private speech in a natural setting. *Journal of Child Language*, 27(3), 665-687.
- Wolfberg, P. J., & Schuler, A. L. (1993). Integrated play groups: A model for promoting the social and cognitive dimensions of play in children with autism. *Journal of Autism and Developmental Disorders*, 23(3), 467-489.
- Wonnacott, T. H., & Wonnacott, R. J. (1969). *Introductory statistics*. New York: Wiley.
- Wootton, A. J. (1999). An investigation of delayed echoing in a child with autism. *First Language*, 19(3), 359-381.
- Yang, T.-r., Wolfberg, P. J., Wu, S.-c., & Hwu, P.-y. (2003). Supporting children on the autism spectrum in peer play at home and school: Piloting the integrated play groups model in Taiwan. *Autism*, 7(4), 437-453.

- Yawkey, T. D., & Hrncir, E. J. (1983). Pretend play tools for oral language growth in the preschool. *Journal of Creative Behavior*, 16(4), 265-271.
- Zanolli, K., Daggett, J., & Adams, T. (1996). Teaching preschool age autistic children to make spontaneous initiations to peers using priming. *Journal of Autism and Developmental Disorders*, 26(4), 407-422.

# Appendices



# Appendix A

## Classification of behaviour

Can we know other people except from  
behavioristic data?

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Floyd N. House (House, 1934, p. 1)

Quantitative data analysis is a research tool that it would be difficult to overstate the usefulness of. Its power and generality as a method for testing the validity of hypotheses can be seen by the breadth and depth of its application in social, biological, and physical sciences. However, by its very nature, quantitative data analysis requires quantitative data. This, then, requires that observed social interaction behaviours be represented as numerical data; these behaviours must be identified to be analysed by particular methods—for example, the frequency of, or duration of particular behaviours, or correlations between behaviours. This is fundamentally a classification process (Choi et al., 2002).

The development of the categories into which observed behaviours are classified is widely discussed in the literature (Barlow & Hersen, 1984; Gittleman & Decker, 1994; Herbert & Attridge, 1975; Slater, 1978; Whitley, 2002). The categories should be:

- *Mutually exclusive*. There should be no overlap between the categories—no behaviour should be classifiable into two separate categories.
- *Complete*. The categories should form a complete or exhaustive set of the possible behaviours. It must be possible to classify every observed behaviour into a category. This does not mean that a large number of categories is required—a small number of sufficiently broad categories can be complete. Notably, any set of categories can be rendered complete by the addition of an “everything else” category. The point to be considered when developing a taxonomy of behaviour is that this catch-all “everything else” category should be *useful*.
- *Usable*. The categories must be understandable—terms used must be clearly understandable and well-defined. Definitions should be concisely and

clearly stated. The names given to the categories must be appropriate. The number of categories must also be appropriate for the intended research.

It is clearly important that the classification of behaviour is performed as accurately as possible. It is especially vital when different sets of behaviour are to be compared quantitatively, such as, for example, when comparing two groups of subjects (e.g., children with autism and typically developing peers), or analysing the change in behaviour of a single group of subjects over time. If there is a significant variation in the classification of social behaviour, the quantitative measures of social behaviour will vary, even if the observed social behaviour remains the same; this is more likely to be a problem when different observers perform the actual classification for different sets of data.

In addition, interobserver consistency is not always simply achieved—a great deal of time and effort can be expended on training the observers in order to maximise consistency in classification by them (Meltzoff, 1998). Even if a single observer performs all of the classification in question, consistency over time is still vital. The importance of consistency is widely recognised, and inter-observer agreement (or inter-observer reliability, although strictly not a measure of reliability) is generally measured (Barlow & Hersen, 1984; Meltzoff, 1998; Mitchell & Jolley, 2001; Whitley, 2002). The consistency achieved in classification, whether by a single observer or multiple observers is likely to depend on the method used for the act of classification. The literature on how the researcher can decide into which category an observed behaviour falls is virtually non-existent.

Nevertheless, this is obviously an issue of no small importance—the reduction of raw observation to quantitative data, and the analysis thereof, cannot proceed without it. The most common method in use appears to be for the researcher to refer to a list of definitions of the categories. Observation of this method in practical use shows that it is far from ideal. If the proper category is not immediately obvious, then the definitions of all the plausible categories need to be re-read, the behaviour re-observed, and so on, until a choice can be made. A great deal of difficulty results from ambiguous social interaction behaviours that appear to fit multiple categories. How can such social interaction behaviours be consistently classified? While these problems are usually minimised if the same researcher who devised the classification scheme is the observer who quantifies (“codes”) the observed behaviours, in practice, much of the coding will be performed by multiple research assistants. Given the importance of inter-observer consistency, the need for a simple and reliable method for classification that will maximise consistency is obvious.



## A.1 Binary keys for classification

Choi et al. (2002) noted that the problem of easy, accurate, and consistent classification is general and multi-disciplinary—classification decisions are important in many fields (Payne & Preece, 1980). One field where the problem of classification is critical is biological taxonomy. Organisms must be able to be classified correctly, even by observers with little training in classification or experience with organisms of the type in question. One of the standard tools designed to make this possible is the *binary key* (or *dichotomous key*), an identification key where decisions are made one at a time, and each question asked of the user of the key has only two possible answers. Each decision is much simpler than if all of the required decisions are grouped together, and have to be made at once (for example, as occurs when classifying by referring to a list of categories). Therefore, each simple decision is made more quickly and more accurately, and as long as the number of decisions to be made is not too large, an identification key can be faster to use than a list of categories. The simplification is especially important in ambiguous cases—the classifier can concentrate on the single feature that divides the decision path, rather than having to simultaneously consider all observable characteristics.

These benefits of using binary keys for identification are not restricted to biological classification (Payne & Preece, 1980); keys can be used advantageously in a variety of fields: medical diagnosis, machine fault location, pattern recognition, and quantitative behaviour analysis. This use of keys is neither common nor unknown in education and behaviour research. Bekoff (1977) notes some examples in animal behaviour research, Gay and Airasian (2000, p 22) gives a key for classifying types of research, and Schmidt and Lee (1999, p 247) demonstrates a binary flow diagram to make decision about motor abilities tasks. A decision tree is used to illustrate the organization of various disorders (differential diagnosis) in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) (American Psychiatric Association, 2000, pp. 745-757). Nonetheless, the use of binary keys as tools for the practical classification of behaviour is virtually unknown.

The basic principles of constructing a successful key are few (Metcalf, 1954): the classification decisions must be based on observable features, with the most prominent observable features dealt with earlier in the key rather than later, the choices at each point must be mutually exclusive, the number of decisions required for any identification (especially common identifications) should be as small as possible, and the key should be written as simply and clearly as possible. Supporting illustrations or examples can be used to clarify specific questions asked in the key. Note that mutual exclusivity is readily obtained in a binary key if questions with yes/no answers can be asked. The shortness of the key is important, since the likelihood of error in answering the questions increases with

the number of questions. A short key results from each decision dividing the relevant group of categories into two subgroups of comparable size.

The process of constructing of a key from a list of definitions can be summarised as:

1. Determine the observable features for each category.
2. Choose one observable that will provide a suitable starting point for the key. Ideally, the first decision in the key should be the least error-prone, and should divide the categories into two roughly equal groups.
3. Continue repeating the previous step for the remaining observable features within a group of behaviours produced by a previous decision, until only one behaviour is left.
4. Check the observable features of the remaining behaviour category. If it is possible to reach this end-point of the key without the remaining observable features (if any) being present, then the original list of categories must be incomplete. Create a new category of necessary.
5. Repeat steps 3 and 4 until all categories have been separated.

If two categories cannot be distinguished from each other by observable features, they must be combined into a single category. If a particular category contains two distinct sets of observable features, the category can be split in two separate categories. This can result in a more logical classification scheme. However, the combined category may be more useful for the intended analysis. For the purposes of constructing the key, it is best to temporarily split the category, since the two sub-categories might be reachable by very different paths in the final key.

In turn, the use of a binary key for the classification of behaviour can be applied to the development of a taxonomy of social interaction in children with autism—the absence of a suitable set of categories for classification was noted earlier. The act of constructing a key guarantees that the categories into which the observed social interaction behaviour is to be classified are mutually exclusive, complete (i.e. exhaustive), and can be distinguished from each other by observation. These properties are required for any set of categories to be considered correct. The key can also warn the observers if any single category contains multiple distinguishable social interaction behaviours.

Therefore, this strongly suggests that the construction of a key is a valuable tool for the validation of a classification scheme, even if there is no intent to use the key for actual classification work. However, it does not mean that binary key is a panacea for classification difficulties (whether measuring social interaction behaviours in children with autism or otherwise). Ambiguous behaviour is still ambiguous behaviour, and while the key prioritises and simplifies the decisions that need to be made, behaviour that is on the borderline between two categories will always vex the classifier.

## A.2 Cognitive play

The widely-used Piaget–Smilansky categories (Piaget, 1962; Smilansky, 1968) form a suitable basis for the classification of cognitive play. However, since a certain amount of time is likely to be occupied by non-play behaviour, the addition of at least one category of non-play behaviour is required for the set of categories to be complete. Since it is worthwhile distinguishing between general non-play and exploration of play objects which can be regarded as a form of proto-play, both a *non-play* and an *exploratory behaviour* category are added. The categories, with brief definitions are:

### Non-play

The target child shows undirected, problem, and stereotype behaviours, or general social interactions without play activities.

### Exploratory

The target child searches around or examines play objects in an ambiguous manner or sensory-motor activities.

### Functional play

The target child uses play objects in repetitive motor movements, physically appropriate manner as its function denoted without any creativity or flexibility, or relational using more than two play objects with no symbolic representation.

### Constructive play

The target child organizes play objects in some type of spatial format to design an object or a model of a real object.

### Symbolic play

The target child lets a play object or person symbolize or represent a thing or person that it is not, in a make believe manner.

### Rule-governed play

The target child and play partner play together with a set of their own rules including obligations or prohibitions.

As noted in the introduction, research assistants are often expected to carry out classification tasks using such a list.

Since the decisions embodied in the key must be based on observable features of the behaviours, it is useful to begin by listing the features that must be present or absent for each category:

### Non-play

Absence of play

**Exploratory**

Explores play environment (examines or searches for play objects or watches play partner's play)

**Functional play**

Obvious play

Uses play object

Play object used in purely physical manner

**Constructive play**

Obvious play

Uses play object

Play object used in purely physical manner

Spatial arrangement of play object(s)

**Symbolic play**

Obvious play

Symbolic or representational elements to play

**Rule-governed play**

Obvious play

Play involves rules

Plays with partner

The next step is to choose the first decision to be made in the key. It should be the least ambiguous decision, and should divide the behaviours as equally as possible. Choosing an observable feature from the above list, a good starting point is to see whether the behaviour is obviously play. We can begin writing the key:

1. Is the child obviously playing?
  - a) Yes—*Functional, Constructive, Pretend or Rule-governed play*
  - b) No—*Non-play or Exploratory*

Since we expect non-play and exploratory behaviour to be frequent, it is useful to separate these behaviours next:

1. Is the child obviously playing?
  - a) Yes—*Functional, Constructive, Pretend or Rule-governed play*
  - b) No—go to 2
2. Is the child exploring or examining play objects or the play partner's play?
  - a) Yes—*Exploratory*
  - b) No—*Non-play*

The purely physical use of play objects characterises both functional and constructive play, and provides a suitable next decision in the key:

1. Is the child obviously playing?

- a) Yes—go to 3
- b) No—go to 2
- 2. Is the child exploring or examining play objects or the play partner's play?
  - a) Yes—*Exploratory*
  - b) No—*Non-play*
- 3. Does the play consist only of play objects being used in a physical manner?
  - a) Yes—*Functional* or *Constructive*
  - b) No—*Pretend* or *Rule-governed play*

Now we can simply complete the key:

- 1. Is the child obviously playing?
  - a) Yes—go to 3
  - b) No—go to 2
- 2. Is the child exploring or examining play objects or the play partner's play?
  - a) Yes—*Exploratory*
  - b) No—*Non-play*
- 3. Does the play consist only of play objects being used in a physical manner?
  - a) Yes—go to 4
  - b) No—go to 5
- 4. Are the play objects being organised spatially?
  - a) Yes—*Constructive play*
  - b) No—*Functional play*
- 5. Are rules obviously being followed?
  - a) Yes—*Rule-governed play*
  - b) No—*Symbolic play*

At this point, a useful and flexible feature of keys can be illustrated: extra categories can be easily added while retaining mutually exclusive categories. For example, it might prove useful to distinguish stereotyped behaviour from other forms of non-play behaviour. This can be simply done by inserting an additional question into the key:

- 1. Is the child obviously playing?
  - a) Yes—go to 4
  - b) No—go to 2
- 2. Is the child exploring or examining play objects or the play partner's play?
  - a) Yes—*Exploratory*
  - b) No—go to 3
- 3. Is the behaviour typical stereotyped behaviour?
  - a) Yes—*Stereotyped behaviour*
  - b) No—*Non-play*
- 4. Does the play consist only of play objects being used in a physical manner?
  - a) Yes—go to 5
  - b) No—go to 6

5. Are the play objects being organised spatially?
  - a) Yes—*Constructive play*
  - b) No—*Functional play*
6. Are rules obviously being followed?
  - a) Yes—*Rule-governed play*
  - b) No—*Symbolic play*

The completed key was shown in figures 5.1 and 5.2 in both a typeset list format and a graphical tree format. The graphical tree format was preferred for the coding of data in this study.

The categories into which the play is now to be classified are not quite the same as the original categories—the original definition of the game with rules category specified that the child plays with the play partner, and this is not a requirement of the new category. In fact, using the the original set of category definitions, it would not be overly difficult to imagine plausible behaviours that would, for example, simultaneously fit the pretend play, game with rules, and constructive play categories. The value of the key in removing such ambiguities is clear—such behaviour as suggested above would be classified in the game with rules category.

### A.3 Social interaction

The basic necessary features of a classification scheme for social interaction (non-overlapping and complete) will be automatically satisfied if the construction of a key is used to determine the categories. To construct a suitable taxonomy of social interaction in children with autism, one must also consider:

#### **Indistinct behaviours:**

Children with autism display much vague and low-level interaction, and that verbal and motor behaviour is often indistinct and has no certain relationship to social interaction. Therefore, the vague vocal-verbal behaviour (e.g., echolalia) and non-verbal (motor) behaviour (e.g., gaze) cannot safely be used as an observable feature indicating social interaction

#### **Degree of interaction:**

The social interaction categories should have some correspondence with the level or degree of social interaction—higher-level, more “desirable” types of interaction must be identifiable from the categories into which they are classified. For the purpose of this study, it is equivalent to the ranking of the Piaget–Smilansky categories by cognitive level. The categories must vary from negative social behaviours, no social interaction, through low-level social interaction, to complex and reciprocal positive social interaction.

**Broad, flexible decisions, supported by specific examples:**

The categories must be observationally distinct; the classification choices must be based on observable features of the social behaviour. Due to the very complex and multi-dimensional nature of social behaviour, it is difficult to choose precise and detailed yes/no classification questions. It is better in practice to use broader-based questions, such as “Does the child with autism display negative social behaviour?” and accept a greater dependence on the judgment of the observer. Therefore, detailed examples will be of great aid to the observer to supplement the use of the key when necessary. This is a case of macro definitions illustrated by micro examples.

**Interaction matrix:**

A reciprocal exchange of social behaviour can be represented by an initiation and a response in verbal or non-verbal behaviour of children with autism. For a behaviour to be considered to be an initiation, its purpose does not need to be clear, but it does need to be clearly intended to elicit a response (an active attempt to obtain response). For the purpose of this study, a response is defined as either a *response to an initiation* or some other *response to the presence of the other child* that does not constitute an initiation. This means that response can passively occur in the absence of initiation, such as, for example, onlooker behaviour. In addition, two different degrees of communicative intent in social interaction can be recognized: clear (either clear reciprocal or clear compliance-type behaviour) or vague (by one or both members of the dyad ), as shown in table A.1.

Table A.1: Social interaction matrix	
	Active (initiation)                      Passive (response)
High (reciprocal and clear)	Both initiation and response are clear. Interaction is reciprocal.
High (clear compliance)	Response and initiation are both clear.
Low (one-sided or unclear)	Either initiation or response, or both is unclear, or not reciprocal (i.e., peer does not initiate)
Low (unclear)	Either initiation or response unclear

Probably the simplest classification decision to make is whether or not the child with autism is displaying negative social behaviour. This might include avoidance, aggressive behaviour, and so on. Another simple choice is whether the child with autism is displaying no social behaviour at all—completely oblivious to or ignoring the presence of the peer. A combination of these two decisions

forms a suitable first question (or node) in the key: "Does the child with autism show non-negative response or interaction with the peer?" This combined first question is still sufficiently simple and usefully shortens the key.

1. Does the child with autism show non-negative response or initiation?

- a) Yes
- b) No

A "no" answer indicates either the presence of negative behaviour, or the absence of social behaviour; these can be easily separated by a further question on the presence of negative behaviour. At this point, the most undesirable behaviours are identified and classified. A more detailed categorization of these behaviours is not necessary for this study. A study of negative social behaviours will, of course, require detailed differentiation of types of negative interaction, but might require only one, or few, non-negative categories. In the absence of both non-negative and negative social behaviour, the child with autism is displaying no social behaviour.

1. Does the child with autism show non-negative response or initiation?

- a) Yes
- b) No—go to 2

2. Does the child with autism show negative social behaviour?

- a) Yes—*Negative interaction*
- b) No—*No interaction*

The remaining behaviours all involve social behaviour by the child with autism. An important feature indicating possible reciprocal interaction is the presence of initiation by the child with autism. Otherwise, the child with autism is interacting in a purely reactive fashion.

