

**Evidence-based AAC Strategies for  
Autism and Developmental  
Disabilities:  
From Early Intervention to Advanced  
Language Training**

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**Program**

- Introduction & Overview
- Early Intervention/Parent Training
- Functional Communication and Speech Production
- Early Language Learning
- Social Interaction and Social Language
- Q & A - Discussion

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**INTRODUCTION**

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**Minimally-verbal  
Learners with Autism**

- Autism includes a “delay in, or lack of the development of spoken language” (American Psychiatric Association, 2000)
- About 30% of children diagnosed with an autism spectrum disorder (ASD) remain minimally verbal (Tager-Flusberg & Kasari, 2013)
  - Low expressive and receptive language skills
  - Some better receptive than expressive (Rapin et al., 2009)
  - Candidates for intervention in **augmentative and alternative communication (AAC)**

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**Other Developmental  
Disabilities (DD)**

- Intellectual Disability: umbrella term for large range of syndromes and conditions that result in cognitive impairment
  - Commonly experience significant difficulty with spoken communication
  - Many do not use speech as primary mode of communication
  - High incidence of problem behavior
- Cerebral Palsy
  - Unique motor control issues
  - Up to two thirds also experience intellectual disability (Beukelman & Mirenda, 2013)

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**Common AAC Strategies**

- AAC strategies particularly used in ASDs/DDs:
  - Manual signs and gestures
  - Pictographic symbols sets/systems
  - High technology speech generating devices (SGDs) including mobile technologies for synthesized and/or digitized speech output
- Practitioners face difficult task selecting a suitable approach
- Evidence-based practice (EBP):
  - Using research outcomes as a major basis for clinical and educational decisions (Lloyd, 2001)

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## Instructional Principles - Augmented Input



- AAC traditionally been used to develop expressive communication (Augmentative and **Alternative Communication**)  
- **Intervention should not stop there** -
- AAC can also be applied to enrich the input of messages to the AAC learner → “augmented input” (**Augmentative** and **Alternative Communication**) (Allen et al., 2016)
- Blending both approaches can follow developmental trajectory in autism/DD

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## Augmented Input Strategies



- Partner uses AAC plus speech when interacting with learner → Pairing visual symbol and spoken word
- **Aided Language Stimulation:** Clinician highlights a symbol on the child's communication board while providing verbal stimuli (Goossens' et al., 1992).
- **Aided Language Modeling:** Use of language boards to implement aided language intervention during interactive play activities (Drager et al., 2006).
- **Partner-Augmented Input/ Partner-Aided Language Modeling:** Systematic modeling, communication partners use the person's AAC system themselves while spontaneously talking (Allen, Schlosser, Brock, & Shane, 2017).

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## Partner-Augmented Input (PAI)/ Aided Language Modeling



- Use of this strategy shown to impact gains in semantics, syntax, morphology, pragmatics, vocabulary comprehension, word combinations and more (Sennott, Light, & McNaughton, 2016; Solomon-Rice, & Soto, 2014; Binger & Light, 2007).

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## Vocabulary Selection – What is Core Vocabulary?



- **Core** vocabulary consists of common words that comprise a large percentage of spoken or written language (McCarthy, Schwarz, & Ashworth, 2017).
- **Fringe** vocabulary is specific to a certain topic, environment, or individual.
  - More limited to a certain setting with specific communication partners (Murphy, 2010).
- When programming AAC systems, typical recommendation is to make the most frequently used vocabulary easily accessible; often this includes core words (Murphy, 2010).

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## EARLY INTERVENTION AND PARENT TRAINING

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## Early Intervention: Benefits



- Promote speech and language learning and accelerate learning rates for young children with ASD (Rogers & Vismara, 2014)
- Reduce severity levels of language and intellectual impairment (Vismara & Rogers, 2010)
- Currently receiving more attention because earlier diagnosis goes along with earlier referral for treatment

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## Early Intervention: AAC Instruction



### Naturalistic Teaching:

- Incorporates behavioral strategies within natural contexts (Ganz, 2015; Schreibman, et al., 2015)
  - Natural routines and everyday activities, enabling generalization
  - Motivating to the child
  - Developmentally, socially important communication skills
  - Use of natural communication partners

### Augmented Input or Aided Language Input:

- Enrich the input of messages to the AAC learner (Allen et al., 2016)
- Moderately to very effective for persons with ASD (Ganz, Earles-Vollrath, et al., 2012)

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## Early Intervention: Family Centered



- Family-centered supports and services for infants/toddlers with special needs are **both recommended and evidence-based practices** in EI (Friedman, Woods & Salisbury, 2012; ASHA, 2008)
- Strengthen child-caregiver relationship
- Build caregiver's confidence and competence to help the child learn in everyday routines
- Involving parents as trainers can maximize benefits of speech-language interventions (Kaiser et al., 2000)

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## VOCABULARY SELECTION IN EARLY INTERVENTION

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## Routines-based Vocabulary



- Early words for AAC must be developmentally appropriate
- Must be meaningful and functional across family routines
- Must be developed in partnership with important communication partners
- Use normal language acquisition as a guide (Van Tatenhove, 2005)

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## AAC Programming



- Very early AAC displays may be context and routine specific
- As stated earlier, fringe may be the most important words
- This may mean that while the child improves comprehension and AAC use, the displays constantly change
- Older children may have greater potential to use preprogrammed displays

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## EARLY INTERVENTION: JOINT ATTENTION



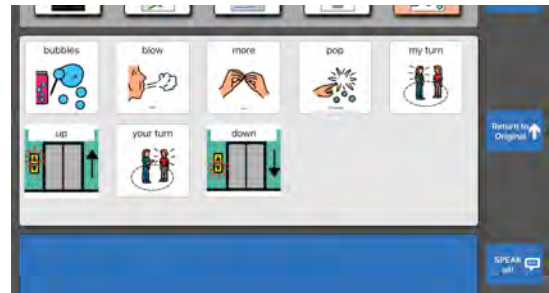
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## Helping Families Build Joint Attention Skills

- Caregivers support joint attention (JA) skills
- JA skills supported better expressive and receptive language outcomes (Schertz & Odom, 2007; Adamson et al., 2007)

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## Bubble Activity Screen Shot



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## The Beginnings of Joint Attention

