





**REPERCUSSIONS IN  
THE EFFECT OF ECHOIC  
PROMPTS, MOTIVATING  
OPERATIONS ON MANDING  
ON A CHILD WITH AUTISM  
AND PAINTINGS IN THEIR  
STEPS FRACTALS**





UNIVERSIDAD DE GUADALAJARA

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*Campus Puerto Vallarta*

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## Preface

The art organizes everything by parts. The authors of this work are implacable authors of some dawns, evenings and nightfalls that bring a fresh change to the Homo Sapiens at any place of the planet. Their valleys, volcanoes, atmospheres, are not only theirs, they are of all of us. They are of the whole world. They will be of the future world. The future generations will enjoy their discoveries, of what today they copy from the nature that surrounds us. The landscape, suddenly becomes difficult to rescue but with the knowledge and dexterity characteristic of the authors of this beautiful book, one proves that, in all the five continents, new aesthetics and semiology transformations, are generated.

Repercussions in the effect of echoic prompts, motivating operations on manding on a child with autism and paintings in their steps fractals, demands an imagination effort. The authors go developing dimensions with colors and give organic forms arranged to them while they paint. They recognize that the essence of life, increases, it transforms and changes in the synergetic objects that they paint in the solid, liquid and gaseous states. They allow in their representations that those parts are logically adequate, so that there is harmony in their painting. The parts that they organize, require a structural setting that is adapted to the variations of functional requests and allows to give extension and relation to the organic structures that the authors paint in the pattern, continuity that they search and study in the nature.

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## Dedication

To the schools, institutions and universities of the five continents that offered me the opportunity to recreate, relearn, reinvent, rethink and study.

Claudio-Rafael Vasquez-Martinez, MSED, Ph.D

To my sister, Dr. Odalia Cecibel Girón Villacís, who always encouraged me.

Graciela-E. Giron-Villacis, MD, MSED, Ph.D

To my children, who always encouraged me.

Rita-Paola Briones-Alcivar, MD, M.Sci

To my son Didier, my husband Daniel and my parents Galo y Maria, who are the mainstay of my life.

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Universidad Tecnológica de Pereira.

To my family. Alicia-Graciela González-Luna,  
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To my family. Víctor-Javier Torres-Covarrubias.  
Professor, Autonomous University of Nayarit.



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## **Introductory comment**

### **Abstract**

For children with autism, manding is useful for teaching new forms of behavior. A multiple baseline design consisted of one stimulus class of manding opportunity that the experimenter classified into three response classes (libro, cookie, and bola). A functional relationship between high levels of independent manding and the onset of the echoic prompts and EO manipulations was replicated across three different mands. The pattern of responding across the three vocal behaviors emitted by the participant verified the behavior change. The present study would enhance the results of Hall and Sundberg (1987) while manipulating the presence of EOs during mand-echoic training. A limitation to the current study that warranted discussion was that because only one participant was included, replication of these procedures with other participants was needed. The results of this study were socially significant.

*Keywords:* mand, echoic intervention, establishing operation.

The Effect of Echoic Prompts and Motivating Operations on Manding.

Although children diagnosed with autism have deficits in communicative speech, a number of studies have demonstrated effective procedures for teaching children functional verbal behavior, as for example mands (Kelley, Shillingsburg, Castro, Addison, & LaRue, 2007; Wallace, Iwata, & Hanley, 2006). Rutter (1978) established that nearly half the individuals with autism do not have vocal speech and that few will obtain it without intervention (Rutter, 1985). Drash, High, and Tudor (1999, p.1) emphasized that, "One of the most challenging tasks in

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establishing functional verbal repertoires in autistic and other language delay children is teaching vocal imitation to children who have no speech and no ability to imitate". Many professionals have abandoned these children entirely because of the effort required (Koegel, O' Dell, & Dunlap, 1998).

"Manding", or teaching an individual to request access to reinforcement, has been one skill frequently targeted in language programs (Sundberg & Michael, 2001). For children with autism, manding has been useful for teaching new forms of behavior (e.g. speech sound that the child previously could not make) and new discriminations (e.g. responding correctly to requests). In addition, by teaching a mand repertoire (vocal or sign) therapists may replace many problem behaviors.

Learners with developmental delays tend to develop mands that are maladaptive, such as screaming and tantrums. Kelley et al. (2007) stated that a common target of intervention for these individuals was an appropriate communicative response, such as a mand. Cooper, Heron, and Heward (2007, p.530) state that, "Manding not only lets children control the delivery of reinforcers, but it begins to establish the speaker and listener roles that are essential for further verbal development." Researchers established that early language programs emphasized basic operant techniques such as reinforcement, prompting, shaping, chaining, and stimulus control (Sunberg, 1990).

