Development and use of the Children's Communication Checklist – 2

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Course Content

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Agenda

1. Need for CCC-2
2. Measuring pragmatic impairment
3. Development of CCC-2 in the UK and US
4. Use of CCC-2 with clinical groups
5. Advantages and Limitations of CCC-2
6. Q&A
Learning Objectives

At the end of this session, the participant will

1. Name at least five areas tested on the CCC-2
2. Describe one advantage of CCC-2 as an assessment tool
3. Describe how CCC-2 differs from other language assessments

Overview of CCC-2™

Purpose
- Identifies pragmatic language impairments in children
- Identifies children with possible speech and language impairment
- Helps in identification of those requiring further assessment of an autistic spectrum disorder (ASD)

1. Why do we need another assessment tool?
What is needed

- Most existing tests focus on grammar, vocabulary, phonological awareness, sentence comprehension
- But some children have major difficulties in pragmatics
- Particularly noted as feature in autism, but also seen in some non-autistic children with language problems
- These problems are hard to measure using conventional language assessments

Some history:
“Semantic-pragmatic deficit syndrome”

- Fluent, well-formed sentences
- Speaks clearly
- Has trouble understanding discourse
- Speech: loose, tangential, or inappropriate
- Train of thought: illogical, difficult to follow
- Sociable

Rapin, I. 1982 Children with Brain Dysfunction (p. 145)

UK National survey of 242 language-impaired children

- Random sample of 7-year-olds attending special language classes in England
- None thought to be autistic
- Direct assessment supplemented by teacher report
- 10% fell in cluster corresponding to “semantic-pragmatic disorder”
- Pragmatic problems not picked up on standardized tests

Terminology

Around 2000, Conti-Ramsden/Bishop started to use "Pragmatic Language Impairment (PLI)"

N.B. not an ‘official’ diagnostic term
Now superseded by Social Communication Disorder - introduced into DSM5 classification in 2013


Social Communication Disorder

- Difficulties using language in social situations, such as greetings, sharing information, changing speech to suit social context, understanding nonliteral language.
- Communication problems similar to autism but without the additional features needed for autism diagnosis, e.g. may have no problems involving repetitive behaviour
- Much overlap with previous categories of pervasive developmental disorder not otherwise specified (PDD-NOS), and 'pragmatic language impairment' (PLI)
- SCD defined as involving no impairment in understanding word structure or grammar, or in general cognitive abilities


How to assess?

- Difficulties using language in social situations, such as greetings, sharing information, changing speech to suit social context, understanding nonliteral language.
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2. Measuring pragmatic problems

Pragmatic impairment: Evidence from children’s conversations

- Studies of open-ended conversations with children – using photographs to introduce topics
- Children’s utterances classified as adequate, immature or pragmatically inappropriate


Expressive pragmatic problems

Too much information provided to partner
Utterance that contains material that is irrelevant, repetitive or bizarre

A: What do you think is wrong with that boy?
C: I think he might have fallen into the water, on January the sixth.
Expressive pragmatic problems

Too little information provided to partner

C: I had a party last week
    I had to take my trousers off
A: huh?
    why did you take your trousers off?
C: my brother was sick on them

see Bishop & Adams, 1989

Expressive pragmatic problems

Lack of awareness of social conventions

A (an elderly visitor to the school, being introduced to the children)
And how old are you, John?
C: Nine.
    How old are you?
A: (rather surprised, but amused)
    I'm seventy eight
C: Nearly dead then

see Bishop & Adams, 1989

Pragmatic problems in comprehension

Failure to take prior conversation into account

A: how did you get to Blackpool?
C: in the car.
A: 'n what about when you went to France?
C: it was hot.
Pragmatic problems in comprehension

Failure to integrate verbal and nonverbal cues

A: (smiling)  
Well, if we don't get this done today, 
we'll just have to cancel Christmas  
C: (panicking and very upset)  
But then I won't get any presents

Pragmatic problems in comprehension

Selecting wrong meaning of ambiguous word

A: (after long session of therapy)  
can you stand to some more?  
C: (stands up)