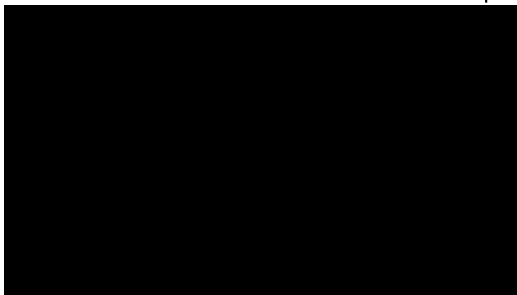


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**EARLY INTERVENTION:  
REQUESTING AND  
COMMENTING**

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## Helping Families Build Requesting Skills



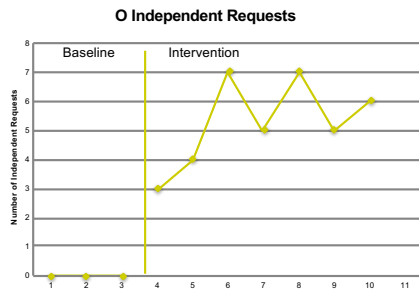
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## Helping Families Feel Empowered: What Mom Added During the Week



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## Requesting Data



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## Helping Families Build Motivation:

Sensory Social Games: SPEAKall! Screen Shot

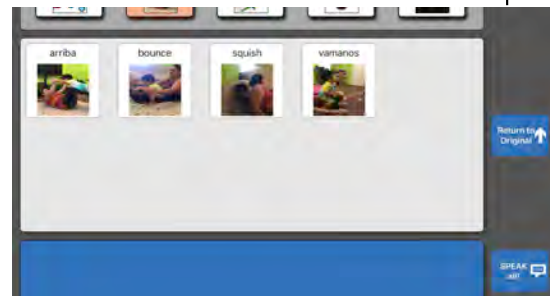


## “Arriba”



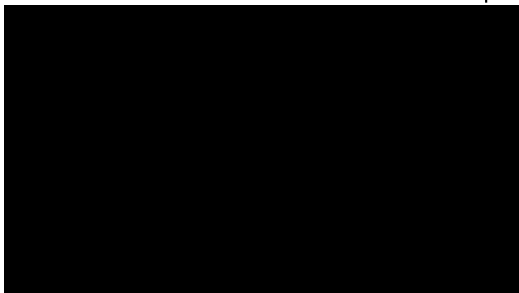
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## Change in Field Size and Change in Symbols



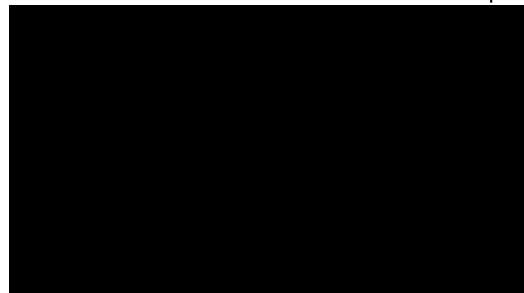
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## Teaching: Change in Field Size and Change in Symbols



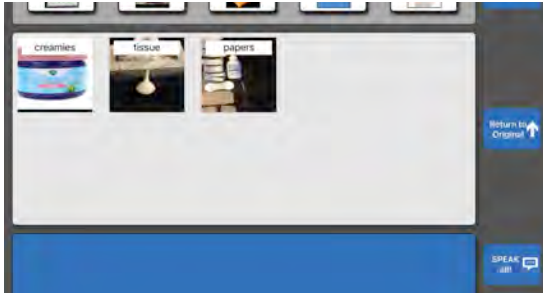
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## Generalizing to Mom



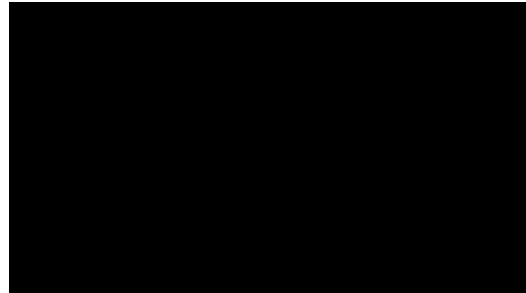
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## Other Daily Routine: Diaper Change



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## Helping Families Include Siblings

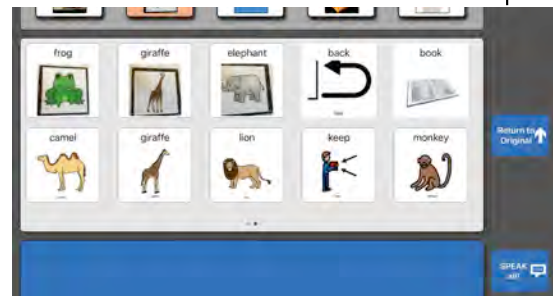


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## Evidence-based AAC Strategies EARLY INTERVENTION: SHARING ACTIVITIES

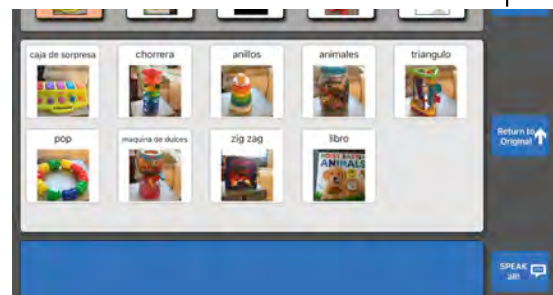
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## Shared Story Time



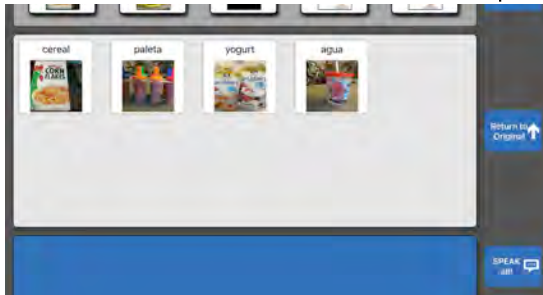
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## Play Time



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### Clinical Challenges: Missing Vocabulary



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### This is what he wanted



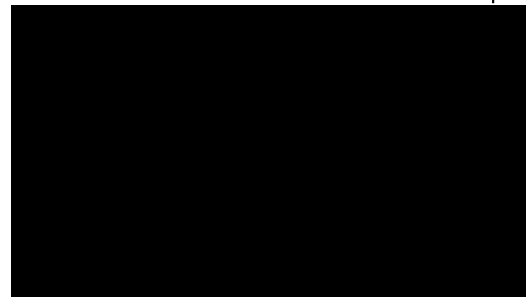
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### Clinical Challenge: Family Does Not Have Technology



