Publié dans Revue Tranel (Travaux neuchâtelois de linguistique) 42, 53-63, 2005
qui doit être utilisée pour toute référence à ce travail

Children's Communication Checklist - 2: a validation study

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The Children's Communication Checklist (Bishop, 1998) was revised (CCC-2 – Bishop, 2003) to provide a general screen for communication disorder and pragmatic/social-interaction deficits. Families of 77 children attending full-time special education for specific language impairment, pragmatic language impairments or autistic spectrum disorders completed the questionnaire. Data were also available from 23 typically developing children. The CCC-2 distinguished children with communication impairments from non-impaired peers. Furthermore, the Social-Interaction Deviance Composite (SIDC) of the CCC-2 identified children with disproportionate pragmatic and social difficulties in relation to their structural language. It is concluded that the CCC-2 provides a useful screening measure for communication impairment and can be helpful in identifying children with more pervasive disorders. However, there was substantial overlap amongst groups, suggesting that it is unrealistic to use the CCC-2 to make categorical distinctions on this continuum of disorder.

1. Introduction

Specific language impairment (SLI) is diagnosed when a child's language development does not follow the normal developmental course for no known reason. It is widely accepted that this definition by exclusion encompasses a heterogeneous population, but to date there has been little consensus as to whether sub-groups of language impairment exist and how best to delineate such groups. Progress in this area has been hampered because of a lack of assessments sensitive enough to capture certain aspects of communicative ability that map onto clinical observations of children (Adams, 2002; Conti-Ramsden, Crutchley, & Botting, 1997). Furthermore, children's clinical presentation changes over time (Bishop & Norbury, 2002; Conti-Ramsden & Botting, 1999; Conti-Ramsden, Botting, Simkin, & Knox, 2001; Stothard, Snowling, Bishop, Chipchase, & Kaplan, 1998), and overlaps between behaviours seen in SLI and other developmental disorders, such as autistic

disorder (Bishop & Norbury, 2002; Kjelgaard & Tager-Flusberg, 2001) are evident.

These challenges are particularly evident when one considers pragmatic language impairment (PLI). Originally described as 'semantic-pragmatic deficit syndrome' (Rapin & Allen, 1983) or 'semantic-pragmatic disorder' (Bishop & Rosenbloom, 1987), the term PLI has come to refer to children who experience significant difficulties with the use of language.

1.1. PLI: A distinct diagnostic entity?

An important question is the extent to which PLI constitutes a distinct subgroup of children with language impairment or autistic disorder (see Bishop, 2000 for discussion). Recent evidence has shown that children may exhibit substantial pragmatic impairments and yet not meet full diagnostic criteria for autism (i.e. do not have significant deficits in all three areas of the autistic triad: social interaction, communication, and repetitive behaviours/restricted interests) (Bishop & Norbury, 2002; Botting & Conti-Ramsden, 1999).

Early clinical accounts of 'semantic-pragmatic deficit syndrome' suggested relatively intact structural language skills (i.e. phonology, syntax and lexical development; Rapin & Allen, 1983). However, many children with PLI do present with structural language difficulties (Bishop & Norbury, 2002). The variability of language and cognitive functioning within this 'group' can be considerable, suggesting they do not form a homogeneous subgroup of their own. The likelihood is that rather than specifying a subgroup of language impairment or autistic disorder, PLI may be a variable correlate of either. Although it is a more common correlate of pervasive developmental disorders, it may also occur in other developmental disorders in which communication skills are vulnerable.

1.2. Assessment and identification of pragmatic difficulties

Clearly, objective means are needed to identify pragmatic language difficulties, but these have proved elusive to date. Researchers have attempted to devise tasks that theoretically should pose difficulties for children with PLI and distinguish them from both typically developing children and those with more typical SLI (see Adams, 2002). Such studies have largely failed to highlight difficulties in children with PLI, because children with SLI frequently show unexpected deficits in the same area. This suggests that basic linguistic ability is an important factor in pragmatic functioning. Furthermore, children with PLI often do better than expected on structured tasks because they benefit from the transparent expectations and adult support inherent in such tasks. Deficits specific to PLI are most noticeable in

naturalistic conversation which is by nature very open-ended (Bishop, Chan, Adams, Hartley, & Weir, 2000). However, the methods used to analyse these deficits are time consuming and not practical for most clinicians and researchers.

