INTRODUCTION

AAC systems frequently based in adult models of the world (Light & Drager, 2007).

Unique perspectives of children with disabilities underrepresented.

Children need to make their own decisions when it comes to technology (Druin, et al., 1999).

The extent to which previous research on language representation and categorization extends to children with ASD is unknown.

Consequently, two studies were undertaken to systematically replicate and extend previous research on representation and categorization with children with ASD with an aim toward determining how clinicians can best construct and utilize symbols.

BACKGROUND AND SIGNIFICANCE

Drawings produced by children are often very different from those that are commercially available (e.g., Boardmaker).

Light and Drager (2007) studied 50 typically developing children of various cultural backgrounds and asked them to draw 10 early emerging abstract concepts.

Their drawings contained entire scenes, included the child in the drawing, and rarely used pieces or parts of objects to depict a concept.

These results varied greatly from commercially available symbol sets.

However, due to the noted differences between typically developing children and children with ASD, it cannot be assumed that findings from typically developing children translate well for children with ASD.

RESEARCH QUESTIONS

How do children with ASD relative to their age-matched peers without disabilities:

(a) pictorially represent and describe early emerging concepts such as “on” and “who”;

(b) identify Picture Communication Symbols (PCS) typically used in many AAC systems; and

(c) recall what target concepts they drew after a short delay?

METHOD: PARTICIPANTS

15 Children with ASD (6 F, 9 M); Age: M = 8;4; (range = 4;10-12;9)

Composite score on CCC-2: M = 79.87 (SD = 9.81)

18 Children without disabilities (5 F, 13 M); Age: M = 7;8 (range = 4;3-11;10)

Composite score on CCC-2: M = 105.33 (SD =11.91)

Chronological age was not significantly different.

CCC-2 scores were significantly different, t(31) = 6.61, p < .001.

METHOD: PROCEDURE

One videotaped session lasting approximately 1 hour

Concepts targeted: big, eat, who, want, what, come, up, all gone, open, more

1) Drawing Task: Children drew pictures of 10 concepts and were asked to describe their pictures.

2) Identification of PCS Task: Name 20 Picture Communication Symbols (PCS; Mayer-Johnson)

3) Identification of Own Drawings Task: Recall what word he/she was attempting to represent in his/her own drawing.

FIGURE 1: CODES OF CHILDREN’S DRAWINGS BY GROUP

IDENTIFICATION OF OWN DRAWINGS

| Children with ASD: 72.14% |
| Children with no disability: 78.89% |
| No significant difference |
| Correlated with age for both groups |
| Children with ASD: r = .784, p < .001 |
| Children without a disability: r = .702, p < .001 |

IDENTIFICATION OF PCS TASK

| Children with ASD: 20.50% |
| Children with no disability: 24.58% |
| No significant group difference |
| Performance was correlated with age for both groups |
| Children with ASD: r = .716, p < .001 |
| Children without a disability: r = .742, p < .001 |
ADDITIONAL CORRELATIONAL FINDINGS

- There were no relations between task performance and general language skills (CCC-2).
- For children with ASD, age was significantly related to:
  - Use of symbols ($r = .55, p < .05$)
  - Use of people ($r = .49, p < .05$)
  - Use of animals ($r = .47, p < .05$)
  - Use of high interest subjects ($r = -.514, p < .05$)

- For TD children, age was significantly related to:
  - Use of symbols ($r = .46, p < .05$)
  - Use of words ($r = .44, p < .05$)

STUDY 2: CATEGORIZATION OF LANGUAGE CONCEPTS

INTRODUCTION

- Organization of symbols for page sets based on adult models (Drager, Light, Speltz, Fallon & Jefferies, 2003)
- Assume older children in taxonomic organizations, but lack of research on the strategies older children may use (Fallon, Light, & Achenbach, 2003)
- Adults more likely to categorize taxonomically (Lucariello, Kaminski & Nelson, 1992) and children more likely to classify schematically (Light & Drager, 2007)
- There is minimal research on how children with ASD categorize language concepts.

RESEARCH QUESTIONS

1. How do children with autism spectrum disorders arrange symbol representations of words taken from the following categories:
   - (a) describing themselves;
   - (b) making an art project;
   - (c) birthday party?
2. How will children with ASD change their organizational schemes when given a specific communication task?
3. How do the children organize concrete (e.g. cake) vs. abstract (e.g. wish) representations of concepts?

PARTICIPANTS

- 10 Children with ASD (5f, 5m); Age: $M = 9.6$; (range = 6.6-12.7)
- Parent reported ASD diagnosis by a professional
- CCC-2: $M = 74.6$; $SD = 14.56$
- 9 typically-developing children (3 f; 5 m); Age: $M = 8.41$; range = 4.5 – 12.7
- CCC-2: $M = 99.55$, $SD = 20.66$

PROCEDURE

- One videotaped scripted session lasting approximately 20-30 minutes

  - Organization Task: Children sorted 57 laminated picture cards made from Boardmarker onto 6 felt boards and then named the categories of each board.
  - Communication Task: Children participated in a pretend silent birthday party. They had an opportunity to rearrange any pictures they wanted before the start of the birthday party. Participants were instructed to use symbols to communicate and given the opportunity to respond to 8 prompts from AMDI 8-level, low-tech aid.

RESULTS: CHILDREN WITH AUTISM

- Themes of Children’s Symbolic Organization
  - 70% (7/10) of participants put all family cards together. This included family, mom, dad, brother, and sister.
  - 40% (4/10) of participants put all animal cards together. This included dog, cat, and bird.
  - 70% (7/10) of participants put dog and cat together.
  - 70% (7/10) of participants put all color cards together. This included orange, red, blue, green, yellow, and purple.

- Birthday Party Task
  - Only two participants used their cards to communicate during this task.
  - Four participants held up fingers when asked “How many pieces of cake do you want?”
  - One participant wrote the number when asked “How many pieces of cake do you want?”
  - Participants made minor changes if any when told they would use the categories for a task.

- Individual Differences
  - One participant created a narrative based construction.
  - One participant used 6 boards to make one large board and organized based on things he likes a lot, things he likes a little, and things he does not like.
  - One participant used picture boards based on items that were in the room, e.g. bananas.

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RESULTS: TD CHILDREN

- Majority of participants (6 out of 9) arranged at least 50% of symbols using inherent categories.
- Youngest participants verbally related symbols to their lives.
- Taxonomic and schematic organizational schemes both present.
- Consistent with previous research, all participants, regardless of age, had more difficulty organizing abstract concepts than concrete ones.
- Evident by the inconsistent and wide range of organizations of abstract concepts by the participants.
- The majority of participants (6 out of 9) arranged at least 50% of symbols using inherent categories.

SUMMARY OF MAJOR FINDINGS

- Children, including older children, still do not replicate adult conceived models.
- One of the oldest participants created a story line, which does not support the belief that all older children move towards more taxonomic strategies.
- It might be easier for younger children to make sense of stimuli when personal connections are apparent.
- Participants utilized spontaneous and unaided communication strategies.

REFERENCES


GENERAL DISCUSSION

- Understanding of children’s personal representations critical.
- Creating transparent symbol sets.
- Heterogeneous population of children with ASD.
- Current technology makes the transposition of different symbol sets within a given AAC system easier.

FUTURE DIRECTIONS

- Importance of communication context for children with ASD.
- Future of research needs to focus on how clinicians should handle abstract concepts.
- Instruction and placement on an AAC device.
- Instruction of the link between a linguistic stimulus and its symbolic representation.
- Are symbols always necessary?

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