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### Clinical Challenge: Working on Regulation and Attention



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### Clinical Challenge: Setting Up the Environment



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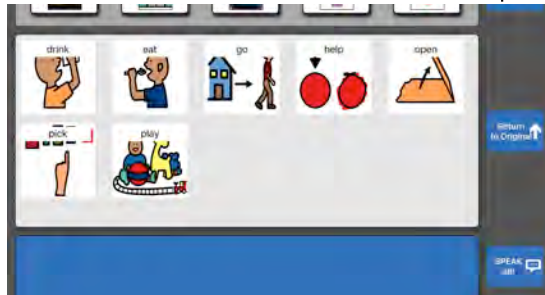
### Next Steps: Now Let's Think About "Core"

- After vocabulary has been matched to routines, child may be ready for core
- When child can reliably and spontaneously use an AAC system with a small vocabulary repertoire of words (a few to more than a few)
- Consider matching core to the child's routines, "every day core"
- Determine list of core in conjunction with caregiver

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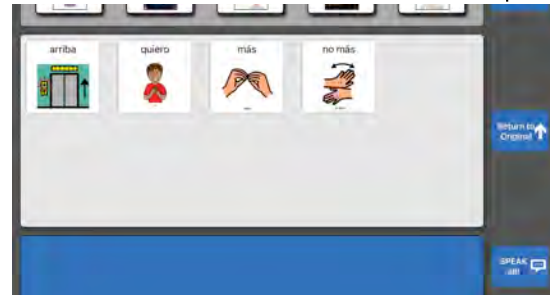


## “Everyday Core”



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## Use Core for the Activity



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## Should We Always Include Core Vocabulary in Toddlers with ASD/DD?

- Strong push in the AAC field to include core vocabulary
- How appropriate for young children with ASD/DD who may not follow typical language trajectory?
- Little to no empirical evidence for EI and AAC in autism
- Further research urgently needed

“Future studies are also needed to evaluate the utility of the core vocabulary identified ... on communication devices used by a variety of toddlers across a variety of activities.”

(Banajee, et al., 2003)

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## Including Core Vocabulary in Toddlers without ASD?

- Use normal language acquisition as a guide
- Consider most functional language
- Consider most important words
- May or may not be core words

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## When Core May Not Be The Best Choice

In a post retrieved from PrAACtical AAC: <http://practicalaac.org/practical/hold-that-core-when-do-you-not-use-a-core-vocabulary-approach/>

Zangari discusses when core may not be the best fit.

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## Some Questions To Ask In Choosing Vocabulary

Zangari poses the following questions:

- How can I help them WANT to communicate?
- What can I do to make interacting seem like the best thing since sliced bread?
- What will it take for them to desire conversational exchanges? What will make them feel successful?
- How can we get them to see that people are fun and worth the effort?
- What is the fastest way to get them to the point where they are ready to become active, more effective communicators?
- How can we make communication irresistible?

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## Possible Answers To the Questions



- Vocabulary may need to be favorite toys, videos, songs, people, places, foods, activities, events, etc.
- Vocabulary may need to be concrete, specific, important, motivating, fringe vocabulary.
- First words may not include core but next set most likely will.

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## More Research Coming



- Core vocabulary successful for student with ASD when combined with nouns (Cafiero, 2001)
- Research continues to be needed to study effects of core on children with ASD.
- May be important to consider multiple variables when selecting vocabulary for children with ASD.

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## Tips and Hints for Using AAC in EI



### Working with Families:

- Build in practice
- Practice each time you visit
- Check on the vocabulary
- Be ready for teaching opportunities
- Engage parent and teach parent to program
- Coach – get out the way. “I do, we do, you do.”
- Pay attention to features and attributes child likes to create motivating activities

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## Tips and Hints for Using AAC in EI, continued



### Provide and Evaluate Intervention:

- Keep data
- Stay in control of the materials!
- Tap into family capacity
- Listen to, and plan for, family priorities
- Support adult learning – ask how the adult learns best
- Understand and respect that you are probably the first in line proposing alternate communication (takes time, grief, acceptance)

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## Tips and Hints, continued



### Proper Training and Instruction:

- Go slowly. Give caregivers time to understand the process and the tools.
- Demonstrate for the parents with fun and relevant activities such as book time or play time.
- Help caregiver see important behaviors in the child, indicating possible success with AAC.

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## Expect Inconsistency Along the Way



- Caregivers cannot always carry through with weekly recommendation.
- AAC often increases “response effort” and caregivers may not have the energy in the moment to support AAC.
- Caregivers’ priorities may change week to week.

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## Ways to Support Consistency

- Program in meaningful ways
- Keep next steps very small
- Accept inconsistency as normal and appropriate
- Back up hi-tech with lo tech
- Keep supports (usually lo tech) easily available
- Ask good questions to gain important information

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## Ideas for Important Questions to Ask Caregivers in using AAC to Support Families

- What would you like \_\_\_\_\_ to be doing 6-12 months from now? What steps might be needed to get there?
- How is \_\_\_\_\_ going? (mealtime, sleeping, bathing, dressing, diapering, playing)
- How does \_\_\_\_\_ do when you go out in the community (going for a walk, to the park, to the store) or when others come to your home?
- What would you be doing if I weren't here?

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## Ideas for Providers to Ask Themselves in Using AAC to Support Families

- Am I targeting what is important for the family and for other caregivers?
- Are my strategies a good fit for the family/other caregivers?
- Am I starting where everyone is comfortable?
- Are the strategies motivating for the child, the family, and other caregivers?
- Am I facilitating optimism?

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## Important Topics

Prerequisites for AAC  
Motor Planning  
Presume Competence

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## PREREQUISITES FOR AAC?

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## Myth: Prerequisite Skills Needed for AAC

“Prerequisite skills such as understanding of cause and effect and showing communicative intent must be demonstrated before AAC should be considered; individuals with cognitive deficits are not able to learn to use AAC. ”

Retrieved from ASHA Key Issues:

[https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589942773&section=Key\\_Issues](https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589942773&section=Key_Issues)

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### Research Support Relevant to Debunking Myth of Prerequisite Skills

- Impaired cognition does not preclude communication (Kangas & Lloyd, 1988; Zangari & Kangas, 1997).
- Development of language skills can lead to functional cognitive gains (Goossens', 1989).
- AAC intervention ... supports functional communication skills, cognitive development, literacy development, social communication (Drager et al., 2010).

