Experimental methods to study conversation: Lexical Pacts in Referential Communication

Aparna Nadig
## Communication profile of people on the autism spectrum with structural language WNL

<table>
<thead>
<tr>
<th>Category</th>
<th>Status</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phonology</td>
<td>Relatively preserved</td>
<td>Kjelgaard &amp; Tager-Flusberg, 2001</td>
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<tr>
<td>Syntax</td>
<td>Relatively preserved</td>
<td>Paul et al., 2005</td>
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<tr>
<td>Semantics</td>
<td>Relatively preserved</td>
<td>Eigsti et al., 2010</td>
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<td></td>
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<td>Whitehouse et al., 2008</td>
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<td>Pragmatic language (inference, ambiguity resolution)</td>
<td>Relatively preserved</td>
<td>Norbury, 2005</td>
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<td></td>
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<td>Brock et al., 2008</td>
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<td></td>
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<td>Eberhardt &amp; Nadig, 2016</td>
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<td>Social communication (verbal and nonverbal interaction with others)</td>
<td>Impaired</td>
<td>Volden et al., 2009</td>
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<td></td>
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<td>Kelley et al., 2010</td>
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<td></td>
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<td>Peppe et al., 2007; Nadig et al., 2010</td>
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Important yet elusive goal: Assessment of real-world social communication

- Standardized tests fall short of capturing the range and depth of social communication

- In people with fluent language, clinical need to
  - Document areas of disability to qualify for services
  - Develop measures that can track progress in sophisticated social communication

- Ultimately we want to be able to capture and evaluate the full complexity of reciprocal conversation
Audience Design

Clark & Marshall, 1981; Clark & Murphy, 1982; Clark, 1992

How do we establish what is shared?

• Seeing the same thing,
• having mentioned it in prior conversation,
• assumed based on shared community membership
Experimental “games” to study conversational processes

Lexical entrainment

Repeated reference to complex novel stimuli

A preferred lexical form or *referential pact* is collaboratively agreed upon through back and forth between conversational partners

Production:
Krauss & Gluscksberg, 1969
Clark & Wilkes-Gibbs, 1986
Garrod & Anderson, 1987
Brennan & Clark, 1996

Manipulation of common ground with partner

The partner shares access to a prior referential pact, or not.

A new partner replaces the original one – continue to use the same pact?

Comprehension, familiar stimuli:
Brennan & Clark, 1996, Exp. 3
Metzing & Brennan, 2003; Brown-Schmidt, 2009; Matthews et al., 2010;
Graham et al., 2014; Koymen et al., 2014
Integrate these two lines of research to study partner-specific lexical entrainment in adults with ASD

Nadig, Seth, & Sasson, 2015

- 13 adults with ASD (confirmed by ADOS or SCQ) without LI
- 13 Neurotypical (NT) adults (18-29 years old)

Groups were not significantly different wrt:
- Age
- Gender proportion
- Verbal IQ (WASI Vocab and Similarities)
Tangram Game  Nadig, Seth & Sasson, 2015

MATCHER (RESEARCH ASSISTANT)

DIRECTOR (PARTICIPANT)
# Rounds of tangram game

<table>
<thead>
<tr>
<th>Condition</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same matcher</td>
<td>Common Ground manipulation</td>
<td>Same matcher needs to check on something, leaves for a minute and returns</td>
<td>Same matcher needs to use the washroom, asks a friend to replace her</td>
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<tr>
<td>New matcher</td>
<td></td>
<td></td>
<td></td>
<td>Critical change across conditions</td>
<td>Identical procedure across conditions</td>
</tr>
</tbody>
</table>
RQ1. Do adults with ASD create referential pacts and demonstrate lexical entrainment?

Prediction: Yes, they will settle on a term and get faster over rounds

Evidence of intact linguistic alignment (Slocombe et al., 2013)
RQ 2. Do participants with ASD demonstrate Audience Design?

