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Examining the effects of adapted peer tutoring on social and language skills of young English language learners

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The purpose of this study was to examine the effects of adapted peer tutoring (APT) on social interactions and early language and literacy skills of pre-school-age children who were English language learners (ELLs). APT was the treatment for this study. Quasi-experimental group comparison design was applied. Two inclusive pre-school classrooms were randomly assigned as the experimental group and two other classrooms were assigned as the comparison group. A total of 75 children participated in this study. The ELLs from the experimental group demonstrated significant improvement than their peers from the comparison group in positive social interaction behaviour, receptive language, and print knowledge. The total effect indicated that children's social interaction behaviour moderately mediated the APT effectiveness on language acquisition.

Keywords: English language learners; peer tutoring; social interaction; language development

Background

With the increase of immigrants to the USA from all over the world, the number of young children in the USA whose home language is not English continues to increase every year. Within the public schools, over 2 million English language learners (ELLs) are in pre-kindergarten through grade 3 classrooms (Abedi, Hofstetter, & Lord, 2004). Recent estimates show that about one-third of pre-school-age children come from families where English is not the primary language used to communicate at home (United States Census Bureau, 2010; U.S. Department of Health and Human Services, Administration on Children, Youth, and Families, 2008, 2011). At least 460 languages are represented in the US schools and programmes (Hepburn, 2004). Meeting the diverse social and educational needs of our nation's new generation is a significant and timely task for educators and policy-makers.

Compared with their native English-speaking (NES) peers, ELLs' academic achievement has been consistently reported to be lower. The national data have indicated that in English reading 76% of third-grade ELLs were performing below grade level, and in mathematics 54% were performing below grade level (Zehler et al., 2003). A long-standing issue that has been a concern for special and general educators in the past several decades was the disproportionate representation of culturally and linguistically diverse students in special education programmes (Artiles & Ortiz, 2002).

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According to Rueda and Windmueller (2006), ELLs were 27% more likely to be placed in special education at elementary grade level and almost twice as likely to be placed in special education at the secondary level.

Social competence

Guralnick (1990) defined social competence as ‘the ability of young children to successfully and appropriately select and carry out their interpersonal goals’ (p. 4). Howes and Matheson (1992) defined children’s social competence with peers as behaviours and cognition that reflect successful social functioning with peers. Social interaction with peers is one of the most important areas in which children develop positive social skills. Young children experience varied learning activities during peer interaction. They also establish positive peer relationships by forming friendships with peers during interactions. Research has shown that social behaviour plays a critical role in causing a child to be liked or to be rejected (Berk, 1999).

However, because of the limited English language proficiency or different cultural background of ELL students, their social behaviours may be different from that of their primary English-speaking peers. Most previous studies have focused on interventions on academic improvements for ELL students (e.g. Gersten & Baker, 2000; Greenwood, Arreaga-Mayer, Utley, Gavin, & Terry, 2001). Very few researchers have examined the social interaction behaviour of these children. At the same time, researchers have found links between social skill deficits in children and delinquency, school dropout, substance abuse in adolescence (Greene et al., 1999; Parker & Asher, 1987), and mental health problems in adulthood (Cowen, Pederson, Baigian, Izzo, & Trost, 1973; Strain & Odom, 1986).

The importance of pre-school years for language and literacy development has been well documented in the literature for English only students and ELLs (e.g. August & Shanahan, 2008; Genesee, Lindholm-Leary, Saunders, & Christian, 2006). The relationship between children’s language development and social skills also has been established (e.g. Berk, 1999; John-Steiner & Mahn, 2011; Mahn, 1999). However, for ELLs at pre-school age, very limited studies have been conducted to examine their social interactions and how their social interactions affect their language development.

Learning context

Children may learn differently in one instructional context than they do in the others. When addressing the specific educational needs of ELLs, educators have debated whether instruction should be primarily in the student’s native language or in English, and when to make a transition from bilingual or English-language-only classrooms. However, a more crucial issue seems to be related to how the instruction is delivered to young ELLs (Arreaga-Mayer, 1998). Effective instruction for ELLs is not only reported to include first and second language acquisition, but also involved in multiple factors such as expectations, scaffolding strategies, collaborative/cooperative learning, implementation with heterogeneous groups, opportunities for students to engage in extended English discourse, applicability to small and classwide groups, social acceptance by teachers, students, parents, and respect for cultural and linguistic diversity (Arreaga-Mayer, 1998; Gersten & Jimenez, 1994). Instructional interventions with features of language and culturally sensitive teaching appear to maximise opportunities for ELLs to become literate.