1. Does the child with autism show non-negative response or initiation?

- a) Yes—go to 3
- b) No—go to 2

2. Does the child with autism show negative social behaviour?

- a) Yes—*Negative interaction*
- b) No—*No interaction*

3. Is the child with autism only responding to the peer (i.e. not initiating)?

- a) Yes
- b) No

It is necessary to deal with a special case, where the child with autism initiates some social behaviour, but the peer does not respond, or responds negatively. Unilateral behaviour like this indicates a clear expression of social desire by the child with autism, even if unsuccessful, and is therefore sufficiently noteworthy to merit a separate category.

1. Does the child with autism show non-negative response or initiation?

- a) Yes—go to 3



- b) No—go to 2
- 2. Does the child with autism show negative social behaviour?
  - a) Yes—*Negative interaction*
  - b) No—*No interaction*
- 3. Is the child with autism only responding to the peer (i.e. not initiating)?
  - a) Yes
  - b) No—go to 4
- 4. Is there any non-negative response from the peer?
  - a) Yes
  - b) No—*Unilateral*

If the child with autism is initiating some social interaction, and the behaviour is not unilateral, there is social interaction with an active contribution by the child with autism. Otherwise, the role of the child with autism in the social interaction is purely responsive. This includes a wide variety of possible behaviours, but practical limits force a simple classification (which was quite adequate for the purposes of the study under consideration). Two major points will be considered: is the interaction reciprocal, and is the interaction high-level? Vague and unclear behaviour should be considered to be low-level. While four categories can be obtained from these considerations, this will lead to an impractical number of categories, and these active social behaviours are simply split into two categories. Question three in the key already distinguished between purely responsive, or passive, behaviours and reciprocal, or active behaviours. All that remains is to separate high-level and low-level social interaction behaviours; this must be done for both passive and active behaviours.

- 1. Does the child with autism show non-negative response or initiation?
  - a) Yes—go to 3
  - b) No—go to 2
- 2. Does the child with autism show negative social behaviour?
  - a) Yes—*Negative interaction*
  - b) No—*No interaction*
- 3. Is the child with autism only responding to the peer (i.e. not initiating)?
  - a) Yes—go to 6
  - b) No—go to 4
- 4. Is there any non-negative response from the peer?
  - a) Yes—go to 5
  - b) No—*Unilateral*
- 5. Is there clear and reciprocal interaction?
  - a) Yes—*Active-high*
  - b) No—*Active-low*
- 6. Is there clear initiation by the peer and clear response by the child with autism?

- a) Yes—*Passive-high*
- b) No—*Passive-low*

The key is now complete, and the endpoints of the key provide a set of categories into which the social interaction behaviour of children with autism playing with a typically developing play partner can be classified.

The binary key for the classification of social interaction behaviour was shown in figures 5.3 and 5.4 in list and tree form. Again, these keys proved to be useful tools to simplify the classification of ambiguous cases and to maintain consistency in classification over time (Choi et al., 2002).

### **A.3.1 Social interaction categories for children with autism**

The questions in the key in the previous section are necessarily concise; further expansion and explanation is useful. The classification questions and the resulting social interaction categories are considered here in more detail, with illustrative examples, especially behaviours that can be expected to occur in the naturalistic play setting in this study. In addition, Parten's categories, and their relation to the categories developed above, can also be usefully reviewed.

#### **Negative interaction**

Child with autism (and, indeed, typically developing children—less frequently, one hopes!) display tantrums, aggressive frustration, rejection, or violent behaviours towards his or her peer, as well as other clearly negative social behaviours. For example, such behaviours in children with autism have been reported in the research literature (van Berckelaer Onnes, van Loon, & Peelen, 2002; Hughes, Cunningham, & Libretto, 2002). These behaviours generally have a negative impact, especially on peers attempting to interact with the children with autism. Safety issues may even need to be considered (Gall, 1996). However, it does not mean that interacting with aggressive children with autism is dangerous. Interaction and relationship with peers in children is established reciprocally and relatively (Rubin et al., 1998). Thus, the occurrence of aggressive behaviour by children with autism during social interaction with others should be considered functionally on the social contexts (e.g., Murphy, Macdonald, Hall, & Oliver, 2000). Sometimes, negative social behaviours might be considered to be appropriate, such as when in response to negative initiations. However, there is no need to create a separate category for such “appropriate” negative behaviours as they are still indicative of “failed” interaction. Of course, such judgments are very culturally and situationally dependent.

#### **Examples:**

- Throwing play materials;
- Vocal or verbal yelling out;

- Rejecting or refusing to share; and,
- Kicking, scratching, or pinching his or her peer.

### **No interaction**

No interaction behaviour in children with autism is behaviour when the child with autism does not respond in any discernable manner to the presence of the peer. He or she engages in either inattentive behaviours, or acts alone and independently without reference to what the peer is doing. The child with autism makes no effort to get close to or speak to the peer because he or she pursues his or her own activity. In addition, the child with autism may not show interaction behaviours intended to avoid further interaction with the peer. This type of active avoidance is considered to be negative interaction.

Parten (1932) described solitary play as the child playing alone and independently among other peers without reference to what peers are doing. He or she plays with play objects different from those of peers although he or she is within speaking distance of them. He or she makes no effort to get close to and speak to peers because he or she pursues his or her own activity. In Parten's observations, this form of play occurred in a total of 42 typically developing children aged from two to four and a half, but with much variation, and it decreased in older typically developing preschoolers.

Indeed, solitary behaviour appears as the primary type of peer play of children with autism (McHale, 1983; Brown & Whiten, 2000; Koegel et al., 2001). In clinical reports, it is described that children with autism indulge in what they are doing, not caring about anything else that is happening. However, there is no systematic research on the solitary play of children with autism in naturalistic settings to find the role of solitary play, how it can be distinguished from parallel play (which involves a different degree of social awareness), which circumstances cause it, and so on.

It must be noted that Parten's unoccupied behaviour category is defined by the absence of play activity (Parten, 1932), and therefore could include all levels of social interaction behaviour. For example, following the teacher seems to be considered as unoccupied behaviour for typically developing children in Parten's categories, perhaps because he or she does not follow other peers to play with. This general social interaction category may simply be omitted from Parten's categories regardless of its occurrence. If the child performs a positive compliance, then it should not be judged that he or she is in unoccupied behaviour. It can be judged that the child is not occupied in play activity but is instead occupied in social interaction in play context. General social interaction behaviours without play activities (e.g., talking about TV programs) in play contexts can be coded separately from play behaviour in order to compare on-play with off-play be-

haviour. Otherwise, it can be included in a continuum of play activities. Some of these general social interaction behaviours in play contexts can be included in the chosen classification scheme, depending on the aim of the study (e.g., Beckman & Lieber, 1994). However, since this study is conducted in a play setting, social interaction will usually be accompanied by play, and in this case, unoccupied behaviour will usually fall into the “no interaction” category.

While this form of behaviour may occur less frequently than other forms in most typically developing children as Parten (1932) reported, it occurs more often and/or for longer in children with autism. It may be related to off-task, inattentive behaviours (Hartshorn et al., 2001), or a lower level of attentional engagement in children with autism (van der Geest, Kemner, Camfferman, Verbaten, & van Engeland, 2001).

**Examples:**

- Play alone with and without private speech
- Standing in one spot or get on and off chairs;
- Looking around the room; and,
- Not responding to the peer’s questions.

**Passive-low interaction**

Social awareness in children with autism is captured in this level of social interaction. The child with autism is interested in the peer’s activity, but does not initiate to the peer. The target child responds to the peer, for example, by just looking, brief imitating, or voluntarily waiting in a non-negative manner, without initiating any social activity. Either the peer’s initiation or the target child’s response, or both, is unclear.

Three interaction patterns are included in this level, onlooker, imitation, and unclear interaction. Onlooker behaviour was distinguished from unoccupied behaviour in typically developing children (Parten, 1932) by their observation of other play groups rather than just being interested by any exciting event. The typically developing child watches other children’s play, and often gives ideas, or asks questions while observing. However, he or she does not enter into the play activities, while remaining within speaking distance of the group. A positive correlation between unoccupied behaviour and onlooker behaviour was noted by Parten.

Adequately measuring onlooker behaviour in children with autism might not be possible in peer play contexts because apparent onlooker behaviour of children with autism does not seem to be consistently intentional. It is not difficult to judge onlooker behaviour if the target child with autism watches the peer while the peer is playing. However, it is difficult to judge if the child with autism watches the play spot or the play materials where the peer played although the

peer has moved on to another area to play with other materials. In these cases, the onlooker behaviour of the child with autism may be judged as either unoccupied behaviour or onlooker behaviour depending on the observer's negative or positive interpretation as mental preparation of the child autism.

Onlooker behaviour may need to be considered in relation to the findings of the failure of social gaze (Charman & Baron Cohen, 1997) and lower levels of eye gaze in general in children with autism. Hadwin and Hutley (1998) discussed eye gaze behaviour in children with autism was discussed in relation to ecological valid situations in everyday life through laboratory experiments. It was found that there were no significant differences in gaze behaviour between high-functioning children with autism and typically developing children on social stimuli (e.g., different emotional faces, cartoon-like scenes including human figures). It was concluded that it could be caused by other factors such as the requirement of social interaction (van der Geest, Kemner, Camfferman, Verbaten, & van Engeland, 2002; van der Geest, Kemner, Verbaten, & van Engeland, 2002). However, it was argued that individuals with autism showed abnormal patterns of social visual pursuit (increased visual fixation time on mouths, bodies, and objects and decreased one on eyes) in comparison to the control group when naturalistic social situations (using a movie scene) were viewed (Klin, Jones, Schultz, Volkmar, & Cohen, 2002).

Given that eye gaze appeared different even in typically developing children, depending on novelty of play materials and play partners (Arnold, Semple, Beale, & Flinn, 2000), eye gaze of children with autism in naturalistic play contexts may be problematic to judge as onlooker behaviour. Onlooker behaviour may be included in social communication skills of children with autism in play contexts. Otherwise, applying onlooker behaviour per se to children with autism may be excessively enthusiastic. Regardless of arguments on eye gaze behaviour in children with autism, it was evidenced that social interaction interventions such as social-emotional training, including peer play activities enabled children with autism to improve their eye gaze in interaction with peers (Bauminger, 2002).

Another problem of onlooker behaviour in Parten's description is related to the verbal expression, giving ideas or asking questions while observing. In social interaction, these are initiation behaviours. Clearly, asking questions is performed in the expectation of getting a response.

Therefore, a modification of Parten's onlooker behaviour is needed for it to be useful for social interaction of children with autism. It can be expressed as the child with autism gazing or watching peer with or without vocalization, verbalization, or exclamations when the peer plays. However, the child with autism does not overtly enter into the play activities of the peer. While in this study, onlooker behaviour will generally fall into this passive-low category, many be-

haviours included within Parten's onlooker category which are not expected to be frequently, if at all, displayed by children with autism, such as clear, high-level behaviours such as conversation or questioning (which is initiation behaviour), belong in other categories.

**Examples:**

- Gazing at the peer; and,
- Watching the peer's play activities.

Secondly, passive imitation in parallel mode can be considered in this category. Due to the lack of a clear distinction between solitary and group play in the small kindergarten setting, parallel activity was discriminated as a type of group play from solitary play in Parten's category (Parten, 1932). Parallel activity was described as the typically developing children playing independently, with the play activities they choose naturally deriving from their peers' play activities. They might use toys in a manner that mimics the behaviour of peers who were playing, but as they see fit. He or she does not try to influence or modified the activity of their peer. There is no attempt to control the coming or going of players in the group. In parallel activity, the typically developing child plays beside, rather than with, their peers. Parallel play appeared quite highly in all age group of typically developing children (Parten, 1932). Provost and LaFreniere (1991) found that parallel play in typically developing preschoolers was not significantly correlated with age, while solitary activity was negatively correlated with age. It has been suggested that parallel play often functioned as a bi-directional bridge between onlooker to group play such as associative and cooperative play in a sequential play analysis for young typically developing children (Bakeman & Brownlee, 1980; Robinson, Anderson, Porter, Hart, & Wouden-Miller, 2003).

However, it is not clear how to discriminate parallel play from solitary play, particularly in children with autism. Proximity and imitation seems to be considered as the two discriminating factors between parallel play and solitary play. Quantitative measures of the required proximity to peers are sometimes applied, with different with distances from peers such as three feet (Pugmire-Stoy, 1992) or five feet (Schleien et al., 1988) being typical. However, in small rooms, the children are in close proximity, independently of any interaction, and proximity is not an adequate factor for judging parallel play, as noted by Parten (1932). While typically developing children display an awareness of personal space and do not usually remain in close proximity to other children with whom they do not interaction, there is no evidence that children with autism conform to this practice. Therefore, imitation is a key feature necessary for the recognition of parallel play.

There do not appear to be any definitive studies on the issue of absence or presence of parallel play behaviour of children with autism in naturalistic settings. (Brown & Whiten, 2000) reported very little imitation in any group of children with autism, adults with autism, and children with mixed learning disabili-

ties, compared to a young group of typically developing children. Schleien et al. (1988) found that inappropriate play behaviour in young children with autism was significantly reduced in the parallel and cooperative play with typically developing peers when a recreational physical activity intervention was provided. However, parallel play in this study has been measured using proximity (within 5 feet) rather than actual behaviour as a criterion.

Nevertheless, successful intervention studies on social interaction observational learning through modelling (D'Ateno, Mangiapanello, & Taylor, 2003; Buggey, Toombs, Gardener, & Cervetti, 1999; Taylor, Levin, & Jasper, 1999) imply the possibility of parallel play behaviour for children with autism through their imitation skills. D'Ateno et al. (2003) reported that children with autism acquired both verbal and motor responses (having a tea party, shopping, and banking) in play through watching video modelling, even without reinforcement or correction procedures. In other studies (Buggey et al., 1999; Taylor et al., 1999), children with autism also learned how to respond verbally to questions in play through watching a video of themselves and self-modelling their behaviour in response to this (Buggey et al., 1999) and increased play comments through watching video modelling between an adult and their sibling (Taylor et al., 1999).

As a result, passive imitation in parallel mode is included in this social interaction level of children with autism. The child with autism imitates motor-nonverbal or vocal-verbal behaviours of the peer who is playing nearby, either simultaneously or soon afterwards, as well as, either in exactly same way or in similar manner. When the child with autism plays near by, he or she shows some social signs such as visual, auditory and spatial cues to imitate, but does not distinctly express verbal or motor social interactions. Therefore, the child with autism seems to play independently although the play activities he or she chooses come from the peer. This imitation cannot occur without at least some response to the presence of the peer; it indicates at least a minimal level of social awareness and interaction.

**Examples:**

- Picking up or changing similar or different play materials whenever the peer changes his or her play materials, either simultaneously or soon afterwards;
- Mimicking vocalization/verbalization, including immediate echolalia;
- Mimicking body gestures; and,
- Mimicking peer's play activity: using an object immediately after the partner has finished using it, put his or her play object beside the partner's play object in a mimicking manner.

Finally, unclear interaction in associative mode can be included in this passive-low interaction level. The child with autism shows mainly motor and substantially vocal- or verbal- interactions in playing with his or her peer. The

child with autism responds to the peer, as he or she wishes, at a similar or identical activity, and possibly uses impulsive vocalization or verbalization such as private speech that is not clear to judge whether it was used for peer-directed or not. Sometimes, both children reciprocally use social signs such as looking each other.

The relationship of leader and follower, through modification of Partner's associative play, may be interpreted to be clear interaction, and therefore either passive-high level (e.g., positive compliance) or active-high level interaction. In passive-low interaction at play context, each player is free to enter in or leave from the play activities because the play activity is not dependent on any one child's continuing involvement. There is no organization for any specific rules in play activities such as having a leader and follower. The child with autism does not subordinate his or her interests to that of the peer. The child with autism and the peer may communicate about their common activities in mild attempts to control their play activities. Therefore, waiting or turn-taking behaviours may be voluntarily displayed from both children. Both players may abruptly interrupt each other's play activities.

**Examples:**

- Putting road blocks together with partner in a mimicking manner without verbal communication
- Throwing a ball to the peer without seeking any response from the partner (likely a response to the peer's presence)

**Passive-high interaction**

In passive-high interaction, children with autism can be called 'social followers' because the child with autism responds (e.g., compliance, answers questions) clearly, but does not initiate. Initiation (from peer) and response (from the child with autism) are both clear. In a play context, it can be seen that some roles are assigned or adopted for each player to carry out in the activity, and organized to complete one theme, such as making some material product, attaining some competitive goal, dramatizing situations of adult and group life, or playing simple games. The peer, as a leader, organizes or controls the activity through verbal or motor direction and/or prompt.

**Examples:**

- Complying with directions in role play such as doctor and patient play;
- Taking and using the shovel when peer provides or suggest it;
- Performing turn-taking behaviour in assigned roles; and
- Responsive talking on the phone in mimic manner by peer's guidance

In overall peer intervention studies for children with autism, peer training for children with autism was aimed at achieving this level of social interaction. More



details are discussed in the following section on peer intervention in this chapter.

Social follower behaviours was also demonstrated as cooperative play of Parten's category (Parten, 1932), discriminating from associative play by the organized supplementary character. In cooperative play, typically developing children organize play activities in order to make a product, win a competition, or emulate adult behaviour, or play formal games. One or two group members controlled their group situations by directing others' activities. Therefore, a child could be criticized by other members if he or she did not perform the assigned role in their group play.