This extensive body of research did not make into account the concepts that appear in Skinner's (1957) book *Verbal Behavior* (Michael, 1984) that provided a functional analysis of verbal events from the perspective of an individual speaker and classified those events into the

“verbal operants” (i.e., mand, tact, echoic). This functional approach suggested new ways to predict and control verbal behavior.

In a notable study, Taylor et al. (2005) evaluated the effects of manipulating established operation of children with autism to promote initiation toward peers. The participants were three children with autism, one of who used a voice communication device. In pre-baseline assessment, the participants selected three preferred snacks. In procedure where the Established Operation (EO) was absent, the teacher presented the instruction, “Have a snack”, and participants ate the edible stimulus on their on plates but they made no verbal or nonverbal initiation toward their peers.

In the procedure where the EO was present, only the peer had access to the snacks items. If the vocal participant made an appropriate mand toward the peer for the snack item, the peer was prompted to hand a small portion of the snack to the participant and was praised. All prompts for the peer were faded across sessions. In the procedure with the EO with an adult (teacher), participants were observed to make initiations in the form of gestures toward their peers like pointing and touching. However, participants did not vocally initiate or use the communicative device for the selected item.

That study demonstrated that manipulating motivating operations (MOs) (i.e., restricting participants' access to preferred items while a nearby peer had access to the items) was not sufficient for the emergence of peer-directed mands, so participants required prompting. Prompts were provided using least-to-most prompting and were gradually reduced within sessions. The results of this

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study indicated that children with autism could learn to mand for preferred items from their peers with autism. It also indicated that MOs must be considered when assessing the generalization of specific mands by an individual with autism. Participants did not respond with a newly taught mand as much, if at all, when they were given access to the item prior to generalization probes. There was a failure to generalize manding to peers.

Another variable that may have affected responding was the efficiency of each response class member. Response efficiency was determined by criteria that include, for instance, the time between a response and reinforcement (Carbone & Sweeney-Erwin, 2010). These researchers used prompt-delay procedures and provided empirical support for the use of manual sign manding in producing functional communication in nonvocal children with autism and developmental disabilities.

The dependent variable measured in the study was the occurrence of unprompted and prompted vocal responses (including speech sounds, word approximations or adult word forms). Prompt-delay procedures, used in combination with alternative forms of communication and mand training, were used in this study. A multiple baseline design across participants verified the effectiveness of this intervention. During the baseline condition there were no vocal responses. During the prompt-delay and vocal prompt condition, when the participant demonstrated motivation for the item and signed, the instructor did not immediately deliver the reinforcer; instead, a five second prompt delay occurred.

If the participant emitted a sound without the sign, the instructor implemented the prompt sequence for the manual sign. The treatment produced an increase in the



number of vocal responses that accompanied the manual sign mands for all the participants. The result of this research demonstrated that the prompt delay procedure and vocal prompting could be implemented with manual sign language to produce an increase in vocal responses in children with developmental disabilities who emitted few vocal responses.

In addition, a variable that might have affected manding was the lack of stimulus control. Egan and Barnes-Holmes (2009) demonstrated the functional independence of mands and tacts. Five children participated. Four children with autism were initially trained to complete two 4-piece assembly tasks. All children were then trained to tact the four pieces that comprised one of the assembly tasks, and to mand for the four pieces that comprised the other task, using arbitrary vocal responses forms.

The remaining child received tact training only, and only on one task. Experimenters taught the four boys to mand for preferred items using adjectives (e.g., left, middle and right). Then, participants were tested for both mands and listener responses (receptive discrimination). The effects of training on the untrained operants were evaluated in a multiple-probe design across tasks. During mand probe and mand training, edible items were restricted outside the sessions to ensure Established Operation (EOs). For tact probes the experimenter pointed to one of the items to specify the adjective but in the modified tact probes, the experimenter included the discriminative stimulus ( $S^D$ ) "What is it?" In mand training, the participants were taught to respond to the mand condition by vocally specifying the target adjective.

