Development of the Children's Communication Checklist (CCC): A Method for Assessing Qualitative Aspects of Communicative Impairment in Children

D. V. M. Bishop

MRC Cognition and Brain Sciences Unit, Cambridge, U.K.

The Children's Communication Checklist (CCC) was developed to assess aspects of communicative impairment that are not adequately evaluated by contemporary standardised language tests. These are predominantly pragmatic abnormalities seen in social communication, although other qualitative aspects of speech and language were also included. Some items covering social relationships and restricted interests were incorporated, so that the relationship between pragmatic difficulties and other characteristics of pervasive developmental disorders could be explored. Checklist ratings were obtained for 76 children aged 7 to 9 years, all of whom had received special education for language impairment. In 71 cases, 2 raters (usually a teacher and speech-language therapist) independently completed the checklist, making it possible to establish inter-rater reliability. From an initial pool of 93 items, 70 items, grouped into 9 scales, were retained. Five of the subscales were concerned with pragmatic aspects of communication. A composite pragmatic impairment scale formed from these subscales had inter-rater reliability and internal consistency of around .80. This composite discriminated between children with a school diagnosis of semantic-pragmatic disorder and those with other types of specific language impairment (SLI). The majority of children with pragmatic language impairments did not have any evidence of restricted interests or significant difficulties in the domains of social relationships.

Keywords: Specific language impairment, pragmatics, assessment, ratings, PDD.

Abbreviations: CCC: Children's Communication Checklist; CLIC: Checklist for Language Impaired Children; IRR: inter-rater reliability; PDDNOS: Pervasive Developmental Disorder Not Otherwise Specified; PLI: pragmatic language impairment; SLI: specific language impairment; SP: semantic-pragmatic.

Introduction

Specific language impairment (SLI) is diagnosed when a child has significant problems in mastering language for no known reason. Given that language is a complex function and this is a diagnosis largely by exclusion, it is perhaps not surprising that a fairly wide range of problems is encompassed by this category. Some children have major comprehension deficits, others have difficulties predominantly with expression. Syntax and/or phonology usually pose particular problems, but in some cases these are relatively intact, and there are peculiarities in the content and use of language. Although most professionals concerned with SLI would agree that children in this category are heterogeneous, it has proved

remarkably difficult to arrive at any consensus as to how SLI should be subclassified.

One approach to subclassification is based on clinical observation. Rapin and Allen (1983) and Bishop and Rosenbloom (1987) independently produced clinical accounts distinguishing between a range of disorders, including those where the main problems are with language form (syntax and phonology) and those where the principal difficulties are with language content and use (semantics and pragmatics). Rapin listed the following features of "semantic-pragmatic disorder"[1]: "Verbosity with comprehension deficits for connected speech. Word finding deficits and atypical word choices frequent. Phonology and syntax unimpaired. Inadequate conversational skills: speaking aloud to no one in particular, poor maintenance of topic, answering besides the point of a question." (Rapin, 1996, p. 646). This description contrasts sharply with textbook accounts of

[1] Rapin (1996) refers to "semantic-pragmatic deficit disorder", and Bishop and Rosenbloom (1987) to "semantic-pragmatic disorder". The latter term will be used henceforth in this paper.

typical SLI, where sentence structure is immature, speech may be unintelligible, and grammatical morphemes omitted. It has been suggested that the pattern of language difficulties seen in semantic-pragmatic disorder may reflect a distinctive neurological location of underlying dysfunction (Shields, 1991). Questions have also been raised about the relationship between semantic-pragmatic disorder and pervasive developmental disorder (PDD). Semantic-pragmatic disorder tends to co-occur with autistic features, although it is also seen in language-impaired children who do not meet diagnostic criteria for autism (e.g. Bishop & Rosenbloom, 1987; Rapin, 1996). Bishop (1989a) suggested that the distinction between autistic disorder, Asperger's syndrome, and semantic-pragmatic disorder may be more a matter of degree rather than a sharp divide.

Clinical descriptions of subtypes are a vital starting point in developing a classification, but a great deal of work needs to be done in validating the proposed categorisation. If a category is to be useful, it must be defined in a way that is reliable and valid, and, as research in psychiatry has amply demonstrated, syndromes based on behavioural characteristics pose major problems (Cantwell, Russell, Mattison, & Will, 1979). Multivariate statistical analyses have been used in the past to find natural groupings in the SLI population, but in general these studies do not lead to the same types of sub-classification as exist in the clinical literature (Aram & Nation, 1975; Wilson & Risucci, 1986; Wolfus, Moskovitch, & Kinsbourne, 1980). This is unsurprising when we consider that the data typically entered into such analyses come from standardised language tests. Most language tests measure complexity of expressive language form, verbal memory, or comprehension of vocabulary or of sentences of increasing length and complexity. Many of the impairments that are regarded as diagnostically important in the clinical literature are not identified on such measures. For instance, several of the features that typify semantic-pragmatic disorder, such as verbosity, over-literal responding to questions, or problems in understanding connected discourse, would not be detected by a conventional language test battery.

Conti-Ramsden, Crutchley, and Botting (1997) found that a cluster analysis of data from children with SLI yielded a coherent pattern of results when test results were supplemented with teacher's opinions as to whether the child had difficulties in the areas of articulation, phonology, syntax and/or morphology, semantics and/or pragmatics. They noted that psychometric tests were particularly poor at identifying semantic-pragmatic problems, and concluded that there was an urgent need for better methods of reliable assessment of this area of communicative functioning. In 1984, Roth and Spekman noted that most pragmatic assessment procedures were informal and lacked information about reliability and validity. Although some progress has been made since that time, the fact remains that assessment of children's difficulties in this domain remains considerably more problematic than assessment of other levels of language functioning. Furthermore, as McTear and Conti-Ramsden (1992) remarked, such procedures as do exist are often developed on the basis of what is known about normal development, and may not be appropriate for

pinpointing the types of problem that arise for language-impaired children.

There are three methods that can be used in assessment; (1) tests that elicit the specific behaviours of interest; (2) observational methods for identifying the critical features in naturalistic contexts (e.g. conversational analysis); (3) ratings of behaviour by someone familiar with the child.

Standardised tests. There is a handful of standardised assessments of pragmatic aspects of language in children; however, none is entirely satisfactory for evaluating the range of pragmatic abnormalities described in clinical accounts. The Test of Pragmatic Language (Phelps-Teraski & Phelps-Gunn, 1992) requires the child to formulate appropriate utterances in relation to pictured situations. One limitation of this approach is that children with semantic-pragmatic difficulties can perform much better when given clear instructions in relation to a concrete context than they do in naturalistic settings (Bishop & Adams, 1991). The Test of Pragmatic Skills (Shulman, 1985) and the protocol devised by Klecan-Aker and Swank (1988) assess the child's use of different communicative functions in a standardised but more natural setting, but they quantify pragmatic skill in relation to developmental norms, rather than enabling one to pinpoint qualitative abnormalities in communication.