### **Active-unilateral interaction**

Unilateral interaction in children with autism can be defined as the child with autism initiates for companionship, or involvement, with the peer, to play together or otherwise, using vocal-verbal or motor behaviour, to which the peer shows either no response or a negative response (one-sided attempt).

The seeking of companionship behaviour may occur from some children with autism towards peers due to the social desire (Bauminger & Kasari, 2000) or interacting preference towards typically developing peers in play (Smith et al., 2002). However, the behaviour forms of the seeking companionship may be somewhat different from conventional ways considering different, or atypical, ways of social communication in children with autism as discussed previously. In fact, social interaction behaviour in children with autism is changed from passive way to active (impulsive) way. It occurs suddenly and impulsively. This sudden and active interaction behaviour was described as 'aloofness' by Wing (1981) and as an 'active but odd social style' by Volkmar et al. (2003).

Unilateral interaction can generally be considered to be failed attempts by the child with autism to interact. Either the peer does not recognise the initiation for what it is, or responds negatively, whether or not this is due to the nature of the initiation by the child with autism, or inattentiveness or deliberate action by the peer. However, the fact that the child with autism attempts to interact is significant.

It may be difficult for typically developing peers to understand these atypical interactive behaviours. Attempts for social interaction in children with autism are therefore likely to fail. Then, social exchange for interaction may either not occur or discontinue between children with autism who seek companionship and typically developing peers who do not know atypical interactive behaviours. Therefore, it may not be surprising to find loneliness with a lack of friendship from children with autism (e.g., Bauminger & Kasari, 2000) and even frustration and depression from the lack of social interaction or inadequate mutual understanding with others (Jones et al., 2001).

**Examples:**

- Slowly rolling cars to the peer's play material and asking to play together, with no positive response;
- Leaning forwards towards the peers' face to get eye-contact, with no positive response;
- Unsuccessfully insisting that the peer drink a cup of tea; and
- Unsuccessfully demanding that the peer put their arm in a toy sphygmomanometer.

**Active-low interaction**

In active-low interaction, the child with autism plays a role of social leader because the child with autism initiates to the peer, to which the peer shows response in non-negative manner. Either initiation or response, or both is unclear, or the peer does not initiate.

'Companionate play' proposed by Pugmire-Stoy (1992) for typically developing infants, toddlers, and children with developmental disabilities may be included in this interaction. This is when the child plays with a significant other who seeks to let him or her control the play. For example, the caregiver or mother lifts the baby overhead, echoes the noises and chuckles that the baby makes, therefore encouraging him or her to take the lead in the early interactive play (Pugmire-Stoy, 1992).

In peer interventions, initiation training for child with autism was aimed at achieving this level of social interaction. It was reviewed in detail in the chapter on peer intervention (chapter 4).

**Examples:**

- Making a phone call to the peer using a toy phone and saying something, then the peer answers in non-negative manner

**Active-high interaction**

Active-high interaction means collaborative partnership between interaction partners. They collaborate together within their common activities, rather than one doing as the other asks. Interaction is reciprocal and constructive—both parties initiate and respond in a reciprocal relationship. Therefore, both initiation and response between both parties are clear. In a play context, the child with autism and the peer may show verbal or motor negotiations to do their activities together. Both players alternatively take each role, leader and follower. In a game, both players show clear turn-taking skills each other. Both players may also provide verbal or motor direction or prompts for each other in their collaborative activities.

In the social play, children collaboratively interact together and become sensitive to partners' feelings and attitudes. Children understand others' points of view, and transform those perspectives to correspond with their own, or accommodate to contradictory perspectives by recognizing and accepting individual differences. However, this ability for inter-subjectivity (ability to acquire and manage representations of self and other through social interaction) is demonstrated very little by children with autism (Toomey & Adams, 1995), particularly in relation to performance with peers (Sherman, Shapiro, & Glassman, 1983). In fact, children with autism show communication difficulties (Mundy et al., 1987) and a lower complexity of social play (Dewey et al., 1988). As a result, it was found by Nabors, Willoughby, and Badawi (1999) that children with disabilities, including autism, tended to engage in fewer complex activities (e.g., pretend play, sand play) than typically developing peers. When children with and without disabilities interacted together, both groups of children tended to have less complex or low-demand activities (e.g., sliding, running) in an integrated setting.

On the other hand, group play can be used to develop collaborative relationships and social communicative interaction between children with autism and typically developing peers, in terms of promoting social inclusion (e.g., Paul, 2003). This idea may be rooted in Vygotsky's socio-cultural theory, using more able peers (typically developing peers) or adults as crucial agents for development and learning in children with autism. This notion may be embedded in cooperative play and language intervention for children with autism. Jahr, Eldevik, and Eikeseth (2000) reported that when children with autism were trained by adults through observing modelling, describing verbally, and imitating, they could demonstrate cooperative play across novel settings and with new play partners. A possibility for more productive interactive play and speech was by high-functioning children with autism in relation to typically developing peers (Smith & Hart, 2002). In addition, the opportunity for choice was pointed out as an important factor in language intervention incorporating social play, that decreased disruptive behaviours in children with autism (Carter, 2001).

**Examples:**

- Talking about dinner party on the phone each other; and
- Having dinner and sharing tea together (dinner party)



# Appendix B

## Data analysis

Figures often beguile me, particularly when I have the arranging of them myself; in which case the remark attributed to Disraeli would often apply with justice and force: “The are three kinds of lies: lies, damned lies, and statistics.”

---

Mark Twain (Twain, 1990, p. 185)

### B.1 Estimate of a mean and standard error

As the reader will no doubt be aware, the mean of a population,  $\mu$ , is

$$\mu = \frac{\sum_{i=1}^N x_i}{N} \quad (\text{B.1})$$

and the population standard deviation  $\sigma$  is

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (x_i - \mu)^2}{N}} \quad (\text{B.2})$$

where  $N$  is the number of members of the population. While the above expressions are only strictly correct for finite  $N$ , they can be readily extended using limits as  $N$  approaches infinity to deal with infinite populations.

However, in practice, one often encounters the case where the entire population cannot be measured, and instead, the characteristics of the population—such as the mean and standard deviation—must be estimated from a sample taken from the population. In particular, this occurs when making measurements in an experiment, since the experimental measurements can be understood to be samples taken from the population of all possible results for that measurement. The sample available is the set of all measurements made under

the same conditions—in this study, measurements of the behaviour of the child with autism in a given dyad, either before or after the peer training phase, constitute such a set of measurements made under identical conditions (insofar as measurements made of the behaviour of people can be considered to be made under identical conditions when made at different times). In this case, there is, in principle, no limit to the number of measurements that could be made, so the population of all possible results is infinite in size. For the remainder of this section, finite samples of  $N$  measurements sampled from the infinite population of all possible measurements will be considered.

Since the means of measurements of the behaviour of the children with autism before and after the peer training phase will be compared, it is only necessary to consider the estimation of a mean from a sample. The best estimate of the mean of a population is the mean of the sample,  $\bar{x}$ ,

$$\bar{x} = \frac{\sum_{i=1}^N x_i}{N}, \quad (\text{B.3})$$

and the standard error  $\Delta\bar{x}$  in the estimate of the mean is

$$\Delta\bar{x} = s/\sqrt{N} \quad (\text{B.4})$$

where  $s$ , the sample standard deviation, given by

$$s = \sqrt{\frac{\sum_{i=1}^N (x_i - \bar{x})^2}{N - 1}} \quad (\text{B.5})$$

is the best estimate of the standard deviation from the sample. The estimated mean and the standard error in the mean are usually written as  $\bar{x} \pm \Delta\bar{x}$ ; for example, if we have an estimated mean  $\bar{x} = 12.7$  with standard error  $\Delta\bar{x} = 1.3$ , we could concisely write this as  $12.7 \pm 1.3$ . For a large number of samples, the standard error specifies the 68.3% confidence interval in the estimated mean—the true mean of the parent population,  $\mu$ , is 68.3% likely to lie within the range  $\bar{x} - \Delta\bar{x}$  to  $\bar{x} + \Delta\bar{x}$  (which is the same confidence interval specified by the standard deviation of a normal distribution). For smaller samples, the  $t$ -distribution, with degrees of freedom equal to  $N - 1$  provides a better estimate of the confidence interval. Since, for  $N = 5$ , the confidence interval is 62.6%, and 65.7% for  $N = 10$ , it can be readily seen that the approach to a normal distribution is rapid.

A very important consequence of the above is that repeated measurements are extremely important. Without repeated measurements, it is essentially impossible to estimate the statistical error in the measurements, and any comparison of two measurements would be on a very uncertain basis. It is necessary to make at least sufficient repeated measurements to allow an estimate of the error in the mean to be made, and a larger number of measurements allows the mean to be

more accurately determined, and any subsequent statistical test will be of higher power. That is, smaller differences will be recognizable as statistically significant. On the other hand, since the standard error only decreases by a factor of  $\sqrt{N}$ , it is rarely cost-effective to make a very large number of measurements. A convenient rule-of-thumb is to make on the order of ten measurements. Circumstances may, of course, mean that this is insufficient, and more may well be necessary, or, if the expected change due to the experimental condition is very large, then even a large standard error is acceptable and fewer measurements may well suffice.

## B.2 Comparison of means

A key question when comparing two sets of experimental measurements is whether or not the means of two sets differ in a statistically significant sense. A simple way in which to determine this is by comparison of the means and standard errors. This can be done by examining the numbers, or, more conveniently, graphically by plotting the means and the intervals specified by the standard errors (i.e. plotting the means and *error bars*). If the error bars of two means overlap, the difference cannot be said to be statistically significant. If the two means are well-separated in comparison to the width of the error bars, they are clearly statistically significant for a moderate value of  $\alpha$  (e.g., for the standard  $\alpha = 0.05$ ). It is only for case where the two means and error bars *almost* overlap that it should be necessary to resort to a more precise test. Since this method allows a very clear visual display, it is adopted here as the primary statistical test.

In order to perform a more precise test, accounting for small sample sizes (and also allowing the calculation of values of  $p$ , the probability that the difference in the two means could arise by chance if both samples are in fact samples drawn from the same population), it is necessary to consider the combination of two means to find a difference between the two means or the mean of the two means. These results can be found in numerous statistics textbooks, but an especially clear and concise explanation was given by Whitley and Ball (2002b) (see also Whitley & Ball, 2002a).

The difference between the two means is

$$\bar{x}_{1-2} = \bar{x}_1 - \bar{x}_2 \quad (\text{B.6})$$

while the mean of the two means is

$$\bar{x}_{12} = (\bar{x}_1 + \bar{x}_2)/2. \quad (\text{B.7})$$

The standard deviation in the difference or sum of two means of independent

samples of sizes  $N_1$  and  $N_2$ , with sample standard deviations  $s_1$  and  $s_2$ , is

$$s_{1-2} = \sqrt{\frac{(N_1 - 1)s_1^2 + (N_2 - 1)s_2^2}{N_1 + N_2 - 2}}. \quad (\text{B.8})$$

The standard error in the difference of the two means is then

$$\Delta\bar{x}_{1-2} = s_{1-2} \sqrt{\frac{1}{N_1} + \frac{1}{N_2}} \quad (\text{B.9})$$

and the standard error in the mean of the means is half of that,

$$\Delta\bar{x}_{12} = \Delta\bar{x}_{1-2}/2. \quad (\text{B.10})$$

The standard error in the difference of the means can then be used to determine whether or not zero lies in the desired confidence interval (e.g., the 95% confidence interval, if testing for significance at the standard level of  $\alpha = 0.05$ ), using the  $t$ -distribution with  $N_1 + N_2 - 2$  degrees of freedom.



# Appendix C

## Peer training package

The training package developed by the researcher and used for the peer training program is presented here. This (and other inclusions in the remaining appendices) is a facsimile reproduction in order to show the actual material that was used. The *Play Note* (see section 5.6) on page 42 of the training package was used in the earliest training sessions, but was replaced by the improved *Play Note 2* and *Play Note 3* immediately following the training package in later sessions.

[AUTISM]

# Peer Play Training Package



Hyun-Jin Choi

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## **Background of the Package**

Physical integration can be the first step towards realizing the concept of *full inclusion* for children with disabilities (Skinner, 1996). However, unless appropriate programs are used for both children with disabilities and typically developing children, qualitatively effective interaction including friendship between them might not develop (Fuchs & Fuchs, 1995; Shanker, 1995; Tansey, 1995). Such a program can be thought of as “software” necessary to make proper use of the “hardware” of physical integration.

Typically developing children develop and refine their play and social interaction skills by trial and error in the course of their usual daily contact with each other. However, these skills may not be appropriate for interacting with children with autism (Kanner, 1943). How can typically developing children acquire the appropriate Play Skills and Strategies to interact with children with autism? These skills should be drawn from their usual play activities and interaction skills, with an understanding that these skills and strategies need to be modified to be suitable for interacting with children with autism.

An understanding of the disability described as ‘autism’ can be approached by recognizing what is meant by *disability*. Disability should be viewed as *differences in ability*, rather than as *diseases* or *lack of ability* (Teitzel & Terkelsen, 1997). Then *abilities* of the child with the disability can be recognized, and the difficulties caused by the differences in these abilities, and develop methods for making use of these abilities and dealing with any problems. This approach can help typically developing children overcome some of the common social misconceptions toward children with disabilities.

In order to learn the necessary concepts about the disability, and avoid prejudices towards children with disabilities, typically developing children can be taught about the disability through instruction, discussion and role-playing. Experiences of disabilities can be an important element in obtaining a positive perspective. Situational role playing in the position of the child with the disability enables typically developing children to obtain concrete and sensitive ideas for developing effective play and interaction skills, especially for playing with children with autism, and also helps typically developing children develop the skills by feedback and self-monitoring.

This package is designed to be used for training typically developing children to develop their play and social interaction skills with children with autism. It is considered that these skills will allow them to take part in a program which is focused on *full inclusion*.

### **Aim of the Program**

The peer play partners (Peer Play Partners) will:

1. examine the meaning and importance of friendship in children.
2. analyze each other's play activities and behaviors.
3. acquire different perspectives and understand the needs of individuals with disabilities.
4. recognize differences of behaviors in children with autism.
5. use verbal and nonverbal communication to play with children with autism.
6. establish Play Skills and Strategies to interact with children with autism.

### **Ultimate Outcomes**

The peer play partners will be able use appropriate Play Skills and Strategies for effective social interaction with children with autism.

### **Teaching Methods of the Package**

Teaching methods of the package are based on teaching prosocial skills written by McGinnis and Goldstein (1990), and written and performed by Baxley et al. (1988).

#### **1. Watching videotapes or reading books with pictures (5 to 10 minutes per session).**

Visual material offers several benefits (Krantz et al, 1991). First, visual material can efficiently display numerous examples of stimulus and response variations. Children can view more information about tasks in realistic contexts (Morgan & Salzberg, 1992). It enables children to expand the diversity of their thinking in a particular situation. In this package, children will obtain information about friendship, play activities, differences in people with disabilities, verbal/non-verbal communication, general behaviors in children with autism, and specific play behaviors in children with autism who are their play partners (target children) from selected video segments.

Second, with video recordings, children can repeatedly review a model behavior that may be difficult to communicate using written materials (Kern-Dunlap, Dunlap, Clarke, Childs, White, & Stewart, 1992). In this package especially, video recordings enable peer play partners to identify and understand target children's specific play behaviors. Video materials are very helpful in setting up Play Skills and Strategies for the peer play partner to use with the target child. Also, video recordings of play activities between peer play partners and target children provide peer play partners with chances to observe themselves in the course of their training. Through watching their play activities, a self-monitoring procedure, peer play partners may be able to improve the appropriate use of Play Skills and Strategies to play with the target children.

Finally, video recording and reviewing can be a fun activity for the children, who participate in these activities as both viewers and actors or actresses.

## **2. Discussions (5 to 10 minutes)**

After video watching or role play, discussion can provide children with clarification of the topic for the session. In this training package, discussion is participant-oriented, directed by the children, with the teacher supporting the discussion rather than controlling it. The teacher is seen as a facilitator, and helps the discussion by asking various simple questions to direct the discussion if needed. When children can be actively involved in the discussion, the children can draw on their own play skills and strategies. Play and social skills can then be based on the children's individual experiences and children-centered discussion procedures can be a creative and useful way of exploring these skills.

## **3. Instruction**

In this training program, the teacher's main role is as a guide and facilitator (Teitzel & Terkelsen, 1997). However, some general information about autism, and specific information about a particular target child needs to be taught. The teacher should be careful to keep this instruction interesting and understandable. Peer play partners need to acquire correct information about features of general behaviors and interaction styles in children with autism. Any information about specific play and interaction behaviors in the target children can also be taught.

## **4. Modeling**

The teacher demonstrates an appropriate or inappropriate play behavior: a specific behavior of an individual with a disability, any specific behavior of children with autism, or a play behavior of a peer play partner in the training sessions. It provides peer play partners with a clear outline of the tasks in the sessions. Also, when peer play partners are used to deal with Play Skills and Strategies, they can be models to demonstrate use of the skills.

## **5. Role play**

Role play enables peer play partners to have direct experience of individuals with disabilities. Peer play partners easily realize the needs of individuals with disabilities while there are playing a part in role play. Peer play partners can recognize the abilities and different needs of individuals with disabilities, and can gain a better understanding of what it means to have a disability. In this role play, peer play partners alternately take a role as a peer play partner and as a child with autism, enabling them to elaborate their

Play Skills and Strategies for effective play with children with autism. This role play should be a fun and enjoyable activity.

## **6. Feedback**

Children can achieve the aims of the tasks more readily when they can get feedback immediately. The teacher's immediate feedback enables peer play partners to evaluate their performance, to correct and reinforce their Play Skills and Strategies. This feedback should allow peer play partners to understand whether they are using appropriate Play Skills and Strategies at the right time and in the right context.