For incorrect responses, the experimenter presented

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the vocal model and the participant echoed that model. In mand training, 3 of the 4 participants displayed the emergence of untaught tact during modified, but not standard, tact conditions. These results suggested that modifying the antecedent stimulus influenced the emergence of untaught tact responses. All participants demonstrated some listener response after mand training but only one responded at high levels. In addition, the apparent functional independence of mands and tacts may be explained by a lack of antecedent control over responding. It was possible that the vocal stimulus, "What is it?" presented in the modified tact probes cued participants to the change from mand to tact contingencies. The study demonstrated that modifications to the testing procedures, intended to provide effective contextual cues for responding, resulted in the emergence of untrained operants.

A response class consists of behaviors that were topographically different but produced the same effect on the environment (Catania, 1998; Johnson & Pennypacker, 1993).

Hall and Sundberg (1987) evaluated the effects of teaching mands by manipulating conditioned establishing operations (CEOs). The participants were two deaf students and severally mentally impaired. The designs used were a multiple baseline across participants and behaviors and a multielement design.

Both participants were taught to complete four chains of behavior leading to a reinforcer. The trainer provided some assistance in completing the chains, but the participants were required to independently initiate the first action for each object that would later be trained as a mand,

at a criterion of 100% accuracy for two consecutive days. Physical guidance was used initially and was faded until criterion was reached. The procedure involved teaching participants to complete chains of behavior ending in reinforcement. For example, a participant was first to make instant soup and was then required to mand for hot water. This action consisted of picking up the pot and pouring at least one drop into the bowl. The participants had to mand for the missing item "money" to operate a vending machine and get candy. They were taught to mand for omitted items through tact or imitative prompting. Stimulus control was then transferred to CEOs by fading tact and echoic. This study appeared that the tact and imitative prompt procedures might have been more efficient if there had been fewer verbal discriminative stimuli.

The participant sometimes made imitative responses to the discriminative stimuli rather than responding to the tact or imitative prompt. The results demonstrated that mands occurred reliably only after direct manding training, demonstrated the functional independence of mand and tact repertoires. Tact and echoic prompts were equally effective in producing a mand repertoire. These results demonstrated the importance of manipulating CEOs as an independent variable in mand training.

There were several dimensions of reinforcement that affected the probability of the emission of any particular member in a response class. One of these was related to the consequences, or the schedule of reinforcement associated with each individual (Paden, Kodak, Fisher, Bullington, & Bouxsein, 2012). That was, an increase in the reinforcement of one response was likely to decrease the rate of other response.

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These authors evaluated differential reinforcement of alternative behavior (DRA) at the same time as using prompting to increase peer-directed mands for preferred items between two nonvocal children with autism using the picture exchange communication system (PECS) as discriminative stimulus. In the baseline procedure, participants did not exhibit peer-directed mands, although they did exhibit independent adult-directed mands. With the differential reinforcement of alternative behavior (DRA) plus prompting intervention, the participants sat at a table adjacent to one another or stood within one meter of the table of another child.

For each participant, the therapist used five target PECS (high-preference items that the participants most frequently requested and consumed) and two distractor PECS (non-preferred stimuli that the participants rarely requested or consumed). The therapist placed the items associated with PECS cards for the current trial in view of the participants either on or next to the table. During each 30-s trial, the therapist presented three PECS cards (one target card and the two distractor cards) to one of the participants. The therapist sequentially presented each of the five target PECS cards, in a quasi-random fashion, and each target card was presented across two trials within each session.

When the therapist used DRA plus prompting, participants' independent peer-directed mands increased. The results suggest that non-vocal children can be taught to exhibit peer-directed mands using PECS. The data showed that children with autism can be taught to initiate interactions with peers with developmental disabilities.

To summarize, Skinner's analysis was that teaching tacts or echoic relation should not automatically lead to

mands. He suggested that the verbal operants are functionally independent. With the more extended treatment of motivate variables it became possible to supplement Skinner's mand definition in several directions. First, it might seem to avoid dealing with establishing operation entirely related to the mand to its history of reinforcement. Hall and Sundberg (1987) evaluated the effects of teaching mands by manipulating conditioned establishing operations (CEOs). In addition, a variable that might affect manding was the lack of stimulus control. Egan and Barnes-Holmes (2009) demonstrated the functional independence of mands and tacts.

Based on these previously discussed researches, manding for missing items or events could be trained. The first study trained children to mand for missing items in which establishing operations were manipulated. In the second, the missing items were presumed to be reinforcers; establishing operations were not manipulated. Taylor et al. (2005) demonstrated that manipulating motivating operations was not sufficient for the emergence of peer-directed mands, so participants had to be prompted. Another concern was to what extent mand-training procedures allowed the experimenter to control the specific topographies to be trained.

