

# Increasing Vocal Variability in Children with ASD

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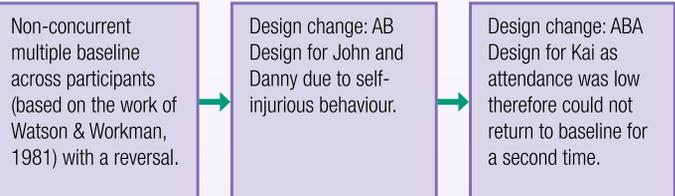
## Background

- Three children with autism spectrum disorder, attending an EIBI/ IBI intensive behaviour intervention program for autism participated in a study to increase vocal variability. All three children exhibited infrequent and/or highly repetitive speech sounds, limiting their ability to communicate effectively with the people around them.
- The following study was a replication of previous research conducted by Esch, Esch, and Love, 2009 which looked at increasing vocal variability in children with autism using lag schedules of reinforcement.
- Replication and extension of the limited research to date is imperative in order to develop an evidence-base for increasing vocalizations in children with ASD which can then lead to an increase in vocal verbal behaviour skills.
- The results of the current study, however, failed to demonstrate a systematic increase in vocal variability over the 3 participants. However, 1 participant did demonstrate a slight increase in vocal variability while the other 2 participants were terminated from the study due to the emergence of SIB during the treatment sessions.

## Participants

- Two boys with a diagnosis of ASD – Kai (6;1) and Danny (5;3) and one with a dual diagnosis of autism and Fragile X – John (7;2)
- Each child attended a government funded intensive behaviour intervention (IBI) program 25-30 hours of 1:1 direct therapy a week.
- Inclusion Criteria:
  - limited to no functional speech sounds
  - limited to no echoic behaviour
  - repetitive non-speech sounds / non-contextual vocal stereotypy (NCVS).

## Design



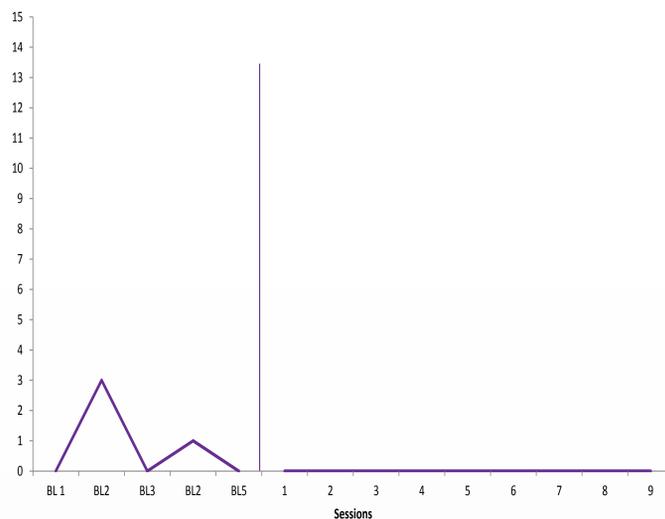
## Method

- Sessions were videotaped and coded in the moment by the experimenter as well as transcribed and coded by a Speech-Language Pathologist grad student during video-tape play back.
- The dependent variable was vocal variability – defined as a different vocalization than the one presented preceding it. For example, if the child was given the target sound “ba” and responded by saying “ooh”, the child’s response would be coded as variable.
- Secondary data was also collected on echoic responses (e.g., if the child repeated the exact same sound as the experimenter it was coded as an echoic).
- Two independent observers collected IOA data for at least 50% of the sessions.
  - John and Danny – IOA - 100%
  - Kai – IOA - 96%

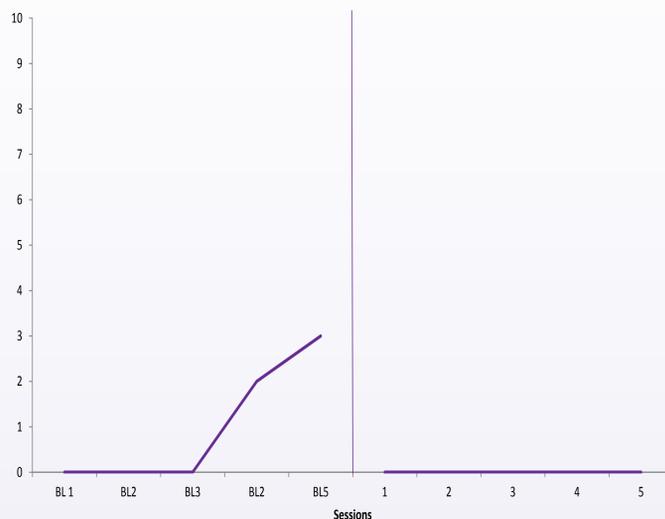
PHASE 1	PHASE 2	PHASE 3
<ul style="list-style-type: none"> <li>• each participant was observed for thirty minutes</li> <li>• recorded any vocalizations heard using the 44 phonemes checklist</li> <li>• SLP grad student under supervision conducted The Kaufman Speech Praxis Test for Children and The Early Echoic Skills Assessment.</li> <li>• Targets for treatment were selected</li> </ul>	<ul style="list-style-type: none"> <li>• Baseline</li> </ul>	<ul style="list-style-type: none"> <li>• Treatment</li> </ul>