Insights from conversational studies

- May be necessary to transcribe and code large amounts of conversation to identify pragmatic difficulties
- Informal observation of a child in a relatively unstructured conversational setting may be informative, but pragmatics *by definition* dependent on context - e.g., child who is OK with adult may look odd with another child
Interim overview

- Conversational analysis reveals wide range of pragmatic problems
- But their occurrence relatively rare
- Virtually impossible to capture whole range in a face-to-face test

3. Development of the UK version of CCC-2 1998-2004
New approach to assessment:
Ratings of communication by people who know the child well

Series of 70 statements for caregiver to rate
Rating is of **how frequently** that behaviour is observed

0 = Less than once a week (or never)
1 = At least once a week, but not every day (or occasionally)
2 = Once or twice a day (or frequently)
3 = Several times (more than twice) a day (or always)

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**Content**

70 items divided into 10 scales
- Each scale has 7 items (5 address difficulties, 2 focus on strengths)
- **Scales A, B, C, & D** assess articulation and phonology, language structure, vocabulary and discourse
- **Scales E, F, G & H** address pragmatic aspects of communication
- **Scales I & J** assess behaviors characteristic of children with ASD

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**CCC-2™: sample items**

**scales A-D, language form/content**

**A: Speech.** Simplifies words by leaving out some sounds, e.g. "crocodile" pronounced as "cockodile", or "stranger" as "staynger"

**B: Syntax.** (+) Produces long and complicated sentences such as: "When we went to the park I went on the swing"; "I saw this man standing on the corner"

**C: Semantics.** Is vague in choice of words, making it unclear what s/he is talking about, e.g. saying "that thing" rather than "pan"

**D: Coherence.** (+) Talks clearly about what s/he plans to do in the future (e.g. what s/he will do tomorrow, or plans for going on vacation)
CCC-2™: sample items
scales E-H, pragmatics

E: Inappropriate initiation. Talks repetitively about things that no-one is interested in
F: Scripted language. Says things he or she does not seem to fully understand or seems to be repeating something he or she heard an adult say (e.g. a 5-year-old describing a teacher by saying, “she’s got a very good reputation”)
G: Use of context. Gets confused when a word is used with a different meaning from usual: e.g. might fail to understand if an unfriendly person was described as ‘cold’ (and would assume they were shivering!)
H: Nonverbal communication. Stands too close to other people when talking to them

CCC-2™: sample items
scales I-J, autistic-like features

I: Social relations. (+) Talks about his/her friends; shows interest in what they do and say
J: Interests. Shows interest in things or activities that most people would find unusual, such as traffic lights, washing machines, lamp-posts

Measures from the CCC-2™

• For each subscale, raw score can be converted to age-standardized score based on mean 10, SD 3. Inter-rater reliability of subscale scores not high, but may provide useful qualitative information

• Overall communication score obtained by summing scores from scales A-H, to give General Communication Composite, GCC.
  NB. In US (not UK) version, GCC scaled to mean 100, SD 15

• Information about relative strengths/weaknesses from a profile score: Social Interaction Difference Index (SIDI)
Differences between UK and US CCC-2

• Minor changes to wording/spelling, e.g. 'holiday' -> 'vacation'; 'film' -> 'movie'
• GCC standardized to mean 100, SD 15
• SIDC renamed Social Interaction Difference Index - SIDI
Overview of CCC-2™

Used with children 4:0 to 16:11 who:
- Speak in sentences
- Primary language is English
- Do not have a permanent hearing loss

Uses a Caregiver Response Form
- An adult who has regular contact with the child
- Completion time: 10-20 minutes
- Scored by a trained clinician: 5-15 minutes

Manual

Provides detailed instruction
- Administration
- Scoring
- Interpreting
- Background
- Evidence of reliability & validity

Caregiver Response Form

Respondent should:
- Be in regular contact with the child (3-4 days/wk for at least 3 months)
- Have appropriate language & literacy skills
- Understand the critical nature of his/her responses
After completion

- Review for missing responses
- Discuss any blank items to encourage completion
- Clarify unanswered questions
- May use as a guided interview

Administration and Scoring

**Scoring - Two options**
- Scoring CD
- Scoring Worksheet

**Using the Scoring CD**
- Uses Excel
- Has three tabs
  - Instructions
  - Raw Data
  - Summary
Administration and Scoring

Using the Scoring CD
- To derive child’s scores:
  - Complete identifying information
  - Record item ratings
  - Converts raw scores to scaled scores, composite scores and percentile ranks
  - Print and save the summary chart

Using the Scoring Worksheet
Follow instructions in manual for computing raw scores
Manual has lookup tables for standard scores and percentiles.