1.3. The Children's Communication Checklist - 2

Bishop (1998) developed the CCC in an effort to systematise clinical opinion by presenting behaviours that lead to an impression of PLI in checklist form. This provided a more objective assessment with acceptable levels of reliability and validity. The original CCC was completed by a teacher or therapist who knew the child well and was likely to have observed the relevant behaviours over time, giving a representative account of the child's behaviour in everyday situations.

A revised version of the CCC, for use with children who are using multi-word utterances, was developed and standardised on 542 typically developing children across the United Kingdom (Bishop, 2003). Parents were used as informants because their ratings have been shown to ally closely to clinical diagnosis (Bishop & Baird, 2001). The CCC-2 is a 70 items checklist with ten sub-scales of seven items (five deficits and two strength items). Four sub-scales tap structural language skills, four consider pragmatic abilities, and two focus on autistic type behaviours. These sub-scales are listed in Table 1.

Table 1 Sub-scales of the CCC-2 (an example of an item from each scale is given in the parentheses)

A. ***Speech***
Leaves off beginning or ends of words; i.e. says 'roe' instead of road.
B. ***Syntax***
Says things that sound babyish because they are just 1 or 2 words long.
C. ***Semantics***
Mixes up words of similar meaning; i.e. says 'dog' for 'fox'
D. ***Coherence***
Gets sequence of events muddled up when telling a story or describing event.
E. ***Inappropriate initiation***
Talks repetitively about things no one else is interested in.
F. **Stereotyped language**
Uses favourite phrases inappropriately; says 'all of a sudden' rather than 'then'
G. **Use of context**
Misses the point of jokes or puns (though may understand slapstick humour)
H. ***Non-verbal communication***
Fails to recognise when other people are upset or angry.
I. ***Social relations***
Is babied, teased, or bullied by other children.
J. ***Interests***
Talks about lists of things s/he has memorised; capitol cities, dinosaurs, etc.

Note: Items in bold are included in the General Communication Composite. Items in italics are included in the Social-Interaction Deviance Composite (Sum of scales A-D minus sum of scales E+H+I+J).

Parents are asked to make a frequency judgement about how often a concrete behaviour occurs, i.e. less than once a week, at least once a week (but not every day), once or twice a day, several times a day (or always).

Scores in each sub-scale are summed and a standard score, with a mean of 10 and a standard deviation of 3, is provided. Two new composite scores are available in the CCC-2. One, the General Communication Composite (GCC), is based on all of the communication scales (A to H). This was designed to discriminate between children with communication impairments and typically developing children. The second, the Social-Interaction Deviance Composite (SIDC), replaces the old pragmatic composite and was derived to give optimal discrimination between children with typical SLI and those with pragmatic difficulties that are disproportionate to their structural language abilities. It is intended to suggest the nature of the deficit in children with identified communication impairments. This composite is the sum of the structural language scales A-D minus the sum of pragmatic/social-interaction scales E+H+I+J (see Table 1 for list of sub-scales).

The current investigation was designed to provide validation for the CCC-2, in relation to the standardisation data. Overall, there were three aims:

1) To determine the utility of the CCC-2 as a general screen for communication impairments.
2) To determine the ability of the CCC-2 to identify pragmatic language impairments, particularly in those children with scores on standardised tests of language ability within the normal range.
3) To determine the extent to which the CCC-2 can discriminate PLI from children with more typical SLI on the one hand, and autistic spectrum disorders on the other.

2. Method

2.1. Participants

The CCC-2 was standardised in the UK on typically developing children aged 4 to 17 years (Bishop, 2003). An additional 23 families of typically developing children aged 8 – 15 years (13 males, 9 females) were recruited as a control group for the current study (TD). These children had no history of hearing loss or special educational needs and all were from a monolingual English-speaking home.

Seventy-seven children with communication impairments (67 males, 10 females) were recruited who fell into three broad categories: SLI (n=16), PLI and autistic spectrum disorders (ASD). The latter two groups were further sub-divided in the following ways: the PLI group was divided into those with evidence of autistic features (PLI+, n=21) and those without autistic features (PLI, n=12). The ASD group was divided into those with a definite diagnosis of high-functioning autism (HFA, n=15) and those with a diagnosis of Asperger disorder (ASP, n=13). Children were assigned to these categories on the basis of multi-disciplinary diagnostic assessment.

2.2. Assessment

Non-verbal abilities were assessed using the performance sub-scales (block design and matrix reasoning) of the Weschler Abbreviated Scales of Intelligence (WASI – Wechsler, 1999). All participating children had standard scores of 80 or above.