Observation in naturalistic contexts. Observational procedures have been developed at both the macro- and micro-level of analysis. Macro-analytic methods are those where a stretch of conversation or other language is reviewed and rated globally on various dimensions of pragmatic function. Prutting and Kirchner (1987) demonstrated that trained raters could achieve acceptable levels of inter-rater reliability with this kind of approach. However, making a global judgement of whether pragmatic behaviours are impaired or adequate becomes problematic when dealing with children who have fairly subtle difficulties. If we identify just one or two instances of a particular abnormal feature in a 10-minute stretch of conversation, it can be difficult to know how typical this is of the child, and how much significance to attach to the behaviour. Micro-analytic methods, which involve coding each utterance in a conversation (e.g. Bishop & Adams, 1989), allow one to achieve a more graded quantification of pragmatic difficulties, but they are enormously time-consuming and require extensive training in order to achieve adequate levels of inter-rater reliability. Nor do they escape the difficulties inherent in generalising from one brief section of conversation that may not be representative of the child's typical behaviour. For example, Bishop and Adams (1989) confirmed that over-literal responding to questions is more common in children with a diagnosis of semantic-pragmatic disorder than in other language-impaired children. However, this is nevertheless a rare phenomenon, and a large amount of conversation needs to be coded if one is to detect it. This is time-consuming and one remains unclear whether, if the behaviour is not observed, this is because it does not occur, or whether it does so but only rarely, so that the probability of encountering examples in a stretch of conversation remains fairly low.

Ratings. Ratings of a child's "typical" behaviour have the disadvantage that they are particularly prone to

subjective interpretation and may be influenced by stereotyped concepts of language disorder. On the other hand, ratings have three distinct advantages over other methods. First, they take relatively little time. Second, if they are completed by someone who knows the child well and has observed behaviour over a prolonged period, they are more likely to give a representative account of typical behaviour without being unduly influenced by day-to-day fluctuations. Third, they allow one to assess behaviours that are difficult to elicit in test situations and that are rare in occurrence. This approach to assessment has been adopted by Dewart and Summers (1988) in their Pragmatics Profile, but their method was not suitable for this study because it focuses on preschool children and is predominantly geared toward assessing the normal developmental progression of pragmatic skills. Furthermore, it is intended to offer a framework for interviewing parents about children's pragmatic skills rather than acting as a formal assessment, and no information about reliability and validity are provided.

The aim of this study was to develop and evaluate a checklist for rating features of language impairment that are given importance in clinical accounts but that are not readily amenable to conventional forms of assessment. The interest was not so much in assessing children in relation to normal development, but in obtaining a more qualitative picture of the profile of communicative difficulties in children with SLI, including some behaviours that may seldom be encountered in the course of normal development. The specific questions that were considered were (1) can such behaviour be reliably assessed; and (2) do checklist data provide any validation for a distinct syndrome of semantic-pragmatic disorder within the SLI population?

The checklist that will be described here builds on a series of studies extending over several years. The overall approach is an iterative one: we start with hypotheses derived from clinical accounts of pragmatic impairments in children, and devise items to measure the relevant behaviours. We then test these items, both in terms of their reliability and their validity, as indexed by how well they distinguish groups who are thought, on global clinical impression, to have different types of disorder. Based on the results of such an exercise, a new set of items is developed, and the exercise repeated until we arrive at an instrument with acceptable reliability and validity. An initial version of the checklist was designed and data were collected on 34 language-impaired children attending special schools, in the course of a detailed study of children's conversational behaviour (see Bishop, Chan, Adams, Hartley, & Weir, in press, for details of this pilot checklist). Raters who completed this checklist were encouraged to offer comments and suggestions for improvement, and on the basis of their feedback, the pool of items was revised to give a new Checklist for Language Impaired Children (CLIC), consisting of 23 items, each with multiple-choice format. Each choice consisted of a statement describing behaviour in a given domain. For instance, one item asked: How likely is the child to initiate conversation with others?, and offered the options (a) Seldom or never initiates conversation; (b) Tends not to initiate conversation but will do so in some settings, e.g. with younger children or family members; (c) Will

initiate conversation normally when this is appropriate; (d) Talkative, but not excessively so; (e) Verbose; will talk incessantly if given the opportunity.

The inter-rater reliability of the CLIC was assessed in a study using ratings by teachers and speech-language therapists for 158 pupils from 3 residential schools for children with SLI. Some results from this initial study were encouraging, but the reliability of several of the items was disappointingly low, and there was a relatively large amount of missing data, which reflected the raters' reluctance to check any of the five options offered for an item if they felt it did not correspond closely to the child. Some results from CLIC are presented by Bishop (in press) but, given the low reliability of some items, it was decided that this should be treated as an exploratory pilot study, and further development was needed. It was decided, therefore, to proceed with a revised version, entitled the Children's Communication Checklist (CCC), which is the focus of the present report.

It is important to emphasise that the checklist was *not* intended to identify children with SLI from within the general population. Rather, the aim was to see whether, within a population that is already identified as language-impaired, professionals who are familiar with the children can agree about the extent to which particular communicative behaviours apply in a given case and, if they do, whether there is any evidence for a distinct subgroup of children with difficulties predominantly affecting semantics and pragmatics.

Method

Sample

The children involved in this study were a subset of those taking part in a survey of children attending "language units" (i.e. special language-based classrooms) for children with SLI (Conti-Ramsden et al., 1997). Most children selected for placement in a language unit will have undergone a formal assessment leading to a statement of special educational needs, and will be deemed to require intensive speech-language therapy. Although criteria vary across the country, most units exclude children who fall below the average range on nonverbal ability, those who have a permanent bilateral hearing loss, or those who have major physical, psychiatric or behavioural difficulties. Conti-Ramsden et al. selected a random sample of approximately half the 7-year-olds attending language units in England for more detailed study, giving a cohort of 242 participants (186 boys and 56 girls). As reported by Conti-Ramsden et al., these children were given a detailed individual assessment, and their teachers and speech-language therapists were interviewed about their speech-language difficulties.

