The Effects of Symbol Format: Sound to Syntax

What data tell us about children with and without complex communication needs

Kris Brock, Ph.D., CCC-SLP
Jamie Zolkoske, M.S., CF-SLP
Idaho State University
Dr. Brock receives compensation as faculty to conduct research at Idaho State University. Boston Children's Hospital will sell the Animated Graphic Symbols Set for children with Autism for a profit.
**Volunteers Wanted for a Research Study**

The Effects of Environmental Sound and Animation on the Naming Accuracy of Graphic Symbols for Children with and without Developmental Disabilities

Researchers at Idaho State University want to find ways to help kids with disabilities name action words. Research is always voluntary!

**Would the study be a good fit for me?**
- Typically developing children 4 years of age OR
- Children with a disability between 5 and 16 years
  - Children with a disability must include autism, Down syndrome, Intellectual Impairment
  - Children who speak English
- No uncorrected hearing or vision difficulties

**What would happen if my child took part in the study?**
- You would complete a standardized rating scale regarding your child's communication, daily living skills, socialization, motor skills, and behavior
- Your child would take a test to see if they understand 18 verbs used in the study
- Your child would play a game involving naming to pictures on a computer
- You and your child would be involved in the study for 3 days (Day 1 = 90 minutes; Day 2 = 25 minutes; Day 3 = 25 minutes)

There are benefits to you by taking part in the research
- Receive a copy of your child's test results and a free copy of the animated graphic symbols for use at home or school

**Contact**
Kris Brock
brockris@isu.edu
208-373-1918

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**Volunteers Wanted for a Research Study**

The effects of symbolic format on receptive syntax outcomes of children with and without disability

**Would the study be a good fit for me?**
- Children 4-5 years and 7-8 years
- Children with autism between the ages of 6 and 12 years
- English speaking
- No uncorrected hearing or vision difficulties

**Risks and Benefits**
- Child may become fatigued or frustrated
- Copy of language test

**What would happen if my child took part in the study?**
- Take a receptive language test
- Confirm child's knowledge of verbs, prepositions, and nouns used in the study
- Play a game on the computer to find sentences depicted as pictures
  - Day 1 = 60 min; Day 2 = 30 min; Day 3 = 30 min

**Contact**
Kris Brock
AACCTLab@isu.edu
208-373-1901

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**Volunteers Wanted for a Research Study**

The effects of symbol format and symbol set on the identification of verbs in typically developing children

**Would the study be a good fit for me?**
- Children between the ages 5 and 6 years
- English speaking
- No uncorrected hearing or vision difficulties

**Risks and Benefits**
- Child may become fatigued or frustrated
- Copy of vocabulary test

**What would happen if my child took part in the study?**
- Take a receptive vocabulary test
- Confirm child's knowledge of verbs used in the study
- Play a game on the computer to find verbs depicted as pictures or movies
  - Day 1 = 30 min; Day 2 = 25 min

**Contact**
Kris Brock
brockris@isu.edu
208-373-1918

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**Contact:** Kris Brock at Brockris@isu.edu OR 208-373-1918
Overview

• A quick poll

Animation
• Research and Clinical Implications

• Sound vs. No Sound: Naming
  • Research and Clinical Implications

• Symbol Format: Naming and Identification
  • Research and Clinical Implications

• Symbol Format: Syntax
  • Research and Clinical Implications

• Conclusion
Animation Poll

• Go to
  • Pollev.com/kristoferbro147

• Text
  • KRISTOFERBRO147 to 37607

• What have you done with animation technology for children with CCN during intervention? If you haven't, tell us about your experience with other populations such as those with language disorders and SSDs?
Augmentative and Alternative Communication
Augmentative & Alternative Communication (AAC)

- AAC has been defined as an area of practice that “... compensate(s) for temporary or permanent impairments, activity limitations, and participation restrictions ...” (ASHA, 2005, para. 1) by incorporating “... tools and strategies [such as symbols, pictures, and speech-generating devices] that an individual uses to solve every day communicative challenges” (ISAAC, 2017, para. 1).
Augmentative & Alternative Communication (AAC)

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Augmentative & Alternative Communication (AAC)

- Interventions, strategies, techniques that supplement or replace natural spoken language (Beukelman & Mirenda, 2013)
  - Augmentative: used to supplement existing spoken language
  - Alternative: used in place of speech

- 7.6% of children with developmental disabilities require AAC (Keeney & Kogan, 2011)

- These children primarily use static graphic symbols to learn language and produce messages (Allen et al., 2017)
  - Not enough research in animations or symbol sequences
Animation

Multimedia Learning and Psychology
Animation

- Animation is defined as a series of sequential frames... (Bétrancourt & Tversky, 2000)
- “Certain types of information are more easily conveyed in animations than static images”
- “Animations portray the qualitative aspects of motion or the microsteps, the exact sequence and timing of complex operations.”