Standardization of US CCC-2™
- Standardized scores based on 950 US children aged 4;0 to 16;11
- US sample representative of population in terms of race/ethnicity, geographic region, and parent education level
- 27% of standardization sample received special services (10% speech-language, 5% reading, 7% gifted/talented, 5% other)
4. Use of CCC-2\textsuperscript{TM} with different clinical groups

**General communication composite (GCC)**

- Compared:
  - SLI,
  - High functioning autism,
  - Asperger,
  - PLI,
  - PLI+autistic features

Very good discrimination between impaired and unimpaired children

Norbury et al., 2004

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**But note!**

Lack of discrimination between different subtypes of disorder

Norbury et al., 2004
Social interaction difference index

SIDI: (E + H + I + J) - (A + B + C + D)
pragmatic/ language
autistic structure

- Child who has impairment in all areas will score around zero
- Child with mainly structural problems (classic SLI) will obtain positive score
- Child with mainly pragmatic problems will obtain negative score

Canadian study

Test of Pragmatic Language

Pictures of common social situations shown to child, briefly described, child asked to generate response for one of pictured characters
e.g. picture of distressed boy in physician’s office, holding stomach
Q: What do you think the boy is saying to the doctor?

Sample for study

- 16 rigorously diagnosed ASD with normal nonverbal IQ and structural language skills
- Compared with 16 typically-developing controls, matched on nonverbal IQ and language level
- CCC-2 rated by parent; TOPL administered by SLP

Mean (SD) scores

<table>
<thead>
<tr>
<th></th>
<th>ASD, N = 16</th>
<th>TD, N = 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>CELF-IV composite</td>
<td>105.5 (11.88)</td>
<td>111.6 (9.85)</td>
</tr>
<tr>
<td>CCC-2 GCC</td>
<td>78.8 (10.85)</td>
<td>114.1 (9.65)</td>
</tr>
<tr>
<td>CCC-2 SIDI</td>
<td>-14.3 (6.68)</td>
<td>2.25 (4.49)</td>
</tr>
<tr>
<td>TOPL LangQu</td>
<td>82.7 (13.84)</td>
<td>98.9 (7.26)</td>
</tr>
</tbody>
</table>
Test identification of pragmatic problems in ASD

- 9 / 16 pragmatically impaired on TOPL
- 13/ 16 pragmatically impaired on CCC-2

For CCC-2, measure was combination of low GCC and negative SIDI

Validation data in US test manual

- 54 with Specific language impairment
- 46 with Pragmatic language impairment
- 62 with Autistic spectrum disorder

N.B. criteria for diagnostic grouping is not specified

US validation sample: Distribution of SIDI scores: SLI, PLI, ASD vs matched group

NB. Low SIDI strongly predictive of autism

BUT! Most with autism have average SIDI - i.e., impaired on both pragmatic and structural
Conclusions from clinical studies

- No clear dividing line between PLI and other communication problems
- Rather, pragmatic impairment can accompany a range of other problems
- N.B. SIDI useful for detecting children with disproportionate pragmatic problems, but it is not the case that most children with autism have low SIDI – many are poor on both structural and pragmatic language
- Volden & Phillips: “Our findings suggest that the CCC-2 is useful for identifying children who might otherwise ‘slip through the cracks’.”