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### Possible Predictors, Moderators, and Mediators of (AAC) Outcomes for Children with ASD/DD

- This study identified possible child-related variables associated with AAC intervention outcomes through a systematic review of the research literature.
- Focused on peer reviewed articles
- No prerequisites, but possible variables that impact outcomes of AAC with children with ASD? (Travers & Ayres, 2015)

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### Definition: Predictors

- Baseline characteristics
  - Have a main effect on outcomes
  - They predict outcomes regardless of the intervention used, e.g., child's cognitive ability
- Kraemer, Wilson, Fairburn, & Agras, 2002

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### Factors Associated with Predictors

- Cognitive Ability
- Severity of ASD symptoms
- Language comprehension
- Language use
- Communication competence
- Composite Measures (scores across multiple domains)

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### Definition: Moderators

- Baseline characteristics that predict differentiated responses to interventions (Kraemer & Gibbons, 2009). For example, child's ability to imitate.

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### Moderators

- Joint Attention
- Object Exploration
- Verbal Imitation

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## Definition: Mediators

- Factors that are assessed during the delivery of an intervention that are associated with outcomes, e.g., frequency of therapy.

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## Mediators

- Frequency of therapy
- Communication partner's knowledge
- Perception of AAC
- Adult input at home, e.g. how often used

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## Study Limitations

- Very small number of studies met criteria for inclusion
- Wide heterogeneity of subjects
- Some small *N* (some single subject studies)

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## Prerequisites, Predictors, Moderators, Mediators

- Treatment Ideas often informed by “vocabulary” in the literature
- Treatment requires knowledge of the research and appropriate AAC programming
- Requires knowledge of the AAC user and important communication partners/contexts
- Requires knowledge of users response to treatment and user/family priorities

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## PRESUMED COMPETENCE

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## “Presume Competence” as a Popular Construct

- Philosophical standpoint based on presumption
- “Least dangerous assumption”
- The premise of presumed competence has evolved from earlier concepts like the criterion of the least dangerous assumption (Travers & Ayres, 2015)

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## Use Good Intervention Along with Presuming Competence

*“Start by presuming that your client is a learner on his/her way to developing competence. Good intervention, consistent language models, the right tools, and plenty of practice will move them along the journey toward improved communication. It’s important that, as clinicians, we truly believe that. Yes, your clients may be impaired, perhaps significantly so, but they will certainly know if you don’t believe in their abilities. Presume competence.”*

- Carole Zangari, Ph.D., CCC-SLP  
<http://practicalaac.org/strategy/strategy-of-the-month-engaging-the-learner/>

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## Recommendations to Inform “Presuming Competence”

- Education and training in autism and developmental disabilities
- Evidence of communicator’s performance
- Consideration of communicator’s priorities
- Functional focus that emphasizes improved quality of life
- Use of evidence based practices

(Travers & Ayres, 2015)

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## FUNCTIONAL COMMUNICATION AND NATURAL SPEECH PRODUCTION

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## Teaching Requesting

- Establishing functional communication initial AAC goal
  - Meeting basic wants and needs
  - Motivational considerations
- Often accompanied by fear “my child won’t learn to speak”
- Popular and promising strategies:



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## Benefits of Parent Involvement

- Involving parents as trainers can maximize benefits of speech-language interventions (Kaiser et al., 2000)
  - AAC interventions can be expensive
  - Often lack of qualified personnel
  - If parents can be trained to conduct AAC intervention at home, children may obtain more consistent benefits from AAC without extra costs
- Little research in AAC and ASD on parent-training (Park et al., 2011)

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## Experiment: Research Aims

- Evaluate effects of parent-implemented AAC intervention
  - Parents are trained to use SPEAKall! on an iPad with their child
  - Monitor effects on requesting skills
  - Monitor effects on natural speech production
- Can participants generalize the learned skills to untrained items?
  - Generalization major difficulty in autism
  - From requesting food items to requesting toys

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## Parent-Training Approach

- *Parent-implemented intervention*: Parents receive comprehensive training
  - General workshop at parent support group
  - Written instructions
  - Modeling and role playing
  - Video resources
  - Sole trainer for child, clinician only provides feedback
- Two clinicians with advanced PECS training independently checking sessions for treatment integrity
- Treatment schedule was 2 days/week, with 1-2 sessions each day

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## Parent Training

- Modeling of intervention steps
- Role-playing with clinician
- Cheat-sheets & videos



iPad Phase I (Student 1) - Treatment Integrity Checklist - Parent Implementation

Name: \_\_\_\_\_ Today's Date: \_\_\_\_\_ Participant: \_\_\_\_\_  
 Session: \_\_\_\_\_ (Date) (Time) \_\_\_\_\_ Session Date: \_\_\_\_\_ Trainer 1: \_\_\_\_\_

COMPONENT: *\*Treat 1% if component is fulfilled*

1. Parent is offering at least two, and if possible more, reinforcing items during each session \_\_\_\_\_  
 2. Any reinforcing items are not used more than six times \_\_\_\_\_

COMPONENT	Set 1	Set 2	Set 3	Set 4	Integrity
1. Preference assessment is performed					
2. Parent places only one symbol on iPad display					
3. Parent is child maintains position of symbol on iPad display with one eye shut					
4. Parent releases four symbol groups					
5. Parent corrects child with guidance					
6. Parent gives confidence to child within 3 seconds					
7. Parent provides verbal praise					

Integrity: \_\_\_\_\_  
*\*Integrity 1% if component is performed, mark 1% if component is not performed during three observations, mark 0% if component is not fulfilled, and is correctly not applicable for the session and 25% if*

- Treatment integrity checklists for each phase
- Need to have 100% correct during role-play

## Parent-Training

### iPad Instructions - Phase I Cheat Sheet

- Purpose: Teach one-symbol requests.
- Setting: Trainer 1 will be sitting across a table from the child and Trainer 2 will be standing behind the child.
1. Conduct a preference assessment. Repeat this every 5 trials.
  2. Put a bag of the preferred snack item on the table and have the corresponding graphic symbol displayed in SPEAKi!
  3. **Trainer 1** places iPad in front of the child and activates with the preferred item.
  4. **Trainer 2** provides prompting for dragging and dropping graphic symbol onto sentence strip. Fade out over time.
  5. **Trainer 1** once sentence strip is activated, give desired item to child and say the item name.
  6. Give the child time to consume the snack item or play with the preferred toy.
  7. **Trainer 1** gives "return card" button to start a new trial. Begin to activate with the desired item again.
  8. Switch communication partners. Make sure child can request at least 3 different items before moving on to the next phase.