Tversky, et al., 2002
Animation

- Animation serves four purposes:
  - (a) to attract a learner’s attention;
  - (b) to convey information related to a process;
  - (c) to portray the completion of a procedure; and
  - (d) to demonstrate changes over time (Berney & Bétrancourt, 2016)
Animation

● Höffler and Leutner (2007):
  ○ Animation conveys movement-based information that provides a mental representation of the word
  ○ 71% of comparisons indicated an advantage for animations

● Berney and Betráncourt (2016):
  ○ Meta-analysis that found animation may contribute to decreased cognitive load
  ○ 30.7% of comparisons indicated an advantage for animations; 59.3% showed no significant differences

● Associated disadvantages
  ○ Shallow understanding and decreased allocation of cognitive resources (Schnotz & Lowe, 2003)
  ○ Information overload (Jones & Scaife, 2000; Lowe, 1999; Mayer & Moreno, 2002)
Literature Review: Overview of Symbol Options
Static Symbols

● Nouns
  ○ Majority of research in AAC (Allen et al., 2017; Schlosser & Sigafoos, 2002)
  ○ Iconicity Principle (Fuller & Lloyd, 1992)
  ○ Age of acquisition (Genter, 1978; Nelson, 1973)
  ○ Word frequency (Bastiaanse, Wieling, & Wolthius, 2016)

● Verbs
  ○ Less emphasis on verbs
  ○ More difficult to depict graphically-Iconicity (Fuller & Lloyd, 1992)
  ○ Activate complex lemmas (Levelt, 1989)

● Newer technology now available
  ○ Animation
Animated Symbols

• Verbs and prepositions
  • Movement also provides additional context to support learning and communication
  • Research has focused on naming and identification of verbs and prepositions (Fujisawa, Inoue, Yamana, & Hayashi, 2011; Harmon et al., 2014; Mineo, Peischl, & Pennington, 2008; Schlosser et al., 2012; 2014; 2019)
Symbols with Sounds

- Difficult to learn verbs
  - Only two studies on 18 verbs in 3- and 4-year-old children with typically development (Brock et al., under review; Harmon et al., 2014)
Literature Review: Animation and Sound
Animation: Sound and No Sound
Harmon et al. 2014

- Over 50, 3-year-olds with typical development
- 18 action words deemed difficult to name in Schlosser et al. (2011)
- Randomized between-group design
  - Animated with Sound and Animated without sound
  - ALP symbols only
- Dependent $t$-test
- DVs: Naming Accuracy
Results: Sound and No Sound Harmon et al. 2014

- Animated symbols with environmental sounds were named with 16.45% greater accuracy.
- Rate of correct naming was higher for 15 of the 18 verbs with environmental sounds.
- 13 of the symbols with sound met the performance criteria of being named with 70% accuracy or higher (Schlosser, 2011).
  - As compared to 6 symbols without sound
Animation: Sound and No Sound
Brock et al. 2014

- 21, 4-year-olds with typical development
- 18 action words deemed difficult to name in Schlosser et al. (2011)
- Randomized between-group design
  - Animated with Sound and Animated without sound
  - ALP symbols only
- Independent $t$-test
- DVs: Naming Accuracy and response time (ms)
Procedure: Sound and No Sound Brock et al. 2014
Results: Sound and No Sound Brock et al. 2014

<table>
<thead>
<tr>
<th>Participant</th>
<th>Naming Accuracy</th>
<th>Response Time ms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sound M(SD)</td>
<td>No Sound M(SD)</td>
</tr>
<tr>
<td>No Disability</td>
<td>70.37 (18.37)</td>
<td>69.84 (13.21)</td>
</tr>
<tr>
<td>Disability</td>
<td>75.9(21.3)</td>
<td>70.37(18.1)</td>
</tr>
<tr>
<td></td>
<td>6074 (2430)</td>
<td>5669 (1476)</td>
</tr>
<tr>
<td>No Disability</td>
<td>6932(2064)</td>
<td>8848(6691)</td>
</tr>
</tbody>
</table>
Animation and Sound: Clinical Implications