## **7. Worksheets (3 to 5 minutes)**

At the end of each session, worksheets help peer play partners to summarize and clarify what they have learned. These also enable teacher to assess the level of peer play partner information taught. Activities such as drawing, making lists, and filling in blanks are used in completing the worksheets.

## **8. Monitor system by *Play Note***

If peer play partners record their play activities using a rating system (just like a researcher!), more feedback and insight can be obtained. A monitor system can be used in two ways: one is for monitoring self-involved play dyads and another is for monitoring other play dyads in this package. For example, sharp observational skills (watching others' activities in role-play time) can be trained by scoring on *Play Note*. These observational skills can be effectively used by the peer play partners for self-monitoring in the course of play activities with children with autism, using play skills, and observing them as well (Kazdin, 1989). The training for peer play partners will be ceased above 80% mastery of using Play Skills and Strategies by peer play partners (Goldstein, Kaczmarek, Pennington, & Shafer, 1992). During the intervention period, peer play partners will sometimes be required to monitor and score their play activities with children with autism. The self-monitoring system provides peer play partners with visual results of using the skills on the graph that shows increase or decrease of their play and social interaction with children with autism. Furthermore, it enables peer play partners to be confident in the use of their play skills and strategies.

## **9. Rewards for trained peer play partners**

When the training sessions are finished, trained peer play partners are offered some rewards such as material award (e.g. candy, hairpin, little toys, etc) and social award (e.g. certificate from the principal). Also, mascot as a proud symbol can be attached on trained peer play partners' shirts on during the intervention period.

### **Management of Schedule**

The training program will be run in two phases: before intervention and during intervention. The Before Intervention Training Phase for Peer Play Partner consists of 12 sessions. Each session lasts for 30 minutes. Included are the aims of the session, teaching materials for the session, sequenced activities for the session, and expected outcomes for peer play partners. Activities in the sessions usually include a review of the last session, watching videotape or reading a book, discussion or instruction, role-play, and one worksheet or an assignment. This package has 12 sessions of training for peer play partners before intervention. The management of the program in this phase can be flexibly controlled by the responses from peer play partners as well as by the school context, in order to achieve effective training for the peer play partners. The activities and the sessions should be flexible and can be re-organized if desired or necessary.

During intervention, trained peer play partners continue to develop and improve their play and interaction skills in a self-monitoring procedure by scoring on *Play Note*. In this phase, the peer play training occurs every 3<sup>rd</sup> session for 15 minutes. It involves watching videotapes of recorded play activities between trained peer play partners and children with autism and scoring on *Play Note*, and discussion. Also, the time management of the training for peer play partners has flexibility as in the training phase before intervention.

### **Settings for Training**

The training can be implemented in either the Special Educational Developmental Unit where children with autism attended or the typically developing children's schools. The settings for training are divided into 2 areas: indoor training area and outdoor training area. A small room equipped with VCR, video camera, and various toys can be used for indoor training. The playground equipped with play facilities and sandpit play material can be used for outdoor training.



## **Diagram of the Program**

### ***Friends***

Session 1: My Friends:  
General friend(s) & friendship

Session 2: Friends & Play:  
Good friend(s) & good manner

### ***Play Interaction Skills***

Session 3: Play Skills & Strategies:  
General play behaviors and manner between children

Session 4: Play Skills & Strategies:  
Identify & distinguish Play Skills and Strategies

### ***Different People***

Session 5: Differences in People:  
General and/or specific differences in people

Session 6: Differences in People:  
Abilities in people with sensory disabilities

### ***Play with different Friends***

Session 7: Play Skills & Strategies with Different Friends:  
Interaction and communication skills to play with people with sensory disabilities

### ***Understanding Autism***

Session 8: General Autism:  
General behaviors in children with autism

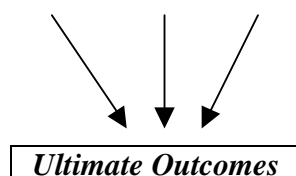
### ***Play Practice***

Session 9: Play Skills & Strategies for Friends with Autism-Indoor Play:  
Specific play behaviors in children with autism

Session 10: Play Skills & Strategies for Friends with Autism-Outdoor Play:  
Specific play behaviors in children with autism

Session 11: Play Skills & Strategies for Friends with Autism-Indoor Play:  
Specific play behaviors in children with autism

Session 12: Play Skills & Strategies for Friends with Autism-Outdoor Play:  
Specific play behaviors in children with autism



### **Peer-Mediated Play Schedule**

## Session 1 (My Friends)

### Aims:

The Peer Play Partners investigate characters of friends and the importance of friendship.

### Materials:

Videotape “Inside the Magic Circle” (10 minutes)

Worksheet 1-1

### Activities:

#### 1. Watching the videotape (10 minutes):

“Inside the Magic Circle”

Bosisto Productions for the South Australian Film Corp. 1971.

It uses brightly colored and animated puppets to explore the concept of friendship between school children and the problems which new pupils often face when they attempt to become friends with others.

#### 2. Discussion 1 (5 minutes):

a. Why was Sally alone?

[Because she has no friends.]

b. What was Sally doing to make friends?

[Nothing particularly. She ate chips by herself. She did not share them. Also other children ate her chips without asking her.]

c. What did other children say to Sally?

[Go away. You look silly.]

d. Why did Sally cry at the hospital?

[Because had no friends.]

e. What was Sally’s wish?

[To have friends.]

f. What did other people say to Sally to be friends?

[I’ll care for you. I can share toys with you. I can read letters for you.]

g. When Sally left from the hospital, and others had written their name on her cast, how did she feel?

[Happy.]

h. Why was she happy?

[Because she made friends.]

#### 3. Discussion 2 (5 minutes):

a. Have you ever felt lonely like Sally?

When?

How were you feeling?

#### 4. Role play (5 minutes):

a. Is there any child in your class like Sally?

What are you going to do to help him/her?

Role play a situational demonstration how to include a child who is lonely in play.

5. Worksheet 1-1 (5 minutes)

a. Characters of my friends:

Draw my friends' faces, write down their favorite foods and hobby.

b. Being with friends:

Good time and bad time with my friends.

**Outcomes for students:**

At the end of this session, the students will be able to:

a. Recognize when and why they feel happy with friends.

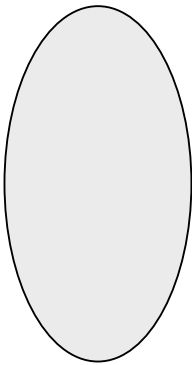
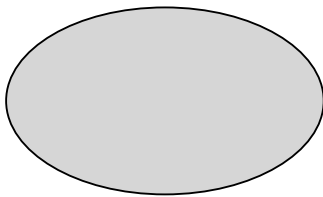
b. Understand the meaning of being alone.

c. Know how to get along with children who are feeling lonely.

[Worksheet 1-1]

**Friends**

1. My friend 1, & 2  
Faces



Name

-----

-----

Favorite food

-----

-----

Very good at (Hobby)

-----

-----

2. I have a good time with my friends

(when) -----

(how) -----

3. I have a bad time with my friends

(when) -----

(how) -----

## Session 2 (Friends & Play)

### Aims:

The Peer Play Partners recognize what kinds of manner are need for friendship.  
The Peer Play Partners recognize and identify common play activities and behaviors in typically developing children.

### Materials:

Review last session (3-5 minutes)

- a. Introduction
- b. Role play or modeling

Videotapes “Left off: to Social Learning & Living” (28 minutes)

Blackboard

Chalk

Worksheet 2-1

### Activities:

1. Watching the videotape (10 minutes):

“Left off: to Social Learning & Living”

-Australian Children’s Television Foundation: Curriculum Corporation.  
1993

-Supports the development of young children’s social experiences.

2. Discussion 1 (5 minutes):

- a. Why did Poss push Kim under the water?  
[Because Poss doesn’t believe Kim swims under the water. Teasing, playing.]
- b. Why did Kim kick and push Poss?  
[Because Kim was scared of going under water. And Poss accused Kim of being a ‘scaredy cat.’]
- c. Were Poss and Kim real friends?  
[Yes. Because they apologize each other later.]
- d. What else could Poss have done?  
[Poss could help Kim swim under the water, rather than teasing her.]
- e. What else could Kim have done?  
[Kim could say honestly, she was not good at swimming under the water.]

3. Discussion 2 (10 minutes):

Friendship:

- a. What is a friend?
- b. Why are friends important or special?
- c. Where do you find friends?
- d. How do you make friends?
- e. How do you keep friends?
- f. What makes someone a best friend?
- g. Do we need a best friend?

- h. Can you still be best friends if you fight?
  - i. How do friends act when they are together?
  - j. How do friends look after each other?
4. Worksheet 2-1 (3-5 minutes)
- a. My best friend(s) and I do together:  
What, where, when, and how
  - b. My best friend(s) help(s) me:  
What, where, when, and how
  - c. I help my best friend(s):  
What, where, when, and how
  - d. When my best friend(s) and I play together, we are:  
In good manner and not in bad manner to each other

**Outcomes for Students:**

- \* At the end of this session, the students will be able to:
  - a. Identify ways in which children make and maintain friendship.
  - b. Recognize better behaviors (helping each other) between friends.

[Worksheet 2-1]

## My best friend(s) & I

### 1. My best friend(s) and I do together

(what) -----  
 (where) -----  
 (when) -----  
 (how) -----

### 2. My best friend(s) help(s) me

(what) -----  
 (where) -----  
 (when) -----  
 (how) -----

### 3. I help my best friend(s)

(what) -----  
 (where) -----  
 (when) -----  
 (how) -----

### 4. When my best friend(s) and I play together, we are





### Session 3 (Play Skills & Strategies)

#### Aims:

The Peer Play Partners identify play skills & strategies by playing with typically developing children.

The Peer Play Partners distinguish differences in play activities

#### Materials:

Videotapes “Play” (30 minutes)

Toys

#### Activities:

1. Review last session (2 minutes)
  - a. Introduction and feedback.
2. Watching the videotape (8 minutes):
 

“Play” (30 minutes)

  - Barrington, III: Magna Systems. 1993.
  - The Developing Child: Module 21
  - The importance of play in the lives of children from infancy to middle childhood is significant all areas of development. Play has been studied according to its social categories and process oriented. Explores the contents and social dimensions of play and the important role of adults in facilitating children’s play.
3. Discussion 1 (10 minutes):
  - a. What are children usually doing at home or at school?  
[Working and playing.]
  - b. What is children’s play?  
[Doing something together for fun]
  - c. Why do children play?  
[To get rid of boredom. To have fun.]
  - d. Where do children play?  
[At the playground. In the classroom. At home.]
4. Role play (10 minutes):
  - a. Drills to demonstrate each play behavior
 

A play dyad (2 play partners for a play dyad) demonstrates each play behavior with toys (modeling):

-Play skills-

    - Sharing offer “We can use the ball together.”
    - Sharing request “Can we play the ball together?”
    - Assistance request “Can you help me? Push the block more.”
    - Assistance offer “I can help you push it more.”
    - Reinforcement “Wha, well done, Tom!”
    - Appreciation “I had fun with you. Thanks Tom.”

-Play strategies-

Turn taking “Now it’s my turn.”

Waiting “Please, show me how to play with the car, Tom.”

Modeling “This car goes on the road just like this, brum brum!”

Giving choice of toys “Do you want to play with car or doll?”

Suggesting play “Why do we play with the doll?”

Getting attention to play “Tom, look at me.”

Narrating play activities “Oh, you drive a car to go shopping.”

**Outcomes for Students:**

At the end of this session, the students will be able to:

- a. Recognize the benefits of play activities for children’ life.
- b. Identify Play Skills and Strategies in play dyads.

## Session 4 (Play Skills & Strategies)

### Aims:

The Peer Play Partners establish play skills & strategies by playing with typically developing children.

The Peer Play Partners distinguish differences in play activities

The Peer Play Partners identify others' play activities by the play skills & strategies (role play & scoring on the "Play Note").

### Materials:

Videotape "Learning through playground" (13 minutes)

Toys

Worksheet 4-1

### Activities:

1. Review last session (2 minutes)

a. Introduction and feedback.

2. Watching the videotape (8 minutes):

"Learning through playgroups" (13 minutes)

-Leederville, W. A: Audio-Visual Education Branch, 1985.

-This program shows the range of play experiences. Through play, children have fun, experiment & explore, they develop concepts, imagination & creativity. Play fosters social interaction, sharing, taking turns, independence, language development & physical skills.

3. Discussion 1 (5 minutes):

a. What can children learn through play with others?

[Learning to do things on their own, turn taking & sharing, language development, creativity, fun, physical development, pretending, working thing out on their own & solving problems, working thing out on their own.]

b. How can you play with others?

[Suggestion, observation for exploratory, modeling, assistance, praising, and practice.]

c. What kind of attitudes do you need in play?

[Being nice, do not hurt partners, and being polite.]

4. Role play (10 minutes):

a. Drills to demonstrate each play behavior

When one play dyad (2 play partners for a play dyad) demonstrates each play behavior with toys, other peer play partners score their skills and strategies on Play Note (modeling & monitoring):

-Play skills-

Sharing offer "We can use the ball together."

Sharing request "Can we play the ball together?"

Assistance request “Can you help me? Push the block more.”

Assistance offer “I can help you push it more.”

Reinforcement “Wha, well done, Tom!”

Appreciation “I had fun with you. Thanks Tom.”

-Play strategies-

Turn taking “Now it’s my turn.”

Waiting “Please, show me how to play with the car, Tom.”

Modeling “This car goes on the road just like this, brum brum!”

Giving choice of toys “Do you want to play with car or doll?”

Suggesting play “Why do we play with the doll?”

Getting attention to play “Tom, look at me.”

Narrating play activities “Oh, you drive a car to go shopping.”

5. Play Tags (5 minutes):

The Peer Play Partners put in order the “*Play Tags*” of the play skills & strategies.

**Outcomes for Students:**

At the end of this session, the students will be able to:

- a. Identify Play Skills and Strategies in others’ play dyads.
- b. Use Play Skills and Strategies in their play dyads.
- c. Match the appropriate Play Skills and Strategies on the context.

## Session 5 (Differences in People)

### Aims:

Peer Play Partners acquire different perspectives through role play  
 Peer Play Partners distinguish or differences in different individuals.  
 PPP explore the needs in individuals with disabilities

### Materials:

Book “The Boy with Two Eyes”  
 Hats to distinguish the role  
 Cast for a leg or an arm  
 Pictures of people (man/woman, adult/child, doctor/teacher, wheelchair/non-wheelchair)

### Activities:

1. Review last session (3 minutes):
  - a. Introduction & feedback
2. Discussion 1 (7 minutes):
  - a. What are the differences/similarities in people on the pictures?  
 [Colors: Skin colors, hair colors, eye colors  
 Physical: wheelchair/non-wheelchair  
 Gender: man/woman  
 Age: old/young  
 Size: adult/child  
 Job: doctor/ teacher]
  - b. What is special about feeling different?  
 [Negatively- Strange, not close, uncomfortable]  
 Positively- Strange, curious enough to approach]
  - c. What does it mean to be different?  
 [Something familiar or something unfamiliar.]
3. Reading a book (5 minutes):
 

“The Boy with Two Eyes”  
 The Jacaranda Press, Queensland, Australia, 1978.  
 Differences in people, ability and inability.
4. Discussion (5 minutes):
  - a. How is the strange boy different from everyone else on the planet?  
 [People have one eye, but he has two eyes.]
  - b. How his parents treat him?  
 [They love him, care for him.]
  - c. What were his problems as he grew up?  
 [Compare him (two eyes) with others (one eye).  

People with one eye –	The boy with two eyes
can see in the dark	can’t see in the dark (carry a light)
can see so far away	can’t see long distance (need a telescope)

can see straight through walls

can't read like others (need extra help)]

d. How was he feeling?

[Very lonely.]

e. Why was lonely?

[Because he had no friend. People mind him.]

f. What were his special amazing abilities?

[People with one eye –

only see black & white

The boy with two eyes

can see colors]

g. After marriage, what was his baby like?

[The baby had only one eye like others on the planet.]

h. If you have one eye on earth, how are you feeling? How should you be treated?

5. Role play (5 minutes):

The Peer Play Partners experience people with physical disabilities.

Toy play with cast of one arm.

Walking through table and chair with cast of one leg.

6. Worksheet 4-1 (5 minutes):

a. Investigating feeling and needs:

If I had a disability

-I would feel---Because I could not---

-And I would want/need---

-If I could get them, I would feel---Because I could---

b. Drawing the faces related the feeling in the situations:

Different feeling on the face

-A face before obtaining the needs

-A face with obtaining the needs

**Outcomes for Students:**

At the end of this session, the students will be able to:

a. Recognize that being different does not always result in a disability.

b. Identify their feeling toward difference.

c. Realize that individual with disabilities just need special services to compensate their difficulties.

[Worksheet 4-1]

**If I had a disability**

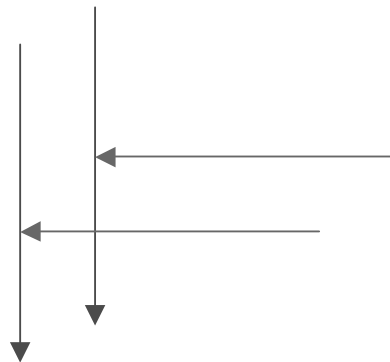
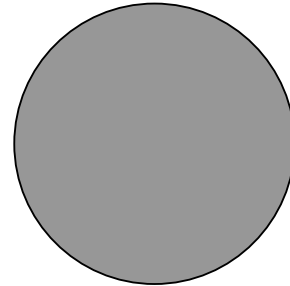
1. I have no \_\_\_\_\_

I would feel \_\_\_\_\_.