- Training materials:
- Cheat sheets
  - YouTube videos

[www.youtube.com/channel/UCNq-ywqu0ESwLawPDvhGU0g](https://www.youtube.com/channel/UCNq-ywqu0ESwLawPDvhGU0g)

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## Intervention Protocol

- Modified Protocol of Picture Exchange Communication System (PECS; Bondy & Frost, 1994) (Preference Assessment)
  - iPad Phase I (Ph 1): One-Symbol Activation
  - iPad Phase II (Ph 2): Distance and Persistence
  - iPad Phase III (Ph 3): Discrimination Between Symbols
  - iPad Phase IV (Ph 4): Sentence Structure
  - *⇒ Added more rigorous speech elicitation, parent and child read "sentence strip" together*
  - iPad Phase V (Ph 5): Responding to "What do you want?"/ Increasing Spontaneity (Boesch, Wendt, Subramanian, & Hsu, 2013a,b)

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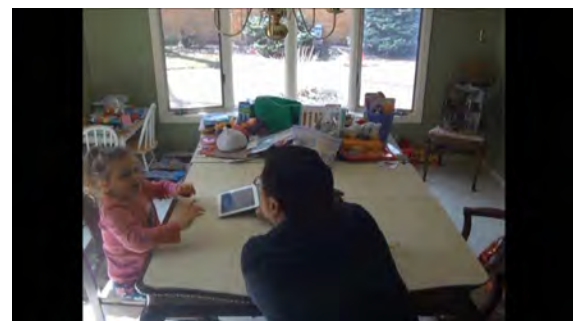
## Participant Characteristics

Participant	Age/Gender	Dx*	Communication Skills
P1	7 yrs./Female	severe autism	some echolalia and scripted speech, less than 15 functional words
P2	8 yrs./Male	moderate-severe autism, dual diagnosis: Down syndrome	no vocalizations, no functional speech
P3	6 yrs./Male	severe autism	vocalization and jargon, no meaningful words, no functional speech

\*based on ADOS and CARS scores

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## Participant P1 Baseline



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**Participant P1**  
**Phase 1 – One-symbol Requests**



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**Participant P1**  
**Phase 2 – Distance and Persistence**



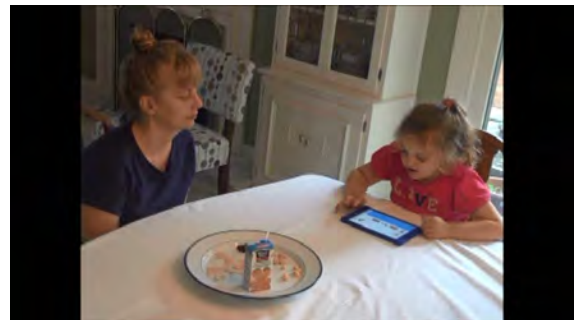
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**Participant P1**  
**Phase 3 – Symbol Discrimination**



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**Participant P1**  
**Phase 4 – Sentence Structure**



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**Participant P1**  
**Phase 5 – “What Do You Want?”**



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**Participant P1**  
**Phase: iPad Fadeout**



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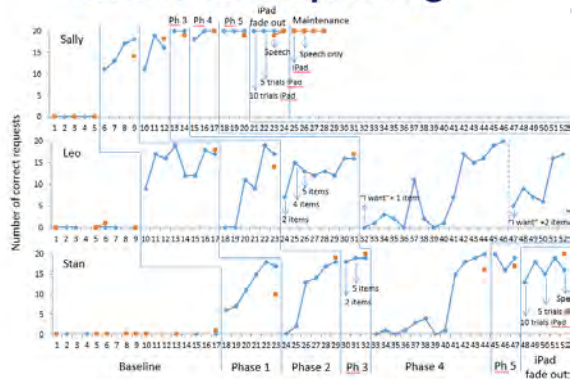


## Participant P1 Maintenance and Generalization



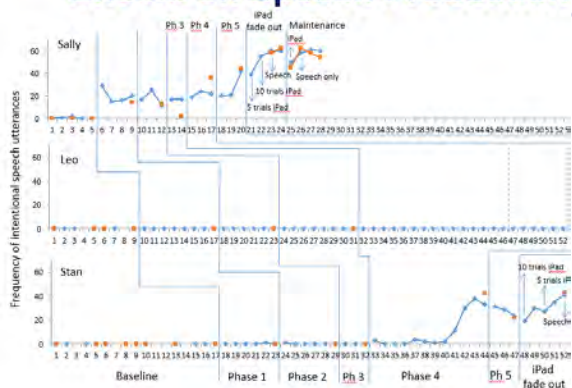
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## Effects on Requesting



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## Effects on Speech Production



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## Conclusions

- Findings provide support that AAC can have facilitative effect on natural speech development
  - There may be a particular role for shaping echolalic utterances
  - Refute myth that AAC prevents speech
- Confirm augmented input may enhance expressive and receptive communication development
- Confirm PECS principles (behavioral) hold true regardless of modality

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## Conclusions (Cont.)

- All participants mastered iPad intervention, but varied in ability to complete later protocol phases; effects are replicable across settings
- Gains in speech production most notable for echolalic child ⇒ able to request in spoken sentences after fading out iPad
  - Other participants varied in effects on natural speech production
- Pre-treatment speech skills and degree of cognitive impairment likely moderator variables

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## Tips and Hints

- Emphasize to caretakers: AAC can have facilitative effect on natural speech development!
  - Provide research evidence (Schlosser & Wendt, 2008)
- Include parents for maximizing benefits of AAC intervention
  - Develop competence for parent-training/coaching
- Behavioral, structured approach can be a starting point
- Move on to augmented input and language modeling when functional communication is established

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Evidence-based AAC Strategies

## FUNCTIONAL COMMUNICATION IN THE CLASSROOM

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## Classroom Based AAC Use: Vocabulary Selection

**Challenges:**

1. Selecting vocabulary that is meaningful across environments
2. Adapting content/instruction to meet student's receptive language ability
3. Adapting assessments to meet student's expressive language ability
4. Generalizing taught vocabulary across locations and communication partners

**Supports:**

1. Use of Core words can support selection of meaningful vocabulary
2. Consider length of child's expressive utterance, when determining instructional level. For example, if the student communicates in 2-3 word utterances, keep instructional phrases to 3-4 words in length.
3. Consider mode of communication when asking a question. How do you expect the student to answer you? Pre-Plan! Is the vocabulary needed pre-programmed in the device.
4. Create an AT Implementation Plan to support student generalization.