Approximately 12 months after children had been individually assessed, school staff were invited to participate in this validation study of the Children's Communication Checklist. Validation of the CCC had not been part of the original survey that staff had agreed to participate in, and because they had already given up time helping with the main study, they were not pressurised to take part. Staff from 52 language units agreed to participate, giving checklist data for 76 pupils (32% of the whole cohort, comprising 44% of those children who were still attending a language unit, and 17% of those who had left). Language data obtained by Conti-Ramsden et al. (1997) were compared for those members of the cohort for whom checklists were completed versus the remainder, and no significant differences were found, confirming the representativeness of the subset of children studied here. The mean age of children at the

time of checklist completion was 8.25 years (range 7.55 to 9.83 years).

Diagnostic Information

Diagnostic information was gathered from the school staff, including a rating of whether children were thought to have semantic-pragmatic disorder. For each child in the study, a diagnosis sheet was completed by a member of the school staff, as shown in Appendix 1, using any information available in the child's records. The categories that were included were not mutually exclusive, and the respondent was encouraged to check as many diagnoses as seemed to apply. The purpose of gathering this information was *not* to provide a gold standard against which to evaluate the checklist: there was no attempt to adopt uniform diagnostic criteria across the different schools in this study and it was not possible to assess the inter-rater reliability of this diagnosis. Nevertheless, comparison between checklist scores and global diagnosis should give a preliminary indication of whether the checklist was likely to be useful. Minimally, we would expect it to be able to reveal different qualitative patterns of impairment in children given different diagnostic labels.

Procedure

Checklists were completed by members of staff who had known the child for at least 3 months. Wherever possible (71 children), two staff members independently completed the checklist, and these cases were used to establish inter-rater reliability. In 76 % of cases, the first rater was a speech language pathologist and the second was a teacher, but some checklists were completed by other professionals such as classroom assistants. There were a further seven cases where only one rater completed a checklist, and these checklists were included when analysing internal consistency of checklist subscales. The median time that raters had known the children was 18 months (range from 5 months to 96 months).

Instructions on the front of the checklist included questions about the identity and profession of the person completing the checklist, and the length of time they had known the child. Raters were also asked to indicate the kind of educational provision the child was receiving, and whether the child had ever had a permanent hearing loss diagnosed, whether the child had a permanent physical handicap or chronic illness, and whether English was the main language spoken at home. Instructions for completing items in the body of the checklist were as follows:

> This checklist contains a series of statements describing aspects of children's behaviour. For each statement, you are asked to judge whether the statement DOES NOT APPLY, APPLIES SOMEWHAT or DEFINITELY APPLIES. Please tick ONE box per item, choosing the response that, in your judgement, best describes the child named above. Do not leave any items blank. If you are unable to answer the question, please tick the box labelled "Unable to judge". PLEASE FILL IN THE CHECK-LIST ON YOUR OWN, DO NOT DISCUSS YOUR ANSWERS WITH ANYONE ELSE. The checklist can-not capture every child's behaviour perfectly, so do not worry if you feel that none of the response alternatives is exactly appropriate; tick the one you think comes closest, and, if necessary, add an explanatory comment.

We added the final sentence to the instructions for two reasons. First, past experience had taught us that teachers and therapists were more willing to use a multiple-choice format if they felt they had the opportunity to add verbal comments to their responses. Second, we had found in pilot work that such comments were useful in drawing attention to possible ambiguities in item wording, or aspects of communication that we had overlooked. Explanatory comments were noted but did not influence the scoring.

Development of the Checklist

Creation of initial item pool. As noted above, checklist items went through a protracted course of development over several years; the pool of items used in the Checklist for Language Impaired Children (CLIC) was used as the basis for developing the Children's Communication Checklist (CCC). The main aim was to devise a checklist that could evaluate communicative behaviours that were difficult to assess using conventional psychological tests but which had been given prominence in clinical descriptions of children's language disorders. These included items assessing use of prosody, word-finding diffi-culties, production and comprehension of discourse, appro-priate use of language, and nonverbal communication (Rapin & Allen, 1983, 1987; Bishop & Rosenbloom, 1987). Some items were motivated by findings from a previous study of children's conversation, which identified characteristics that led to a judgement of inappropriacy (Adams & Bishop, 1989; Bishop & Adams, 1989). These included verbosity, failure to use context in comprehending utterances, socially inappropriate utterances, tendency to provide too much or too little information for the listener, and use of stereotyped language. In addition, items assessing intelligibility of speech and complexity of spoken grammar were included in the checklist, as these are regarded as important in differentiating subtypes of language impairment. Because the diagnostic relationship between autistic disorder and language impairment, especially semantic-pragmatic dis-order, has been a matter of debate, we also wanted to include items assessing social relationships with peers and adults, and unusual and restricted interests. Two additional areas, attention and gross motor skills, were also included, as these are both domains where children with SLI are known to have difficulties, and it was of interest to see whether they would act as an external criterion that would differentiate between subgroups of children selected on the basis of their communicative charac-teristics.

One of the problems with the CLIC had been that it used a five-choice item format, and raters had appeared reluctant to check any of the five options if they did not feel it closely matched the child. It was decided therefore to proceed with a revised version, CCC, using a larger pool of items with a simpler response format, so that, in effect, each response option previously offered in the five-choice format of CLIC was presented in isolation, with the rater being asked to check whether it definitely applied, applied somewhat, or did not apply. The further option "unable to judge" was also offered, but raters were instructed to use this only if they had no opportunity to observe the behaviour in question. At this stage, some further items were dropped or added, on the basis of feedback from raters who had participated in the CLIC study. This gave a final pool of 93 items, grouped into 14 broad domains. To provide raters with the opportunity of commenting on strengths as well as weaknesses, and to avoid raters developing a response set, some items asked about positive characteristics of the child.

Preliminary evaluation of subscales in terms of internal consistency and inter-rater reliability. Each of the 14 domains of functioning was treated as a subscale, and a mean item score was computed by awarding 2 points for each item where "definitely applies" was checked, and 1 point for "applies somewhat". Scores for the subscale were then totalled, with a positive sign given to items describing a child's strengths, and a negative sign to those describing a weakness (see Appendix 2), and the total was added to 30 to ensure that all subscale scores

were positive, for ease of computation. Scores for items that were omitted (1.57% of all responses) or coded "unable to judge" (1.45% of all responses) were prorated provided they did not constitute more than one fifth of the items in a subscale. (The majority of "unable to judge" responses occurred on nonlinguistic items rated by speech-language therapists).