Three indices of structural language ability were administered to all children in the clinical sample. Two measured receptive language skills: the British Picture Vocabulary Scales – 2nd edition (BPVS - Dunn, Dunn, & Whetton, 1997), which measures receptive vocabulary by asking children to point to the picture (out of a choice of four) that corresponds to a spoken word; and the Concepts and Directions (Concepts) sub-test of the Clinical Evaluation of Language Fundamentals – III^{UK} (CELF- III^{UK} - Semel, Wiig, & Secord, 2000), which measures the child's ability to follow oral directions of increasing length and complexity. The Recalling Sentences (Recall) sub-test of the CELF- III^{UK}, which requires the child to repeat sentences of increasing length and complexity, was administered to estimate expressive language.

To be included in the SLI group, children had to have standard scores of at least –1.25 SD on two of the three language measures. Language ability was not a selection criterion for any of the other groups.

3. Results

3.1. Non-verbal and verbal abilities

Table 2 shows the mean age and scores on background measures for each group. All clinical groups showed significant language impairments relative to controls, except the ASP group. Furthermore, children in the ASP group significantly outperformed those in the SLI and PLI+ groups in all measures. It is important to bear in mind that 75% of children in the ASP group score within normal limits on standard tests of language ability.

Table 2 Mean (SD) scores on background verbal and non-verbal measures

Group	N	Age	WASI	BPVS	Concept	Recall
Specific Language Impairment (SLI)	16	12.51 (2.59)	94.13 (6.87)	80.50 (10.65)	4.44 (1.86)	4.63 (1.93)
Pragmatic Language Impairment (PLI)	12	11.26 (2.23)	103.50 (11.92)	90.67 (14.21)	6.42 (3.55)	5.50 (3.06)
PLI+ autistic features	21	12.23 (2.03)	101.71 (11.93)	81.57 (14.39)	5.00 (2.56)	4.86 (2.49)
High Functioning Autism (HFA)	15	11.64 (2.05)	99.33 (13.15)	87.93 (17.38)	6.33 (2.61)	6.00 (2.98)
Asperger Disorder (ASP)	13	12.38 (2.14)	110.69 (11.55)	103.54 (18.43)	9.46 (4.27)	8.92 (2.78)
Typically Developing (TD)	23	10.80 (2.15)	110.48 (12.41)	109.91 (10.86)	11.87 (2.69)	10.78 (2.34)

WASI = Wechsler Abbreviated Scales of Intelligence (non-verbal sub-tests only)

BPVS = British Picture Vocabulary Scales

Concept = Concepts and Directions sub-test of the Clinical Evaluation of Language Fundamentals – III^{UK} (CELF-UK^{3})

Recall = Recalling Sentences sub-test of the CELF- III^{UK}

WASI and BPVS have a normative mean of 100 (SD = 15)

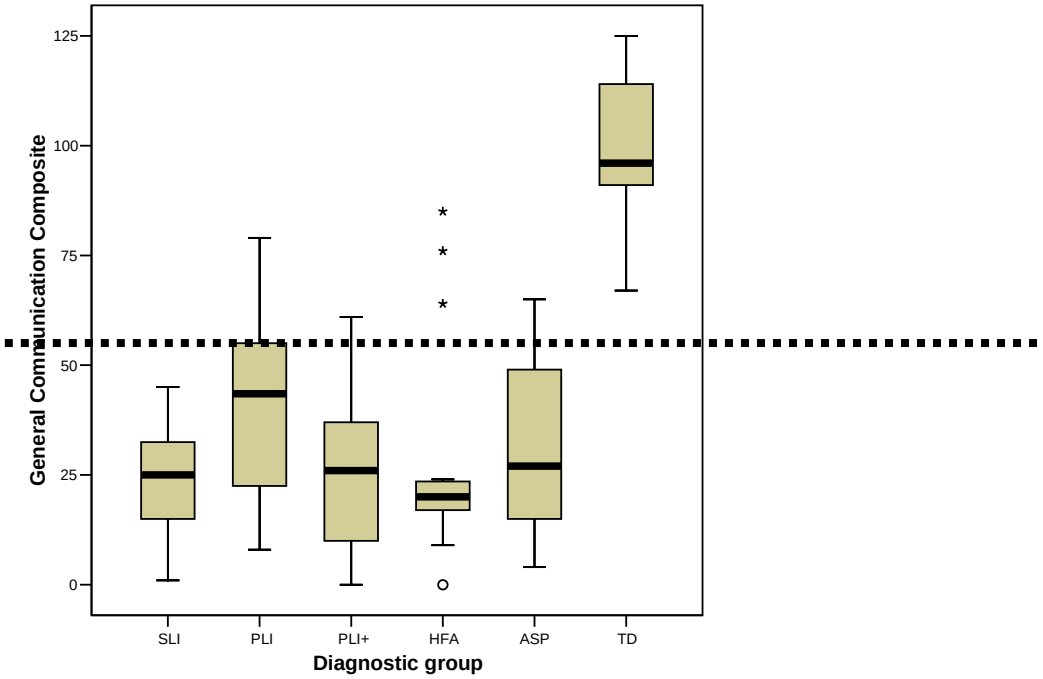
Concept and Recall have a normative mean of 10 (SD = 3)