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## Classroom Based AAC Use: Vocabulary Selection

- Vocabulary Selection Questionnaire -

- Activity-First Approach -

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## Examples of Classroom Based AAC Use – Routine-based

- Play Time/Snack Time
- Choice Making
- High-frequency Requesting
- Yes/No
- More/All Done
- Classroom Jobs
- Delivery
- Attendance
- Lunch Choice

- Circle Time
- Greeting
- Song
- Calendar/Weather
- Teacher-Directed Instruction/Routine Questions
- Page number?
- Who's turn?
- What's next?
- Take a Poll

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### Choosing CORE Vocabulary: "Activity-First" Approach

**First 30 Core Words:**  
Again, All Done, Away, Big, Do, Down, Get, Go, Help, Here, I, In, It, Like, Little, Mine, More, My, Off, On, Out, Put, Some, Stop, That, There, Up, Want, What, You

"Language Functions & Early Generative Language Production" Van Tatenhove (2005)

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Evidence-based AAC Strategies

## EARLY LANGUAGE LEARNING

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Evidence-based AAC Strategies

## EMERGING LANGUAGE AND GENERATIVE LANGUAGE TRAINING

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### Early Language Intervention

- Using AAC apps and additional low technology AAC strategies in intervention
  - Requesting
  - Commenting and joint attention
  - Greeting
  - Giving and following directions/ making sentences

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### Intervention Principles

- Using AAC to supplement speech and language intervention for individuals with Autism Spectrum Disorders (ASD)
- Using AAC within a social context
- Individual and group settings
- Activity-Specific and Non-Activity Specific Pages

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### Intervention Targets

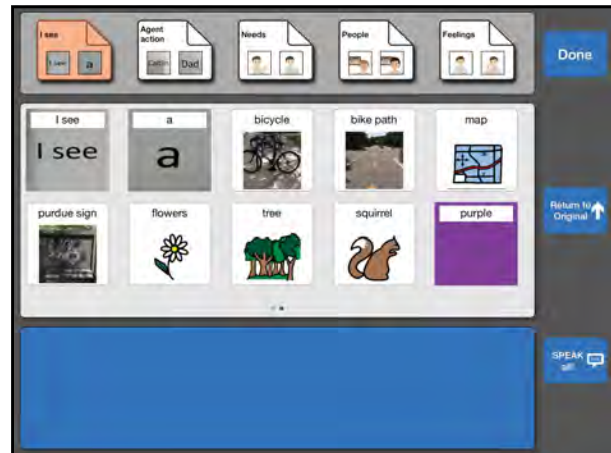
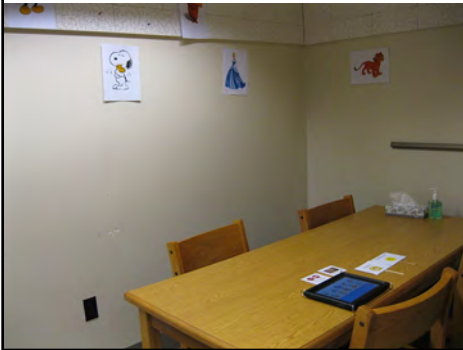
- Using SPEAKall! and additional AAC strategies in intervention
  - Commenting
  - Pairing 2 and 3 words
  - Giving and following directions/ sentence formulation
  - Socially providing information (“go,” “stop,” “again”)
  - Turn-taking and joint attention

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### Commenting: “I see – You see”



## Commenting: "I see – You see"



## Music Activity

- Instruments are on the table.
- Each person in the group takes a turn with the iPad.
- Follow the directions.

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## Pairing Words: Agent – Action – Object



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## Shared Storybook Reading

- Children who use graphic symbols to communicate can struggle with creating multi-word messages (Tönsing, Dada, & Alant, 2014).
- Shared story reading fosters a natural situation where pictures, symbols and words can be combined.
- Children with autism who use AAC need the same type of interactions with books as their verbal peers (Berkowitz, 2015).

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## Shared Storybook Reading How Does It Help?

- Develops a shared topic
- Language skills targeted in a repetitive and structured way.
- Carrier phrases ("I see \_\_\_\_") target creating word combinations in a more concrete format yet only requires the child to change one word in the phrase per page.
- Use of a limited amount of words on the AAC page decreases the demand of word retrieval.
- Teaches emergent literacy skills.
- Natural setting for incorporating visuals (already requires picture and symbol attention).

(Berkowitz, 2015)

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### "Pete the Cat" Page

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### "Pete the Cat" Sentence Strip

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### Shared Book Reading Activity Specific Page

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### "Go Away Big Green Monster" Page

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### "Go Away Big Green Monster" Sentence Strip

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### Shared Story Book Reading Activity Specific Page

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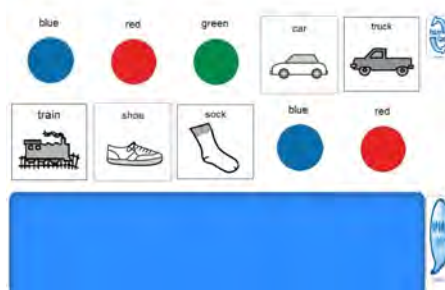


## Shared Story Book Reading Activity Specific Page



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## Word Combinations: Attribute-Object



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## Generative Language Through Matrix Training in Autism

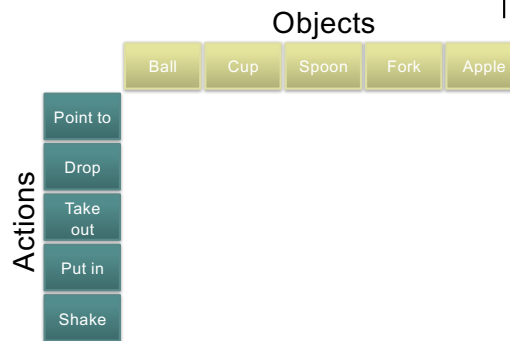
What is matrix training?