Two measures of reliability were considered: internal consistency (coefficient α, Cronbach, 1951) gives an indication of how far the items in a subscale differentiate in the same direction as the whole scale. This was computed for both sets of ratings. Inter-rater reliability (IRR, measured in terms of Pearson's intraclass correlation, r) indicates how well the two sets of ratings agreed. An iterative procedure was adopted for optimising the subscales. The total score for the subscale was computed (on the basis of a priori assignation of items according to item content), and the correlation of each item with the total scale was inspected. Items were then progressively deleted (on the basis of low intercorrelation with total scale) until internal consistency was optimised, except that no item was dropped if this led to a drop in IRR. (Items that were discarded in this exercise were subsequently considered for reassignment to another subscale, see below.)

Discarding unsatisfactory subscales. Any subscale where α or IRR fell below .61, or where the subscale consisted of less than four items, was discarded, and items from that scale were considered for reassignment. Five of the original subscales (prosody, lexical semantics, conversational engagement, attention, and motor skills) were discarded at this point.

Reassignment of discarded items. Discarded items were next examined in terms of correlations with remaining subscales. Items that correlated significantly with one of the retained subscales were considered for incorporation in that subscale, and were retained if this led to increased α without decreasing IRR.

The final set of items, grouped into subscales, is shown in Appendix 2, together with data on the internal consistency and IRR of each subscale.

Results

Validation: Relationship of School Diagnostic Information to CCC Subscales

As noted earlier, the diagnostic information available for each child could not be regarded as a "gold standard", as no uniform diagnostic criteria had been applied. Nevertheless, we would anticipate that the checklist should be able to differentiate children who were regarded as having a semantic-pragmatic disorder from those who were not. In evaluating this hypothesis, children who were noted as having any permanent hearing loss ($N = 2$), nonverbal IQ below 80 ($N = 6$), definite autistic disorder ($N = 3$), physical handicap ($N = 1$), or bilingual home background ($N = 4$) were excluded. One further child for whom no diagnostic information was provided was also excluded. The remaining 59 children were divided, on the basis of school diagnostic information, into three broad groups:

(1) *Semantic-pragmatic, pure* (SP pure): ($N = 14$) children who were identified as having possible or definite semantic-pragmatic disorder, but who were not regarded as having autistic disorder, autistic features, or Asperger's syndrome

(2) *Semantic-pragmatic, plus* (SP plus): ($N = 8$) children who were identified as having possible or definite semantic-pragmatic disorder, but who were also thought to have possible or definite autistic features, autistic spectrum disorder, or Asperger's syndrome. (Note that children who were coded as having definite autistic disorder have been excluded from consideration.)

(3) *Other SLI*: ($N = 37$) children who were identified as having some other kind of communication disorder (developmental language disorder, developmental verbal dyspraxia, language delay), and who were not regarded as having either semantic-pragmatic disorder or any kind of pervasive developmental disorder (including autistic features, autistic spectrum disorder, or Asperger's syndrome).

Scores for these three subgroups on the nine CLIC subscales are shown in Table 1. The only measure on which the three groups of children did not differ was the syntax subscale. On the speech scale, children with SLI were significantly impaired relative to the SP pure group.

Table 1
Mean Checklist Subscale Scores (Rater A) for Language-impaired Children Subdivided According to School Diagnosis

Subscales	Possible range	Actual range	SP plus ($N = 8$[a])	SP pure ($N = 14$)	SLI ($N = 37$[b])	F	p
A. Speech	16–38	17–36	30.1 (4.49)	30.6$_x$ (4.65)	26.5$_y$ (5.05)	4.34	.018
B. Syntax	24–32	24–32	30.3 (1.58)	29.2 (2.12)	28.7 (2.24)	1.86	.165
C. Inappropriate initiation	18–30	20–30	25.0$_x$ (3.29)	25.9 (3.57)	28.0$_y$ (2.37)	5.48	.007
D. Coherence	20–36	20–35	23.6$_x$ (3.11)	25.5$_x$ (2.38)	28.7$_y$ (4.44)	7.34	.002
E. Stereotyped conversation	14–30	15–30	21.4$_x$ (4.87)	23.9$_x$ (3.65)	27.5$_y$ (2.04)	17.84	< .0001
F. Use of context	16–32	19–32	22.3$_x$ (4.27)	24.2$_x$ (3.58)	28.5$_y$ (2.90)	16.86	< .0001
G. Rapport	18–34	18–34	25.0$_x$ (4.72)	29.1$_y$ (3.36)	31.0$_y$ (2.87)	11.54	< .0001
H. Social relationships	14–34	20–34	25.3$_x$ (4.00)	28.9 (4.19)	29.9$_y$ (3.56)	4.25	.020
I. Interests	20–34	25–34	28.3$_x$ (2.07)	30.8 (2.29)	31.8$_y$ (2.08)	7.19	.002
Pragmatic composite (subscales C to G)	86–162	100–158	119.6$_x$ (12.68)	129.8$_x$ (8.79)	143.2$_y$ (10.39)	21.18	< .0001

[a] $N = 7$ for social, $N = 6$ for interests.
[b] $N = 36$ for use of context, $N = 33$ for social and interests.
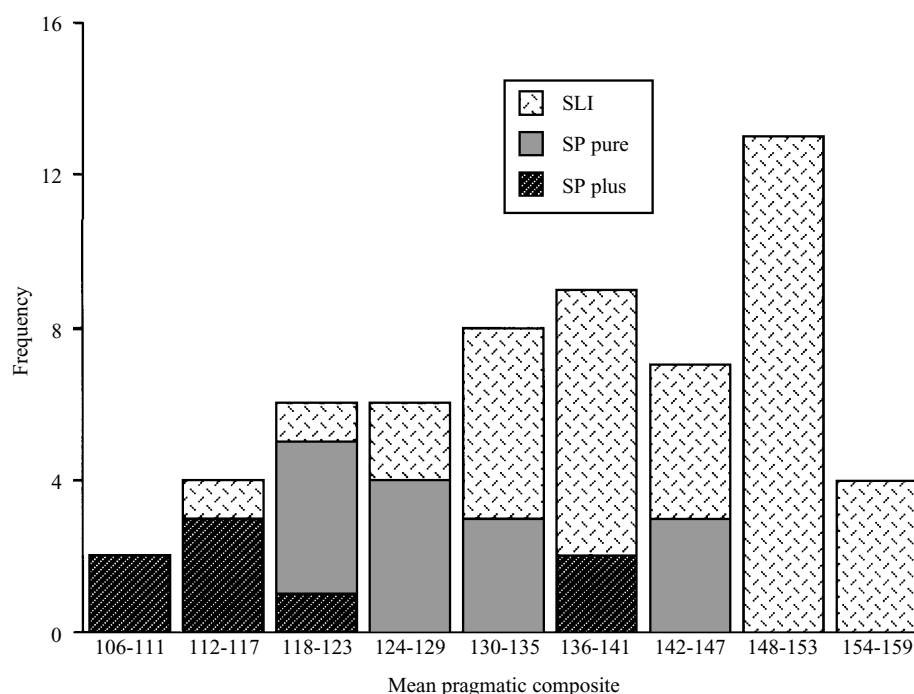Means with different subscripts are significantly different on Scheffé test at .05 level.

