


Effect of an AAC App on Communication and Play for Children with Autism and Peers



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- ### Agenda
- Background and research questions
 - Methods
 - Results
 - Discussion and clinical implications
 - Limitations and future directions

- ### Background
- During childhood, play with peers provides an important opportunity to develop **critical social and communication skills** (Charlton, Lang, & Huppo, 2018; Schuler & Wolfberg, 2000; Coplan & Arbeau, 2009; McQuinn, O'Connell, Fagan, Hodder, Mitchell, & Thomas, 2010; Shaker, 2009; Freeman, Gohari & Kasari, 2015; Chang, Shi, & Kasari, 2018)
 - Opportunities to develop social skills such as sharing, turn-taking, cooperation, helping, and conflict resolution
 - Context for friendship formation
 - Context for language learning
 - To participate in play with peers, children must demonstrate a minimal level of competence in both play and communication skills (Boudreau & Harvey, 2013)
 - Children with ASD evidence significant deficits in both play skills and communication during play.

- ### Play Difficulties in ASD
- **Predominance of sensory-oriented play** (Wilson et al., 2017; Charlop et al., 2018; Wolfberg et al., 2015)
 - **Functional play is often less frequent, less diverse, and less complex than the functional play of their same-aged peers** (Wilson et al., 2017; Jung & Sainato, 2013)
 - **Less symbolic play overall** (Wilson et al., 2017; Kasari et al., 2013; Wolfberg et al., 2015; Williams, Reddy, & Costall, 2001)

- ### Communication Difficulties in ASD
- **Less likely than peers to initiate and sustain social interactions** (Charlop et al., 2018)
 - **Many are unable to rely on speech** (e.g., Schlosser & Koul, 2015)
 - **Frequently struggle to apply spoken language skills during peer interactions** (Tager-Flusberg & Kasari, 2013)
 - **May rely on scripted utterances, resulting in repetitive interactions** (Tager-Flusberg & Kasari, 2013; Charlop et al., 2018)

Play Interventions in ASD

- Difficulty with these skills places children at risk for exclusion (Boudreau & Harvey, 2013; Schuler & Wolfberg, 2000)
- This can result in loss of learning opportunities
- There is a need for interventions that support both play and communication simultaneously

Video Visual Scene Displays (Video VSDs)

- Video VSDs (Light, McNaughton, & Jacobs, 2014) offer an approach that may support both play and communication simultaneously
- 2 components
 - Video (of an event or activity)
 - Visual Scene Display (VSD) for expressive communication

Visual Scene Displays (VSDs)

- AAC platform appropriate for young children
 - Photo captures context
 - “Hotspots” provide voice output
 - Draws on familiar experiences
 - VSDs intervention has led to an increase in frequency of communication during peer interactions (e.g., Therrien & Light, 2018)
- Light & McNaughton (2012)

Video VSDs

- Video captures dynamic context of everyday interactions
- Serves as a video model for target actions
- Video modeling interventions have led to improvements in functional and pretend play skills for children with ASD (Fragale, 2014)
- Embedded VSDs support communication

Example: Pets toy

Light, McNaughton, & Jakobs (2014)

Video VSDs for Play and Communication

- Video VSDs have effectively supported both task completion and communication for older individuals with ASD (O'Neill, Light, & McNaughton, 2017; Babb, Gormley, McNaughton, & Light, 2019; Babb, Wydner, McNaughton, Light, & Pierce, 2018)
- They have not been studied with younger children within a play context

Research Questions

1. What is the effect of a treatment package consisting of video VSD technology and instruction on the number of turns in which children with ASD both communicate and engage in functional or symbolic play during play interactions with peers?
2. Do the children with ASD generalize use of the video VSD technology to improve performance with a new set of toys and maintain their performance over time?
3. How do stakeholders (teachers) perceive the video VSD technology and intervention?

Design

- Single case multiple probe design (Gast & Ledford, 2014)
- 6 dyads (12 participants)

Participants (all names are pseudonyms)

Name	Age and gender	CARS/severity	PPVT-4 (Form A) ^a	MCDI words and sentences ^b	Peer, age, and gender
Ava	6;0/F	31/mild-mod	81/10.0	680	Audrey/6;0/F
Brian	6;6/M	48.5/severe	68/2.0	233	Brianna/7;0/F
Caleb	9;2/M	39/severe	20/<0.1	61	Connor/7;0/M
Daniel	6;8/M	39.5/severe	79/8.0	304	Daisy/7;0/F
Emma	6;4/F	36.5/mild-mod	87/19.0	680	Evie/5;5/F
Felicity	6;1/F	45.5/severe	65/1.0	469	Farah/6;1/F

Mean age: 6;6 (range: 5;5 – 9;2)
 2 participants had mild-moderate ASD
 4 Participants had severe ASD
 All participants with ASD had receptive vocabulary scores below the 20th percentile
 4 participants with ASD produced fewer words than expected based on age
 2 participants with ASD produced at least 680 words

Setting and Materials

- Setting
 - 2 elementary schools
 - Sessions conducted in quiet, private spaces separate from the classroom
- Materials
 - Toys
 - Printed photographs for choice-making (baseline only)
 - Video VSDs

Toys

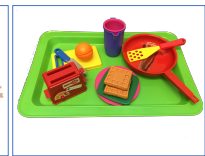
- Selected by the researcher and matched to participant interests
- 3 toy sets used



Car Garage



Pets



Food

Video VSDs

- 5 Video VSDs per toy set
 - Each video demonstrated an action with a role for both participants
 - Each embedded VSD contained 2 related hotspots