Time delay procedure trained mands for items or events which had already been established as reinforcers; it did not manipulate the reinforce effectiveness of these items like previous mentioned studies. At this point, (Carbone & Sweeney-Erwin, 2010) extended the benefits of prompt-delay procedures and provided empirical support for the use of manual sign manding in producing functional communication in nonvocal children with autism. In

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addition, a variable that might affect manding was the lack of stimulus control. Indeed, a similar study provided by Paden et al.(2012) showed thatdifferential reinforcement of alternative behavior (DRA) plus prompting increased peer-directed mands, using picture exchange communication system (PECS).The purpose of this study was to demonstrate the effects of mand-echoic intervention while manipulating the presence of Establishing Operations (EOs) in a nonverbal child with autism.

## Method

### Participant

The participant was a Hispanic child who met the criteria for a diagnosis of Severe Symptoms of Autism Spectrum disorder as per CARS2-ST. He was with Autism Spectrum Disorder 299.00 based on the DSM-5. A psychologist and a speech language pathologist independently tested the child. The participant was enrolled in a program offering in-home behavioral intervention for 20 hours per week. The child had an Individualized Family Service Plan.

The participant was evaluated using the following assessments: the Childhood Autism Rating Scale (CARS2-ST) (Schopler, Reichler & Renner, 1988), and the DSM-5 were used as the screening tools during this observation. TheDevelopmental Assessment of Young Children (DAYC-2) (Voress & Maddox, 2013) and HELP (Hawaii Early Learning Profile) was also used from birth to 3 years. Participant's mand repertoire was not established. Permission of the parents and clinical supervisor was obtained prior to the entry into the study.A curriculum-based assessment and standardized assessment were used to confirm parental

reports about the participants' lack of vocal speech (see Table 1).

Before the study, instructional programs were implemented to teach the participants to sit still, make eye contact, and follow one-step directions and vocal imitation. In addition to the behavioral program, the child also received speech language and occupational therapy services.

The child was severely language delayed, and he did not produce functional language at the onset of therapy. Specific information on the participant was provided in Table 1. Johnny was 2 years 4 months old at the beginning of the study. He lived in a Spanish-speaking household and received special instruction for four hours a day, 5 days a week.

He was referred for a bilingual psychological evaluation because of concerns regarding the quality of her communication (limited speech, inability to point), social skills and stereotyped behavior (toe walking, tensing, repetitively running back-forth were observed and flapping, turning of wheels, watching his reflection on glass and his shadow were reported).

During the intake evaluation this child was noted to make unintelligible sounds with no purpose of communicating any wants and needs. Johnny's assessment placed his language level at 12 months. During the intake evaluation, his mother reported that the inconsistently used some word approximations such as "te" (te—bottle) ma (mama), and da (daddy). Child was said to communicate mostly through the use of pull-show and reaching using others' hands.

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## Setting

Baseline and intervention sessions were conducted in participant's home, in a quiet small living room, 5 m by 6 m and contained some toys kept on shelves. The room contained a child-sized table, two child-sized chairs. The materials were selected by asking the parents about the children's preferences during reading time, snack, and playtime. Sessions were conducted with one experimenter seated in front of the participant at a child-sized table. The experimenter implemented the procedure and collected data at the same time.

Establishing the therapy setting as a reinforcing environment.

During therapy sessions the child's parent remained in the living room, which served the dual purpose of providing assurance to the child and training opportunities for the parent. The reinforcing nature of the therapeutic environment was evident in the fact the child voluntarily walked to reach the therapist's bag every morning. Most of the time, he climbed into his chair without arguing and participated actively during therapy most of the time. Prior to the study, the child had the tendency to grab items from the therapist's hand or cry and he learned how to point when he was asked what he wanted.

## Materials

The materials used were a child-size table, two chairs and data sheet (Appendix A) and social validity and treatment integrity questionnaires. The stimulus materials consisted of a foam-colors book, cookies, and a small ball. These items were selected because the parents stated the



participants like them.

### Dependent Variable

A percentage of correct prompted vocalization was defined as stating the name of the presented item within 5 s of the echoic prompt (e.g. Want? or just That? Say "Libro"). The targeted words were modified and accepted based on the child's echoic repertoire. For example, for "Libro (I, o, Li, bo, oo, ii), for "Cookie" (k, o, I, ii, oo, ko, ki), and for "Bola" (bo, b, o, la, aa, ooo, bu). The echoic operant was a type of verbal operant that occurs when a speaker repeats the verbal behavior of another speaker. It was controlled by a verbal discriminative stimulus that has point-to-point correspondence and formal similarity with the response (Michael, 1982). One response that was likely to occur when an establishing operation (EO) was in effect was a mand. Skinner (1957, p.36) defined the mand as "a verbal operant in which the response is reinforced by a characteristic consequence and was therefore under the functional control of relevant condition of deprivation or aversive stimulation."