3.2. CCC-2

3.2.1. General Communication Composite (GCC)

A GCC score was calculated by summing scales A to H. The results are depicted in Figure 1. This score clearly differentiated affected from unaffected cases, with almost no overlap between controls and clinical cases [$F(5, 94) = 46.97$, $p < .001$]. Post-hoc analysis showed that the TD control group had significantly higher mean scores than all of the clinical groups. Furthermore, the PLI group had significantly higher scores than the HFA group. There were no other differences amongst the clinical groups.

Figure 1 Boxplots depicting parent ratings on the General Communication Composite.



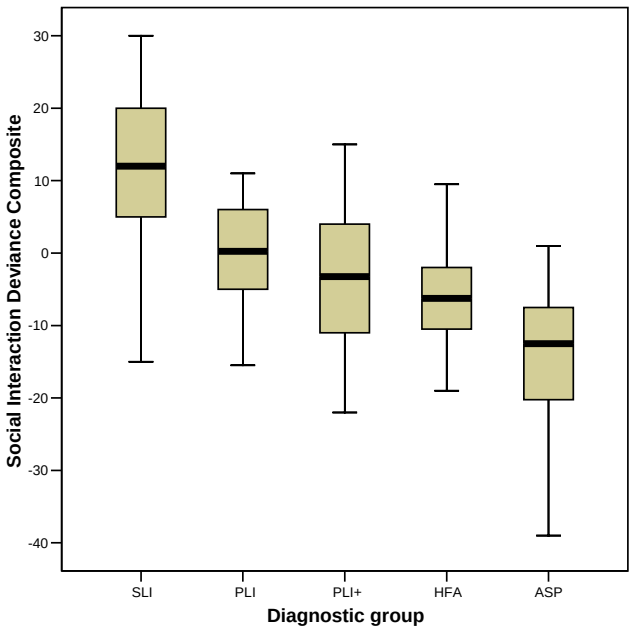
Note: The box represents scores falling between the 25th and 75th centiles; the thick black line is the median; the whiskers are the highest and lowest scores excluding outliers; the circles are scores that are more than 1.5 box lengths from the 25th or 75th centile mark. Asterisks represent extreme outliers. The dashed line represents the bottom 10th centile (score of 55).

3.2.2. Social-Interaction Deviance Composite (SIDC)

It was notable that the SLI group was different from the other clinical groups in that their ratings on scales A to D were depressed relative to their ratings on other scales (see Table 3). The difference between the pragmatic and social-interaction sub-scales that were best at discriminating SLI from other communication impairments (E + H + I +J) and the sub-scale scores that tapped structural language abilities (A + B + C + D) resulted in the Social Interaction Deviance Composite (SIDC; see Bishop 2003). The SIDC does not solely consider pragmatic behaviour, because it includes scales I and J which are not solely concerned with communication. A child with predominantly structural language difficulties (SLI) would receive a positive value (0 or above), while a negative value would be indicative of a child with pragmatic and/or social difficulties that are disproportionate to structural language impairments. The SIDC is used to ascertain the nature of an identified communication impairment and should therefore usually only be considered when the GCC is less than 55. The exception would be an extreme SIDC of –15 or more. A score this extreme was not seen in the standardisation sample

and is more typical of high-functioning children with autism or Asperger disorder (see Bishop, 2003). Thus children in the TD group, who do not exhibit communication difficulties, are not included in this analysis. The distribution of SIDC scores is depicted in Figure 2.

Figure 2 Boxplots depicting parent ratings of the Social Interaction Deviance Composite (negative scores indicate disproportionate pragmatic difficulties).