Classwide peer tutoring

Classwide peer tutoring (CWPT) involves tutor–tutee pairs working together on a class-wide basis. It is a form of intraclass, same-age, and reciprocal peer tutoring. Unlike other forms of peer tutoring, CWPT is designed to operate only with the children in one particular classroom or age group. CWPT also differs from other forms of peer tutoring in that all children in the same classroom or group have the opportunity to be a tutor regardless of the child's level of academic skills. The focus of CWPT is to create equal opportunities for children whose academic performance may be below the grade level to be actively involved in the peer-mediated learning process.

CWPT typically involves selection of instructional content and materials, pairing of students for reciprocal tutoring, regular changes of partners, immediate error correction, points contingent upon performance, allocation of tutoring pairs into teams competing for the highest point total, public posting of individual and team scores, and social rewards for the winning teams (Greenwood, Delquadri, & Carta, 1988). It is designed to accelerate student learning by increasing students' opportunities to initiate/respond and thereby increasing their level of academic performance.

As most of the literature demonstrates, CWPT has been effective for increasing students' academic achievement and improving the classroom behaviours of students with different needs. Children involved in CWPT studies included typically developing children, students with attention deficit disorder/attention deficit hyperactivity disorder (e.g. DuPaul, Ervin, Hook, & McGoey, 1998), mild mental disability (e.g. Mortweet et al., 1999), emotional/behavioural disorders (e.g. Sutherland & Snyder, 2007), developmental disabilities (e.g. Utley et al., 2001), low socio-economic status (e.g. Greenwood, Delquadri, & Hall, 1989), and school-age ELLs (e.g. Greenwood et al., 2001). The settings where CWPT has been implemented include special education, general education, and inclusive classrooms. Furthermore, previous studies covered a variety of academic content (e.g. spelling, mathematics, social studies, reading, health and safety) and grade levels (from pre-school to elementary children).

In spite of the impressive research studies involving CWPT demonstrating increases in academic engagement, academic acquisition, and social skills in diverse student populations, few studies have focused on young ELLs. Even fewer studies have been done to compare the effects of CWPT on young ELLs and NES children in the general education setting. Among the very few studies on ELLs, almost all of them exclusively focused on children's language acquisition and academic achievement. For example, Greenwood et al. (2001) used classwide peer tutoring learning management system (CWPT-LMS) in the literacy instruction of elementary-level ELL students. August (1987) examined the effects of peer tutoring with the more skilled peer as the tutor consistently, instead of the CWPT, on second language acquisition of Mexican American children. Similarly, Gersten and Baker (2000) reported the effectiveness of peer tutoring and cooperative learning on English language development of ELL students. However, little attention has been paid to the social interaction behaviour of ELLs, which is highly related to and interacts with other developmental areas, particularly for young children before they enter kindergarten (Lau, Higgins, Gelfer, Hong, & Miller, 2005; Xu, Gelfer, & Perkins, 2005).

In the field of educational research, there is a shortage of experimental studies on young ELLs, particularly on their social interaction behaviour and how it affects their early or pre-academic development and learning. The relationship of children's social interaction behaviour and their early language and literacy development was

the focus of this study. From a developmental perspective, young children's social skills are interrelated with their skills in other developmental areas (Piaget, 1962; Vygotsky, 1978). From research perspective, recent large scale observation studies of pre-kindergarten (pre-K) to elementary children suggested an interaction between children's social behaviour and academic achievement (National Early Literacy Panel, 2008; Wentzel, 2003). Research also indicated the critical role of instructional support and emotional support for children who are at risk of developmental delays due to environmental, biological, or social factors (Hamre & Pianta, 2005; Xu, 2008). Unfortunately, for young children at risk, most early intervention programmes tend to focus on discrete skills through formal clinical settings. For example, for young ELLs, most instructional support has been focused on their second language acquisition; their social emotional development has been under-examined, if not totally ignored (Xu & Drame, 2008).

