

Teaching Object and Gesture Imitation to Children with Autism Spectrum Disorder Using Reciprocal Imitation Training

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Review of Literature

Prelinguistic Language Skills

- Before a child can fully develop language, prelinguistic language is used. Prelinguistic language skills are seen as precursor to functional language.
- Prelinguistic communication can be defined as a non-verbal means of communication that is meaningful and purposeful but is not a symbolic system like language (e.g., gestures, vocalizations, eye gaze, expressions, imitation)

Autism Spectrum Disorder

- Autism spectrum disorder (ASD) is characterized by deficits within the social communication domain (e.g., impairments in joint attention and social reciprocity and use of nonverbal communication skills like gestures). Individuals with ASD can demonstrate restrictive or repetitive patterns such as repetitive speech, motor movement or use of objects.
- Children with ASD do not share the same ability as typically developing peers to use and acquire non-verbal prelinguistic skills (Ingersoll, 2008).

Imitation: “Any manifestation, whether acquired or innate, whose actual performance is suggested by the similar acts of others. (Guillaume, p. 59, 1971).”

- Three primary types of imitation: Gestural, Object, and Vocal

Intervention

Reciprocal Imitation Training

- Reciprocal imitation training (RIT) combines naturalistic and behavioral intervention approaches to teach children with ASD to imitate spontaneously. Reciprocal imitation training follows a naturalistic approach implemented in a play setting or in daily routines and incorporates a reward-based system as an aspect of operant conditioning (Ingersoll, n.d.).
- Naturalistic approach may be a more effective method for teaching the skill of imitation (Ingersoll, 2010).
- RIT has been proven to be an effective intervention strategy to teach imitation (Ingersoll, 2008; Ingersoll and Lalonde, 2010; Ingersoll, 2010).

Purpose of Current Study:

The purpose of this study is to:

- Verify that RIT is an effective way to improve gestural imitation.
- Verify that RIT is an effective way to improve object imitation.
- Determine if teaching gestural imitation first results in greater gains of total imitation following treatment.

Participants

- 2 males with ASD who are nonverbal (age 4:10, 5:1)

Methodology

- ABCA (i.e., pre-intervention baseline, treatment 1, treatment 2, post-intervention assessment)
- Intervention occurred during a short period of the total therapy session (i.e., two, 45-minute sessions a week), once the participants were content.
- Intervention conducted by 2 Eastern Illinois University graduate clinicians who received supervision by a certified speech-language pathologist

P1	Pre- Intervention Baseline	Pre- Intervention Baseline	Pre- Intervention Baseline	Tx 2	Tx 2	Tx 2	Tx 1	Tx 1	Tx 1	Post- Intervention Assessment	Post- Intervention Assessment	Post- Intervention Assessment
P2	Pre- Intervention Baseline	Pre- Intervention Baseline	Pre- Intervention Baseline	Tx 1	Tx 1	Tx 1	Tx 2	Tx 2	Tx 2	Post- Intervention Assessment	Post- Intervention Assessment	Post- Intervention Assessment

Object and Gestural Imitative Behaviors

- Gesture: conventional gestures (e.g., clap, wave), which are gestures that have a standard social meaning, were selected due to the functionality of the gestures for social communication.
- Object: actions with objects (e.g., running a toy horse, pushing a toy car, and “answering” a toy phone) were selected based on the participants’ interest in the toys during play prior to the beginning of treatment.
- **RIT protocol :**
- Clinician first engaged in contingent imitation, target action then modeled paired with verbal label, clinician waited ten seconds for a response, if no response repeat first model twice. If no attempt, the clinician used model and label, paired with “You do it.” If no attempt, the clinician repeated model and label, paired with a physical prompt to initiate the movement. If no attempt, the clinician repeated the model and label and utilized hand-over-hand assistance to complete the target action. (For both gestural and object imitation). Verbal praise was used after each action no matter the amount of cuing.

Data Collection, Scoring, and Analysis

- Participant responses and behaviors were scored from video analysis, on a password protected server, following RIT protocol implementation.
 - No cuing was used during pre-intervention or post-intervention baseline
- Data was taken from the participants’ best attempt at imitation and scored utilizing a Likert rating scale
 - The scale is as follows: 0=No attempt to imitate; 1=Minimal attempt to imitate action; 2=Close approximation; 3=Exact Imitation. For data analysis, a score of 1, 2, or 3 resulted in an indication that the imitation was “present”, while a 0 resulted in a data code for “not present.”
- Data was converted to a binary scale to represent whether imitation was present (1,2,3) or not present (0) in each of the 6 opportunities during pre- and post-data collection. Presence of measured imitative behaviors was calculated as a percentage of opportunities (i.e., percent gain).