Note: SIDC scores are derived only in the presence of an overall communication deficit (i.e. scores below 55 on the GCC). Therefore, SIDC scores for children from the Typically Developing (TD) group are not included here.

Considering just the clinical groups, a one-way ANOVA revealed significant group differences on the SIDC [$F(4, 72) = 13.86$, $p < .001$], with the PLI+, HFA, and ASP groups all achieving lower scores than the SLI group (all p values < .001). Though the SLI group tended to have higher mean scores than the PLI group, this difference was not reliable ($p = .21$).

Table 3 Mean scores (SD) per sub-scale on CCC-2 parent ratings

	SLI	PLI	PLI+	HFA	ASP	TD
A. Speech	3.31 (3.50)	6.58 (3.12)	5.95 (3.84)	7.47 (4.31)	8.00 (2.86)	11.81 (1.47)
B. Syntax	3.00 (3.50)	5.50 (4.08)	4.90 (4.21)	5.40 (4.07)	6.77 (3.79)	12.10 (1.73)
C. Semantics	1.44 (2.50)	3.92 (4.17)	2.05 (2.92)	3.60 (3.56)	4.31 (4.23)	13.38 (3.01)
D. Coherence	1.88 (2.53)	4.67 (3.47)	2.76 (3.24)	2.67 (4.17)	3.38 (3.38)	12.52 (1.89)
E. Inapprop. initiation	4.88 (2.78)	5.83 (4.09)	2.19 (2.86)	3.53 (5.89)	2.38 (2.96)	12.38 (3.79)
F. Stereo. language	2.50 (2.42)	6.25 (3.60)	4.43 (3.96)	2.60 (4.47)	2.62 (3.45)	12.10 (2.41)
G. Use of context	1.69 (2.50)	3.25 (3.57)	1.05 (1.88)	1.80 (3.78)	1.23 (2.35)	13.76 (3.18)
H. Non-verbal	5.00 (3.16)	4.58 (3.68)	2.76 (3.91)	1.20 (2.48)	1.92 (3.12)	12.19 (1.47)
I. Social relations	5.19 (4.45)	6.08 (4.08)	2.05 (3.56)	.53 (1.81)	1.54 (2.99)	11.81 (1.37)
J. Interests	5.13 (2.63)	5.42 (3.34)	1.86 (2.37)	2.73 (4.76)	1.00 (1.63)	3.12 (3.46)

Note: Scores are standard scores with a normative mean of 10, SD 3. Thus a low score is indicative of more severe impairment.

4. Discussion

The current study had three main aims, outlined in the introduction. First, the greatest strength of the CCC-2 is its ability to distinguish children with communication impairments from typically developing children. There was very little overlap in the GCC scores of the two populations, suggesting the CCC-2 is a valid screening measure for communication disorder.

A second aim of the CCC-2 is to identify pragmatic difficulties that are not typically picked up by other standard language measures. Using the SIDC, it was possible to identify children who scored within normal limits on language measures yet showed clear social/pragmatic deficits on CCC-2. This is particularly striking for some children with Asperger disorder, many of whom scored within normal limits on standardised tests of language. The CCC-2 therefore gives an indication of children's ability to communicate in real-world environments.

Finally, it had been hoped that the CCC-2 would distinguish children thought to have PLI from those with more typical SLI. This presented us with a complicated picture. We were able to derive a metric (SIDC) that identified children with disproportionate pragmatic and social impairments. This is in keeping with traditional clinical descriptions of children with PLI as having poor

pragmatic skills in the face of relatively spared structural language abilities. Not all of these children would meet diagnostic criteria for autism. However, the SIDC provided the best discrimination between groups when sub-scales I and J, which tap current autistic behaviours, were included in the composite. Therefore, any child with a negative score on the SIDC should be considered for further diagnostic evaluation.

These data lend further support to the idea that rather than continuing to think categorically, we should take a dimensional view of pragmatic impairment. Pragmatic ability will be affected by linguistic skill, autistic-type behaviour, attention, and social cognition, to name but a few factors. It is plausible that children may have any of these deficits in any combination, which will contribute to individual differences in linguistic, cognitive and pragmatic ability, even for children within the same diagnostic 'group.'

Abbreviations

SLI	(specific language impairment)
PLI	(pragmatic language impairment)
HFA	(high-functioning autism)
ASP	(Asperger disorder)
TD	(typically developing)
CCC	(Children's Communication Checklist)
GCC	(General Communication Composite)
SIDC	(Social-Interaction Deviance Composite)

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