Experimental Evaluation of a Parent-Implemented AAC Intervention Protocol for Children With Severe Autism

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Disclosure Statement

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Autism Spectrum Disorder and AAC

- Autism includes a "delay in, or lack of the development of spoken language" (American Psychiatric Association, 2000)
- 14-25% of children diagnosed with an autism spectrum disorder (ASD) present with little or no functional speech (Lord & Bailey, 2002; Lord, Risi, & Pickles, 2004)
  - Autistic disorder only: 50% of children are functionally non-verbal
  - No sufficient natural speech or writing to meet their daily communication needs (Light, Roberts, DiMarco, & Greiner, 1998) ⇨ Candidates for intervention in augmentative and alternative communication

Picture Exchange Communication System (PECS) versus Speech-Generating Devices (SGDs)

- PECS teaches to make requests by handing/exchanging symbols for desired items
  - Often the initial choice for starting AAC intervention
- SGDs produce speech output when activating symbols
  - Composing more detailed messages
  - Speech output may facilitate acquisition and maintenance of communication skills
  - Producing speech can be perceived as more natural

iPads as AAC Devices

- iPads and other tablet devices are
  - Lightweight and portable
  - Cost-efficient compared to dedicated SGDs
  - Easy to program
  - Highly motivating to use
  - Socially appealing (peer acceptance) (Flores, et al., 2011)

iPad Impact on AAC Services

Pre-2010

- $2,000-$10,00
  high price tag
- Prescriptive
  therapist led
- Isolation
  learner alone, 1-on-1 therapy

Post-2010

$0-$200
low app price tags

Do It Yourself
parental experimentation!

Shared Community
between learner, parent, clinicians

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)

Research Aims

- Evaluate effects of modified, picture-exchange protocol when parents are involved in implementing intervention
- Monitor treatment integrity when parents serve as interventionists
- Can participants generalize the learned skills to untrained items?
  - Generalization major difficulty in ASD
  - From requesting food items to requesting toys

Experimental Design

- Multiple Probe Design across participants (Horner & Baer, 1978)
  - Intervention phase split into sub-phases derived from modified picture-exchange protocol
  - Generalization probes taken throughout baselines and all subsequent intervention phases
  - Non-concurrent for participant 1 (Sally)
- Dependent measures:
  - Requesting skills: number of correct requests during 20-trials session
  - Emerging speech: intentional word vocalizations or word approx. or full word utterances
    - Full sentences ("I want cookie") counted as one utterance

Modified PECS Protocol (after Bondy & Frost,1994)

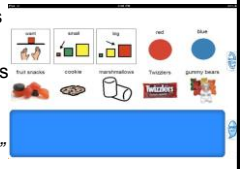
(Preference Assessment)

- 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)

Materials: iPad and *SPEAK all!*

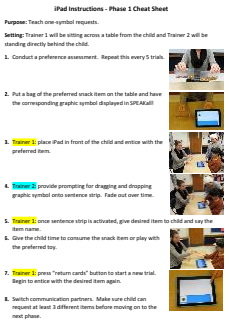
- "Lower level app": Helps teach constructing simple sentences
- Sensory-friendly, reducing cognitive load
- Seamlessly connects with PECS or ProxTalker intervention
- Selection Area on top replaces PECS book
- "Sentence Strip" at bottom speaks selected graphic symbols
- "Shuffle button" randomly regroups graphic symbols
- Developed by Purdue students, free on iTunes: search *"SPEAKall"*
- iOS 7 version coming Nov. 19!



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

Parent Training


iPad Instructions - Phase 1 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 directly behind the child.

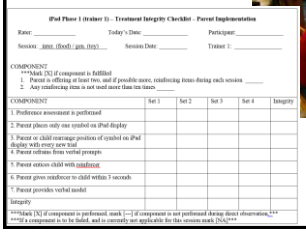
1. Conduct a preference assessment. Repeat this every 5 trials.
2. Put a bag of the preferred snack item on the table and have the corresponding graphic symbol displayed in SPEAKall!
3. Trainer 1: place iPad in front of the child and entice with the preferred item.
4. Trainer 2: provide prompting for 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: press "return cards" button to start a new trial. Begin to entice 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-ywgu0ESwLawPDvhGUOg

Parent Training (cont.)