- Language intervention
  - Systematically build up vocabulary and teach longer word combinations
- Generative approach to instruction
  - Words are arranged in matrix format, some multiword phrases are taught and others develop without direct instruction
- Linguistic elements (e.g., nouns, verbs, etc.) are presented in systematic combination matrices.
  - Induce generalized rule-like behavior

(Nigam, Schlosser, & Lloyd, 2006)

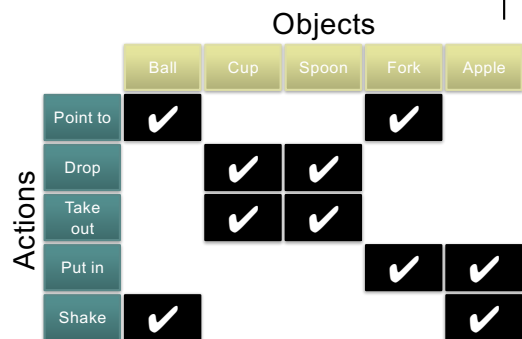
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## Matrix Training Illustration



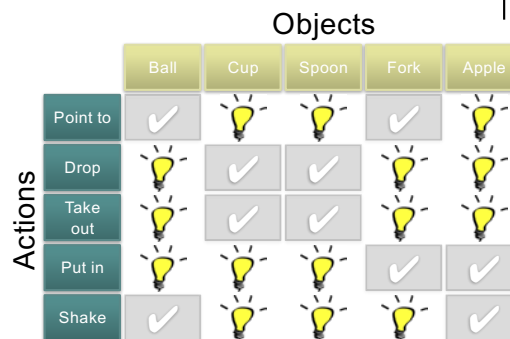
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## Matrix Training Illustration



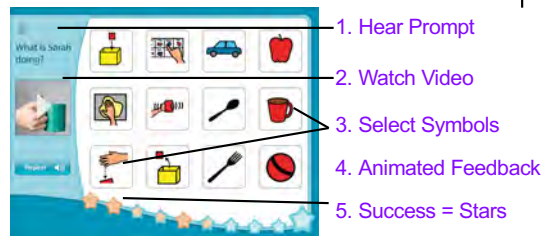
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## Matrix Training: Generalization



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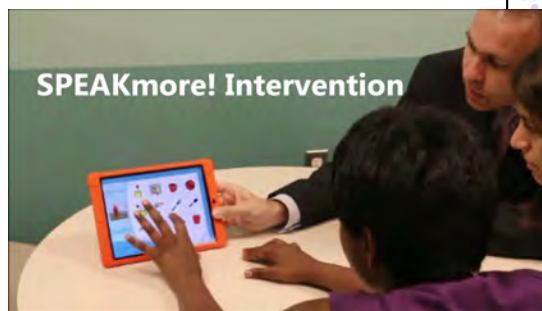
## AAC Application for Matrix Training: SPEAKmore!



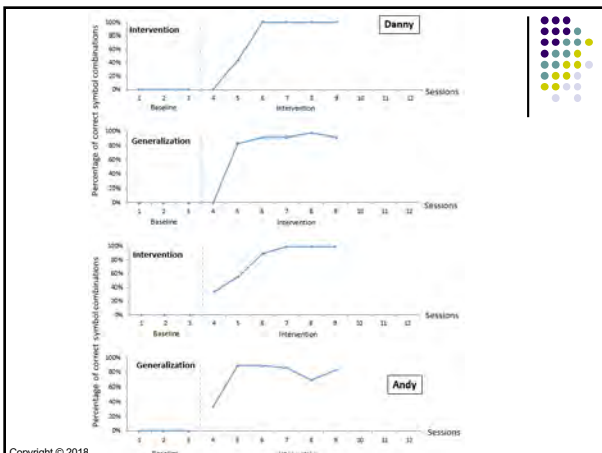
Engaging ♦ Reinforcing ♦ Motivating

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## Matrix Training in Practice



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## Tips and Hints

- Technology plus instruction/intervention approach lead to success
- Chose an instructional model that matches the learning characteristics of your client
- Build the bridge to social elements and contexts
- Motivational element needs to be there
  - Fun and engaging
  - Be creative!

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Evidence-based AAC Strategies

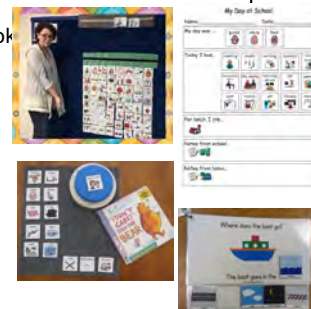
## AIDED LANGUAGE IN THE CLASSROOM

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## Teacher Use of AAC during Direct Instruction

What does Aided Language Instruction look like in the classroom?

- BIG Core Board in Classroom
- Low-tech Adapted Books
- Adapted Worksheets
- Choice Boards
- Adapted Games
- Visual Schedules



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## Teacher Use of AAC during Direct Instruction

- Literacy Example:



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## Teacher Use of AAC during Direct Instruction

- Activity Example:



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Evidence-based AAC Strategies

## EARLY LANGUAGE: VOCABULARY ISSUES

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## Vocabulary Selection

- Needs to be matched to user needs
- Generally includes both core and fringe
- Should be continually re-assessed
- Should support language growth across domains

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## Bilingual Families: Another Vocabulary Consideration

- Consider language used by the parent, the language development of the child and the language provided on the AAC device.
- For SLPs a key issue will be how to support language development in the second language (Kelley & Kohnert, 2012).

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## Activity: Let's Try It!

- (1) Concept:**
  - With a partner you will design a fringe vocab board for completing a worksheet (provided). You will then implement your lesson through a role-play activity.
- (2) Materials:**
  - Core Board with blank row for Fringe Vocabulary
  - Sequencing Worksheet
- (3) Instructions:**
  - Partner up!
  - Complete Questionnaire
  - Fill out blank Fringe Board
  - Role-play lesson: "teacher" to support "student" in completing assigned worksheet.

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## Core Board with Blank Fringe



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## Modified Vocabulary Selection Questionnaire

As you work to decide which fringe words to choose consider the following:

- People?
- Places?
- Activity?
- Items?
- Animals?
- Feelings?
- Interjections?
- Actions?
- Descriptors?
- Sequence words?
- Task related words?