Interpreting CCC-2

Interpretation
- Useful in both clinical and research contexts
- Combined with other data to aid in clinical decision making
- Adds to assessment and intervention processes by describing current behaviors and identifying areas of communication that need additional assessment

Interpreting CCC-2

Scaled Scores
- Norm-referenced (sample: 4:0 to 16:11)
- Derived from raw scores (M = 10, SD = 3)
- Domains measured: speech, syntax, semantics, coherence, initiation, scripted language, context, nonverbal communication, social relations and interests.
Interpreting CCC-2

Percentile Ranks

- Indicate child’s standing relative to others of the same age
- Based on standardized sample
- Range from < 0.1 to > 99.9 ($M = 50$)
- Provides age-based %ile ranks for scaled scores A through J and the GCC

Interpreting CCC-2

General Communication Composite (GCC)

- Norm-referenced standard score
- Enables comparison of child’s performance to other children the same age
- Sum of subtest scaled scores derived from subtests A – H
- Represents equal weighting of each subtest
- May identify significant communication problems

Interpreting CCC-2

Social Interaction Difference Index (SIDI)

- Helpful to identify children w/communicative profile characteristic of language impairment or ASD
- Typical scores range -10 to 10 (90% of normative sample)
- Scores ≥11 = similar to children w/SLI Dx
- Scores ≤-11= similar to children w/ASD Dx
- Use with caution & in combination w/other measures
### Interpretation Guidelines for Clinical Profiles

#### Children w/Dx of Language Impairment
- Expected difficulty with Scales A, B, C, & D
- Relatively better with Scales E, H, I, and J though generally lower than typically developing communication skills
- More likely to have GCC below mean of 100
- More likely to have SIDI that is 11 or greater

#### Children w/Dx of Social Communication Disorder
- Typically better on Scales A-C than children w/SLI Dx
- Expect poor scores on Scales E-H
- No major impairment on Scale J (repetitive and restricted interests)

#### Children w/Dx of ASD
- Profile contrasts w/children with Dx/SLI
- Performance on Scales A-D (language skills) below typical levels
- Performance on Scales E-J (pragmatic skills) even more depressed
- Profiles show low scaled scores on I (social relationships) and J (interests)
- Coupled w/SIDI score <-11 suggests possible ASD – refer for further evaluation
Case Studies

Case Study #1
Amelia is 8 years old and is in second grade. She received a GCC of 69 and a SIDI of -19 following completion of the CCC-2 by her father. Language performance is below expected levels & pragmatic skills were even more depressed with poor performance on social relationships & interests. Based on this information, it is likely that:

a. She has a pragmatic language impairment
b. She is performing as expected
c. She is at risk for ASD and she should be referred
d. She has a specific language impairment

What do we suspect for Amelia?
The CCC-2 scores indicate that Amelia has a profile typical of children suspected of ASD for the following reasons:

- Children with ASD usually have low performance on language scales and pragmatic scales with the later even poorer
- Children with an SIDI of less than -11 suggest the possibility of ASD
- Children with ASD usually have low scores on the social relationships & interests scales
Case Study #2
Jacob is a 4 year old in preschool. He received a GCC of 80 and a SIDI of 13 following completion of the CCC-2 by his mother. His scores on the language scales were poorer than the pragmatic scales. Based on this information, it is likely that:
   a. He has a pragmatic language impairment
   b. He is performing as expected
   c. He is at risk for ASD and she should be referred
   d. He has a specific language impairment

What do we suspect for Jacob?
The CCC-2 scores indicate that Jacob has a profile typical of children SLI for the following reasons:
   - Children with SLI usually have lower performance on the language scales than the pragmatic scales
   - Children with SLI usually have a GCC of less than 100
   - Children with SLI usually have a SIDI of greater than 11

5. Overview
Advantages and limitations of CCC-2 as assessment tool
Limitations

- Problematic to use if the parent has poor communication/literacy skills
- Can be completed by teachers, but rating of frequency of behavior difficult unless teacher spends much time with the child
- Low inter-rater reliability of individual scales

Advantages

- Quick and easy to gather information using CCC-2
- Parents appreciate opportunity to be involved in assessment
- Detects difficulties that are hard to assess using language testing
- Usefulness goes beyond original goal of detecting pragmatic difficulties: GCC scale is sensitive indicator of communication difficulties in children
- Can use SIDI to identify children with disproportionate pragmatic problems

Key points

- CCC-2 useful for identifying communication problems that are not detected on face-to-face testing
- Complements information from standardized language tests
- NOT a diagnostic test: no clearcut boundaries between diagnostic groupings
- But can be used to identify children who require more detailed assessment of either language impairment or autistic features
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