Because I could not

\_\_\_\_\_.

\_\_\_\_\_.



2. And I would need

\_\_\_\_\_.

\_\_\_\_\_.

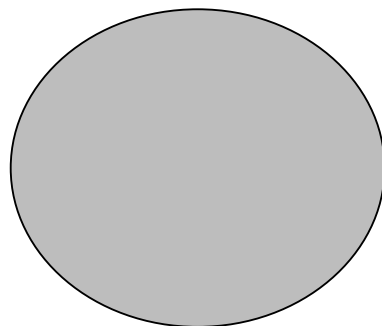
3. If I could get what I need,

I would feel \_\_\_\_\_.

Because I could

\_\_\_\_\_.

\_\_\_\_\_.



## Session 6 (Differences in People)

### Aims:

Peer Play Partners acquire different perspectives through role play.

Peer Play Partners explore the needs or differences in people with visual/hearing impairment.

Peer Play Partners find abilities in individual with disabilities.

### Materials:

Videotape

Hats

Blindfold

Ear plugs

### Activities:

1. Review last session (1 minutes):

- a. Introduction & feedback

2. Discussion 1 (2 minutes):

- a. What is the visual/hearing impairment?  
[It's difficulty to see]
- b. Who can get it?  
[Anybody, friends, relatives, family members, myself]
- c. Where can you see people with visual/hearing impairment?  
[Shopping centres]
- d. Have you ever had chance to help any person with visual/hearing impairment?  
How did you help them?

3. Watching videotapes (10 minutes):

“Captain Johnno” (60 minutes)

-Carlton, Vic: Australian Children's Television Foundation, 1988.

-This film shows a story of a young deaf boy who lives in small fishing town. Johnno, who is isolated because of his handicap, finds an ally in the Italian fisherman Tony. This film provokes discussions on individual differences, prejudice, communication, and friendship.

4. Discussion 2 (4 minutes):

- a. In what way is Johnno different?  
[He cannot hear]
- b. What does Johnno like?  
[Sea, spends time alone in the water playing on the beach, loves animal sea life, especially crab]
- c. What attracts Johnno to Tony?  
[Cannot speak English well to communicate with others in the small town (communication disorders)]

5. Role play (10 minutes):



**Sensory Training-**

1. Peer Play Partners experience people with visual impairment.  
Guessing through smelling (fruits, vinegar, onion, etc) & touching (fur, sandpaper, etc)
  2. Peer Play Partners experience people with hearing impairment.  
Guessing through hearing (familiar sounds and unfamiliar sounds)
6. Worksheet 5-1 (3 minutes):
- a. Writing compensation skills to cope with disabilities for communication.

**Outcomes for Students:**

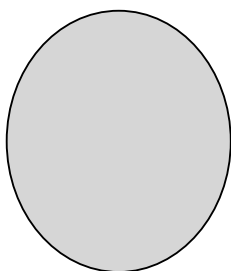
At the end of this session, the students will be able to:

- a. Realize abilities or compensation skills to cope with in being disabilities.
- b. Establish correct thinking about disabilities, excluding prejudice.

[Worksheet 5-1]

## If I

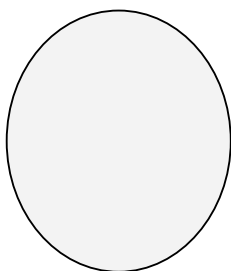
1. If I cannot see an  with my , I can use



-----to-----.

-----to-----.

2. If I cannot hear  with my , I can use



-----to-----.

-----to-----.

## Session 7 (Play Skills & Strategies with Different Friends)

### Aims:

Peer Play Partners review and establish Play Skills and Strategies to play with sensory disabilities.

Peer Play Partners monitor their Play Skills and Strategies (scoring on the “Play Note”).

Peer Play Partners use verbal and nonverbal communication (including basic sign language).

### Materials:

Hats

Ear plugs

Blindfold

Play Note

Written form of Play Skill & Strategies

Video camera

Videotape “Non-verbal communication”

VCR

TV monitor

### Activities:

1. Review last session (2 minutes):

- a. Introduction & feedback

2. Watching videotapes (5 minutes):

“Non-verbal communication” (12 minutes)

Box Hill, Vic: Television Production Unit, Box Hill College of TAFE, 1987.

This film discusses different aspects of non-verbal communication—gesture, posture, personal space, and eye contact.

3. Discussion 1 (3minutes):

- a. What is communication?

[Understanding each other]

- b. How can we talk each other?

[Verbal and non-verbal way]

4. Role play (15 minutes):

Characters –

Researcher: a friend with hearing/visual impairment.

Peer Play Partners: facilitators to play with the researcher.

Settings –

Indoor play: toy play

Outdoor play: using facilities

Procedure –

-Peer Play Partners try to play with the researcher by verbal or non- verbal communication methods.

-When a dyad (researcher & a PPP) participates in a role play, other Peer Play Partners observe and score Play Skills and Strategies used by the PPP on the Play Note.

-This session may be recorded to monitor the skills and strategies for Peer Play Partners.

5. Discussion 2 (3 minutes):

- a. What skills and strategies are involved to play with? Researcher provides Peer Play Partners with feedback.

[Scoring on Play Note]

- b. When was the most difficult part in the role play? And why?
- c. What skills and strategies need to be practiced more for more effective play?

6. Worksheet 6-1 (2 minutes):

- a. Drawing methods to communicate each other.  
e.g., mouth & mouth, hands & hands, and eyes & mouth, etc.
- b. Do the first one together with students.

**Outcomes for Students:**

At the end of this session, the students are able to:

- a. Recognize verbal/non-verbal social communication skills.
- b. Distinguish the Play Skills and Strategies used by others.

[Worksheet 6-1]

**Talking with Friends**

My friends and I can talk to each other

1.	<div></div>	<div></div>
2.	<div></div>	<div></div>
3.	<div></div>	<div></div>
4.	<div></div>	<div></div>
5.	<div></div>	<div></div>

## Session 8 (General Autism)

### Aim:

Peer Play Partners distinguish differences of behaviors and emotions in between children with autism and without autism (compare with their younger siblings).

Peer Play Partners review and establish the Play Skills and Strategies to play with children with autism.

### Materials:

Videotape

Play Note

VCR

TV monitor

### Activities:

1. Review last session (2 minutes):

- a. Introduction & feedback

2. Watching videotape (13 minutes):

“The child couldn’t play” (60 minutes)

Published SBS TV, 1996.

Autistic children in infancy and childhood.

3. Introduction & Discussion (13 minutes):

- a. How is the child in the film different?

[Toe walking, hand flapping, hurting themselves, being alone, repeating words others say, repetitive running, keeping to themselves.]

- b. What kind of difficulties do children with autism have for playing with others?

[No eye-contact, can’t imitate others well, don’t observe others well.]

- c. What were the children’s reactions toward fear emotion?

[Compare the child with autism to other kids in the film. A typically developing child / a child with Down Syndrome / a child with autism.]

- d. What did Dr Templin who has autism say about her difficulties with emotion?

[Being happy, sad, cry are OK, but being love and jealous are difficulty for her to understand.]

- e. What kind of skills and strategies do we need to play with children with autism?

[Getting their attention, rewarding, tickling, and hugging can be used. If the children with autism enjoy, they may realize stimulus, and start to communicate or interact with partners.]

- f. Are people with autism all the same?

[No, some of them have intellectual disabilities, and some of them are very smart.]

- g. What about their sensory abilities?

[Very interesting, the child with autism doesn’t distinguish that his dad came back home, but sometimes surprisingly sensitive.]

- h. When children with autism get frustrated, how do they react?

[Tantrum]

- i. Can children with autism learn?

[Yes, they can appropriate behaviors with extra help such role modeling and correct behaviors and reward.]

4. Play tags (2 minutes):

How can we play with children with autism?

-Review Play Skills and Strategies

**Outcomes for Students:**

At the end of this session, the students will be able to:

- a. Acquire generally different behaviors in children with autism from others.
- b. Realize that there are some ways to communicate or interact with children with autism (positive attitude).
- c. Identify their roles as peer play partners to play with children with autism.

## Session 9 (Play Skills & Strategies for Friends with autism-Indoor Play)

### Aim:

Peer Play Partners analyze indoor play behaviors or emotion in their play partners with autism.

Peer Play Partners acquire the Play Skills and Strategies to play with their play partners with autism.

Peer Play Partners monitor their Play Skills and Strategies (scoring on the “*Play Note*”).

### Materials:

Videotapes

Hats

Play Skills & Strategies (Play Skills and Strategies )

Play Note

Video camera

VCR

TV monitor

### Activities:

#### 1. Review last session (2 minutes):

- a. Introduction & feedback

#### 2. Watching videotapes (5 minutes):

“Play Behaviors of their play partners with autism 1”

Recorded by the researcher in the Special Education Developmental Unit

This film show the subjects with autism in indoor play (toy play with adults) in their Special Education Developmental Unit.

#### 3. Discussion 1(5 minutes):

- a. What do you think about behaviors in the child with autism?

[Analyze play behaviors in the children with autism]

- b. How was their playing?

[Score on the *Play Note*]

- C. What do you need to play with your play partners with autism?

[Use Play Skills and Strategies ]

#### 4. Role play (15 minutes):

Characters –

Researcher: a friend with autism.

Peer Play Partners: facilitators to play with the researcher.

Settings –

Indoor play: toy play

Procedure –

-Peer Play Partners try to play with the researcher by Play Skills and Strategies .



- Researcher provides Peer Play Partners with feedback.
- When a dyad (researcher & a PPP) participates in a role play, other Peer Play Partners observe and score Play Skills and Strategies used by the PPP on the Play Note.
- This session may be recorded to monitor the skills and strategies.

5. Discussion 2 (3 minutes):

- a. What skills and strategies are involved to play with?  
[Scoring on Play Note]
- b. When was the most difficult part in the role play? And why?
- c. What skills and strategies need to be practiced more for more effective play?

**Outcomes for Students:**

At the end of this session, the students will be able to:

- a. Identify characters of indoor play behavior in their play partner with autism.
- b. Use Play Skills & Strategies (Play Skills and Strategies ) in their role play.
- c. Evaluate others' Play Skills and Strategies and score them on the *Play Note*.

## Session 10 (Play Skills & Strategies for Friends with autism- Outdoor Play)

### Aim:

Peer Play Partners analyze outdoor play behaviors or emotion in their play partners with autism.

Peer Play Partners monitor their Play Skills and Strategies (scoring on the “*Play Note*”).

Peer Play Partners modify & elaborate the play skills & strategies (“Play Skills and Strategies ”).

### Materials:

Videotapes

Hats

Play Skills & Strategies (Play Skills and Strategies )

Play Note

Video camera

VCR

TV monitor

### Activities:

#### 1. Review last session (2 minutes):

- a. Introduction & feedback

#### 2. Watching videotapes (5 minutes):

“Play Behaviors of their play partners with autism 2”

Recorded by the researcher in the Special Education Developmental Unit

This film show the subjects with autism in outdoor play (using facilities with others) in their Special Education Developmental Unit.

#### 3. Discussion 1(5 minutes):

- a. What do you think about behaviors in the child with autism?

[Analyze play behaviors in the children with autism]

- b. How was their playing?

[Score on the *Play Note*]

- C. What do you need to play with your play partners with autism?

[Use Play Skills and Strategies ]

#### 4. Role play (15 minutes):

Characters –

Researcher: a friend with autism.

Peer Play Partners: facilitators to play with the researcher.

Settings –

Outdoor play: using facilities.

Procedure –

-Peer Play Partners try to play with the researcher by Play Skills and Strategies .

- Researcher provides Peer Play Partners with feedback.
- When a dyad (researcher & a PPP) participates in a role play, other Peer Play Partners observe and score Play Skills and Strategies used by the PPP on the Play Note.
- This session may be recorded to monitor the skills and strategies.

5. Discussion 2 (3 minutes):

- a. What skills and strategies are involved to play with?  
[Scoring on Play Note]
- b. When was the most difficult part in the role play? And why?
- c. What skills and strategies need to be practiced more for more effective play?

**Outcomes for Students:**

At the end of this session, the students will be able to:

- a. Identify characters of outdoor play behavior in their play partner with autism.
- b. Use Play Skills & Strategies in their role play.
- c. Evaluate others' Play Skills and Strategies and score them on the Play Note.

## **Session 11 (Play Skills & Strategies for Friends with autism-Indoor Play)**

### **Aim:**

Peer Play Partners analyze indoor play behaviors or emotion in their play partners with autism.

Peer Play Partners monitor their Play Skills and Strategies (scoring on the “*Play Note*”).

Peer Play Partners modify & elaborate the play skills & strategies.

### **Materials:**

Videotapes

Hats

Play Skills & Strategies

Play Note

Video camera

VCR

TV monitor

### **Activities:**

1. Review last session (2 minutes):

a. Introduction & feedback

2. Watching videotape (5 minutes):

“Play Behaviors of their play partners with autism 3”

Recorded by the researcher in the Special Education Developmental Unit.

This film shows the subjects with autism in indoor play (using facilities with others) in their Special Education Developmental Unit.

3. Discussion 1(5 minutes):

a. What do you think about behaviors in the child with autism?

[Analyze play behaviors in the children with autism]

b. How was their playing?

[Score on the Play Note]

c. What do you need to play with your play partners with autism?

[Use Play Skills and Strategies ]

4. Role play (15 minutes):

Characters –

Researcher: supervises Peer Play Partners’ role playing and provides with feedback.

Peer Play Partners: alternatively take roles, as a facilitator to play with or as a child with autism.

Settings –

Indoor play: toy play.

Procedure –

- Peer Play Partners try to play with each other using Play Skills and Strategies supported by researcher.
- Researcher provides Peer Play Partners with feedback.
- When a dyad (a Peer Play Partner & a Peer Play Partner) participates in a role play, other Peer Play Partners observe and score Play Skills and Strategies used by the Peer Play Partner on the Play Note.
- This session may be recorded to monitor the skills and strategies.

5. Discussion 2 (3 minutes):

- a. What skills and strategies are involved to play with?  
[Scoring on Play Note]
- b. When was the most difficult part in the role play? And why?
- c. What skills and strategies need to be practiced more for more effective play?

**Outcomes for Students**

At the end of this session, the students will be able to:

- a. Find and use Play Skills & Strategies (Play Skills and Strategies ) properly for the situation in their role play.
- b. Evaluate others' Play Skills and Strategies properly and score them on the Play Note.

## Session 12 (Play Skills & Strategies for Friends with autism- Outdoor Play)

### Aim:

Peer Play Partners analyze outdoor play behaviors or emotion in their play partners with autism.

Peer Play Partners monitor their Play Skills and Strategies (scoring on the “*Play Note*”).

Peer Play Partners modify & elaborate the play skills & strategies.

### Materials:

Videotapes

Hats

Play Skills & Strategies

Play Note

Video camera

VCR

TV monitor

### Activities:

1. Review last session (2 minutes):

a. Introduction & feedback

2. Watching videotape (5 minutes):

“Play Behaviors of their play partners with autism 4”

Recorded by the researcher in the Special Education Developmental Unit.

This film shows the subjects with autism in outdoor play (using facilities with others) in their Special Education Developmental Unit.

3. Discussion 1(5 minutes):

a. What do you think about behaviors in the child with autism?

[Analyze play behaviors in the children with autism]

b. How was their playing?

[Score on the *Play Note*]

c. What do you need to play with your play partners with autism?

[Use Play Skills and Strategies ]

4. Role play (15 minutes):

Characters –

Researcher: supervises Peer Play Partners’ role playing and provides with feedback.

Peer Play Partners: alternatively take roles, as a facilitator to play with or as a child with autism.

Settings –

Outdoor play: toy play.

Procedure –

- Peer Play Partners try to play with each other using Play Skills and Strategies supported by researcher.
- Researcher provides Peer Play Partners with feedback.
- When a dyad (a PPP & a PPP) participates in a role play, other Peer Play Partners observe and score Play Skills and Strategies used by the Peer Play Partner on the *Play Note*.
- This session may be recorded to monitor the skills and strategies.

5. Discussion 2 (3 minutes):

- a. What skills and strategies are involved to play with?  
[Scoring on *Play Note*]
- b. When was the most difficult part in the role play? And why?
- c. What skills and strategies need to be practiced more for more effective play?

**Outcomes for Students:**

At the end of this session, the students will be able to:

- a. Be familiar to use Play Skills & Strategies properly for the situation in their role play.
- b. Evaluate others' Play Skills and Strategies properly and score them on the *Play Note*.

## Play Tags

Getting attention	“Hello! Tom” [with Eye-Contact or Touching his/her shoulder].
Choosing	“Do you want to play with the car or the doll?”
Waiting	“Please, show me how to use the car, Tom.”
Showing	“My car goes on the road, brum brum!”
Suggesting	“Let’s play with the car.”
Turn taking	“It’s my turn.” or “it’s your turn.”



Telling	“Oh, you drive a car to go to the shop.”
---------	--

Asking for help	“Can you help me? Push the block more.”
-----------------	---

Giving help	“Push it more. I can help you.”
-------------	---------------------------------

Sharing	“We can use the ball together.”
---------	---------------------------------

Explaining	“Stand up in the circle. Roll it in the circle.”
------------	--

Praising	“Well done, Tom!”
----------	-------------------

Eye-Contact	Having contact with each other using the eyes.
Gesture	Moving parts of the body to communicate. [by Finger pointing, Clapping hands, or Shaking head]
Personal Space	Space around you.