The purpose of this study was to examine the effects of adapted peer tutoring (APT) on social interactions and early language and literacy skills of pre-school-age children who are ELLs. APT was developed based on the standard CWPT. APT was modified from the standard CWPT in the following ways: (a) no public posting of individual children's performance; (b) reduced number of peer tutoring sessions (e.g. three sessions instead of five sessions per week); (c) changes in pairing procedures; (d) using colour coding (e.g. green for 2 points, yellow for 1 point, red for incorrect) instead of numerals to score (e.g. 2, 1); and (e) no public point recording on charts and verbal reporting by participating children. These modifications were made to accommodate children's age (i.e. pre-school), language proficiency (i.e. ELLs), or level of development (e.g. children with disabilities or developmental delays).

The hypothesis was that APT was effective in increasing and improving social interactions of young ELL children in inclusive early childhood classrooms. It was further hypothesised that the improved social interactions would be associated and/or predictive of ELL children's early language and literacy skills. Five research questions were addressed:

- (1) Is APT effective in improving young ELL children's social interaction skills and early language and literacy skills?
- (2) To what extent do young ELL children differ from their NES peers in social interactions after receiving APT?
- (3) To what extent do young ELL children differ from their NES peers in language and literacy skills after receiving APT?
- (4) Do social interactions mediate the effect of APT on language and literacy skills?
- (5) What are children's and teachers' perceptions of APT?

Theoretical framework

To address the needs of young ELLs, the researcher used the developmental ecological approach as the conceptual framework to guide this study. Developmental ecological approach addresses both the child's development as relative to his or her peers and the environment in which the child lives. According to the guidelines for developmentally appropriate practice (DAP) proposed by the National Association for the Education of Young Children (NAEYC), the DAP includes three dimensions: developmental appropriateness, individual appropriateness, and social/cultural

appropriateness (NAEYC, 2009). The child develops within a dynamic and changing social and environmental context across time. An ecological system view of early learning purports that children from diverse backgrounds develop in a complex social world and that it is necessary to observe interactions at multi-level contexts and examine changes over time at all levels. To ensure the success of these young children, it is critical to integrate individual and contextual characteristics and processes and to examine interrelations among these systems.

Ecological theory adds to the traditional developmental approach in that development cannot be understood and viewed apart from its immediate context. Children may learn differently in one instructional context than the other. This is especially true for children whose primary language is not English. For example, Lopez-Reyna (1996) examined the bilingual children who were taught with skills-focused instruction and those who were taught with a whole language approach. They found that the children taught in a whole language approach were more capable in comprehension by making connections with their own life experience, whereas the children who were taught with skills-focused instruction were focusing on discrete skills. Peer-mediated instruction provides children an effective learning context that is meaningful for children through reciprocal interactions between each other.

Method

Research design

Quasi-experimental group comparison design was applied in this study. Four pre-school classrooms were identified as the research sites. Two classrooms were randomly selected as the experimental group and the other two classrooms were selected as the comparison group. The APT procedures were implemented 3 times per week, 20 minutes per time, throughout the spring semester. The APT trained educational specialist (ES) implemented APT to the participating children after completing the training sessions.

Participants

A total of 75 children (39 females) participated in this study. Of this, 60 (80%) participating children were ELLs whose home language was Spanish. Their average age was 58 months, ranged 51–59 months. All participants were from low-income families and had attended pre-school for at least six months. See Table 1 for demographic information of participants.

The APT procedure

During the 20-minute APT session, the tutor and the tutee were seated at separate, adjacent child-size desks or on the floor. The tutor was provided with a set of the educational toys or materials selected by the teacher (e.g. parquetry blocks and picture cards). For example, the tutor would ask the tutee to use the blocks to reproduce a picture of a house on the workplace. The teacher or instructional assistant would provide minimal assistance to ensure that the reproduction of the picture was successful. Assistance typically involved pointing out relevant physical properties of the blocks (colours and shapes) and stating how they corresponded to particular parts of the picture (e.g. roof, door, and chimney). The

Table 1. Participants' demographic information.

	Number (%)
Age	
51–53 months	16 (21)
54–56 months	12 (16)
57–59 months	47 (63)
Gender	
Male	36 (48)
Female	39 (52)
Ethnic/race	
White	13 (17)
Hispanic	62 (83)
Home language	
English	15 (20)
Spanish	60 (80)
Family income	
< \$20,000	5 (7)
\$20,000–\$30,000	37 (49)
\$30,000–\$40,000	31 (41)
\$40,000–\$45,000	2 (3)

process instead of the product was the focus. When the tutor's 10 minutes were up, the two children had to switch roles with the tutee now being the tutor. This new tutor would play for another 10 minutes, trying to build the house with the blocks. During this interaction, modelling was the key from the tutor so that ELLs with limited English proficiency would be able to play both tutor and tutee roles.