Figure 1.   Distribution of scores on pragmatic composite in relation to school diagnostic information.

Table 2
Intercorrelations Between CCC Subscales: Correlations Above the Diagonal Are for Rater A (N = 59) *and Those Below the Diagonal for Rater B* (N = 51)

	A	B	C	D	E	F	G	H	I
A. Speech		.289	−.224	−.123	−.303	−.202	−.136	.005	−.027
B. Syntax	.501*		−.450*	.354*	−.355*	.013	.186	−.007	−.213
C. Inappropriate initiation	−.242	−.339		.151	737*	598*	.172	.354*	.547*
D. Coherence	.164	.530*	.064		.348*	.496*	.529*	.178	.256
E. Stereotyped conversation	−.230	−.277	.480*	.314		.729*	.426*	.502*	.653*
F. Use of context	−.087	.030	.452*	.508*	.632*		.618*	.659*	.596*
G. Rapport	−.065	.044	.283	.470*	.558*	.505*		.551*	.589*
H. Social relationships	−.082	−.202	.451*	.194	.453*	.528*	.513*		.650*
I. Interests	−.234	−.322	.264	.027	.490*	.322	.565*	.452*	

  * Denotes a correlation that is significant at .01 level.

On all other scales, the tendency was for the SP plus group to obtain lowest scores, the SLI group to obtain highest scores, with the SP pure group intermediate. The differences between SLI and SP plus groups was significant on all these subscales. The difference between the SP pure and SLI groups reached significance on the following scales: coherence, stereotyped conversation, and use of context. The SP pure and SP plus group differed significantly on rapport.

Next, a composite scale was formed by summing subtests C to G, all of which are concerned with pragmatic aspects of communication. This gave IRR of .80, with internal consistency α of .867 for rater A and .797 for rater B. The distribution of composite scores is shown in Fig. 1. (To maximise sample size, the plot shows the mean score from the two raters, with a single rater's score being used where only one set of ratings was available.) The majority of children with a composite score greater than 132 were categorised as other SLI, whereas the majority

of those with a composite score lower than this were classified as either SP pure or SP plus.

Intercorrelations between Subscales

The sample size is too small in relation to the number of variables to give reliable output from a multivariate procedure such as factor analysis, but exploration of the pattern of intercorrelations can give a preliminary indication of how the variables interrelate. The intercorrelations between the CCC subscales are shown in Table 2, with rater A shown above the diagonal and rater B below the diagonal. In general the two sets of ratings showed a similar pattern of intercorrelations between scales, giving one confidence that these are stable, and not the result of chance fluctuations. Overall, correlations between the two indices of language structure (A: speech

Table 3
Mean Language Test Scores (Centiles) and Nonverbal IQ (Matrices) for Language-impaired Children Subdivided According to School Diagnosis

	SP plus (N = 8)	SP pure (N = 14)	SLI (N = 35[a])	F	p
Naming vocabulary[b]	45.9 (26.23)	48.9 (23.94)	41.4 (28.84)	0.39	.673
Grammatic closure[c]	27.2 (8.91)	31.5 (9.86)	28.4 (8.18)	0.82	.445
Bus story information[d]	29.7 (34.94)	26.6 (25.07)	14.4 (16.69)	2.54	.088
Goldman-Fristoe[e]	66.9_x (32.36)	57.2 (38.34)	31.2_y (26.77)	6.15	.004
Test for Reception of Grammar[f]	28.1 (22.86)	23.6 (25.94)	25.1 (22.94)	0.09	.910
Raven's matrices IQ	102.0 (11.81)	102.3 (14.39)	98.8 (11.73)	0.49	.611

[a] N = 33 for Goldman-Fristoe and Grammatic Closure.
[b] Subtest from British Ability Scales (Elliott, Murray, & Pearson, 1983).
[c] Subtest from Illinois Test of Psycholinguistic Abilities (Paraskevopoulos & Kirk, 1969).
[d] A test of narrative recall (Renfrew, 1991).
[e] Articulation test (Goldman & Fristoe, 1986).
[f] Multiple-choice grammatic comprehension test (Bishop, 1989b).
Means with different subscripts are significantly different on Scheffé test at .05 level.

and B: syntax) were positive, though the correlation fell short of significance in the first set of ratings. Scale A (speech) had nonsignificant correlations with the remaining scales. For both sets of ratings, there was a significant positive correlation between scale B (syntax) and scale D (coherence). Each scale contributing to the pragmatic composite was positively intercorrelated with at least two of the other scales contributing to the composite. Two of the scales contributing to the pragmatic composite (E: stereotyped conversation, and G: rapport) were reliably correlated with the nonlinguistic scales H (social) and I (interests), which were also positively correlated with one another.

Relationship of School Diagnostic Information to Language Test Scores

One rationale for developing a checklist had been that conventional assessments are insensitive to pragmatic impairments. To evaluate this assumption, the same three subgroups of children were compared on the formal speech-language tests that had been administered by Conti-Ramsden et al. (1997). The reduced numbers in each group reflect missing data. Results are shown in Table 3. The only test on which groups differed significantly was the Goldman-Fristoe articulation test, on which there was a trend for the two SP groups to obtain higher scores than the SLI group, with the difference reaching significance for the SP plus group. On the Bus story test, there was a nonsignificant trend for better performance by the SP groups. In a supplementary analysis, children with full test data were classified according to whether they scored above the 10th centile on all of the 5 speech-language measures. The numbers of children doing this well were 10 out of 35 (29%) of the SLI subgroup, 8 out of 14 (57%) of the SP pure subgroup, and 2 out of 8 (25%) of the SP plus subgroup. Although these proportions do not differ significantly $[\chi^2(1, 57) = 4.00, p = .135]$, the trend is for fewer of the SP pure subgroup to have significant impairments on conventional tests.

Relationship of the CCC Pragmatic Composite to Language Test and IQ Scores

The CCC pragmatic composite was correlated with the test measures shown in Table 2 for the 50 children on whom there were complete data. The .01 level of significance was adopted to allow for the inflated probability of a significant finding by chance when six correlations are computed. Only one correlation reached significance: that between the pragmatic composite and the Goldman-Fristoe articulation test $[r(48) = -.349]$. Thus, as is also suggested by other analyses, children who obtain a low score on the pragmatic composite tend to have relatively good articulation.