Play Note

Name:

1	Getting Attention					
2	Choosing					
3	Waiting					
4	Showing					
5	Suggesting					
6	Turn taking					
7	Talking about					
8	Asking for help					
9	Giving help					
10	Sharing					
11	Explaining					
12	Praising					

### References

- Baxley, N. & Associates (1988). The skillstreaming video: how to teach students prosocial skills. Champaign: Research Press.
- McGinnis, E. & Goldstein, A. P. (1990). Skill-streaming in early childhood: teaching prosocial skills to the preschool and kindergarten child. Champaign: Research Press.
- Fuchs, D. & Fuchs, L. S. (1995). Sometimes separate is better. Educational Leadership, 52(4), 22-26.
- Goldstein, H., Kaczmarek, L., Pennington, R., & Shafer, K. (1992). Peer-mediated intervention: Attending to, commenting on, and acknowledging the behavior of preschoolers with autism. Journal of Applied Behavior Analysis, 25, 289-350.
- Kanner, L. (1943). Autistic disturbances of affective contact. The Nervous Child, 2, 217-235.
- Kazdin, A. E. (4<sup>th</sup> Ed.) (1989). Behavior Modification in Applied Settings, California: Brooks/Cole Publishing Company.
- Kern-Dunlap, L., Dunlap, G., Clarke, S., Childs, K. E., White, R. L., & Stewart, M. P. (1992). Effects of a videotape feedback package on the peer interactions of children with serious behavioral and emotional challenges. Journal of Applied Behavior Analysis, 25(2), 355-364.
- Krantz, P. J., MacDuff, G. S., Wadstrom, O., & McClannahan, L. E. (1991). Using video with developmentally disabled learners. In P.W. Dowrick (Ed.), Practical guide to using video in the behavioral sciences (pp. 256-267). New York: Wiley.
- Mesibov, G. B. & Shea, V. (1996). Full inclusion and students with autism. Journal of Autism and Developmental Disorders, 26(3), 337-346.
- Morgan, R. L. & Salzberg, C. (1992). Effects of video-assisted training on employment-related social skills of adults with severe mental retardation. Journal of Applied Behavior Analysis, 25(2), 365-383.
- Shanker, A. (1995). Full inclusion is neither free nor appropriate. Educational Leadership, 52(4), 18-21.
- Skinner, M. F. (1996). Full inclusion and students with disabilities: One size fits all? Reading and Writing Quarterly: Overcoming Learning Difficulties, 12(2), 241-244.
- Tansey, K. (1995). This can't be my responsibility: it must be yours! An analysis of a reintegration programme for a school refuser. British Journal of Special Education, 22(1), 12-15.

Teitzel, T & Terkelsen, J (1997). A PEER IN. NSW: Tweed District Early Intervention Centre.

### **Bibliographies**

Haring, T. G., Kennedy, C. H., Adams, M. J., & Pitts-Conway, V. (1987). Teaching generalization of purchasing skills across community settings to autistic youth using videotape modeling. Journal of Applied Behavior Analysis, 20(1), 89-96.

Roberts, C. M. & Smith, P. R. (1999). Attitudes and behavior of children toward peers with disabilities. International Journal of Disability, Development and Education, 46(1), 35-50.

Meyer, L. H., Fox, A., Schermer, A., Ketelsen, D., Montan, N., Maley, K., & Cole, D. (1987). The effects of teacher intrusion on social play interactions between children with autism and their nonhandicapped peers. Journal of Autism and Developmental Disorder, 17(3), 315-332.

## Play Note 2

(Observation)

**Date:**

**Player:**  
**Observer:**

[illegible]

## Play Note 3

(Observation)

**Date:**

**Player:**

**Observer:**

Play Skills & Strategies	Non-verbal Communication	Eye-contact	Personal Space	Gesture	# (/3)
Verbal Communication	Getting Attention				
	Suggesting				
	Choosing				
	Waiting				
	Showing				
	Turn taking				
	Sharing				
	Telling				
	Explaining				
	Asking for help				
	Giving help				
	Praising				



# Appendix D

## Study 1—Information letters and consent forms

Information letters and consent forms sent to prospective participants are included here. The items reproduced here are:

1. Information letter for parents of typically developing children
2. Consent form for parents of typically developing children and typically developing children
3. Information letter for parents of children with autism
4. Consent form for parents of children with autism
5. Application to conduct research in state schools and other organisational units

[PEERS]

### **PARTICIPANT INFORMATION LETTER**

19<sup>th</sup> May, 1999

Dear Parent,

My name is Serene (Hyun-jin) Choi and I am a Ph D student at the Schonell Special Education Research Centre in The University of Queensland, St Lucia. My research topic is play and social interaction between children with autism and typically developing children. The main purpose of my research is to design and test the effectiveness of a peer mediated play intervention on the play and social interaction skills of young children with autism. This research will take about one year, and will be carried out in 1999 at a Special Education Developmental Unit (SEDU) where children with autism attend, adjacent to your child's school.

The research will require 4-6 young children with autism, and 8-12 typically developing children who are 7 to 9 years old as participants. Peer participants will acquire several social cognitive skills by participating in this research. They are pro-social behaviors such as helping others; leadership such as management skills for interpersonal relationship; and investigating skills for social science subjects such as "Studies of Society and Environment", particularly the aspect related to culture and diversity. I would be most pleased if your child could be one of these participants in my research.

Your child's participation could involve: Twelve play training sessions for four weeks (total 6 hours, 20-30 minutes per session, which include watching videotapes, role play, and discussions to learn play and interaction skills to play with children with autism) before playing with the child with autism. The training sessions will be undertaken in consultation with class teacher in order to ensure that your child's regular school program will not be disrupted. For the peer participants, the hours away from the class activities will be minimized and time taken will be under the supervision with the advice of the class teacher. Play intervention sessions with a child with autism would then be undertaken. These will be held at the SEDU for one day a week (total 3 hours 20 minutes, 20-30 minutes per session). The play sessions will be observed, and the behavior of the children analyzed. Discussions have already been undertaken with the class teacher and it is expected that for the trained peer participants used in the study about 9 hours 20 minutes of time away from class activities over the year be required.

Safety of peer participants in this study will be ensured by the presence of researcher, the teacher in charge, and teacher aides in the play environment at all times. All data including videotapes or audiotapes will be treated as confidential, and the anonymity of the participants will be preserved. All observation, and any videotapes or audiotapes made will only be used for the purposes of this research and held in locked filing cabinets in the researcher's or supervisor's office.

I would be most pleased if you would give consent for your child to take part in this research. If so, could you please complete the enclosed consent form?

This study has been cleared by one of the human ethics committees of the University of Queensland in accordance with the National Health and Medical Research Council's guidelines. Approval for this research has also been granted by Education Queensland and supported by Mr. John D. Shelley Principal Thornlands State School. If you would like any further information about this research, please contact me (3365 6466), or my research supervisor, Dr Anne Jobling (3365 6405). If you would like to speak to an officer of the University not involved in the study, you may contact the Assistant Ethics Officer or Ethics Officer on 3365-4582 or 3365-3924.

Thank you for your co-operation.

Serene Hyun-jin Choi

[PEERS]

### CONSENT FORM

#### Parent(s)

I give my consent for my child \_\_\_\_\_ to take part in a study of peer assisting play and social interaction skills in children with autism which is being conducted by researcher Serene Hyun-jin Choi at the Schonell Special Education Research Centre in The University of Queensland.

I understand that all the information will be confidential and that I may withdraw my child from the study at any time.

I also understand that my child and I shall be given feedback. Also my child will be given opportunities to review his/her participation experiences.

Signed: \_\_\_\_\_ Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

Signed: \_\_\_\_\_ Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

Address: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

#### Child

I would like to help in this study being conducted by Serene Hyun-jin Choi of the Schonell Special Education Research Centre in The University of Queensland by helping children with autism to play.

I understand that all the information about me and my playing which is on video will be secret.

I understand that I may stop taking part in the study at any time.

Signed: \_\_\_\_\_ Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

[AUTISM]

### **PARTICIPANT INFORMATION LETTER**

18<sup>th</sup> May, 1999

Dear Parent,

My name is Serene (Hyun-jin) Choi and I am a Ph D student at the Schonell Special Education Research Centre in The University of Queensland, St Lucia. My research topic is play and social interaction between children with autism and typically developing children. The main purpose of my research is to design and test the effectiveness of a peer mediated play intervention on the play and social interaction skills of young children with autism. This research will take about one year, and will be carried out in 1999 at a Special Education Developmental Unit where children with autism attend.

The research will require 4-6 young children with autism, and 8-12 typically developing children who are 7 to 9 years old as participants. I would be most pleased if your child can be one of these participants in my research. Your child's participation would involve taking part in a play session of about 20-30 minutes with a peer play partner for one day a week. The play sessions will be observed, and the behavior of the children analyzed. As the peer play partners will have undertaken specific training designed to enhance their play and social interaction skills, it is considered that your child could gain from participating in the play intervention research program.

Safety of participants in this study will be ensured by the presence of researcher and the teacher in charge in the play environment at all times. All data including videotapes or audiotapes will be treated as confidential, and the anonymity of the participants will be preserved. All observation, and any videotapes or audiotapes made will only be used for the purposes of this research and held in locked filing cabinets in the researcher's or supervisor's office.

I have prepared one questionnaire form for you to collect information about basic play behaviors and social skills in your child. I would be most pleased if you would give consent for your child to take part in this research and accordingly fill out the questionnaire form. If so, could you please complete the enclosed consent form and questionnaire?

This study has been cleared by one of the human ethics committees of the University of Queensland in accordance with the National Health and Medical Research Council's guidelines. If you would like any further information about this research, please contact me (3365 6466), or my research supervisor, Dr Anne Jobling (3365 6405). If you would like to speak to an officer of the University not involved in the study, you may contact the Assistant Ethics Officer or Ethics Officer on 3365-4582 or 3365-3924.

Thank you for your co-operation.

Serene Hyun-jin Choi

[AUTISM]

### CONSENT FORM

**Parent(s)**

I give my consent for my child \_\_\_\_\_ to take part in a study of peer assisting play and social interaction skills in children with autism which is being conducted by researcher Serene Hyun-jin Choi at the Schonell Special Education Research Centre in The University of Queensland.

I understand that all the information will be confidential and that I may withdraw my child from the study at any time.

I also understand that I shall be given feedback on my child's performance, if it is needed.

Signed: \_\_\_\_\_ Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

Signed: \_\_\_\_\_ Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



## APPLICATION TO CONDUCT RESEARCH IN STATE SCHOOLS AND OTHER ORGANISATIONAL UNITS

Department of Education, Queensland

Supporting information may be attached but the information presented on the form should stand alone in conveying the salient features of the research proposal. *See attachments* will not suffice.

**Ref. No.**

<b>1. Name of principal researcher</b> Miss Hyun-jin (Serene) Choi	<b>Designation:</b> Ph D research student  <b>Organisation:</b> Schonell Special Education Research Centre
<b>Contact address:</b> Schonell Special Education Research Centre Graduate School of Education The University of Queensland	<b>Telephone:</b> 3365 6466 <b>Fax:</b> 3365 8553 <b>Email:</b> s800706@student.uq.edu.au
<b>2. Title of research</b> Peer mediated instruction in play and social interaction for children with autism	
<b>3. Purpose of the research activity</b> (e.g. to fulfil requirements for M. Ed., trial of test instruments). The conduct of research to complete post-graduate study requirements of my doctoral program	
<b>4. Research aim</b>	To examine the effectiveness of a peer mediated play intervention on the play and social interaction skills of young children with autism
<b>5. Summary of field activity:</b> <ul style="list-style-type: none"> <li>• Subjects</li> <li>• Sample sizes</li> <li>• Instruments</li> <li>• Time required</li> <li>• Administration</li> </ul>	Observe and collect data of play and interaction skills in 4-6 children with autism who are 4 to 6 years old and in 8-12 typically developing peers who are 7-9 years old (30minutes per session, use of two standardized play or social interaction scales, obtain permission from their parents on the consent form)  Observe and collect data of play and social interaction skills between the children with autism and their typically developing peers (20-30minutes per session, use the 10-second interval data sheet which are designed by the researcher-Appendix 1, 2, 3, & 4 of the research proposal)  Provide 4 peers with play and social interaction skills training (30minutes per session before intervention period, 10-15 minutes per session during intervention period)  The study will be conducted by the researcher
<b>6. Schools and/or organisational units to be approached</b>	Browns Plain Special Education Developmental Unit Redland District Special Education Developmental Unit Redland Special School P.T.O.

↓The section below to be completed by approving officer.↓

<b>Conditions of Approval</b>   Draw a line through the conditions 1 to 3 which do not apply.  If any additional conditions apply, list them in the adjacent space or on the reverse of this approval.	<b>Conditions applicable to all research:</b> <ul style="list-style-type: none"> <li>• All data to be treated as confidential; anonymity of participants to be preserved.</li> <li>• An executive summary of the research findings to be provided to the participating schools and approval authority.</li> </ul> <b>Conditions that may apply:</b> <ol style="list-style-type: none"> <li>1. Parental permission to be obtained for participating students.</li> <li>2. Permission to be obtained from participating teachers.</li> <li>3. Audiotapes and videotapes to be used only for the purposes of the research.</li> </ol> <b>Additional conditions:</b>										
<table style="width: 100%;"> <tr> <td style="width: 50%;"> <b>This research application is approved/not approved.</b> </td> <td style="width: 50%; text-align: right;">           (Cross out what does not apply.)         </td> </tr> <tr> <td colspan="2"> <b>Signed:</b> _____         </td> </tr> <tr> <td> <b>Name:</b> _____         </td> <td> <b>Designation:</b> _____         </td> </tr> <tr> <td> <b>Address:</b> _____         </td> <td> <b>Telephone:</b> _____         </td> </tr> <tr> <td>           _____         </td> <td> <b>Fax:</b> _____         </td> </tr> </table>		<b>This research application is approved/not approved.</b>	(Cross out what does not apply.)	<b>Signed:</b> _____		<b>Name:</b> _____	<b>Designation:</b> _____	<b>Address:</b> _____	<b>Telephone:</b> _____	_____	<b>Fax:</b> _____
<b>This research application is approved/not approved.</b>	(Cross out what does not apply.)										
<b>Signed:</b> _____											
<b>Name:</b> _____	<b>Designation:</b> _____										
<b>Address:</b> _____	<b>Telephone:</b> _____										
_____	<b>Fax:</b> _____										
<i>Approval allows the principal researcher outlined above to approach schools and other organisational units within the Department of Education, Queensland, to seek their cooperation to participate in the approved research. However, although approval may be granted by the department, there is no obligation for participation in the study. A copy of this signed approval should be provided as evidence of approval to the regions, school principals and others whose cooperation is requested.</i>											



**7. Overall timeline for the research and months for each data collection, e.g. terms, months, stages.**

March (in term 1, Pre-observation & orientation to select participants)

April (for 2 weeks of term 1, Baseline)

April-May (for 3 weeks of term 1, Peer Training)

May-September (17 weeks of term 2-3, Intervention)

October-December (6 weeks of term 4, Follow-up)

**8. Summary of the research approach, design, methodology and strategies employed to ensure validity and reliability.** (Attach data collection instruments.)

A multiple baseline design across people (trained peer play partners=TPPP& untrained peer play partners=UTPPP) and situations (indoor & outdoor)

Pre-observation (March): Play & social interaction skills in 4-6 children with autism will be observed and collected in their educational settings (Use of two standardized behavior, play, and social interaction scales, obtain permission from their parents on the consent form); Play skills in 8-12 peers will be observed through play activities with the researcher in their schools (Use one standardized social interaction scales, obtain consent forms from their parents)

Baseline (April): Play activities & social interaction skills between the children with autism and the peers will be recorded on the 10-second interval data sheets which are designed by the researcher (Appendix 1, 2, 3, & 4 of the research proposal)

Peer Training (April-May): Half (4-6) of the peer play partners (PPP), who will be called TPPP, will be selected and trained for effective play activities & social interaction skills with the children with autism (adapt the training package manual of Pierce and Schribman, 1995)

Intervention (May-September): Play activities & social interaction skills between the children with autism and the TPPP/UTPPP will be recorded on the interval data sheets (Appendix 1, 2, 3, & 4 of the research proposal); The training will be continuing every 3<sup>rd</sup> sessions

Follow-up (October-December): Same as Baseline

**9. Signature of principal researcher**

Signature: \_\_\_\_\_

Date: 22 / February / 1999

**10. Statement of verification and support.** To be signed by supervisor, Head of University Department, Director of Research Agency, Employing Authority or Tertiary Institution as applicable.

I verify the details of the research proposal and provide assurance that I am fully aware and supportive of the purpose and content, and that ethical considerations have been adequately addressed.

Name (print): Dr. Anne Jobling

Designation: Lecturer in Graduate School of Education in The University of Queensland

Dept/Organisation: Schonell Special Education Research Centre in Graduate School of Education

Telephone: 3365-6405

Fax: 3365-8553

Email: a.jobling@mailbox.uq.oz.au

Signature: \_\_\_\_\_

Date: 22 / February / 1999



# **Appendix E**

## **Study 1—Play History Inventory**

The questionnaires for the Play History Inventory instrument are presented here.

These consist of:

1. Questionnaire for parents of children with autism
2. Questionnaire for teachers of children with autism

[AUTISM]

# Play History

## Questionnaire for parents

Today's Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Parent(s)' Name:

Father: \_\_\_\_\_ Mother: \_\_\_\_\_

The questionnaire completed by: \_\_\_\_\_

Child Name : \_\_\_\_\_

Date of Birth : \_\_\_\_/\_\_\_\_/\_\_\_\_

Language spoken at Home: \_\_\_\_\_



**A. Play Behaviors**

1. Do you think your child can play? (Please circle)

Yes                      /                      No                      /                      I do not know

2. Read each statement carefully and place tick ( ) on any item that you have actually observed when your child is playing.

