Pragmatic language impairment: overlap between SLI and ASD

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• navigating terms: what do I mean by pragmatic language impairment (PLI)?

• is there evidence of pragmatic impairment in children with ‘specific’ LI?
  o what does the CCC-2 actually measure?

• what is the source of pragmatic impairment in children with autism spectrum disorders (ASD)?
origins of PLI: “semantic-pragmatic disorder”

- Rapin and Allen (1982)
  - semantic-pragmatic deficit syndrome used as descriptive term
  - communicative profile more often seen in autistic disorder, but could occur in other developmental populations, including SLI

- Bishop and Edmundson (1987)
  - semantic-pragmatic disorder used as a diagnostic term
  - given to children with communicative profiles typical of autistic disorder who did not meet full diagnostic criteria for autism
Semantic-pragmatic Syndrome/disorder: clinical descriptions (Rapin 1996)

- Phonology and syntax unimpaired
- Verbose
- Comprehension deficits for connected speech
- Atypical word choices
- Poor conversation skills
- Poor topic maintenance
- Answering beside the point of a question
Conti-Ramsden et al (1997) investigated the communication profiles of 7-year-olds in language units in the UK

- sub-group (~30%) scored within normal limits on standard language measures, including those tapping semantic skills
- same group were described by teachers and clinicians as having significant pragmatic impairments
Bishop (1998) developed the Children’s Communication Checklist (CCC) as a standard measure of pragmatic impairment in clinically referred populations.

- Items tapping lexical-semantic abilities did not differentiate those children thought to have pragmatic impairments from cases of more typical SLI.
  - Semantic and pragmatic problems do not always go hand in hand.
is PLI a euphemism for autism?

- considerable academic and clinical debate about the status of this ‘disorder’
  - one view: PLI is just another word for autism
  - OR: ‘diagnostic substitution’ – relaxed criteria for ASD means that children with PLI more likely to be diagnosed with ASD
  - another view: PLI is a distinct diagnostic category, representing the middle ground between SLI and ASD
    - implications for aetiology
    - implications for developmental trajectory
  - and finally: PLI is a descriptive term, not a diagnostic label
how we characterise PLI depends crucially on how we characterise autism spectrum disorders
autistic spectrum disorders

onset before 36 months

reciprocal social interaction

verbal and nonverbal communication

restricted and repetitive behaviours
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communication

social interaction

autism

restricted interests/behaviours

PDD-NOS (atypical autism, ASD) = 2/3 areas of the triad affected, or atypicalities present but below threshold in all areas
applied standard diagnostic measures to children with PLI and more specific language impairments

- Autism Diagnostic Observation Schedule - Module 3
  - current assessment of child behaviour
  - professional rating
- Autism Diagnostic Interview
- Social Communication Questionnaire
  - developmental history of child behaviour
  - parent report

assessed how many children scored above threshold for disorder across indices
How many meet criteria for autism? children with PLI

<table>
<thead>
<tr>
<th>ADOS-G</th>
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<th>PDDNOS</th>
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ADI/SCQ
# How many meet criteria for autism?

**children with SLI**

<table>
<thead>
<tr>
<th>ADOS-G</th>
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**ADI/SCQ**

- **autistic PDDNOS none**
agreement between measures not as great as we might have hoped

many children with PLI meet criteria for PDD-NOS at least, but just as many don’t

on the whole, these children with PLI did not have restricted interests or rigid behaviours

and they were socially interested, but reciprocity often lacking
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diagnostic substitution (Bishop et al. 2008)

- assessment of adults who had been previously diagnosed with SLI or PLI (but not autism)

- depending on criteria adopted for ASD-diagnosis:
  - between 40-95% of PLI individuals met ASD criteria
  - between 0-33% of SLI individuals met ASD criteria

- autistic behaviours evident in ADI
  - not just a case of developing more ASD behaviours over time
why not diagnosed with ASD?

- behaviour did not interfere with daily life
- children were communicative and not ‘aloof’
  - ‘active but odd’ pattern of communication
- provision for children with ASD catered for those with more severe impairments
  - reluctance of professionals to diagnose ASD – tailor diagnosis to most appropriate available provision
- lack of clear diagnostic boundaries
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possible addition to DSM-V?

