INVESTIGATING THE EFFECTS OF THE ECHOIC ON THE EMERGENCE OF NAMING IN CHILDREN WITH AUTISM

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This paper focuses on investigating the role of the echoic on the emergence of the six subtypes of naming as described by Hawkins, Chiesa and Gautreaux (2018). Experiment 1 looked at the effects of the use of a yoked learn unit of point to and echoic response topographies on the emergence of speaker unidirectional naming and the outcomes of this training on the emergence of all the six subtypes of naming. Three participants aged 4-5 years diagnosed with autism and a moderate learning disability took part in Experiment 1. Experiment 2 focused on implementing a yoked learn unit of match-to-sample and echoic response topographies on the emergence of joint incidental bidirectional naming in 2 different participants aged 7 years. A multiple baseline across participants design was implemented in both experiments to ascertain the effects of the echoic on the emergence of speaker unidirectional naming, joint bidirectional naming, listener incidental unidirectional naming, speaker incidental unidirectional naming and joint incidental bidirectional naming.

Results of both experiments demonstrated that a yoked learn unit of the echoic and either the point-to or the match-to-sample topographies resulted in the emergence of the corresponding subtype of naming.

Literature Review

- Naming theory **(Horne & Lowe, 1996)** provides an account of how new verbal behaviour occurs without direct teaching.
- Naming is the fusion of listener and speaker behaviour and **Greer and Ross (2008)** have suggested that once listener and speaker behaviour are integrated then an individual is truly verbal.
- **Miguel (2016)** introduced the concept of subtypes of naming, specifically Common Bidirectional Naming and Intraverbal Bidirectional Naming. Common Bidirectional Naming has more recently been described as Bidirectional Naming (BiN).
- **Hawkins, Chiesa and Gautreaux (2018)** proposed further classification and identified six subtypes of BiN (Table 1).
- **Horne and Lowe (1996)** suggested that in typically developing children BiN developed at about age 2 and develops through incidental language interactions between children and their caregivers.
- The use of the echoic to induce naming was researched by **Longano (2008)**. Results showed that by adding an echoic component to Multiple Exemplar instruction (MEI) training, BiN was induced in participants for whom MEI without the echoic component had previously been unsuccessful.
- **Horne and Lowe (1966)** suggested that echoic behaviour is the possible source of children's reinforcement of the establishment of BiN in typically developing children and is a crucial component for the development of emergent language.
- The current study investigated the effects of the use of a yoked learn unit of point to and echoic response topographies on the emergence of the BiN sub-type speaker unidirectional naming and the effects of this training on the emergence of all the six subtypes of BiN.

Method

Participants

- Five participants aged between 4 and 7 years. Participants 1-3 took part in Experiment 1 and Participants 4-5 took part in Experiment 2. All were diagnosed with autism and a moderate learning disability.

Setting

- An independent day school for children and young people aged 4-19 years diagnosed with autism and a learning disaility.

Materials

- Contrived 2D cartoon pictures with one syllable names were used throughout the experiment.
- A different set of stimuli were used for each step of the study.
- Example sets of stimuli are shown in Table 2.

Inter-observer agreement

- IOA was collected for 100% of the probe sessions with a mean of 100%.
- IOA was also collected for the 60% of the training sessions with a mean of 98% that ranged from 90% to 100%.

Table 1: Six suggested subtypes of BiN with corresponding descriptions (Hawkins et al., 2018)

Subtype of naming	Description
Listener Unidirectional Naming (LUN)	Speaker behaviour is taught and corresponding untaught listener behaviour emerges.
Speaker Unidirectional Naming (SUN)	Listener behaviour is taught and corresponding untaught speaker behaviour emerges.
Joint Bidirectional Naming (JBN)	Both Listener Unidirectional Naming and Speaker Unidirectional Naming
Listener Incidental Unidirectional Naming (LIUN)	Following an incidental experience providing the name of a novel item, but no direct teaching or direct reinforcement, the novel name can be selected from a choice of items without any further teaching; the novel name emerges as listener behaviour.
Speaker Incidental Unidirectional Naming (SIUN)	Following an incidental experience providing the name of a novel item, but no direct teaching or direct reinforcement, the tact for the novel name is produced without any further teaching; the novel name emerges as speaker behaviour.
Joint Incidental Bidirectional Naming (JIBN)	Both Listener Incidental Unidirectional Naming and Speaker Incidental Unidirectional Naming; the novel name emerges as listener behaviour and speaker behaviour.

Table 2: Examples of the sets of stimuli

Set 1 Monsters		Set 2 Fairies	
	Tess		Meg
	Matt		Liz
	Will		Hope

Experiment 1 Procedure:

Test for Listener Unidirectional Naming

- Speaker behaviour was initially taught as a pure tact using learn units (Greer, 2002; Greer & McDonough, 1999) for each stimulus. Criterion was set at 18/20 correct responses to learn units over 2 consecutive sessions.
- Participants were then tested for untaught listener behaviour which involved presenting the same 5 stimuli and the SD, "Point to (name of stimulus)."
- No reinforcement or corrections were provided. Twenty trials were conducted and criterion was set at 16/20.

Test for Speaker Unidirectional Naming

- Listener behaviour was taught initially (using a different set of stimuli to the previous test for naming) using learn units. Criterion was set at 18/20 correct responses to learn units over 2 consecutive sessions.
- Participants were then tested for untaught speaker behaviour (tacts).
- No reinforcement or corrections were provided. Twenty trials were conducted. Criterion was set at 16/20.
- If the participant met the mastery criteria for listener unidirectional naming and also speaker unidirectional naming then the mastery criteria for joint bidirectional naming was met. Participants 1-3 did not meet these mastery criteria.