<i>My child</i>	Yes	No
1) Looks at the toy(s) carefully, licks it (them), mouths it (them), touches it (them), and twirls it (them).		
2) Turns toward direction of others to watch their play activities.		
3) Likes templin, bouncing a ball, running a car backwards and forwards, filling bucket with sand, or throwing basketball through hoop.		
4) Likes building a castle with blocks, cutting and pasting activity.		
5) Likes doctor and patient play, Batman and Robin play, or doll play.		
6) Likes soccer with others, or any game with others.		
7) Watches other's play activities but does not play with them.		
8) When somebody (play partner, for example, father or mother) invites your child, he/she responses to the play partner to play with.		
9) Plays alone and does not care much about anything else that is happening.		
10) Plays near or among others in a similar manner to deal with toys, without real interaction with them.		
11) Plays with 2 or more play partners and sometimes borrows, lends, or shares the toys.		
12) Plays with others with real interactions.		
13) Shows any cooperative response such as touching with hands, hugging, holding hands, waving hands, or kissing to play together.		
14) Hits, pinches, kicks, runs away, pulls, destroys other's work, or ignores.		
15) Shows any verbal behaviors nicely to play with		
15) Screams, shouts, cries, or whines.		
16) Suggests someone to play with by talking or gesture		
17) Responses toward other(s)' suggestion for play		
18) Gets attention from other(s) to play with, e.g. "Mum!", or eye-contact		
19) Maintains eye contact while speaking or spoken to		
20) Shows how to deal with toys to other(s) to play with		
21) Shares toys with other(s) to play with		
22) Takes turns with other(s) to play with.		
23) Asks for help or assists other(s) to play with		
24) Praises other(s) to play with, e.g. "Great bouncing!"		

3. Who does your child prefer to play with? (Please circle one)

By himself/herself / with a family member / with any other play partner

4. How does your child play when he/she is left alone at home?

---



---



---

5. Who does your child prefer to play with at home? (Please circle one and describe their play interaction)

Mother / Father / Sister / Brother/ other ( )

Describe the play interaction

---



---

6. In which place does your child prefer to play at home? (Please circle one and describe)

1) Indoor area:

\*In bedroom, living room, kitchen, veranda, toilet, other ( )

\*Describe the play interaction

---



---

2) Outdoor area:

\*In the garden, garage, swimming pool, other ( )

\*Describe the play interaction

---



---

7. What are your child's favorite playthings in indoor play? (kinds of toys)

---

8. What are your child's favorite playthings/facilities in outdoor play? (kinds of toys and facilities/equipment)

---

9. What kinds of play activities does your child least enjoy?

---

10. At home how long does your child play with one toy (average)?

---

11. In another environment (not home), how long does your child play with one toy (average)?

---

12. At home, how long does your child play with one play partner (average)?

\_\_\_\_\_. Name of the environment \_\_\_\_\_

13. In another environment (not home), how long does your child play with one toy (average)?

\_\_\_\_\_. Name of the environment \_\_\_\_\_

14. Do you think your child enjoy in playing at home?

Yes                      /                      No                      /                      I don't know

15. Please, your answer.

---

16. How does your child express his/her feelings of enjoyment when playing?

---

17. How do you know about his/her enjoyable expression?

---

18. How does your child express when his/her feelings of anger when playing?

---

19. How do you know about his/her angry expression?

---

20. Has your child taken any specific play program?

Yes                      /                      No

21. Please, describe.

1) How long has your child taken the play program?

From \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_ to \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_

2) Where ?

---

3) By whom?

---

3) What was the program? Please, describe it in detail.

---

---

---



[AUTISM]

# Play History

## Follow-up Questionnaire for Teachers

Today's Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Teacher Name (SEDU):

Child Name : \_\_\_\_\_



### **A. Play Behaviors**

1. Did you see any change in play activities of the child with autism after the peer play program last year ? (Please, tick)

- 1) Yes ( )  
 2) No ( )  
 3) I do not know ( )

2. In what ways did the autistic child's play activities change? (Please, tick and provide any examples)

- 1) The child with autism has improved his/her play activities. ( )

For example, \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- 2) The child with autism has deteriorated in his/her play activities. ( )

For example, \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3) The child with autism has not changed his/her play activities. The child with autism still plays in the same way as before the peer play program. ( )

- 4) I do not know. ( )

3. Read each statement carefully and please circle next to any item that you have actually observed, not guessing, the child with autism is engaging in before and after the peer play program.

<i>Cognitive dimension in play</i>	Before		After	
1) Looks at the toy(s) carefully, licks it (them), mouths it (them), touches it (them), and twirls it (them).	Yes	no	yes	no
2) Turns toward direction of others to watch their play activities.	Yes	no	yes	no
3) Likes trampoline, bouncing a ball, running a car backwards and forwards, filling bucket with sand, or throwing basketball through hoop.	yes	no	yes	no
4) Likes building a castle with blocks, cutting and pasting activity.	yes	no	yes	no

5) Likes doctor and patient play, Batman and Robin play, or doll play.	yes	no	yes	no
6) Likes soccer with others, or any game with others.	yes	no	yes	no
<i>Social dimension in play</i>				
7) Watches other's play activities but does not play with them.	yes	no	yes	no
8) When somebody (play partner, for example, father or mother) invites the child with autism, he/she responds to the play partner to play with.	yes	no	yes	no
9) Plays alone and does not care much about anything else that is happening.	yes	no	yes	no
10) Plays near or among others in a similar manner with toys, without real interaction with them.	yes	no	yes	no
11) Plays with 2 or more play partners and sometimes borrows, lends, or shares the toys.	yes	no	yes	no
12) Plays with others with real interactions.	yes	no	yes	no
<i>Social interaction behaviors in play</i>				
13) Shows any cooperative response such as touching with hands, hugging, holding hands, waving hands, or kissing to play together.	yes	no	yes	no
14) Hits, pinches, kicks, runs away, pulls, destroys other's work, or ignores.	yes	no	yes	no
15) Shows any verbal behaviors nicely to play with	yes	no	yes	no
15) Screams, shouts, cries, or whines.	yes	no	yes	no
16) Suggests someone to play with by talking or gesture	yes	no	yes	no
17) Responses toward other(s)' suggestion for play	yes	no	yes	no
<i>Play skills</i>				
18) Gets attention from other(s) to play with, e.g. "Mum!", or eye-contact	yes	no	yes	no
19) Maintains eye contact while speaking or spoken to	yes	no	yes	no
20) Shows how to deal with toys to other(s) to play with	yes	no	yes	no
21) Shares toys with other(s) to play with	yes	no	yes	no
22) Takes turns with other(s) to play with.	yes	no	yes	no
23) Asks for help or assists other(s) to play with	yes	no	yes	no
24) Praises other(s) to play with, e.g. "Great bouncing!"	yes	no	yes	no

### **B. Preference for play partner (friends)**

4. Have you found any change in the child with autism's choice of play partner since last year (Please, tick)?

- 1) Yes, the autistic child's play partner has changed. ( )
- 2) No, the child with autism still plays with same partner as before. ( )
- 3) I do not know ( )

5. Why do you think the child with autism changed his/her play partner after the program?

Because \_\_\_\_\_  
 \_\_\_\_\_

6. Who does the child with autism prefer to play with? (Please, most preference=1, second most=2, and so on)

	<i>Play with</i>	<i>Before</i>	<i>Now</i>
1)	By himself/herself	( )	( )
2)	with teaching staff	( )	( )

Please, describe how they play together.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

3) with any other play partner ( ) Who? \_\_\_\_\_ ( ) Who? \_\_\_\_\_

Please, describe how they play together.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

7. How does the child with autism play when he/she is left alone at your class since last year? (Types of play enjoyed)

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

### **C. Preference for place**

8. In which place does the child with autism prefer to play at your class? (Please describe)

1) Indoor area:

\*With what?

\*Describe how the child with autism plays there and with whom.

2) Outdoor area:

\*With what?

\*Describe how the child with autism plays there and with whom.

#### **D. Preference for playthings**

9. Has the child with autism's favorite play things been changed since last year? (Please, tick)

1) Yes, the child with autism has changed his/her favorite play things after the program. ( )

2) No, the child with autism still plays with the same things. ( )

3) I do not know ( )

#### **Indoor play**

10. If the child with autism has changed, what are the child with autism's favorite playthings in indoor play? (kinds of toys)

Before\_\_\_\_\_ After (now)\_\_\_\_\_

#### **Outdoor play**

11. If the child with autism has changed, what are the child with autism's favorite playthings/facilities in outdoor play? (kinds of toys and facilities/equipment)

Before\_\_\_\_\_ After (now)\_\_\_\_\_

12. If the child with autism has changed, what kinds of play activities does the child with autism least enjoy?

Before \_\_\_\_\_ After (now) \_\_\_\_\_

### **E. Play time**

13. Has the child with autism's time of play increased in indoor setting since last year? (Please, tick)

- 1) Yes, the child with autism plays for longer. (   )
- 2) No, the child with autism still plays for the same length of time. (   )
- 3) No, the child with autism plays shorter. (   )
- 4) I do not know (   )

#### **Indoor play with toys**

14. If the child with autism has changed his/her length of play time, how long does the child with autism play with one toy at your class (average time)?

	<i>Average length of time</i>	<i>Play thing</i>	<i>With whom</i>
1) Before	_____	_____	_____
2) After (now)	_____	_____	_____

15. If the child with autism has changed his/her length of play time, in another environment (not at your class but at other class), how long does the child with autism play with one toy (average time)?

	<i>Average length of time</i>	<i>Play thing</i>	<i>With whom</i>
1) Before	_____	_____	_____
2) After (now)	_____	_____	_____

#### **With outdoor equipment**

16. If the child with autism has changed his/her play time length, how long does the child with autism play with one play equipment in an outdoor environment (average time)?

	<i>Average length of time</i>	<i>Play thing</i>	<i>With whom</i>
1) Before	_____	_____	_____
2) After (now)	_____	_____	_____

17. If the child with autism has changed his/her length of play time, how long does the child with autism play with one play partner in an outdoor environment?

	<i>Average length of time</i>	<i>Play thing</i>	<i>With whom</i>
1) Before	_____	_____	_____
2) After (now)	_____	_____	_____

### **F. Playful mood**

18. Did you notice any change in the child with autism's playful emotion since last year (Please, tick)?

- 1) Yes, the child with autism has changed. ( )

How? \_\_\_\_\_

- 2) No, the child with autism shows the same emotion. ( )  
 3) I do not know ( )

19. Do you think that the child with autism enjoys play activities at your class more than last year?

- 1) Yes, the child with autism enjoys playing activities more at your class.  
 ( )

What kind of play activity? \_\_\_\_\_

\_\_\_\_\_

Why? \_\_\_\_\_

\_\_\_\_\_

- 2) Well, I do not recognize any change before and now. ( )  
 3) No, the child with autism enjoys playing less at your class than before.  
 ( )  
 4) I do not know ( )

20. How does the child with autism express his/her feelings of enjoyment when playing?

- 1) Before \_\_\_\_\_  
 2) After (now) \_\_\_\_\_

21. How do you recognize these his/her enjoyable expressions?

---

22. How does the child with autism express his/her feelings when he is angry in playing?

1) Before \_\_\_\_\_

2) After (now) \_\_\_\_\_

23. How do you recognize these about his/her angry expressions?

---

### **G. Experience of play therapy**

24. Has the child with autism taken any specific play program in your class since last year? (Please tick)

1) Yes ( )

2) No ( )

25. Please, describe it.

1) How long was this play program for?

From \_\_\_\_/\_\_\_\_/\_\_\_\_ to \_\_\_\_/\_\_\_\_/\_\_\_\_

2) Where?

---

3) By whom?

---

3) What is the program? Please, describe it in detail.

---



---



---



**H. General comments**

26. What did you think about the peer play program for children with autism? Please, any comment about it.

- 1) Advantage for the child with autism in the program:

---

---

---

- 2) Disadvantage for the child with autism in the program:

---

---

---

27. Would you participate in more play intervention programs for the children with disabilities in your class, if you received them? (Please tick one and describe)

- 1) Yes, I would. ( )

Why? \_\_\_\_\_

---

- 2) No, I would not. ( )

Why? \_\_\_\_\_

---

- 3) I do not know. ( )

Why? \_\_\_\_\_

---



# **Appendix F**

## **Study 3—Instruments and forms**

### **F.1 Ideas about and Attitudes towards Disability Inventory (IADI)**

The Ideas about and Attitudes towards Disability Inventory (IADI) questionnaire used in Study 3 is reproduced here.

## Ideas about and Attitudes towards Disabilities

### Ideas about children with disabilities

Please read each sentence and think about children with disabilities. Then decide what you think about children with disabilities described.

If you do not agree or if you think the sentence is wrong, circle the 0.

If you agree with it, circle the 1.

If you do not know, circle the 2.

There are no right or wrong answers, just what you think about these things. Be sure to ask questions if you don't know what to do.

	<b>What do you think about children with disabilities?</b>	<b>No</b>	<b>Yes</b>	<b>Don't know</b>
1	They are physically weak.	0	1	2
2	They look the same as others.	0	1	2
3	They bother others.	0	1	2
4	They are very quiet.	0	1	2
5	They are dirty.	0	1	2
6	They are noisy.	0	1	2
7	They look different.	0	1	2
8	They help others.	0	1	2
9	They look sad.	0	1	2
10	They work hard and well.	0	1	2
11	They do their school work well.	0	1	2
12	They are lazy.	0	1	2
13	They are cooperative.	0	1	2
14	They are alone and have no friends.	0	1	2
15	They are selfish.	0	1	2
16	They are neat.	0	1	2
17	They are uncooperative.	0	1	2
18	They share toys to play with others.	0	1	2
19	They have many friends.	0	1	2
20	They are greedy.	0	1	2
21	They look happy.	0	1	2
22	They are strong.	0	1	2
23	They are not good at their work.	0	1	2
24	They are generous.	0	1	2

## Attitudes toward children with disabilities

If you do not want to do it, circle the 0.

If you do want to do it, circle the 2.

	<b>What activities do you want to do with her/him?</b>	<b>No</b>	<b>Sometimes</b>	<b>Yes</b>
1	Sit down beside her/him.	0	1	2
2	Work together in the classroom.	0	1	2
3	Play together in the playground.	0	1	2
4	Have lunch with them at school.	0	1	2
5	Play together at free time.	0	1	2
6	Take her/him to my house to play together.	0	1	2
7	Play ball game together.	0	1	2
8	Play pretend play such as cooking together.	0	1	2
9	Go on a picnic together.	0	1	2
10	Be a partner in a game or in classroom.	0	1	2

**Name:** \_\_\_\_\_  
First Last

**Boy**      **Girl**      **Today's date:** \_\_\_\_\_  
Month Date Year

**Grade:** \_\_\_\_\_ **Age:** \_\_\_\_\_ **Birth date:** \_\_\_\_\_  
Month Date Year

**School:** \_\_\_\_\_

**Teacher's name:** \_\_\_\_\_

## **F.2 Peer interview form**

The form used by the researcher to record responses during the interviews of peer players held during the follow-up phase is reproduced here.

### **Information about play partners**

Name: ( TP / UTP )

Date of birth:

Gender:

#### 1. Siblings

Do you have any brothers or sisters? How old are they?

1) Older brothers

2) Older sisters:

3) Younger brothers

4) Younger sisters:

#### 2. Living with Parents

Do your parents live at home with you?

1) Mother:

2) Father:

If either “No” do you visit? How often?

1) Mother:

2) Father:

#### 3. Employment

Do your mother or father work? What do they do?

1) Mother’s job

2) Father’s job

#### 4. Living with Others

Do other people live at home with you? Who?

1) Grandmother

2) Grandfather

3) Aunt

4) Uncle

5) Others

#### 5. House Type

What is your house?

1) House

2) Flat/Unit

3) Shop

4) Other

#### 6. Transportation

Do you come to school by?

1) Walking

2) Car

3) Bus

4) Bike

5) Other

#### 7. Activities/Hobbies

What is your most liked/favorite play activity when you play with your friends? And what is the least liked play activity?

1) Most

2) Least

#### 8. Participation in Play Project

How did you feel as a peer play partner? Were you happy with it? Or you were not happy with it? Why?

#### 9. When were you excited while you were playing with your partner? And when were you frustrated?

#### 10. What did you learn while you were playing with your play partner in the SEDU?





# Appendix G

## Study 4—Questionnaires

The questionnaires used in Study 4 are reproduced here. The questionnaires are:

1. Play History-follow-up Questionnaire for Parents (PHQP)
2. Play History-follow-up Questionnaire for Teachers (PHQT)
3. Play History-follow-up Questionnaire for Regular Teachers (PHQR)

[AUTISM]

# Play History

## Follow-up Questionnaire for parents

Today's Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Parent(s)' Name:

Father: \_\_\_\_\_ Mother: \_\_\_\_\_

The questionnaire completed by: \_\_\_\_\_

Child's Name : \_\_\_\_\_

Date of Birth : \_\_\_\_/\_\_\_\_/\_\_\_\_

Language spoken at home: \_\_\_\_\_



**A. Play Behaviors**

1. Did you see any change in your child's play activities after the peer play program last year ? (Please, tick)

- 1) Yes ( )  
 2) No ( )  
 3) I do not know ( )

2. In what ways did your child's play activities change? (Please, tick and provide any examples)

- 1) My child has improved his/her play activities. ( )

For example, \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- 2) My child has deteriorated in his/her play activities. ( )

For example, \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3) My child has not changed his/her play activities. My child still plays in the same way as before the peer play program. ( )

- 4) I do not know. ( )

3. Read each statement carefully and please circle next to any item that you have actually observed, not guessing, your child is engaging in before and after peer play program.