- Children with typical development
  - Controlled homogeneous sample (Bedrosian, 1995)
- Animation and sound likely works
  - Reduce the cost of communicative competence
  - Less time teaching symbol meaning (Harmon et al., 2014)
- Beware of poor symbols and errors types
  - SWEEP WIPE DRY
Results of the Brock et al. (under review) study are in contrast with those of Harmon et al. (2014) for children with typical development

- Animation may be more important, but the inclusion of environmental sounds was not detrimental
- An age effect is possible
  - 3- and 4-year-olds similar accuracy in sound condition but not in the no sound condition
  - Fast vs. Slow Mapping
- Sociocultural differences
- The amorphous blob
- Results from kids with disabilities is promising
Literature Review: Animation in AAC
Symbol Format: Mineo et al. 2008

- Preschoolers without disabilities: 3yo, 4yo, 5yo
- 24 action words from Huttenlocher et al.’s list (1983)
- Within-group design
  - 4 conditions
    - 1) Static line drawings with disequilibrium cues
    - 2) Static line drawing with movement cues
    - 3) Animated line drawings
    - 4) Black & white video
- Two-way ANOVA
- DVs: Identification Accuracy – 4-choice array
Symbol Format: Mineo et al. 2008

Static line drawings with movement

Animated line drawings

Static line drawings with disequilibrium cues

Black and white video
Results: Mineo et al. 2008

Results indicate that
- Video representation stimulates higher verb identification accuracy
- Animated verbs were identified more accurately than static verbs
- Older children tend to be more accurate with both identifying animated and static verbs
- Clinical implications?
Typically developed preschoolers had to 1) name and 2) identify the 24 graphic representations of verbs and 8 prepositions.

A 2 x 2 x 2 x 3 randomized block design was used:
- (2) Symbol Format: animated or static
- (2) Symbol Set: ALP or PCS
- (2) Word class: verbs or prepositions
- (3) Age: 3yo, 4yo, 5yo

DV: Naming & Identification percent accuracy
Schlosser et al. 2014
Results: Schlosser et al. 2014

• Results indicated that

  • Naming
    • Animated symbols (58% accurate) were named more readily than static symbols (45% accuracy)
    • ALP symbols were named with greater accuracy (71%) than PCS (38%)
    • ALP verbs and prepositions named with greater accuracy than PCS counterparts
      • More pronounced for prepositions: ALP prep (72%) PCS prep (18%)
    • Older children were more accurate

  • Identification
    • Verbs are easier to identify than prepositions; regardless of symbol set
      • ALP > PCS
      • ALP verbs = to PCS verbs
      • ALP prepositions identified with 30% greater accuracy than PCS
Symbol Format: Schlosser et al. 2019

- 27 children with autism identified 24 ALP representations of verbs using a 4-choice array
- Randomized between groups design
  - Static vs Animated Conditions
  - Age, CARS and ROWPVT scores were equal across groups
- DVs: Identification percent accuracy
### Results: Schlosser et al. 2019

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Experimental Conditions</th>
<th>Number of Participants</th>
<th>M Scores</th>
<th>SD</th>
<th>t (p value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification</td>
<td>Static</td>
<td>15</td>
<td>58.61</td>
<td>19.57</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Animation</td>
<td>12</td>
<td>79.76</td>
<td>14.42</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>27</td>
<td>68.01</td>
<td>20.22</td>
<td>3.41 (p=.002)</td>
</tr>
</tbody>
</table>
Symbol Format: Fujisawa et al.

- Intellectually disabled students (11-18yrs.) were taught 16 static verb symbols within two sessions that included two conditioned trials.
  - 16 static Pictogram Symbol Set and their corresponding animated or static symbols
    - Controlled Condition: 8 static symbols: incorrect response → static symbol
    - Experimental Condition: 8 static symbols: incorrect response → animated graphic
- Between-subjects design
- DVs:
  - Comprehension of action verbs
Symbol Format: Fujisawa et al.