Results:

Object Imitation:

- Participant 1 demonstrated 34% increase from pre-intervention baseline to post-assessment baseline
- Participant 2 demonstrated 0% increase from pre-intervention baseline to post-assessment baseline.

Gesture Imitation

- Participant 1 demonstrated 66% increase from pre-intervention baseline to post-assessment baseline.
- Participant 2 demonstrated 66% increase pre-intervention baseline to post-assessment baseline.

Overall imitation:

- Participant 1 demonstrated 50% increase from pre-intervention baseline to post-assessment baseline.
- Participant 2 demonstrated 34% increase from pre-intervention baseline to post-assessment baseline.

Measurable Behavior	# opportunities for target behavior to occur	#/% Imitative behaviors Pre-intervention Baseline	#/% Imitative behaviors Post-Intervention Assessment	Percent Gain
Total Imitation	12	1 (8%)	7 (64%)	50%
Gesture Imitation	6	0 (0%)	4 (66%)	66%
Wave	3	0 (0%)	2(66%)	66%
Clap	3	0 (0%)	2 (66%)	66%
Object Imitation	6	1 (16%)	3 (50%)	34%
Car	3	0 (0%)	1 (33%)	33%
Animal	3	1 (33%)	2 (66%)	33%

Measure	# opportunities for target behavior to occur	#/% Imitative behaviors Pre-intervention Baseline	#/% Imitative behaviors Post- Intervention Assessment	Percent Gain
Total Imitation	12	2 (16%)	6 (50%)	34%
Gesture Imitation	6	0 (0%)	4 (66%)	66%
Wave	3	0 (0%)	3 (100%)	100%
Clap	3	0 (0%)	1 (33%)	33%
Object Imitation	6	2 (33%)	2 (33%)	0%
Phone	3	2 (66%)	2 (66%)	0%
Animal	3	0 (0%)	0 (0%)	0%

Discussion

Likert Scale Rating

- Quantitative measures (i.e., percent gain) and a Likert scale were used to measure and rate the participants’ qualitative process over time (i.e., preciseness of imitative behaviors).
 - Qualitative measures were taken because small improvements should be documented, specifically in individuals with ASD who are non-verbal; because these individuals typically present with more communication challenges

Gesture Imitation Improvement

- The findings of the current study support the use of RIT as an effective treatment protocol to improve gesture imitation skills.
 - Participant 1 and Participant 2 made both quantitative and qualitative gains
 - Participant 1 and Participant 2 made more gains in gesture imitation compared to object imitation

Object Imitation Improvement

- From the data of the current study, it can be concluded that the implementation of RIT is an effective treatment protocol to improve object imitation skills.
- Both participants showed the ability to complete object imitation minimally during pre-intervention baseline
 - Participant 1: Made both quantitative and qualitative gains in object imitation
 - Participant 2: Showed improvements qualitatively (i.e., Likert Scale rating) but not quantitatively (i.e., percent gain)
 - Limited gains in object-based imitative behaviors could be contributed, in part, to the participants’ engagement in self stimulatory and repetitive behaviors with the target objects (e.g., intense visual examination of a toy horse, spinning of toy car wheels, etc.)

Overall Imitation Improvement

- Due to an extremely limited sample size and extraneous factors influencing participation in intervention, implications regarding importance of the order of treatment (i.e., gesture vs. object first taught in intervention) cannot be determined.

Clinical Implication

- **Pre-linguistic skills and early language skills**
 - Teaching foundational prelinguistic language skills, such as imitation with objects and through gestures, has proven to be an effective pathway to foster further language development (i.e., vocal imitation and increased communicative intent) (Ingersoll and Lalonde, 2010).
 - Further language development: use of vocalizations, interest in use of augmentative and alternative communication device
- **Restricted, Repetitive Patterns of Behavior**
 - Results from the current study indicate that despite both participants’ engagement in restricted and repetitive self-stimulatory behaviors throughout intervention, improvements were made with imitative abilities
 - Choosing target actions with objects that an individual receives stimulation from could allow them to learn more precise imitation because they are more regulated during the intervention.
- **Sequential Imitation Development**
 - In typically developing children, object imitation appears prior to gesture and in the literature
 - Conclusions could not be drawn to support the need for mastery of one type of imitation skill before introduction of another. It appears that children with ASD may not follow the similar hierarchy of development as typically developing children.

Limitations

- The perceived improvement in overall imitation could be related to extraneous factors and not solely implementation of RIT
- Due to the small sample size, conclusions cannot be generalized.

Future Research

- Broader sample size to generalize and drawn conclusion, more imitative behaviors (e.g., gesture, vocal, object), examine carryover effect

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