*Lastly, prioritize! What vocabulary is most functional to task? What is target vocabulary for this lesson?*

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## Sequencing Worksheet



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Evidence-based AAC Strategies

## OTHER ISSUES IN LANGUAGE LEARNING: MOTOR PLANNING

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## Language Acquisition Through Motor Planning (LAMP)

- Therapeutic approach that teaches consistent motor plans to locate vocabulary (Potts & Satterfield, 2013).
- Emphasis on motor planning may reduce the cognitive demands of choosing from a symbol set and may result in more automatic and faster communication (Autism Spectrum Australia [Aspect], 2013).  
Retrieved from:  
[https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589942773&section=Key\\_Issues](https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589942773&section=Key_Issues)
- Focus is on acquisition of motor plans, not directly on language learning (symbol retrieval vs. symbolic comprehension).

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## Evidence to Support Motor Planning

- Very limited, only 6 studies total, mostly pre-experimental
  - 2 unpublished
  - 3 open access or newsletters
  - Only one peer-reviewed study with typically developing participants (Dukhovny & Gahl, 2014)
- Dukhovny and Gahl (2014) found marginally better outcomes using motor planning
- For beginning learners may prevent “processing of the language”
- More research urgently needed!

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Evidence-based AAC Strategies  
**SOCIAL INTERACTION AND  
SOCIAL LANGUAGE**

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Evidence-based AAC Strategies  
**SOCIAL SHARING AND  
LANGUAGE FOR  
ADOLESCENTS**

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**Case Study:  
Social Communication**

- Communication targets:
  - Pronouns I, you, we
  - Following directions
  - Spontaneous initiation
  - Directing language to others
  - Joint engagement
- Context: "Science" activities
  - Activities themselves are motivating
  - Completion is motivating
  - Both partners are involved with the project

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**Participant D**

- Male, 13 yrs. old
- Severe-moderate autism (ADOS)
- Highly echolalic
- Intentional speech, but sparse
- Previous AAC training on requesting

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Data Collection Form - Language Enrichment During "Science Experiments"

Observer \_\_\_\_\_ Date \_\_\_\_\_

Definition: Record a correct response when the participant verbally describes his/her activities without being prompted. Correct responses include full sentences; partial sentences (e.g., "drop blue" instead of "I drop blue") should be marked as incorrect and the partial utterances are noted under comments. Correct responses include those composed on the iPad in combination with verbal speech, or those through verbal speech only without iPad activation.

Recording Sheet

Activity: Elephant Toothpaste					
#	Target Sentence	Spontaneously initiates on iPad	Verbalizations	Directs himself to partner	Comments and novel utterances
1	We pour hydrogen peroxide				
2	I drop colors				
3	You hold funnel				
4	I add soap				
5	You put in yeast				
6	We make foam				
Activity: Magic Milk					
1	You open milk				
2	I fill plate				
3	We put in colors				
4	You give Q-tip				
5	I touch soap				
6	We make swirls				

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**Elephant Toothpaste Directions**

Elephant Toothpaste

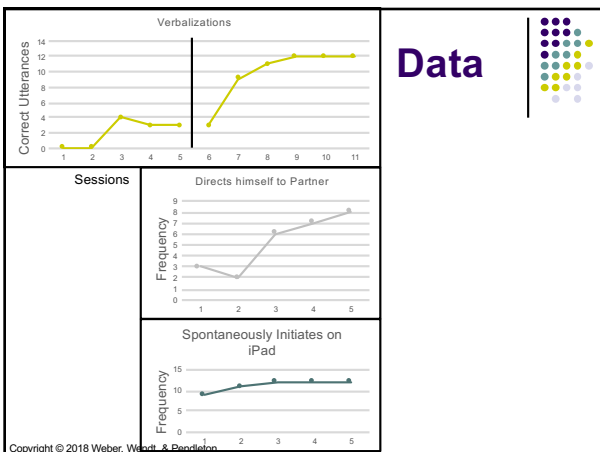
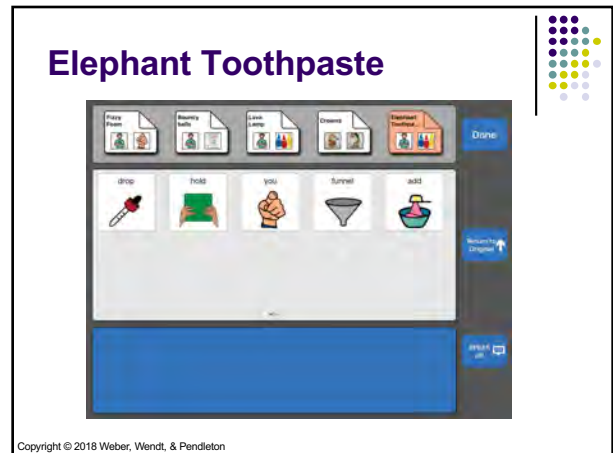


Materials:

1. Plastic pop bottle
2. Hydrogen peroxide
3. Dish soap
4. Food coloring
5. yeast mix
6. Funnel

Step One: We pour hydrogen peroxide.

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- ### Future Directions
- Elements that could be changed:
    - Turn-taking with the iPad itself
    - Attention to novel message opportunities
    - Add the articles
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Evidence-based AAC Strategies

## PRAGMATIC LANGUAGE IN THE CLASSROOM

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## Supporting Pragmatic Language in the Classroom

### Considerations for Vocabulary Selection:

- Student Age and Gender
- Location and Age of Communication Partner
  - Peers vs. Adult
  - Home vs. School
- Include exclamations
  - Yay!
  - Oh No!
  - Wow!
- Edit often!
  - Include inside jokes and changing slang
- Don't delete!
  - Over-use of "funny" words is often developmentally appropriate
  - Teach when/where to utilize vocabulary

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## Supporting Pragmatic Language in the Classroom

- Routine-based Play
  - Bubbles: Pop!
  - Sports: Go! Go!
  - Lunch: Yum!
  - Doll: Shhh!
- Joke Time!
  - TM- Student Video Example



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## Supporting Pragmatic Language in the Classroom

- Planned Share Time
- Turn & Talk



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## Key Elements To These Interventions

- It takes place within a social context
- Language is supported with visuals (both low tech and high tech)
- The activities are repeated
- The activities are motivating
- Social communication is supported through prompts such as waiting and positioning
- Turn-taking

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## Conclusions

- Make sure to target language in a social context
- Incorporate AAC across contexts to maximize benefits
- Intentionally include and empower communication partners
- Motivation is key, intervention needs to be engaging
  - Instruction plus technology
- Support multi-modal communication

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## Questions ???



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## Contacts & Resources

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