Training procedure

The training procedure included four sessions.

- Session one: The ES received a copy of the APT process including an overview of APT, session scheduling methods, a time breakdown, materials to use, and pairing approaches.
- Session two: The ES described and modelled peer tutoring procedures to the whole group. Then she had the group practice tutoring for 15 minutes. Each child had an opportunity to be a tutor and a tutee.
- Session three: Children were assigned as tutor and tutee, working on a list of age and developmentally appropriate activities. Two approaches were used to pair children for APT: random pairing and skill pairing. Each child was also assigned by the ES to one of the two teams in the whole group.
- Session four: Children were reassigned by the ES with different partners from the previous session. All children, regardless of their developmental levels or cultural/linguistic background, should have practiced working with each other as tutor and tutee.

APT fidelity assessment

Trained research assistants evaluated the APT implementation by using a 40-item procedural checklist developed by Greenwood et al. (2001). These items are grouped into three categories: (1) visibility of APT materials during sessions; (2) adult supervision

(by ES); (3) child tutoring behaviours. For the first two months, fidelity checks were made twice per month. After the first two months, one fidelity observation was randomly conducted each month.

Measures

The social interaction observation system (SIOS, Kreimeyer, Antia, Coyner, Eldredge, & Gupta, 1991) was used to measure the social interaction behaviour of participating children. The SIOS was designed to discriminate 15 types of social interaction behaviour (positive peer interactions, negative behaviours directed to the peer, non-play behaviour, solitary play, parallel play, cooperative play, positive linguistic interaction, peer initiations of interaction, child responding positively to peer initiation, child responding negatively to peer initiation, no response to peer initiation, child initiation of interaction, peer responding positively to child's initiation, peer responding negatively to child's initiation, and peer making no response to child's initiation). These were further divided into seven positive behaviours, five passive behaviours, and three negative behaviours. The two active behaviours also belong to the positive behaviour category. Three sessions of free play period were videotaped and the mean behaviours per session were computed as the baseline status of children's social interaction behaviour. After APT was implemented, every two weeks a free play session again was videotaped. For the comparison group, children were also videotaped every two weeks during free play-time without receiving APT treatment. The recorded videotapes were coded and rated as followed. After the first minute of the 10-minute free play session, each participant was rated over four one-minute intervals. For each one-minute interval, the social behaviours of the child were marked as occurred (1) or not occurred (0). This process was repeated for the second child in the class during the second viewing of the tape. The process was repeated until all the children in the class were coded and rated with their social interaction behaviour.

Participating children's early literacy and language skills were measured using Peabody Picture Vocabulary Test, 4th edition-PPVT-IV (Dunn & Dunn, 2007); phonological Awareness Literacy Screening-PALS-PreK (Invernizzi, Sullivan, Meier, & Swank, 2004); and Test of Preschool Early Literacy – TOPEL (Lonigan, Wagner, Torgesen, & Rashotte, 2007). PPVT-IV is an unlimited, norm-referenced assessment measuring the receptive vocabulary of children and adults. The measure consists of 19 sets of 12 items each; sets and items are arranged in order of increasing difficulty. The PALS-PreK was composed of six separate subtests that were individually administered, assessing children's emergent phonological awareness, alphabet knowledge,¹ and print skills in familiar contexts. The TOPEL is a norm-referenced assessment including three subtests (print knowledge, definitional vocabulary, and phonological awareness) and a composite score that forms the TOPEL early learning index by combining the scores from the three subtests. This index represents a child's overall emergent literacy skills. Summative data of the PPVT-IV and TOPEL were completed at pre-intervention and post-intervention. The PALS-PreK data were collected for formative purpose biweekly. In addition, Child Satisfaction Questionnaire and Teacher Satisfaction Questionnaire adapted from the questionnaires developed by DuPaul et al. (1998) were completed to obtain participants' perceptions on the use of APT.

Data analysis

Four sets of analyses were completed. The first set focused on group differences between children receiving APT and children not receiving APT. This set of analyses answered the first research question. Children from the experimental group were videotaped during free playtime at baseline and intervention periods. For the comparison group, children were videotaped regularly (twice/month) during free playtime after the routine activity, as in the baseline condition. A multivariate analysis of variance with repeated measures was conducted to compare the two groups; significant effects were followed up with univariate analyses. The main effects and interaction effects were analysed through this set of data analyses.