Printed Photographs

- 5 photographs per toy set
- Each showed a set of props
- Identical to the first frame of corresponding video VSD

Procedures: Probes

- Baseline, intervention, and maintenance
 - Participants took turns selecting photographs (baseline) or video VSDs (intervention and maintenance) – 10 turns per participant
 - Chosen toys were provided by the researcher
 - Children had 10 seconds to play
 - Researcher did not provide prompting
- Generalization Probes: Identical to baseline or intervention probes but with an untrained toy

Procedures: Instruction

- 2 individual sessions to introduce the videos and hotspots
- Dyad training provided throughout intervention phase
 - Turn-taking structure identical to probes
 - Researcher used least-to-most prompting as needed to help participants
 - Complete the play action shown in the video
 - Use at least one hotspot
- Treatment integrity (based on randomly selected 25% of sessions for each dyad): 99.4% across the study

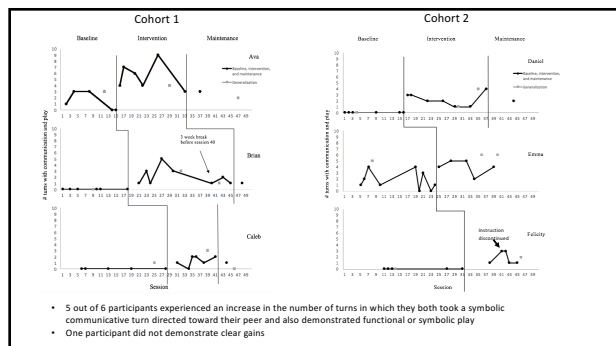
Data Collection and Analysis

- Coding completed by two undergraduate students blind to goals of study and condition
- IOA: A third undergraduate student coded at least 20% of randomly selected probes in each phase for each dyad
 - Mean IOA for the DV was 86%
- Visual analysis used to examine data with respect to level, trend, variability
- Gain scores and Tau-U used to calculate effect size

Social Validity

- Teachers of participants with ASD completed the Treatment Acceptability Rating Form-Revised (TARF-R; Reimers, Wacker, Cooper, & de Raad, 1992)
- 12 items in a Likert-type format
- Items addressed the acceptability, feasibility, effectiveness, and importance of the intervention

Results: Play and Communication Skills

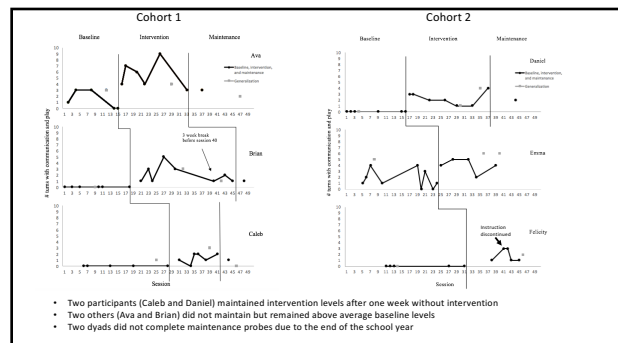
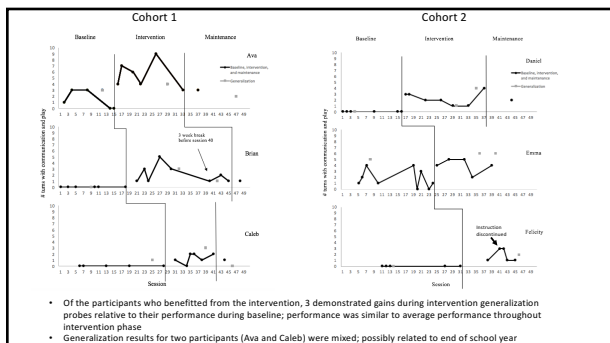


Results: Play and Communication Skills

Participant	Tau-U	Gain Score
Ava	.9 (very large effect size)	+4.1 turns
Brian	1.0 (very large effect size)	+2.1 turns
Caleb	.8 (large effect size)	+1.3 turns
Daniel	1.0 (very large effect size)	+2.3 turns
Emma	.8 (large effect size)	+2.2 turns
Felicity	1.0 (very large effect size)	+1.8 turns

All 5 participants who made gains demonstrated large or very large effect sizes

Results: Generalization and Maintenance



Results: Social Validity

Results: Social Validity

- 3 teachers, representing 4 participants with ASD, completed the TARF-R
 - 2 teachers reported favorable views overall
 - 1 teacher reported largely favorable views
 - Concerns regarding length of the intervention

Discussion and Clinical Implications

- The intervention may be effective in increasing the number of turns in which children with ASD demonstrate both peer-directed communication and functional or symbolic play behaviors while interacting with peers
 - Results were positive for 5 participants
 - No participants demonstrated a decrease in performance
- Efficiency of the intervention
 - 5 participants demonstrated immediate gains (after ~10-15 min of instruction)

Discussion and Clinical Implications

- No participants reached mastery
 - Challenge of integrating multiple difficult skills within a social context
 - Possible boredom with toys
 - Perhaps mastery is not the goal
- Relatively strong generalization data suggest that new video VSDs could be introduced (to increase variety and provide choice) without additional instruction.

Limitations

- IV was a treatment package
- DV combined play and communication within a single measure
 - Individual contributions of play and communication to performance are unknown
- Peer performance not considered
- Input from direct consumers (children) not obtained

Future Directions

- Post-hoc analyses
 - Diversity of utterances and play behaviors
 - Peer communication and play
- Increase choice and variety of toys
- Decrease amount of intervention

Thank you!

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