Re-Test for Speaker Unidirectional Naming using a yoked learn unit of an echoic and the 'point to' response

- The point-to procedure with echoic consisted of delivering a point-to instruction as learn units (Sd: "point to___") and waiting 3 seconds for the participant to point to the stimulus and to emit the echoic of the name.
- Participants were then tested for untaught speaker behaviour (tacts) as above.

Re-probes

- The echoic procedure was repeated with new sets of contrived stimuli until the participant responded correctly to at least 80% of trials for speaker unidirectional naming.
- The whole procedure was re-probed with a novel set of stimuli.
- Finally, the incidental subtypes of BiN were re-probed with novel stimuli.

Experiment 2 Procedure:

Test for Listener Unidirectional Naming and Test for Speaker Unidirectional Naming

- As Experiment 1. Participants 4 and 5 met the mastery criteria for listener unidirectional and speaker unidirectional naming.

Test for Joint Incidental Bidirectional Naming

- A match-to-sample (MTS) procedure was conducted to provide participants with the opportunity to hear and see the novel stimuli without direct teaching. Criterion was set at 18/20 correct responses to learn units over 2 consecutive sessions.
- Participants were then tested for untaught listener and speaker behaviours.
- If the participant scored 16/20 correct responses for untaught listener behaviour then the criterion for listener incidental unidirectional naming was met.
- If the participant scored 16/20 correct responses for both untaught speaker behaviours (pure tact and impure tact) then the criteria for speaker incidental unidirectional naming were met.
- If the participant met the criteria for listener incidental unidirectional naming and also speaker incidental unidirectional naming then the criteria for joint incidental bidirectional naming were met

Re-Test for Joint Incidental Bidirectional Naming using a yoked learn unit of an echoic and the 'match-to-sample' procedure

- The match-to-sample procedure with echoic consisted of presenting the participant with the stimuli and the vocal Sd 'match (name) with (name)' and waiting 3 seconds for the participant to correctly match the stimuli and emit echoic of the name.
- Participants were then re-tested for the untaught listener and speaker behaviours.

Re-probes

- The echoic procedure was repeated with new sets of contrived stimuli until the participant responded correctly to at least 80% of trials for speaker unidirectional naming.
- Finally, the whole procedure was re-probed with a novel set of stimuli.

Results

Figure 1: Number of correct responses to probe trials for speaker unidirectional naming for Participants 1-3

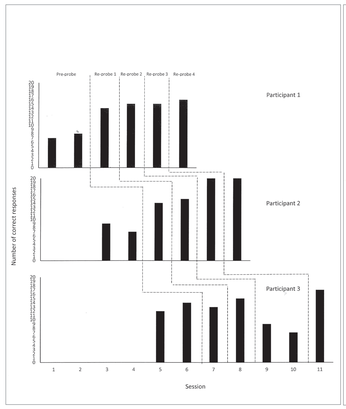


Figure 2: Number of correct responses to probe trials for listener incidental unidirectional naming and speaker incidental unidirectional naming for Participants 1-3

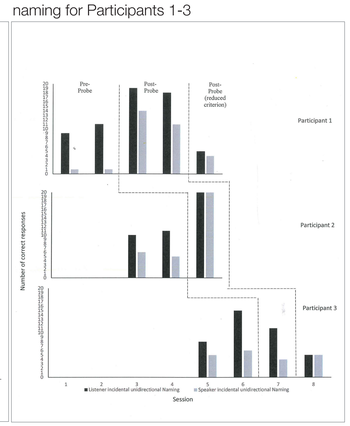
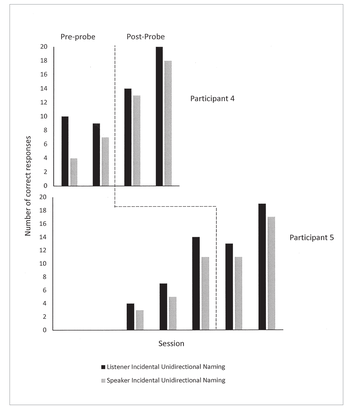


Figure 3: Number of correct responses to trials for listener incidental unidirectional naming and speaker incidental unidirectional name for Participants 4-5



Discussion

- The findings of the study support and expand the current literature on the importance of echoics for the emergence of BiN.
- The post intervention probes in both experiments showed that the training was effective in order to induce the next subtype of naming in all 5 participants.
- The findings of this study support Horne and Lowe's (1996) theory of the fundamental role of echoic behaviour in the emergence of BiN as well as Longano's (2008) research and proposal that the echoic behaviour can function to join listener and speaker repertoires in students that have conditioned reinforcement for looking to stimuli and listening to words and sounds.
- We do not suggest that MEI is not necessary for the acquisition of BiN, but rather, we suggest the importance of the use of yoked echoic learn unit for listener responses as tactic in order to induce BiN.
- An important educational outcome that can be derived from the findings of this study is to adapt student's curriculum and programmes in order to increase the programmes with yoked learn units of pointing-to and matching with echoics.
- Future research should focus on comparing MEI with echoics, echoics alone and MEI alone to ascertain if one procedure is more efficient overall or for different groups of participants.

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