The second set of analyses was conducted to answer the second and third research questions. This set of analyses examined the group differences between the children who were ELLs and the children who were NES. The hypothesis related to the intervention was tested in a group design (intervention versus comparison) format that involved change over time. The repeated measures included three experimental phases: pre-treatment, treatment, and post-treatment.

The third set of analyses used path analysis to examine whether social interactions mediated the effect of APT on language and literacy skills to answer the fourth research question. Path analysis was a method of testing the validity of a theory about causal relations between three or more variables (Gall, Borg, & Gall, 1996) and was used to test the proposed mediating model presented in Figure 1. Parameters were estimated using maximum likelihood procedures. The fit of mediating model was evaluated based on the comparative fit index (CFI: Bentler, 1995) and root mean square error of approximation (RMSEA: Browne & Cudeck, 1993).

The last set of data analyses addressed participating children's and teachers' perceptions of using APT to answer the fifth research question. This analysis allowed the researcher to examine the social validity of APT and help identify its long-term effects.

Results

The ELLs from the experimental group demonstrated significant improvement than their peers from the comparison group in positive social interaction behaviour ($t = 4.98$, $p < .001$; see Table 2) and receptive language skills as measured by PPVT-IV ($t = 5.04$, $p < .001$; see Table 2). Children from the experimental group also showed significant improvement in print knowledge ($t = 4.13$, $p < .001$) and vocabulary ($t = 3.99$, $p < .005$) as measured by TOPEL (see Table 2); however, no significant difference was found between the two groups in phonological awareness ($p > .05$). The formative PALS-Prek results indicated that ELLs' alphabet knowledge was significantly improved after they received the APT procedure.

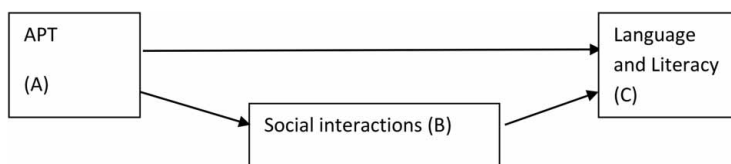


Figure 1. Mediating model of social interactions on language acquisition.

Table 2. *t*-test results of children's positive social behaviour and early language and literacy skills.

	APT		Non-APT		<i>t</i> -test
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
SIOS	3.5	1.23	1.9	1.54	4.98**
PPVT	92.85	12.53	87.23	12.54	5.04**
TOPEL					
Print knowledge	100.15	12.87	97.89	12.79	4.13**
Defi. vocabulary	97.21	11.35	95.12	11.89	3.99*
Phono. aware.	90.61	11.67	90.13	12.01	.22

** $p < .001$.* $p < .005$.

No significant difference was found between the ELLs and their NES peers in social interaction behaviour after receiving the APT. However, ELLs from the experimental group showed significant growth in early language and literacy skills than their NES peers ($t = 3.95$, $p < .05$).

The path analysis model yielded good fit to the data: $\chi^2(3) = 10.16$, $p < .10$; RMSEA = 0.08; Standardized Root Mean Residual = 0.04; CFI = 1.00. All hypothesised paths reached significance, with the A-B path showing the strongest effect ($\beta = 0.51$, $p < .001$), the A-C path ($\beta = 0.39$, $p < .01$) and the B-C path showing the moderate effect ($\beta = 0.38$, $p < .01$). The total effect indicated that children's social interaction behaviour moderately mediated the APT effectiveness on language acquisition.

All teachers (four teachers and four instructional assistants) reported that they enjoyed the procedure of the APT and would consider using it in the future. The majority (97%) of participating children indicated that they enjoyed the procedure of APT and would share it with their friends.

Interrater reliability

The social interaction behaviour of the participants was videotaped by the research assistant in each of the classrooms. The videotapes were viewed and coded by two observers. Reliability checks were conducted on the scores of children's social behaviours using SIOS.

First, Observer A (the researcher) viewed all the videotapes and rated the social interaction behaviour of children from two groups by using the SIOS. Then, Observer B (the research assistant) viewed 25% of the videotapes and rated children's social interaction behaviour using the SIOS. Interrater reliability on the SIOS was determined by $[\text{agreements}/(\text{agreements} + \text{disagreements})] \times 100 = \text{percent of agreement}$. Interrater agreement was 99.4% on the SIOS.