- Results indicated that
  - Animated symbols enhanced the learning of static action verb symbols for school children with intellectual disabilities
  - The lower the participant’s linguistic development age was, the more effective the animation cues were when learning the verb symbols.
Animation: Clinical Implications

- Go to
  - Pollev.com/kristoferbro147
- Text
  - KRISTOFERBRO147 to 37607
- What are the clinical implications of animation for children with complex communication needs?
Animation: Clinical Implications

- What is good animation?
- What is my purpose for using animation?
- How is my animation presented?
- What other stimuli is present in addition to animation?
- How many animated symbols do I need?
- JITs or Just-in-Time prompts/modifications
Literature Review: Static Symbol and Syntax Outcomes
Static Symbol Receptive Syntax

- Lots of helpful previous research using children with typical development, various disabilities, and CCN (3- to 49-years-old)
  - (a) act-out tasks in response to a video clip or spoken sentence (Trudeau et al., 2014)
  - (b) forced-choice identification (Sutton et al., 2004; Sutton et al., 2010; Trudeau, Morford, et al., 2010; Trudeau, Sutton, et al., 2010)
  - (c) act-out tasks in response to a graphic symbol sequence (Boyer et al., 2012; Choe et al., 2020; Trudeau et al., 2014)
  - (d) reading graphic symbol sequences (Boyer et al., 2012; Trudeau et al., 2014)
Static Symbol Syntax: Identification

- Studied the identification of SVO sequences in 30 typically developing preschoolers given a four-choice array
- 52% accurate
- Conclusion
  - “Children at this age level have not yet developed the skills required to deal with graphic symbols even though they have mastered the corresponding spoken language structures.” Sutton et al., 2010

Fig. 3. Example of a trial on the Interpretation Task.
Static Symbol: Reading Tasks

- Boyer et al. 2012 and Trudeau et al. 2014
  - Reading task to measure 3- to 6-year-old typically developing participants’
  - SV and SVO symbol sequences

- Boyer et al. Results
  - 95% of all participants passed (6/8 trials)

- Trudeau et al. Results
  - Accuracy ranging from 35% in 3-year-old participants to 91% in 6-year-old participants

- Conclusion
Static Symbol Syntax: Identification and Construction

- Studied the identification of SVO, SVOA, and SAVO sequences in 22 people who use AAC (9 to 49 years old)
  - Four-choice array

- Construction of SVO, SVOA, and SAVO sequences

Trudeau, Sutton et al., 2010
Static Symbol Syntax: Identification and Construction

- Trudeau, Sutton et al., 2010 results
  - Identification Results
    - 54% had stable response pattern (50% and above on identification)
  - Construction of SVO, SVOA, and SAVO sequences
    - 68% had a stable response pattern (50% and above on construction)
  - Receptive syntactic skills = better performance on the tasks
  - Red Flags
    - 50% and above = stable
    - Stimuli
  - Conclusion
Static Symbol: Sequence Construction

- Trudeau et al. 2014 used 3- to 6-year-olds with typical development to see how well children used graphic symbols
  - Dictation Task (speech input, symbol output)
  - Construction of Symbol Sequence Task (video clip input, symbol output)
Static Symbol: Sequence Construction

- Trudeau et al. 2014 Results
  - Dictation Task (speech input, symbol output)
    - Age effect
  - Construction of Symbol Sequence Task (video clip input, symbol output)
    - Age effect: 3-year-olds could not construct symbol sentences
These results from studies investigating receptive and expressive syntax in AAC are concerning.

- Sutton et al. (2010) 30 kids (3-4 years) consistently created SVOs
  - Red flags (e.g., no intervention, symbol iconicity, typical)
  - Science is not truth...

- Binger, Kent-Walsh and colleagues have strong intervention data
  - AAC clients, range of disabilities
  - Can create static symbol sequences
Symbol Format and Receptive Syntax
Brock et al. (in preparation) investigated the effects of symbol format on symbol sequence identification and symbol sequence reading.