- A. Should demonstrate disruption by taking longer on critical R4 with new matcher

- B. Should be less likely to maintain referential pact with a new matcher

Prediction: Participants with ASD may show some sensitivity to matcher change but likely to show reduced effects (Begeer et al., 2010)
Duration difference between Round 1 and 4

- Faster over time

= R₁
Maintenance of referential pacts

**Maintain Referential Pact**

Round 1: Director: The waiter with the triangle tray, facing right
Round 2: D: The waiter with the tray
Round 3: D: The waiter
Round 4: D: Waiter
Round 5: D: Waiter

**Expanded or Broken Pact**

Round 1: D: The sad dog
Round 2: D: The sad dog, facing left
Round 1: D: The bird facing left with two triangle feet
Round 2: D: The giraffe
Maitenance of referential precedent on Round 4

<table>
<thead>
<tr>
<th>Condition</th>
<th>Same Matcher</th>
<th>New Matcher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Figures</td>
<td>ASD</td>
<td>NT</td>
</tr>
<tr>
<td></td>
<td>7.5</td>
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<tr>
<td></td>
<td>0.0</td>
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</tbody>
</table>
RQ 2. Do participants with ASD demonstrate Audience Design?

C. Should show direct evidence of incorporating the matcher’s descriptors

**Round 4**
Director: a four legged or two legged animal facing the right
The head is a parallelogram and its back leg is a rectangle
and the front legs look like paws
New Matcher: does it look like an elephant if the parallelogram is a trunk?
Director: yeah, it does look like an elephant

**Round 5**
Director: an elephant facing right
Proportion of the time directors incorporated matcher descriptors

<table>
<thead>
<tr>
<th></th>
<th>new matcher</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ASD</td>
</tr>
<tr>
<td>By end of round 3</td>
<td>.44 (.31)</td>
</tr>
<tr>
<td>Round 4 through 5</td>
<td>.18 (.19)</td>
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</tbody>
</table>
RQ 1. Lexical entrainment Summary

- Adults with ASD showed typical lexical entrainment effects when collaborating to describe complex novel referents (got faster, usually settled on a term) but were slower overall in their production.

- Also used similar, animate, conceptualizations of tangrams.

- Longer production be due to differences in variables that we did not measure directly:
  - time to formulate descriptions
  - disfluencies when producing the descriptions
  - the content of their descriptions may have led the matcher to respond more slowly.
RQ 2. Audience Design Summary

Adults with ASD showed clear sensitivity to the matcher switch, but more difficulty adjusting to it:

- Slowed down significantly with a new compared to the same matcher on round 4, in fact showed a larger effect
- Majority maintained pacts less often with a new matcher, but coming up with new formulation appeared effortful
  - Minority continued to maintain referential pact with new matcher
- Collaboratively incorporated matcher suggestions early in the game, but much less so after matcher switch
Clinical Applications?

-Psycholinguistic tasks like this can be informative in highlighting specific conversational processes
  - Sensitive to need for Audience Design
  - Difficulty orchestrating it

- Not a good assessment tool or measure of treatment change
  - Time, resource, and personnel demanding to administer
  - Let alone to transcribe, code, and analyze!

- Need quicker measures that are more adapted to real-life situations
Role Play Assessment of Social Skills
(R-Pass Trudel & Nadig, 2016; CASS -Ratto et al., 2011)

• 3-minute role-play featuring a realistic social conflict with a colleague or a roommate (two scenarios created for retesting purposes)

• Brief questionnaire with 10 rating and short answer items to be completed by participant, actor, or a blind rater
  • Evaluating understanding of sarcasm, another’s perspective, communicating a solution for the social conflict, anxiety

• Use in a mini pilot intervention study (Trudel 2016, n=6) shows promise for measuring treatment change
Role Play Assessment of Social Skills
(R-Pass Trudel & Nadig, 2016; CASS -Ratto et al., 2011)