Discussion

This study has shown that pragmatic aspects of communicative difficulty in 7- to 9-year-old children can be rated reliably by teachers and speech-language therapists. A substantial proportion of children with SLI do have significant problems in this domain, and they are not detected by standardised tests. The question arises as to how one should refer to those children who have significant pragmatic difficulties and who do not meet criteria for autistic disorder. The term "semantic-pragmatic disorder" is widely used in the U.K., but is unpopular in many quarters because the label implies that impairments in semantics and pragmatics will always go together. An attempt was made in CCC, and in its forerunner, CLIC, to include items assessing semantic as well as pragmatic functioning, using items based on clinical accounts of word-finding difficulties, use of vague terminology (e.g. "thing" rather than a specific noun), or paraphasic errors. However, these did not form a coherent scale, and did not show strong correlations with the items assessing pragmatic functioning (see Appendix 2). Furthermore, as can be seen in Table 3, a test of Naming Vocabulary did not differentiate children with a diagnosis of semantic-pragmatic disorder from other children with SLI. Although there is clear evidence from clinical descriptions and case reports that semantic impairments can go hand in hand with pragmatic

difficulties (e.g. Sahlén & Nettelbladt, 1993), the association does not appear to be a necessary one. Taken together, these results suggest the "semantic" part of the "semantic-pragmatic disorder" label is inappropriate, and that a term such as Pragmatic Language Impairment (PLI) is preferable.

Another result that was not in line with clinical accounts was the lack of any significant differences between the school diagnostic groups on the syntax scale of the CCC (scale B). This contrasts with clinical accounts of semantic-pragmatic disorder, which postulate that children with this type of language impairment have unusually complex syntax. The lack of difference could be influenced by poor sensitivity: there was a nonsignificant trend in the predicted direction, and scale B is the shortest scale of the CCC, with a restricted range. However, the lack of significant group differences on the two language tests that are concerned with syntax (i.e. Grammatic closure and Test for Reception of Grammar) suggests this is not the whole story. There are (at least) two explanations that can be proposed for this finding. The first is that pragmatic difficulties may simply be more *obvious* when they occur in the context of good structural language skills. If a child talks in very simplified sentences, we may focus more on the structural limitations, and disregard, or make allowances for, pragmatically inappropriate behaviours. On this view, there is no real dissociation between syntax and pragmatics: rather, we are simply more aware of those cases where there is a mismatch between these domains. A second possibility is that the profile of impairment seen in PLI may vary with age. Bishop and Rosenbloom (1987) noted that many children with "semantic-pragmatic disorder" had very delayed language in the preschool period, and may not start speaking in sentences until the age of 5 or 6 years. It is possible that the picture of pragmatic limitations associated with complex and fluent expressive language becomes increasingly apparent as children grow into middle childhood, and that the children studied here were still too young to show such a striking profile. According to this view, there is an inverse relation between syntactic and pragmatic impairment, but only in older children.

The question arises as to whether children with pragmatic difficulties should be regarded as a distinct subgroup within the SLI population. This study cannot provide a definitive answer, but, in providing a method for identifying pragmatic difficulties with acceptable reliability, it lays the ground for future research on this question. Cantwell and Rutter (1994) reviewed various methods for validating categories and suggested that the most satisfactory approach is to find some external criterion that is associated with the category of interest. So if, for instance, we could demonstrate that children with PLI had a different profile on nonlinguistic cognitive measures, this would help validate the notion that pragmatic impairment characterises a qualitatively distinct subgroup of children. We had hoped to use information on children's attentional problems and motor competence as external criteria, but the items that were included were not sufficiently reliable to be retained. There is, however, a suggestion in the literature that there might be a distinctive neurological etiology for PLI: Woodhouse et al. (1996) reported that children with a

diagnosis of semantic-pragmatic disorder were significantly more likely to have unusually large heads when compared with other children with more typical SLI. In this regard, they resemble children with high-functioning autism (Piven et al., 1995).

This brings us on to the question of the relationship between PLI and autistic disorder. Much of the debate on this question has implicitly accepted the categorical distinction between specific developmental disorders (such as SLI) and pervasive developmental disorders (such as autistic disorder), which is given prominence in the fourth revision of the Diagnostic and Statistical Manual (DSM-IV) of the APA (American Psychiatric Association, 1994). Arguments have revolved around the question of whether "semantic-pragmatic disorder" is just another name for high-functioning autism (Lister Brook & Bowler, 1992). The data reported here from CCC lead one to question the emphasis on differential diagnosis between language disorder and autistic disorder, and rather to follow the logic of Rapin and Allen (1987), who regarded language impairment and autistic disorder as different levels of description, rather than alternative diagnoses. None of the children in our study had a diagnosis of autistic disorder, although some, referred to as SP plus, were described as having possible or definite autistic features, autistic spectrum disorder, or Asperger's syndrome. However, the majority of children who received a school diagnosis of definite or possible semantic-pragmatic disorder were *not* regarded as having any autistic symptomatology, and children in this SP pure group did not differ from other children with SLI in terms of ratings of social relationships or unusual interests, although they were clearly differentiated in terms of their communicative behaviour. Overall, the evidence is compatible with the view that while pragmatic difficulties often occur as part of the autistic triad of impairments in social interaction, social communication, and imaginative development (Wing, 1989), they may be seen in children who would not meet diagnostic criteria for autistic disorder, in whom communication problems are the most obvious area of difficulty. This is consistent with evidence from a study of relatives of individuals affected with autistic disorder (Bolton et al., 1994), which used a standardised interview to assess functioning in the three domains of communication, social interaction, and stereotyped behaviour. They reported that although very few relatives met criteria for autistic disorder, many of them had impairments in just one or two of these domains. If we combine the notion of three correlated but dissociable domains of impairment with the conceptualisation of PLI as a disorder that is intermediate between autistic disorder and SLI (cf. Bishop, 1989a), this gives a picture of diagnostic possibilities as shown in Fig. 2.