- 24 children (7- and 8-years-old),
  - 2 x 2 x 2 between-within subjects repeated measures
  - The within-subjects variables included symbol format (animated and static) and sentence (18 individual sentences)
  - The between subjects variables included the first condition (animation or static) and the first task (identification or reading)

- ALP and PCS graphics
- Only ALP symbols were animated
Identification Task
Reading Experimental Task
Results: Identification

• Results from the 2 x 2 x 2 ANOVA found a significant main effect for symbol format, $F(1,20) = 4.44, p = .048$; partial $\eta^2 = .181$
  • Animated symbol sequence = 65%
  • Static symbol sequences = 58%
• An interaction between symbol format and first condition was approaching significance, $F(1,20) = 3.81, p = .065$; partial $\eta^2 = .160$.
  • Suggests learning effects
Results: Reading

- Labeled (read) all symbols correctly and in order
- Significant main effect for symbol format, $F(1,20) = 42.49$, $p = < .001$; partial $\eta^2 = .680$
  - Animated reading condition = 54%
  - Static reading condition = 31%
Results: Reading

- Labeled (read) all symbols correctly and in order
  - Significant main effect for symbol format, $F(1,20) = 42.49, p < .001$; partial $\eta^2 = .680$
    - Animated reading condition = 54%
    - Static reading condition = 31%

- Symbol-by-symbol reading (overall percentage of correctly labeled [read] symbols)
  - Significant main effect found for symbol format, $F(1,20) = 7.56, p < .001$; partial $\eta^2 = .274$
    - Animated reading condition = 88%
    - Static reading condition = 77%
Results: Reading

- Labeled (read) all symbols correctly and in order
  - Significant main effect for symbol format, $F(1,20) = 42.49, p < .001$; partial $\eta^2 = .680$
    - Animated reading condition = 54%
    - Static reading condition = 31%

- Symbol-by-symbol reading (overall percentage of correctly labeled [read] symbols)
  - Significant main effect found for symbol format, $F(1,20) = 7.56, p < .001$; partial $\eta^2 = .274$
    - Animated reading condition = 88%
    - Static reading condition = 77%

- Significant interaction between symbol format and first condition was found, $F(1,20) = 14.10, p = .001$; partial $\eta^2 = .413$
  - Learning effects
Symbol Format and Syntax: Clinical Implications

• Let’s get a jump on those CEU learning objectives
  • Go to
    • Pollev.com/kristoferbro147
  • Text
    • KRISTOFERBRO147 to 37607
• What are the clinical implications of static and animated symbols on syntax outcomes?
Symbol Format and Syntax: Clinical Implications

• Reduce teaching time
• Animations can improve comprehension
• Verbs are more important
Symbol Format and Syntax: Clinical Implications

- **Reading:**
  - **Symbol-by-Symbol:** high accuracy with animations
    - Mental representation
    - Reduced working memory
  - **Word Class:** large effect sizes for verbs and prepositions, medium effect sizes for objects and prepositional complements
    - Comprehension of message as a whole (Boyer et al., 2012)
  - **Whole Sentence:** low accuracy as a whole
    - Inability to comprehend the meaning
Symbol Format Clinical Implications

Intervention
Symbol Format Clinical Implications

- Animation is not a panacea
  - There are real problems with animation in AAC systems
    - Animation files in AAC systems
      - Just in Time
    - Looping confounds
  - Quality animation (Berney & Bétrancourt, 2016; Schnottz & Rasch, 2005)
    - Sounds, text, speed, context
    - What accompanies the animation?
So How Do I use Animation?

- Procedure (RAA RAA RAA) or RAAPrompt
  - Read + 2 symbol aided AAC model, Ask + 2 symbol aided AAC model, Answer + 2 symbol aided AAC model
  - Read + 2 symbol aided AAC model, Ask + 2 symbol aided AAC model, Answer + 2 symbol aided AAC model + Prompt child to create symbol-based message
So How Do I use Animation?

- Widespread use of general-purpose portable hardware (e.g., Apple iPad™, Google Android™) equipped with SGD apps
- ALP graphics and the Visual Immersion Program (Shane et al., 2012)
So How Do I use Animation?
So How Do I use Animation?
So How do I use Animation?

- Presume competence
- Don’t sell your clients short
- Address more complex syntax! Address morphology!
  - Treatment Complexity Principles
Which Aided AAC Treatment Do I Use?

....while also including animation
Augmented input refers to the communication partner’s use of the client’s augmentative and alternative communication (AAC) device when speaking to the client.

A variety of terminology has been used in describing treatment approaches that incorporate augmented input.