## Figures

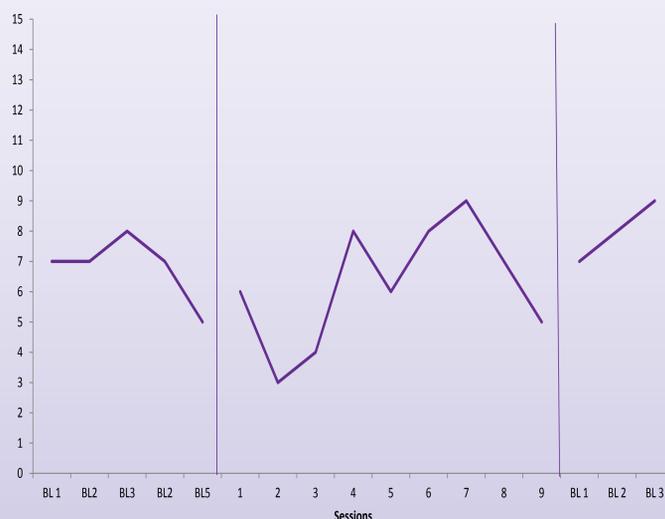
Danny's Results



John's Results



Kai's Results



## Discussion

- Increasing vocalizations and vocal variability for children with ASD continues to be a significant challenge
- The difference in the schedule of reinforcement and putative reinforcers in baseline to treatment may have contributed to the failure to acquire the new behaviours (i.e., during baseline they received social praise plus motor task after each trial but during treatment they only received a motor task after a non-response)
- Baseline characteristics (e.g., higher frequency of varied vocalizations for Kai) may indicate the participants that may be better suited to the use of lag schedules for further vocal behaviour development

Participant	Age	Hearing Acuity	Vocalizations (speech & non-speech) / Speech Sound Production	Receptive Vocabulary	Manding / Requesting Skills & Mode of Communication	Fine Motor Skills	Attending Skills / Joint Attention	Schedules of reinforcement
Danny	5;3	Hearing Assessment – parent reported that there were no concerns.	Non-contextual vocalizations only with little variance in the sounds produced (only a couple rudimentary vowel sounds). No echoic skills were demonstrated. Sounds did not accompany use of the AAC system (i.e.,	Followed instructions in routines only. Understood two simple motor instructions in discrimination. Could not demonstrate any discrimination of receptive nouns in 2D or 3D form.	Spontaneously asked for an average of four items when items are in view only. Phase IV of PECS. Mandated with simultaneous eye contact.	Ten actions involving arm and hand movements in imitation. No fine motor skills developed to the 1;6 to 2;0 year level.	Required a prompt to look to instructor for instruction.	Continuous schedule of reinforcement with tangibles (e.g., Fixed Ratio = 1 – FR1)
Kai	6;1	Hearing Assessment – parent reported that there were no concerns.	Non-contextual vocalizations comprised of a varied number of vowels and consonants produced. No echoic skills demonstrated. Demonstrated humming of highly familiar tunes (e.g., Happy Birthday song) and engaged	Followed instructions in routine only. Understood two simple motor instructions in discrimination. Could not demonstrate discrimination of any receptive nouns in 2D or 3D form.	Spontaneously asked for an average of four items a day when items were in view. Phase IV of PECS. Mandated with simultaneous eye contact.	Five actions involving arm and hand movements in imitation. Ten fine motor imitation skills. Functional fine motor skills developed to the 1;6 year to 3;0 year developmental level.	After scanning looked to instructor for instruction.	Continuous schedule of reinforcement for new tasks with tangibles (FR1) and variable schedule for mastered tasks (variable ratio = 3; VR3).
John	7;2	Hearing Assessment – parent reported that there were no concerns.	Non-contextual vocalizations comprised of only a couple rudimentary vowels produced. No echoic skills were demonstrated. Sounds did not accompany use of the AAC device (i.e., not paired with manding).	Followed instructions in routine and out of routines. Understood at least six simple motor instructions. Could receptively identify over fifty objects / pictures.	Spontaneously requested ten or more items a day when out of view. Used an augmentative communication device (Speech Generating Device) to request (mean length of utterance = 4). Mandated	Ten actions involving arm and hand movements in imitation. Ten fine motor imitation skills (involving the use of his fingers). Functional fine motor skills developed to the 2;0 to 2;6 year level.	After scanning looked to instructor for instruction.	Continuous schedule of reinforcement for new tasks with tangibles (FR1) and variable schedule for mastered tasks (variable ratio = 3; VR3).

## Acknowledgments

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