The category of Pervasive Developmental Disorder Not Otherwise Specified (PDDNOS) was introduced in DSM-IV to provide a diagnostic label for cases where there is a "severe and pervasive impairment in the development of reciprocal social interaction, verbal and nonverbal communication skills or the developmental of stereotyped behaviour, interests and activities", including cases where there is late age at onset, or "atypical" or "subthreshold" symptomatology. Because this diagnosis
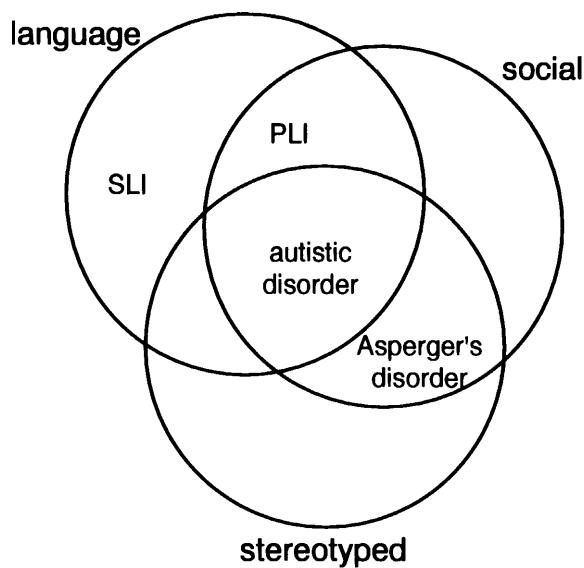
Figure 2. Pragmatic language impairment (PLI) in relation to SLI and autistic disorder. The full triad of impairments in language, social interaction, and stereotyped behaviour is seen in autistic disorder, but there may be dissociation between these areas of impairment.

requires impairment in only one of the autistic triad domains, and because it includes "subthreshold" symptomatology, it could be said to apply to a child who had relatively pure pragmatic difficulties. However, the problem with this category is that it is very broad and could also include children with very different symptom profiles, e.g. one whose only problems were in the domain of stereotyped behaviour, and with normal communication. If one's main aim in making a diagnosis is to identify children with similar characteristics who might benefit from similar kinds of intervention, then PDDNOS seems to be far too broad a category to be useful.

The checklist looks promising as a tool for both research and clinical practice, but limitations of this study must be noted. As noted in the Introduction, checklist ratings are a quick and efficient way of gathering information, but they run the risk of subjective bias. We deliberately collected information only from teachers and others who knew the children well (for at least 3 months), because it was felt that accurate identification of pragmatic difficulties might require prolonged contact, but, although this should reduce the degree of random error, it could increase the risk of systematic bias arising if the staff member is familiar with the child's diagnostic label and has a stereotyped conception of the disorder. We do therefore need studies that cross-validate checklist ratings against other kinds of information, such as the microanalysis of conversational behaviour developed by Bishop et al. (in press). It would also be of interest to see whether reliable ratings could be obtained on the basis of a much shorter acquaintance with the child, or, conversely, whether the checklist could be used as means for obtaining parental report of qualitative aspects of communicative behaviour. Another limitation of the study concerns the sample. We restricted consideration only to 7- to 9-year-olds receiving special educational provision for SLI, and we did not have systematic data on

psychiatric diagnoses using a standardised procedure. There would be considerable interest in using CCC with children who had been diagnosed according to a standard diagnostic algorithm that takes into account early developmental history, such as the Autism Diagnostic Interview–Revised (Lord, Rutter, & LeCouteur, 1994). It would also be informative to compare and contrast communicative difficulties in other clinical groups where pragmatic impairments have been described, such as those with Fragile X syndrome (Sudhalter, Scarborough, & Cohen, 1991), Williams syndrome (Karmiloff-Smith, Klima, Bellugi, Grant, & Baron-Cohen, 1995; Rapin, 1996), hydrocephalus (Cromer, 1994; Rapin, 1996), Turner's syndrome (Skuse et al., 1997), childhood schizophrenia (Caplan, 1996), and Attention Deficit Hyperactivity Disorder (Tannock, Fine, Heintz, & Schachar, 1995). In future work, we plan to extend use of CCC to other ages and diagnostic groups, and to consider whether it is adequately reliable when used by parents.

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Appendix 1

Diagnostic Information

Listed below are a number of diagnostic terms. We would like to know if any of these terms have been thought to apply to the child for whom you are completing the checklist.

The child might have been given more than one diagnosis. Please tick any of the terms below that have been used to describe this child's difficulties:

	possible	definite

developmental language disorder
    OR
developmental dysphasia
    OR
specific language impairment		

delayed language		
developmental dyspraxia		
articulation disorder OR phonological disorder/impairment		
dyslexia OR specific reading retardation		
semantic-pragmatic disorder		
autistic disorder OR infantile autism		
autistic features OR autistic spectrum disorder		
Asperger's syndrome/disorder		
pervasive developmental disorder OR PDDNOS		
attention deficit disorder OR ADHD		
clumsy child OR developmental inco-ordination disorder		
mental handicap/retardation OR learning disability (not *specific*)		
other (please specify)		

Appendix 2

Items from the Children's Communication Checklist (CCC)

Note: For girls, an alternative form was used with appropriate pronoun gender. Response options, and corresponding scores were: does not apply (0), applies somewhat (1), definitely applies (2), and unable to judge. A + sign preceding the item number denotes that scores were positive; all other items were negative. *denotes items that were originally assigned to a different subscale, but were reassigned on the basis of internal consistency analyses.

I. Items Retained in the Final Version of the Checklist

A. Speech output: Intelligibility and fluency.
α (A) = .863, α (B) = .838, IRR = .749.

+1. people can understand virtually everything he says
 2. people have trouble in understanding much of what he says
+3. seldom makes any errors in producing speech sounds
 4. mispronounces one or two speech sounds but is not difficult to understand; e.g. may say "th" for "s" or "w" for "r"
 5. production of speech sounds seems immature, like that of a younger child, e.g. he says things like: "tat" for "cat", or "chimbley" for "chimney", or "bokkle" for "bottle"
 6. he seems unable to produce several sounds; e.g. might have difficulty in saying "k" or "s", so that "cat" and "sat" are both pronounced as "tat"
 7. leaves off beginnings or ends of words, or omits entire syllables (e.g. "bella" for "umbrella")
 8. it is much harder to understand him when he is talking in sentences, rather than just producing single words
+9. speech is extremely rapid
 10. seems to have difficulty in constructing the whole of what he wants to say: makes false starts, and repeats whole words and phrases; e.g., might say "can I-can I-can-can I have an-have an icecream"
+11. speech is clearly articulated and fluent

B. Syntax.
α (A) = .739, α (B) = .779, IRR = .663.

 12. speech is mostly two to three word phrases such as "me got ball" or "give dolly"
+13. can produce long and complicated sentences such as: "When we went to the park I had a go on the swings"; "I saw this man standing on the corner"
 14. tends to leave out words and grammatical endings, producing sentences such as: "I find two dog"; "John go there yesterday" "She got a bag"
 15. sometimes makes errors on pronouns, e.g. saying "she" rather than "he" or vice versa