<table>
<thead>
<tr>
<th>Term used</th>
<th>No. of included studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aided AAC Modeling</td>
<td>5</td>
</tr>
<tr>
<td>Aided Language Stimulation</td>
<td>3</td>
</tr>
<tr>
<td>Augmented Input</td>
<td>2</td>
</tr>
<tr>
<td>Natural Aided Language Stimulation</td>
<td>1</td>
</tr>
<tr>
<td>Aided Language Modeling</td>
<td>1</td>
</tr>
<tr>
<td>Not specified</td>
<td>3</td>
</tr>
</tbody>
</table>

# Augmented Input Characteristics

Table 3. Characteristics of named approaches.

<table>
<thead>
<tr>
<th>Name (number of studies)</th>
<th>Key Features</th>
<th>Incoming Communication/Language</th>
<th>Other AAC System Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aided AAC Modeling (5)</td>
<td>Can occur with or without voice output system.</td>
<td>Mentor points to symbol while mentor or speech synthesizer labels symbols. Mentor provides: repeated AAC model; spoken model; recast/expansion; expectant delay; wait time; verbal prompt; imitations; interactive video depiction</td>
<td>Mentor points to combinations of symbols sequentially.</td>
</tr>
<tr>
<td>Aided Language Stimulation (3)</td>
<td>Traditionally uses static communication boards</td>
<td>Mentor speaks; simple short phrases; reduced rate; emphasizes keywords; expansions of child’s productions; repeated AAC model; wait time</td>
<td>Mentor points to picture symbols on AAC display</td>
</tr>
<tr>
<td>Augmented Input (2)</td>
<td>Traditionally uses static communication boards.</td>
<td>Mentor provides: repeated AAC model; spoken model; recast/expansion; extension; wait time; expectant delay; imitations; verbal prompt; physical guidance</td>
<td>Mentor’s speech is augmented by pointing to a symbol referent(s) for keywords.</td>
</tr>
<tr>
<td>Natural Aided Language Stimulation (1)</td>
<td>Traditionally uses static communication boards. Targets ASD population. Involves use across all environments.</td>
<td>Mentor speaks; simple short phrases; reduced rate; emphasizes keywords; expansions of child’s productions</td>
<td>Mentor points to picture symbols alone, text + symbols, or text alone</td>
</tr>
<tr>
<td>Aided Language Modeling (1)</td>
<td>Traditionally uses static communication boards.</td>
<td>Mentor says the word for a referent while pointing to its graphic symbol. Mentor provides: repeated AAC model; spoken model; recast/expansion.</td>
<td>Mentor points to referent in the environment, then within 2 seconds points to a graphic symbol of the referent</td>
</tr>
</tbody>
</table>
Intervention Recommendations Based on Static Symbol Research

• Strongest evidence was from studies of Aided AAC Modeling (Binger & Light, 2007) and Aided Language Modeling (Drager et al. 2006)

  • Bare minimum dosage
    • 30 models per 15 minutes (2 per minute)
    • 2-3x per week
    • 15-20 minute play-based sessions
<table>
<thead>
<tr>
<th>Techniques, strategies, prompts, and cues</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repeated AAC model/AAC model</td>
<td>13</td>
</tr>
<tr>
<td>Repeated Spoken Model/spoken model</td>
<td>13</td>
</tr>
<tr>
<td>Ask question</td>
<td>10</td>
</tr>
<tr>
<td>Recast/expansion/aided AAC recast</td>
<td>9</td>
</tr>
<tr>
<td>Wait time</td>
<td>8</td>
</tr>
<tr>
<td>Verbal prompt</td>
<td>8</td>
</tr>
<tr>
<td>Imitations</td>
<td>6</td>
</tr>
<tr>
<td>Expectant delay</td>
<td>6</td>
</tr>
<tr>
<td>Read</td>
<td>5</td>
</tr>
<tr>
<td>Actions (pointing gesture)</td>
<td>5</td>
</tr>
<tr>
<td>Verbal reinforcement (e.g., “good job”)</td>
<td>4</td>
</tr>
<tr>
<td>Aided Language Stimulation</td>
<td>3</td>
</tr>
<tr>
<td>Physical guidance</td>
<td>3</td>
</tr>
<tr>
<td>Acknowledge participants’ communication</td>
<td>2</td>
</tr>
<tr>
<td>Extension</td>
<td>2</td>
</tr>
<tr>
<td>Scripts</td>
<td>1</td>
</tr>
<tr>
<td>Puppet Plays (e.g., performed action)</td>
<td>1</td>
</tr>
<tr>
<td>Prompt (i.e., build-ups and breakdowns)</td>
<td>1</td>
</tr>
<tr>
<td>Peer model</td>
<td>1</td>
</tr>
<tr>
<td>Group therapy</td>
<td>1</td>
</tr>
<tr>
<td>Cues (spoken, object, and movement)</td>
<td>1</td>
</tr>
<tr>
<td>Correction</td>
<td>1</td>
</tr>
<tr>
<td>Interactive play/video demonstration</td>
<td>1</td>
</tr>
<tr>
<td>Sabotage non-VOCA condition (i.e., broken)</td>
<td>1</td>
</tr>
</tbody>
</table>
Intervention Recommendations Based on Static Symbol Research