- assessing pragmatic impairments in systematic way and valid way extremely challenging
- identifying children with primary pragmatic difficulties even more challenging
Aged between 8 and 15 years old
Non-verbal abilities within the normal range
All attending special education units or schools
Grouped according to clinical opinion and documented diagnoses in school files

Aim
- find children with pragmatic impairments
  - who did not have structural language impairments
  - who did not meet criteria for ASD
Groups

- SLI-typical (n = 19)
- PLI (n = 14)
- PLI+some ASD behaviours (n = 21)
- High Functioning Autism (n = 17)
- Asperger Disorder (ASP) (n = 16)
- Typically Developing Controls (n = 21)
Social Communication Questionnaire

- Forty item YES/NO checklist
- Questions taken from the Autism Diagnostic Interview and cover all three areas of the autistic triad
- Focus on period between ages of 4-5
- Good diagnostic agreement between SCQ and ADI
- Diagnostic algorithm provides cut-off scores for PDD-NOS and core autism
Distribution of SCQ scores

Diagnostic group

SLI, PLI, PLI+, HFA, ASP, control

Autism

PDD
### SCQ cut-off scores

<table>
<thead>
<tr>
<th></th>
<th>no PDD</th>
<th>PDD</th>
<th>Autism</th>
</tr>
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<tbody>
<tr>
<td>SLI</td>
<td>7 (41%)</td>
<td>7 (41%)</td>
<td>3 (18%)</td>
</tr>
<tr>
<td>PLI</td>
<td>8 (61%)</td>
<td>4 (31%)</td>
<td>1 (8%)</td>
</tr>
<tr>
<td>PLI+</td>
<td>6 (30%)</td>
<td>6 (30%)</td>
<td>8 (40%)</td>
</tr>
<tr>
<td>HFA</td>
<td>0</td>
<td>4 (25%)</td>
<td>12 (75%)</td>
</tr>
<tr>
<td>ASP</td>
<td>2 (14%)</td>
<td>1 (7%)</td>
<td>11 (79%)</td>
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- 4/8 had additional language impairments.
Sub-scale scores

Social Communication Interests
Raw score
SLI
PLI
PLI+
HFA
ASP
CON
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current research strategy

Does child meet criteria for ASD?

- Yes
- No

Does child meet criteria for LI?

- Yes
- No

LI

ASD + (ALI)

ASD - (ALN)
Autism Spectrum Disorder  
(proposed revision DSM-V)

1. Clinically significant, persistent deficits in social communication and interactions, as manifest by all of the following:
   - a. Marked deficits in nonverbal and verbal communication used for social interaction:
   - b. Lack of social reciprocity;
   - c. Failure to develop and maintain peer relationships appropriate to developmental level
2. Restricted, repetitive patterns of behavior, interests, and activities, as manifested by at least TWO of the following:
   ○ a. Stereotyped motor or verbal behaviors, or unusual sensory behaviors
   ○ b. Excessive adherence to routines and ritualized patterns of behavior
   ○ c. Restricted, fixated interests

3. Symptoms must be present in early childhood (but may not become fully manifest until social demands exceed limited capacities)
what about language?

- **language profile is extremely variable**
  - different language phenotypes?
  - generally considered noise and not central to understanding core symptoms OR pragmatic impairments

- **long standing assumption that both language and pragmatic deficits are direct result of primary social impairment**
  - doesn’t explain heterogeneity
  - pragmatic deficits seen in a number of other neurodevelopmental disorders
questions that interest me

- if a child has a language impairment, how does that impact on pragmatic develop and processing?
- if a child has ASD, how does an additional language impairment affect social and pragmatic processing?
- how do some children with ASD manage to learn language in the face of atypical social experiences/interactions?
do children with SLI have pragmatic difficulties?

CCC-2

- screen for language/communication impairment
- identify pragmatic difficulties in children with language impairment
- identify children requiring further assessment for autistic spectrum disorders
- standardised on 542 typically developing UK children aged 4 - 16yrs
parents used as respondents
frequency judgements about concrete behaviours
‘deficit’ items grouped separately to ‘strengths’ and items from different scales interspersed
10 scales, 7 items each (5 deficit, 2 strength)
two composite scores
  o General Communication Composite (GCC)
  o Social-interaction Deviance Composite (SIDC)
• **stereotyped language:**
  ○ Uses favourite phrases or sentences in inappropriate contexts. E.g. ‘we went to the park and *all of a sudden* we had a picnic.’ Or might habitually start utterances with ‘by the way’

• **use of context:**
  ○ Is over-literal. E.g. when told ‘watch your hands’ when using scissors, child just looks at his fingers
general communication composite

- A: speech
- B: syntax
- C: semantics
- D: coherence
- E: inappropriate initiation
- F: stereotyped language
- G: use of context
- H: non-verbal communication
- I: social relations
- J: interests

mean normative score = 80
no group differences
social-interaction deviance composite (SIDC)

- A: speech
- B: syntax
- C: semantics
- D: coherence

- E: inappropriate initiation
- H: non-verbal communication
- I: social relations
- J: interests
A negative score on the SIDC indicates *disproportionate* social and pragmatic difficulties in relation to structural language abilities.
The diagram compares the social interaction deviance composite across three groups: LI, ALI, and ALN. The box plots show a wider range for LI, which is more consistent with the SLI profile. ALN shows a narrower range, indicating a more consistent profile with ASD, especially if GCC > 55. The LI group has values that are more consistent with the Asperger profile. The text states: "LI > ALN."
what do SIDC scores mean?