C. Inappropriate initiation.
α (A) = .790, α (B) = .801, IRR = .684.

 16. talks to anyone and everyone
 17. talks too much
 18. keeps telling people things that they know already
 19. talks to himself
 20. talks repetitively about things that no-one is interested in
 21. asks questions although he knows the answers

D. Coherence.
α (A) = .860, α (B) = .835, IRR = .619.

 22. it is sometimes hard to make sense of what he is saying because it seems illogical or disconnected
+23. conversation with him can be enjoyable and interesting
+24. can give an easy-to-follow account of a past event such as a birthday party or holiday
+25. can talk clearly about what he plans to do in the future (e.g. tomorrow or next week)
 26. would have difficulty in explaining to a younger child how to play a simple game such as "snap"
 27. has difficulty in telling a story, or describing what he has done, in an orderly sequence of events
 28. uses terms like "he" or "it" without making it clear what he is talking about
 29. doesn't seem to realise the need to explain what he is talking about to someone who doesn't share his experiences; for instance, might talk about "Johnny" without explaining who he is

E. Stereotyped conversation.
α (A) = .867, α (B) = .865, IRR = .681.

 30*. pronounces words in an over-precise manner: accent may sound rather affected or "put-on", as if child is mimicking a TV personality rather than talking like those around him
 31*. makes frequent use of expressions such as "by the way", "actually", "you know what?", "as a matter of fact", "well, you know" or "of course"
 32. will suddenly change the topic of conversation
 33. often turns the conversation to a favourite theme, rather than following what the other person wants to talk about
 34. conversation with him tends to go off in unexpected directions
 35. includes over-precise information in his talk, e.g. will give the exact time or date of an event. For instance, when asked "when did you go on holiday" may say "13th July 1995" rather than "in the summer"
 36. has favourite phrases, sentences or longer sequences which he will use a great deal, sometimes in inappropriate situations
 37*. sometimes seems to say things that he does not fully understand

F. Use of conversational context.
α (A) = .844, α (B) = .737, IRR = .747.

 38*. tends to repeat back what others have just said
 39. his ability to communicate clearly seems to vary a great deal from one situation to another
 40. takes in just one or two words in a sentence, and so often misinterprets what has been said
+41. can understand sarcasm (e.g. will be amused rather than confused when someone says "isn't it a lovely day!" when it is pouring with rain)
 42. tends to be over-literal, sometimes with (unintentionally) humorous results. For instance, a child who was asked "Do you find it hard to get up in the morning" replied "No. You just put one leg out of the bed and then the other and stand up". Another child who was told "watch your hands" when using scissors, proceeded to stare at his fingers
 43. gets into trouble because he doesn't always understand the rules for polite behaviour, and is regarded by others as rude or strange
 44. may say things which are tactless or socially inappropriate

45*. treats everyone the same way, regardless of social status: e.g. might talk to the head teacher the same way as to another child

G. Conversational rapport.
α (A) = .868, α (B) = .871, IRR = .828.

46*. ignores conversational overtures from others (e.g. if asked "what are you making?" the child just continues working as if nothing had happened)
47*. seldom or never starts up a conversation; does not volunteer information about what has happened
48. doesn't seem to read facial expressions or tone of voice adequately and may not realise when other people are upset or angry
49. poor at using facial expression or gestures to convey his feelings; he may look blank when angry, or smile when anxious
+50. makes good use of gestures to get his meaning across
51. seldom or never looks at the person he is talking to: seems to actively avoid eye contact
52. tends to look away from the person he is talking to: seems inattentive or preoccupied
+53. smiles appropriately when talking to people

H. Social relationships.
α (A) = .799, α (B) = .882, IRR = .691.

+54. is popular with other children
+55. has one or two good friends
56. tends to be babied, teased or bullied by other children
57. is deliberately aggressive to other children
58. may hurt or upset other children unintentionally
59. a loner: neglected by other children, but not disliked
60. perceived as odd by other children and actively avoided
61. has difficulty making relations with others because of anxiety
62. with familiar adults, he seems inattentive, distant or preoccupied
63. overly keen to interact with adults, lacking the inhibition that most children show with strangers

I. Interests.
α (A) = .840, α (B) = .725, IRR = .653.

64*. uses sophisticated or unusual words; e.g. if asked for animal names might say "aardvark" or "tapir"
65*. has a large store of factual information: e.g. may know the names of all the capitals of the world, or the names of many varieties of dinosaurs
66. has one or more over-riding specific interests (e.g. computers, dinosaurs), and will prefer doing activities involving this to anything else
+67. enjoys watching TV programmes intended for children of his age
68. seems to have no interests: prefers to do nothing

+69. prefers to do things with other children rather than on his own
70. prefers to be with adults rather than other children

II. Items Dropped from CCC Because of Poor Reliability or Internal Consistency (N = 23)

- speech is slow and laboured
- the beginning of words are repeated or prolonged (a kind of stammer)
- speech is monotonous or unmelodious, rather like a robot speaking
- speech melody is over-expressive and exaggerated; as if he is an actor speaking a script
- has difficulty adjusting loudness of speech to a specific context: may talk too loudly or too softly (e.g. whispering when far away from someone, or talking very loudly when close up)
- often pauses to grope for a word, although he knows it
- uses over-general terms such as "thing", rather than a more specific word
- confuses words of similar meaning: e.g., might say "dog" for "fox", or "screwdriver" for "hammer"
- confuses words of similar sound: e.g. might say "telephone" for "television" or "magician" for "musician"
- seems unsure of the exact pronunciation of some long words, so might, for instance say "vegebable" rather than "vegetable" or "trellistope" rather than "telescope"
- tends to use actions rather than words in response to a question, e.g. if asked: "what are you making?" would show what he was doing rather than saying "a boat"
- answers readily when asked a question (even though the answer may be wrong)
- no problems in starting conversation with very familiar people, but reluctant to talk to children or adults if he does not know them well
- produces meaningless words or phrases that sound rather like a foreign language, and which cannot be accounted for in terms of poor articulation
- understands more than he can say
- tends to stare at the person he is talking to
- inhibited with strangers, but will warm up as he gets to know someone
- highly distractible; difficult to keep him engaged on one task because his attention is grabbed by any noise or movement that occurs
- can concentrate very well on something that interests him
- unco-ordinated in activities such as sports, riding a bike, dancing
- movements are graceful and well co-ordinated
- messy when eating or drinking
- handwriting is neat