Goals:
- Syntax!
- Binger et al. (2020)

Treatment Complexity
- Complex sentences “Bilbo, who goes on adventures, rarely has time to shower.”
- Simple Sentence “Bilbo does not shower.”
Intervention Recommendations Based on Static Symbol Research

- Goals:
  - Syntax!
  - Narratives!

- Several studies to date indicate that animation improves narrative language outcomes (Diehm et al., 2020; Gazella & Stockma, 2003; Klop & Engelbrecht, 2013)

- But why does it work?
  - (a) to attract a learner’s attention;
  - (b) to convey information related to a process;
  - (c) to portray the completion of a procedure; and
  - (d) to demonstrate changes over time (Berney & Bétrancourt, 2016)
VOLUNTEERS WANTED FOR A RESEARCH STUDY

The Effects of Environmental Sound and Animation on the Naming Accuracy of Graphic Symbols for Children with and without Developmental Disabilities

Researchers at Idaho State University want to find ways to help kids with disabilities name action words. Research is always voluntary!

Would the study be a good fit for me?

- Typically developing children 4 years of age OR
- Children with a disability between 5 and 16 years
  - Children with a disability must include autism, Down syndrome, Intellectual impairment
- Children who speak English
- No uncorrected hearing or vision difficulties

What would happen if my child took part in the study?

- You would complete a standardized rating scale regarding your child’s communication, daily living skills, socialization, motor skills, and behavior
- Your child would take a test to see if they understand 18 verbs used in the study
- Your child would play a game involving naming to pictures on a computer
- You and your child would be involved in the study for 3 days (Day 1 = 90 minutes; Day 2 = 25 minutes; Day 3 = 25 minutes)

There are benefits to you by taking part in the research

- Receive a copy of your child’s test results and a free copy of the animated graphic symbols for use at home or school

CONTACT: Kris Brock at Brockris@isu.edu OR 208-373-1918

VOLUNTEERS WANTED FOR A RESEARCH STUDY

The effects of symbol format on receptive syntax outcomes of children with and without disability

Would the study be a good fit for me?

- Children 4-5 years and 7-8 years
- Children with autism between the ages of 6 and 12 years
- English speaking
- No uncorrected hearing or vision difficulties

Risks and Benefits

Child may become fatigued or frustrated
Copy of language test

What would happen if my child took part in the study?

- Take a receptive language test
- Confirm child’s knowledge of verbs, prepositions, and nouns used in the study
- Play a game on the computer to find sentences depicted as pictures
  - Day 1 = 60 min; Day 2 = 30 min
  - Day 3= 30 min

Contact

Kris Brock AACCTLab@isu.edu
208-373-1901

VOLUNTEERS WANTED FOR A RESEARCH STUDY

The effects of symbol format and symbol set on the identification of verbs in typically developing children

Would the study be a good fit for me?

- Children between the ages 5 and 6 years
- English speaking
- No uncorrected hearing or vision difficulties

Risks and Benefits

Child may become fatigued or frustrated
Copy of vocabulary test

What would happen if my child took part in the study?

- Take a receptive vocabulary test
- Confirm child’s knowledge of verbs used in the study
- Play a game on the computer to find verbs depicted as pictures or movies
  - Day 1 = 30 min; Day 2 = 25 min

Contact

Kris Brock
Brockris@isu.edu
208-373-1918
Questions?
References