The qualitative data such as children's verbal statements during the APT procedures were observed and transcribed by Observer A. Then Observer B watched all the segments including these qualitative data and transcribed them independently. The interrater reliability on children's verbal statements was 100%.

Discussion

Social competence not only indicates the social skills of young children, but also affects all the other developmental areas because children's development is all related to one

another across domains. Social interaction plays a significant role in young children's learning and social skill development that enables children to be active learners in the interaction with peers and adults. Children learn best when they positively interact with their peers and adults in a meaningful activity (Phillips & Soltis, 1998). However, because of environmental or developmental differences, some children were not provided the most appropriate social context in their learning. Among these were children who are from culturally and linguistically diverse backgrounds.

In the USA, more and more children with diverse backgrounds have been served in the early childhood education programmes. Among this diverse population, young ELLs are a group whose primary language is other than English and who are included in the general education settings. In addition to their limited English language proficiency, many ELLs are from a disadvantaged background that often disconnects the necessary interactions between the children's families, the community, and the school (Torres, 2001). It has been a challenging task for educators to prepare appropriate educational environments and instructional strategies in helping these children reach their potentials in developmental areas. Unfortunately many ELLs have received lower quality education in terms of materials, interactions, activities, and expectations (Faltis, 1997). Among the limited empirical studies on young ELLs, almost all focused on their second language development (i.e. English; August, 1987; Gersten & Baker, 2000; Greenwood et al., 2001).

The positive effects of APT on ELLs' social interactions and language acquisition suggested the critical importance of instructional methods and strategies for teaching young children in inclusive settings, specifically children from culturally and linguistically diverse backgrounds. The mediating role of social interactions, as supported by the findings of this research, provides valuable information on the development and implementation of language instruction for young ELLs and children with developmental or language delays. Additionally, findings from this research may help policy-makers in determining eligibility requirements for children with special needs due to a specific learning disability or language delay and therefore potentially reduce the disproportionate representation of language minority children in special education.

This research also is helpful in identifying critical factors that affect young ELLs' learning and development, particularly the role of social interactions in their later school success.

A limitation of this study was the small sample size related to the results and interpretation of the path analysis. Based upon the estimated size of the effect (e.g. Wehby, Symons, Canale, & Go, 1998) and the estimated number of parameters, a sample size of 200 students would provide adequate statistical power (Tabachnick & Fidell, 1996). Therefore, larger sample size is recommended for future studies to further examine the effects of the APT and the mediating effect of social interactions.

Implications

This study observed ELLs' social interactions immediately after APT was implemented. A more conservative design can be developed to examine the long-term effects of APT because the spillover effects of peer tutoring could carry over for at least 24 hours (August & Shanahan, 2008). For example, the observation of children's social interactions can be conducted the next day after APT is used. When children's social skills are generalised to different settings, learning occurs more naturally and effectively (Filler & Xu, 2007; Hyatt & Filler, 2013). In addition, ELLs in this

study were primarily from Hispanic backgrounds. More data are needed to examine the effects of APT on children from more diverse backgrounds. Also, the relationship between children's social interaction and inappropriate behaviour of ELLs was not the focus of this study. Future studies can investigate the relationship between these two variables and how it might affect their academic performance.

Peer tutoring is only one of the peer-mediated instructional strategies and it may not work for all children. The message from this study is that children from minority backgrounds have common characteristics in social and academic areas with children from the majority culture. They also have their unique needs in their language development, especially in the sequence of second language acquisition. Adapted peer tutoring, as an instructional strategy, has the potential to help these children learn effectively in a developmentally appropriate early childhood programme.

Disclosure statement

No potential conflict of interest was reported by the author.

Notes on contributor

Dr Yaoying Xu is an associate professor in Special Education and Disability Policy at Virginia Commonwealth University. She teaches graduate courses including assessment, instructional programming, multicultural perspectives in education, and research design in special education. Dr Xu's research interests involve culturally and linguistically appropriate assessment and instruction for young children and students with diverse backgrounds, impact of social interactions on school performance, and empowering culturally diverse families of children with disabilities in assessment and intervention.

Note

1. The Alphabet Knowledge subtest includes three separate but related tasks to assess the various levels of the alphabetic code: upper-case alphabet recognition, lower-case alphabet recognition, and letter sounds. Once a child demonstrates the ability to identify 16 or more upper-case letters, he or she moves to the Lower-case Alphabet Recognition. Once a child names nine or more lower-case letters correctly, he or she moves to letter sounds task.

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