- **scores of 8 or more**
  - more likely to be “typical” SLI – structural language skills more severely impaired than other pragmatic/social skills

- **scores of 1-8**
  - more likely to be SLI, but indicates pragmatic difficulties may also be present

- **scores around 0**
  - many children with ALI score here – indicates that *both* structural and pragmatic/social skills impaired

- **scores < 0**
  - more indicative of ASD – would warrant further assessment (note: sometimes non-autistic LI children have negative scores if pragmatics poor)

- **extreme scores < -15 (even when GCC > 55)**
  - in validation study, this pattern of score was more typical of individuals with an Asperger profile
what CCC-2 can do

- demonstrate communication problems in children with good language scores
- indicate need for detailed assessment of ASD
- provide signposts to further assessment and diagnostic hypotheses

what CCC-2 doesn’t do

- diagnose SLI, pragmatic impairment or any kind of ASD
- provide absolute cut-off scores for different diagnoses
- categorically differentiate different diagnostic groups (note overlap between them)
• with Dorothy Bishop, we have developed a short-form of the CCC-2 (CCC-S)
• adapted for use in large scale screening studies of children starting school
  ○ 7 questions about history and current provision, esp:
    ▹ parental/teacher concern
    ▹ access to services
    ▹ possible co-morbidities
  ○ 13 items from CCC-2 that best discriminated affected from non-affected individuals in clinically referred samples
• NOTE: studies have not been funded (yet!) so don’t know if it actually works...
what accounts for pragmatic deficits in children with ASD?
cognitive theories of ASD

- **social cognition:**
  - poor appreciation of speaker intention
    - word learning
    - understanding metaphor / irony
  - poor appreciation of listener needs
    - narrative
    - under/over informative utterances

- **weak central coherence:**
  - difficulties integrating information in context
    - word learning
    - resolving ambiguous language
      - idioms
      - homonym
      - jokes
    - inferencing
    - narrative
some challenges

- role of structural language skills rarely considered
  - important for demands of task
  - also important for developing cognitive constructs?

- until recently, can only investigate the output, rather than the processing, of pragmatics
  - have adopted eye-tracking methodologies to begin to understand processing in real time
Norbury (2005)

- resolving lexical ambiguities in school-aged children with SLI, ALI, ALN and TD
- SLI and ALI matched for language ability
- ALN and TD matched for language ability (esp. vocabulary)
- all groups matched for age and non-verbal abilities

see Brock, Norbury, Einav & Nation (2008) for eye-tracking study investigating temporary ambiguities
Bill saw the coach.

Bill spoke to the coach.

Norbury (2005)
Bill spoke to the coach.

Bill spoke to the bus.
contextual facilitation

Bill saw the coach vs. Bill spoke to the coach
narrative production

- Norbury, Gemmell & Paul (in preparation)

- compare LI versus ALN versus TD
  - index of pragmatic error
  - index of story structure
  - indices of linguistic complexity and diversity
  - internal state language
pragmatic errors

- **misattributions**
  - the boy is swimming with the frog in the pond
  - the other boy came out

- **irrelevant detail**
  - the towel is on the floor beside the bath
  - the boy shouted 13 times for the frog

- **vague references**
  - he took it over there

- **inconstant reference**
  - the frog ran away from Jack. he went in the pond. a boy did too.
challenges

- typical kids say ‘off-script’ things
- agreement on which utterances are appropriate versus inappropriate difficult to achieve
- wide age-range; some indication that pragmatic errors more evident at younger ages
**preliminary findings**

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<thead>
<tr>
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<th>LI (n = 23)</th>
<th>ALN (n = 27)</th>
<th>TD (n = 25)</th>
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<tbody>
<tr>
<td>core language</td>
<td>LI</td>
<td></td>
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<tr>
<td>pragmatic error</td>
<td>no</td>
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<td>differences!</td>
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<tr>
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<td>LI</td>
<td>ALN</td>
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<tr>
<td>linguistic complexity</td>
<td>LI</td>
<td>ALN</td>
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<tr>
<td>internal state language</td>
<td>LI</td>
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take home messages

- Diagnostic boundaries between SLI and ASD are fuzzy.
- PLI is best considered a communicative profile that is applicable to either SLI or ASD (though more likely in ASD).
- Children with SLI experience pragmatic impairments in a range of tasks that draw on contextual processing, social knowledge and cognitive ability.
- For children with ASD, additional language impairments associated with more impaired performance on pragmatic tasks.
- Even ALN experience difficulties on tasks that integrate linguistic and social competencies.
Thank you for listening!

https://www.pc.rhul.ac.uk/sites/lilac

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