Atypical spoken language acquisition
• Developmental language & communication disorders exist in a notable percentage of the population of children acquiring spoken language.
  - Specific Language Impairment (SLI) approximately 7% of hearing children who speak English (Leonard, 1998)
  - Phonological Difficulties Over 6% of otherwise normal children are referred to SLPs or therapy clinics (Broomfield & Dodd, 2001)
  - Stuttering [fluency disorder] 2.5% of African American and European American ages 2-5 stutter (Proctor et al., 2008)

Atypical signed language acquisition (ASA)?
• Few descriptions of Deaf children who exhibit so-called signed language disorders
  - Anecdotal accounts of atypical acquisition in ASL, but no reports in the literature

What may cause a "signed language disorder"?
Child-centered causes:
• Specific Language Impairment (SLI): only affects linguistic domain
• Spatial-cognitive deficit that affects linguistic functioning in sign
• Motor impairment or visual processing problem that interferes with sign language production or comprehension

Environmental causes:
• Delayed exposure to signed language (e.g., deaf children of hearing parents)
• Poor input models

Plan for presentation:
I. Discussion of our methodology for investigating atypical signed language acquisition
II. Results from case study: "Alice"

Quinto-Pozos: davidqp@mail.utexas.edu
Singleton: singletn@illinois.edu
Methodology: Utilizing multiple sources of information

**Child's language**

- Interviews with adults who interact with child
- Review of school records
- Linguistic assessments
- Non-linguistic (cognitive) assessments

**Non-linguistic assessments**

- Motor skills
- Non-linguistic (cognitive) assessments
- Visual-spatial skills

Quinto-Pozos, Forber-Pratt, & Singleton (under review, 2010)

Quinto-Pozos & Singleton (SRCD, 2009)

Detailed Case Study of “Adam”

Quinto-Pozos: davidqp@mail.utexas.edu
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Abilities to converse in ASL
• Adult-child conversation
• Child-child conversation

General ASL skills
• Sentence reproduction tests
• Fingerspelling test
• Comprehension of classifier arrangement & orientation
• Perspective-taking in ASL

Visual-spatial linguistic skills

Part II: Case Study Results
“Alice”
• Congenitally deaf
• Both parents are Deaf signers of ASL
• Attends bilingual-bicultural school for the Deaf
• Socially engaged in school activities such as sports
• Data collected at ages 13-16

General points about Alice
• From reports:
  - Requires extra time to respond to questions
  - Difficulty with spatial phenomena (e.g. pronoun references and classifiers)
• From our observations of her signing:
  - Inconsistent introduction of characters and background information for a narrative
  - Lack of overt marking for shifts in character reporting

Parent Interview Data: A miscommunication with Alice involving a pronominal reference
Alice, while looking at a man:
I LIKE SHIRT, PRETTY
Mother looks at the man, then at Alice:
YEAH THAT NICE STRIPED SHIRT
Alice, while looking at mother:
NO, I MEAN MY SHIRT PRETTY (the one in the shopping bag)."

Alice’s School Record Data: Challenges with classifiers when she was younger
Information from school records

Linguistic assessment instrument: ASL-PA
American Sign Language Proficiency Assessment (Maller, Singleton, Supalla, & Wix 1999)

Quinto-Pozos: davidqp@mail.utexas.edu
Singleton: singletn@illinois.edu
Data from ASL-PA:
Self production of ASL spatial devices often problematic

Qualitative analysis from native signing Deaf research assistant (Alice was age 13 at time of data collection):

- Tendency to use a small signing space
- Not particularly clear in her use of eyegaze and torso shifts to help differentiate characters and referents
- Signer reference frame seemed atypical

Analyses within our lab: ASL-SRT uses of space (not part of general scoring procedure for test)

ASL-SRT sentences contain various examples spatial devices:

1. Pronominal references: n=10
2. Inflected or modified signs: n=12
3. Classifiers (depicting verbs/signs): n=9
4. Referential shift and constructed action: n=3

We report on Alice’s performance on categories 1-3

Linguistic assessment instrument: ASL-SRT
American Sign Language-Sentence Reproduction Test (Paludneviciene et al., 2006)

Percentages of correct responses on imitation of ASL-SRT spatial devices

<table>
<thead>
<tr>
<th></th>
<th>Pronominal reference (n=10)</th>
<th>Inflected &amp; modified signs (n=12)</th>
<th>Classifiers (n=9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alice 2009</td>
<td>50%</td>
<td>83%</td>
<td>100%</td>
</tr>
<tr>
<td>Alice 2010</td>
<td>70%</td>
<td>75%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Comparison data from 5 age-matched peers:

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pronominal reference</td>
<td>56%</td>
<td>18%</td>
<td>13%</td>
</tr>
<tr>
<td>Inflected &amp; modified signs</td>
<td>70%</td>
<td>13%</td>
<td>14%</td>
</tr>
<tr>
<td>Classifiers</td>
<td>80%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

General point: Alice can produce (i.e., imitate) spatial devices like her peers using this measure of performance

Non-Linguistic assessment instrument
Perspective Taking/Spatial Orientation Test
(Hegarty, Kozhevnikov & Waller 2008 version)

Perspective Taking/Spatial Orientation Test
Tests ability to mentally rotate & manipulate imagined object
12 items
Tests ability to reorient self

Alice’s performance:
- 9 errors suggesting an ego-centric, or body-centered, frame of reference (Alice: 23 SD below means for 18 year olds)
- Left and right sides confused on those 9 errors
- One additional error confused front and back

Non-Linguistic assessment instrument
The Mental Rotation Test
(Van der Molen & Kuei, 1970)

The Mental Rotation Test
Tests ability to mentally rotate & manipulate imagined object
20 items total two parts
Timed assessment

Alice’s performance:
- 10 errors on Part 1 (no correct responses)
- 8 errors on Part 2 (20% correct responses)
Summary of Alice

- Atypical signing reported by parent and school records
- At age 13, self-generated examples of the use of space are often problematic
- Yet, the imitation of spatial phenomena within ASL sentences is in line with peer comparisons
- Poor performance on measures of non-linguistic visual spatial cognition (perspective-taking and mental rotation)

What may be causing Alice’s atypical performance on spatial phenomena?

- Possible deficits in non-linguistic spatial cognition (the processing and management of space)
- Such a deficit may be linked to one or more of the following:
  - Difficulty taking on a visual (physical) perspective that is not her own
  - Difficulty imagining a scene before using language to tell about the scene
  - Difficulty imagining how objects change appearance through movement
  - Spatial memory limitations

Summary

Utilizing a multiple case study approach to investigating signed language disorders requires:

- Reports from adults who interact with the children
- Reports from the children’s school records
- Collection & analysis of:
  - Linguistic data through formal assessments
  - Linguistic data from conversational settings
  - Non-linguistic data through formal assessments
- Comparison of atypically-developing children to their “typically-developing” peers

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References