<i>Cognitive dimension in play</i>	Before		After	
1) Looks at the toy(s) carefully, licks it (them), mouths it (them), touches it (them), and twirls it (them).	yes	no	yes	no
2) Turns toward direction of others to watch their play activities.	yes	no	yes	no
3) Likes tremploin, bouncing a ball, running a car backwards and forwards, filling bucket with sand, or throwing basketball through hoop.	yes	no	yes	no
4) Likes building a castle with blocks, cutting and pasting activity.	yes	no	yes	no
5) Likes doctor and patient play, Batman and Robin play, or doll play.	yes	no	yes	no
6) Likes soccer with others, or any game with others.	yes	no	yes	no

<i>Social dimension in play</i>	Before		After	
7) Watches other's play activities but does not play with them.	yes	no	yes	no
8) When somebody (play partner, for example, father or mother) invites your child, he/she responds to the play partner to play with.	yes	no	yes	no
9) Plays alone and does not care much about anything else that is happening.	yes	no	yes	no
10) Plays near or among others in a similar manner with toys, without real interaction with them.	yes	no	yes	no
11) Plays with 2 or more play partners and sometimes borrows, lends, or shares the toys.	yes	no	yes	no
12) Plays with others with real interactions.	yes	no	yes	no
<i>Social interaction behaviors in play</i>				
13) Shows any cooperative response such as touching with hands, hugging, holding hands, waving hands, or kissing to play together.	yes	no	yes	no
14) Hits, pinches, kicks, runs away, pulls, destroys other's work, or ignores.	yes	no	yes	no
15) Shows any verbal behaviors nicely to play with	yes	no	yes	no
15) Screams, shouts, cries, or whines.	yes	no	yes	no
16) Suggests someone to play with by talking or gesture	yes	no	yes	no
17) Responses toward other(s)' suggestion for play	yes	no	yes	no
<i>Play skills</i>				
18) Gets attention from other(s) to play with, e.g. "Mum!", or eye-contact	yes	no	yes	no
19) Maintains eye contact while speaking or spoken to	yes	no	yes	no
20) Shows how to deal with toys to other(s) to play with	yes	no	yes	no
21) Shares toys with other(s) to play with	yes	no	yes	no
22) Takes turns with other(s) to play with.	yes	no	yes	no
23) Asks for help or assists other(s) to play with	yes	no	yes	no
24) Praises other(s) to play with, e.g. "Great bouncing!"	yes	no	yes	no

### **B. Preference for play partner (friends)**

4. Have you found any change in your child's choice of play partner since last year (Please, tick)?

- 1) Yes, my child's play partner has changed after the program.(    )
- 2) No, my child still plays with same partner as before.(    )
- 3) I do not know (    )

5. Why do you think your child changed his/her play partner after the program?

Because \_\_\_\_\_

---

6. Who does your child prefer to play with? (Please number, the most preference=1, the second preference=2, and the last preference=3)

*Play with*

1) By himself/herself

How? \_\_\_\_\_

2) with a family member

How? \_\_\_\_\_

3) with any other play partner Who? \_\_\_\_\_

How? \_\_\_\_\_

7. How does your child play when he/she is left alone at home? (Types of play enjoyed)

---



---



---

8. Who does your child prefer to play with at home? (Please number, the most preference=1, the second preference=2, and the third preference=3,...)

1) Mother ( )

2) Father ( )

3) Sister ( )

4) Brother ( )

5) Other ( ) Who is he/she? \_\_\_\_\_

Please, describe how they play together.

---



---



---

### **C. Preference for place**

9. In which place does your child prefer to play at home? (Please circle and describe)

1) Indoor area:

\*In bedroom, living room, kitchen, veranda, toilet, other ( )

\*Describe how your child plays there and with whom.

---



---

2) Outdoor area:

\*In the garden, garage, swimming pool, other ( )

\*Describe how your child plays there and with whom.

---



---

#### **D. Preference for playthings**

10. Has your child's favorite play things changed since last year? (Please, tick)

- 1) Yes, my child has changed his/her favorite play things since last year. ( )
- 2) No, my child still plays with the same things. ( )
- 3) I do not know ( )

#### **Indoor play**

11. If your child has changed, what are your child's favorite playthings in indoor play? (kinds of toys)

---

#### **Outdoor play**

12. If your child has changed, what are your child's favorite playthings/facilities in outdoor play? (kinds of toys and facilities/equipment)

---

13. If your child has changed, what kinds of play activities does your child least enjoy?

---

**E. Play time**

14. Has your child's time at play increased in indoor setting since last year? (Please, tick)

- 1) Yes, my child plays for longer. (   )
- 2) No, my child still plays for the same length of time. (   )
- 3) No, my child plays shorter. (   )
- 4) I do not know (   )

**Indoor play with toys**

15. If your child has changed his/her length of play time, how long does your child play with one toy at home now (average time)?

<i>Average length of time</i>	<i>Where/Play thing</i>	<i>With whom</i>
_____	_____	_____

16. If your child has changed his/her length of play time, in another environment (not at home but at a friend's home), how long does your child play with one toy now (average time)?

<i>Average length of time</i>	<i>Where/Play thing</i>	<i>With whom</i>
_____	_____	_____

**With outdoor equipment**

17. If your child has changed his/her play time length, how long does your child play with one play equipment in an outdoor environment now (average time)?

<i>Average length of time</i>	<i>Where/Play thing</i>	<i>With whom</i>
_____	_____	_____

18. If your child has changed his/her length of play time, how long does your child play with one play partner in an outdoor environment now?

<i>Average length of time</i>	<i>Where/Play thing</i>	<i>With whom</i>
_____	_____	_____

**F. Playful mood**

19. Did you notice any change in your child's playful emotion since last year (Please, tick)?

1) Yes, my child has changed. ( )

How? \_\_\_\_\_

2) No, my child shows the same emotion. ( )

3) I do not know ( )

20. Do you think that your child enjoys play activities at home more since last year?

1) Yes, my child enjoys playing activities more at home. ( )

What kind of play activities? \_\_\_\_\_

Why? \_\_\_\_\_

2) Well, I do not recognize any change before and now. ( )

3) No, my child enjoys playing less at home than before. ( )

What kind of play activities? \_\_\_\_\_

Why? \_\_\_\_\_

4) I do not know ( )

21. How does your child express his/her feelings of enjoyment when playing?

\_\_\_\_\_

22. How do you recognize these enjoyable expressions?

\_\_\_\_\_

23. How does your child express his/her feelings when he is angry when playing?

\_\_\_\_\_

24. How do you recognize these angry expressions?

\_\_\_\_\_

### **G. Experience of play therapy**

25. Has your child taken any specific play program since last year? (Please tick)



- 1) Yes ( )  
 2) No ( )

26. Please, describe it.

1) How long was this play program?

From \_\_\_\_/\_\_\_\_/\_\_\_\_ to \_\_\_\_/\_\_\_\_/\_\_\_\_

2) Where?

\_\_\_\_\_

3) By whom?

\_\_\_\_\_

3) What is the program? Please, describe it in detail.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

#### **H. General comments**

27. What did you think about the peer play program for your child? Please, any comment about it.

1) Advantage for your child in the program:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2) Disadvantage for your child in the program:

\_\_\_\_\_

\_\_\_\_\_

---

28. Would you participate in more play intervention programs for your child, if you received information about them? (Please tick one and describe)

1) Yes, I would. ( )

Why? \_\_\_\_\_

---

2) No, I would not. ( )

Why? \_\_\_\_\_

---

3) I do not know. ( )

Why? \_\_\_\_\_

---

[AUTISM]

# Play History

## Follow-up Questionnaire for Teachers

Today's Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Teacher Name (SEDU):

Child Name : \_\_\_\_\_



### **A. Play Behaviors**

1. Did you see any change in play activities of the child with autism after the peer play program last year ? (Please, tick)

- 1) Yes ( )
- 2) No ( )
- 3) I do not know ( )

2. In what ways did the autistic child's play activities change? (Please, tick and provide any examples)

- 1) The child with autism has improved his/her play activities. ( )

For example, \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- 2) The child with autism has deteriorated in his/her play activities. ( )

For example, \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3) The child with autism has not changed his/her play activities. The child with autism still plays in the same way as before the peer play program. ( )

- 4) I do not know. ( )

3. Read each statement carefully and please circle next to any item that you have actually observed, not guessing, the child with autism is engaging in before and after the peer play program.

<i>Cognitive dimension in play</i>	Before		After	
1) Looks at the toy(s) carefully, licks it (them), mouths it (them), touches it (them), and twirls it (them).	Yes	no	yes	no
2) Turns toward direction of others to watch their play activities.	Yes	no	yes	no
3) Likes trampoline, bouncing a ball, running a car backwards and forwards, filling bucket with sand, or throwing basketball through hoop.	yes	no	yes	no
4) Likes building a castle with blocks, cutting and pasting activity.	yes	no	yes	no

5) Likes doctor and patient play, Batman and Robin play, or doll play.	yes	no	yes	no
6) Likes soccer with others, or any game with others.	yes	no	yes	no
<i>Social dimension in play</i>				
7) Watches other's play activities but does not play with them.	yes	no	yes	no
8) When somebody (play partner, for example, father or mother) invites the child with autism, he/she responds to the play partner to play with.	yes	no	yes	no
9) Plays alone and does not care much about anything else that is happening.	yes	no	yes	no
10) Plays near or among others in a similar manner with toys, without real interaction with them.	yes	no	yes	no
11) Plays with 2 or more play partners and sometimes borrows, lends, or shares the toys.	yes	no	yes	no
12) Plays with others with real interactions.	yes	no	yes	no
<i>Social interaction behaviors in play</i>				
13) Shows any cooperative response such as touching with hands, hugging, holding hands, waving hands, or kissing to play together.	yes	no	yes	no
14) Hits, pinches, kicks, runs away, pulls, destroys other's work, or ignores.	yes	no	yes	no
15) Shows any verbal behaviors nicely to play with	yes	no	yes	no
15) Screams, shouts, cries, or whines.	yes	no	yes	no
16) Suggests someone to play with by talking or gesture	yes	no	yes	no
17) Responses toward other(s)' suggestion for play	yes	no	yes	no
<i>Play skills</i>				
18) Gets attention from other(s) to play with, e.g. "Mum!", or eye-contact	yes	no	yes	no
19) Maintains eye contact while speaking or spoken to	yes	no	yes	no
20) Shows how to deal with toys to other(s) to play with	yes	no	yes	no
21) Shares toys with other(s) to play with	yes	no	yes	no
22) Takes turns with other(s) to play with.	yes	no	yes	no
23) Asks for help or assists other(s) to play with	yes	no	yes	no
24) Praises other(s) to play with, e.g. "Great bouncing!"	yes	no	yes	no

### **B. Preference for play partner (friends)**

4. Have you found any change in the child with autism's choice of play partner since last year (Please, tick)?

- 1) Yes, the autistic child's play partner has changed. ( )
- 2) No, the child with autism still plays with same partner as before. ( )
- 3) I do not know ( )

5. Why do you think the child with autism changed his/her play partner after the program?

Because \_\_\_\_\_  
 \_\_\_\_\_

6. Who does the child with autism prefer to play with? (Please, most preference=1, second most=2, and so on)

	<i>Play with</i>	<i>Before</i>	<i>Now</i>
1)	By himself/herself	( )	( )
2)	with teaching staff	( )	( )

Please, describe how they play together.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

3) with any other play partner ( ) Who? \_\_\_\_\_ ( ) Who? \_\_\_\_\_

Please, describe how they play together.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

7. How does the child with autism play when he/she is left alone at your class since last year? (Types of play enjoyed)

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

### **C. Preference for place**

8. In which place does the child with autism prefer to play at your class? (Please describe)

1) Indoor area:

\*With what?

---

\*Describe how the child with autism plays there and with whom.

---



---

2) Outdoor area:

\*With what?

\*Describe how the child with autism plays there and with whom.

---



---

#### **D. Preference for playthings**

9. Has the child with autism's favorite play things been changed since last year? (Please, tick)

1) Yes, the child with autism has changed his/her favorite play things after the program. ( )

2) No, the child with autism still plays with the same things. ( )

3) I do not know ( )

#### **Indoor play**

10. If the child with autism has changed, what are the child with autism's favorite playthings in indoor play? (kinds of toys)

Before\_\_\_\_\_ After (now)\_\_\_\_\_

#### **Outdoor play**

11. If the child with autism has changed, what are the child with autism's favorite playthings/facilities in outdoor play? (kinds of toys and facilities/equipment)

Before\_\_\_\_\_ After (now)\_\_\_\_\_

12. If the child with autism has changed, what kinds of play activities does the child with autism least enjoy?

Before \_\_\_\_\_ After (now) \_\_\_\_\_

### **E. Play time**

13. Has the child with autism's time of play increased in indoor setting since last year? (Please, tick)

- 1) Yes, the child with autism plays for longer. (   )
- 2) No, the child with autism still plays for the same length of time. (   )
- 3) No, the child with autism plays shorter. (   )
- 4) I do not know (   )

#### **Indoor play with toys**

14. If the child with autism has changed his/her length of play time, how long does the child with autism play with one toy at your class (average time)?

	<i>Average length of time</i>	<i>Play thing</i>	<i>With whom</i>
1) Before	_____	_____	_____
2) After (now)	_____	_____	_____

15. If the child with autism has changed his/her length of play time, in another environment (not at your class but at other class), how long does the child with autism play with one toy (average time)?

	<i>Average length of time</i>	<i>Play thing</i>	<i>With whom</i>
1) Before	_____	_____	_____
2) After (now)	_____	_____	_____

#### **With outdoor equipment**

16. If the child with autism has changed his/her play time length, how long does the child with autism play with one play equipment in an outdoor environment (average time)?

	<i>Average length of time</i>	<i>Play thing</i>	<i>With whom</i>
1) Before	_____	_____	_____
2) After (now)	_____	_____	_____



17. If the child with autism has changed his/her length of play time, how long does the child with autism play with one play partner in an outdoor environment?

	<i>Average length of time</i>	<i>Play thing</i>	<i>With whom</i>
1) Before	_____	_____	_____
2) After (now)	_____	_____	_____

### **F. Playful mood**

18. Did you notice any change in the child with autism's playful emotion since last year (Please, tick)?

- 1) Yes, the child with autism has changed. ( )

How? \_\_\_\_\_

- 2) No, the child with autism shows the same emotion. ( )  
 3) I do not know ( )

19. Do you think that the child with autism enjoys play activities at your class more than last year?

- 1) Yes, the child with autism enjoys playing activities more at your class.  
 ( )

What kind of play activity? \_\_\_\_\_

\_\_\_\_\_

Why? \_\_\_\_\_

\_\_\_\_\_

- 2) Well, I do not recognize any change before and now. ( )  
 3) No, the child with autism enjoys playing less at your class than before.  
 ( )  
 4) I do not know ( )

20. How does the child with autism express his/her feelings of enjoyment when playing?

- 1) Before \_\_\_\_\_  
 2) After (now) \_\_\_\_\_

21. How do you recognize these his/her enjoyable expressions?

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22. How does the child with autism express his/her feelings when he is angry in playing?

1) Before \_\_\_\_\_

2) After (now) \_\_\_\_\_

23. How do you recognize these about his/her angry expressions?

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### **G. Experience of play therapy**

24. Has the child with autism taken any specific play program in your class since last year? (Please tick)

1) Yes ( )

2) No ( )

25. Please, describe it.

1) How long was this play program for?

From \_\_\_\_/\_\_\_\_/\_\_\_\_ to \_\_\_\_/\_\_\_\_/\_\_\_\_

2) Where?

---

3) By whom?

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3) What is the program? Please, describe it in detail.

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**H. General comments**

26. What did you think about the peer play program for children with autism? Please, any comment about it.

- 1) Advantage for the child with autism in the program:

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- 2) Disadvantage for the child with autism in the program:

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27. Would you participate in more play intervention programs for the children with disabilities in your class, if you received them? (Please tick one and describe)

- 1) Yes, I would. ( )

Why? \_\_\_\_\_

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- 2) No, I would not. ( )

Why? \_\_\_\_\_

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- 3) I do not know. ( )

Why? \_\_\_\_\_

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[TYPICALLY DEVELOPING CHILDREN]

# Play History

## Follow-up Questionnaire for Teachers

Today's Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Teacher Name (REGULAR SCHOOL): \_\_\_\_\_



**A. Experience with friends with disabilities**

1. Did any of the children who participated in the play partner program talk about disability after peer play program last year (Please, tick)?

Child name	Yes	No	I do not know
1) TP10			
2) TP12			
3) UP14			
4) TP9			
5) UP11			

2. What do you think was their level of understanding about disabilities after the program?

Child name	Positive/ about	Negative/ about	Neutral/ about
1) TP10			
2) TP12			
3) UP14			
4) TP9			
5) UP11			

**B. General comments**

3. What did you think about the peer play program participation of the typically developing children from your class? Please, any comment about it.

1) Advantages of participation:

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2) Disadvantages of participation:

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4. Have you implemented any other educational program that encourage inclusion of typically developing children with children with disability?

1) Yes ( )

Program name: \_\_\_\_\_

Duration: from \_\_\_\_\_ to \_\_\_\_\_

How was it? \_\_\_\_\_

2) No ( )

5. Would you be interested in implementing a program such as the peer play program, if you had any children with disabilities in your class? (Please tick one and describe)

1) Yes, I would. ( )

Why? \_\_\_\_\_

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2) No, I would not. ( )

Why? \_\_\_\_\_

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3) I do not know. ( )

Why? \_\_\_\_\_

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6. Are there any curriculum units in which such programs could be embedded?

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