- Modeling of intervention steps
- Role-playing with clinician


iPad Phase 1 (trainer 1) – Treatment Integrity Checklist – Parent Implementation

Rater: _____ Today's Date: _____ Participant: _____

Session: _____ (food) / _____ (toy) Session Date: _____ Trainer 1: _____

COMPONENT

***Mark [X] if component is fulfilled

1. Parent is offering at least two, and if possible more, reinforcing items during each session _____
2. Any reinforcing item is not used more than ten 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 or child rearrange position of symbol on iPad display with every new trial					
4. Parent refrains from verbal prompts					
5. Parent entices child with reinforcer					
6. Parent gives reinforcer to child within 5 seconds					
7. Parent provides verbal model					
Integrity					

Mark [X] if component is performed, mark [—] if component is not performed during direct observation.

If a component is to be faded, and is currently not applicable for this session mark [NA]

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

Participant Characteristics

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

*based on ADOS and CARS scores

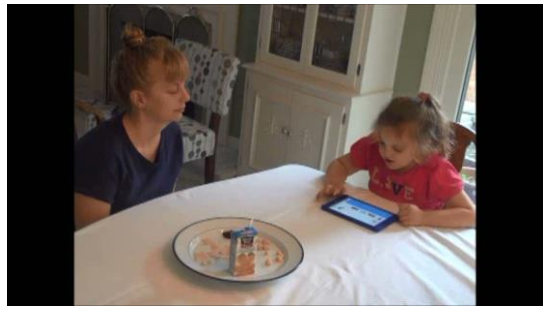
Participant Sally
Baseline

Participant Sally
Phase 1 – One-symbol Requests

Participant Sally
Phase 2 – Distance and Persistence

Participant Sally
Phase 3 – Symbol Discrimination

Participant Sally
Phase 4 – Sentence Structure

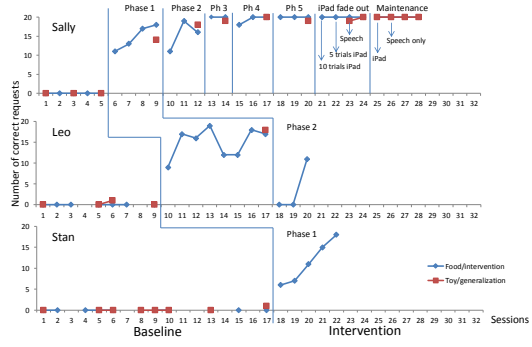


Participant Sally
Phase 5 – "What Do You Want?"

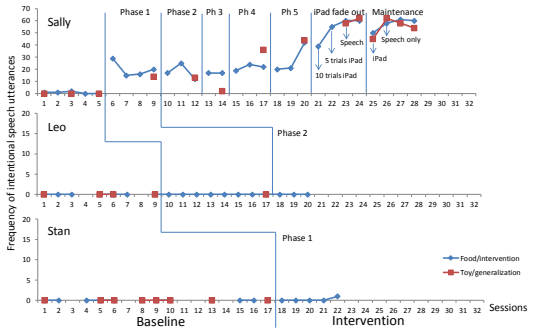
Participant Sally
Phase: iPad Fadeout

Participant Sally
Maintenance and Generalization

Effects on Requesting



Effects on Speech Production



Reliability

Participant Sally

- Second, independent observer scoring baseline and training sessions on all dependent measures for 40% of sessions, yielding inter-rater agreement scores:
  - Overall mean=99% (range 93-100%)
- Treatment integrity (TI): correct implementation of protocol steps by parents
  - Overall mean=97.75 (range from 87%-100%)
- Currently replication with 2 more families

Current Progress: Participant Leo

Current Progress: Participant Stan

Families That Dropped-out

Discussion

- 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 (c.f., Romski & Sevcik, 1993, 1996)
- Suggest PECS principles (behavioral) hold true regardless of modality

Discussion (cont.)

- Pre-treatment speech skills and degree of cognitive impairment likely moderator variables

Limitations of Study:

- Not cost-efficient to send team to parent-home
- Limited geographical context of selecting families

Discussion (cont.)

Potential limitations to parent-implemented intervention:

- Burden on family schedule
- Ability to handle problem behavior
- Finding trained personnel to work with

Discussion (cont.)

- Results underscore the potential of including parents for maximizing benefits of AAC intervention in autism
- Clinicians should recognize the value of joint parent-professional partnerships, and develop expertise for parent training

Parent Perspective

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Further Information on SPEAK all! / SPEAK now! Apps

- Download on iTunes (free app)
  Appstore>Education>Purdue>SPEAKall!
  http://itunes.apple.com/gb/app/speakall!/id478863940?mt=8l
- Instructional Videos:
  http://youtu.be/h2hWMQc8IUg
- Support Site:
  http://epics.ecn.purdue.edu/ipaac/#speakall

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Questions ???

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