Establishing operations (EO) assessments were conducted to increase the probability that highly reinforcing stimuli would be available to the child during therapy. To accomplish this, the experimenter gave the parents a list of snacks, toys, picture books, and candies. Parents were asked about their child's favorite cookies, picture book, and toys. To enhance food as a reinforcer, parents were asked to refrain from feeding their child for at least one hour before therapy.

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## Procedure

Therapy was conducted in a discrete-trial format. Therapist made sure the child had an EO (motivation) for the item. A trial began when the therapist prompted the child for a vocal response, for example, "Want? Say "li-bo." When the child echoed (vocally imitated) the name of the item, the item was delivered while saying the name again. After several fully prompted trials, partial vocal prompt was provided (initial sound of the item). Error or non-responses were redirected by telling the words again. If the child said the name of the item, it was delivered immediately. Each prompt and response was recorded on data sheet. A response was defined as a specific vocal sound for each verbal behavior emitted by the child within approximately 5<sub>s</sub> following the therapist prompt. If the child pointed, he was redirected to vocalize and model the word by taking his hand to the therapist's cheek near her mouth. Each response was classified and recorded as occurring in one of two categories: Correct (Yes) or No response (N) (See Appendix A).

All sessions were 8 to 10 minutes for each item in length and no more than two sessions were conducted on a single day. Typically, 5 to 6 sessions were conducted in a week. Three words were targeted for each instructional session and the session ended when a participant had received nine opportunities to respond across response types. The environmental arrangements are that the child sat at the table across from the instructor. For participant's verbal behaviors, a delayed baseline was used. The child's verbal behavior "libro" was trained first and a baseline condition was applied. After 3 sessions, an intervention phase started. Once the participant's verbal behavior met a criterion of at least a 44% of two correct responses, the

second participant's verbal behavior "cookie", which was under baseline condition, started the intervention. Once the participants reached an 88% of correct responses or better for two consecutive sessions the intervention stopped for each behavior.

### Baseline.

During all sessions, the teacher sat facing the participant at a child-size table. The edible item was on a plastic tray and the rest of the stimuli were placed in sight but out of reach. Each session was presented one trial at a time. The child was given two seconds to make eye contact by attracting their attention and calling his name, and then he was presented with the item and the instructor asked, "Want? Or just That?" and waited five seconds for a response. If the child did not say the approximation word within six seconds, the reinforcer was not delivered.

If the participant said an approximation word other than the targeted word (e.g., "te" (bottle) when a cookie was presented, the instructor gave the participant the requested item and not the targeted item. If the participant said the approximation word, the teacher gave the participant the item immediately and did not praise correct responses. If the participant did not respond after 5s but was still indicating interest in the item (e.g., pointing, grabbing, otherwise vocalizing), he or she was also given access to the item but this was not considered a correct response. This procedure was implemented as recommended by Sundberg and Partington (1998), to pair the instructor with reinforcement from the beginning of the study. During baseline measurement, the therapist did not present prompts to facilitate the participant's answers in response to the items before them. Nine opportunities to respond were presented

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during each session.

Intervention phase.

The training procedures were set up exactly as in the baseline phase. The participant received echoic mand training. The child was given two seconds to make eye contact after attracting their attention by calling their name. Before each session of echoic training, the experimenter chose the first word and an approximate form from the participant's desired stimuli along with the S<sup>D</sup> for example, "Want?" or simply, "This? Thus, procedure was introduced in a sequential fashion across the three behaviors (book, food, and ball) of the multiple baseline design. The reinforcer was delivered at the onset of the pointing or few time cries. He was redirected by taking his hand to the therapist's face to model the word.

The experimenter presented the target vocal stimulus once or twice (i.e., the syllable later repeated during pairings). During the vocal prompt condition, if the participant demonstrated motivation for the item and signed, the instructor did not deliver the reinforcer and it was considered an incorrect response. If the participant approximated or matched the vocal stimulus within six seconds, it resulted in delivery of the preferred stimulus immediately. These (edible, book or ball) stimuli were terminated when the item was consumed, or played for 6 seconds.

The first form of each word to be taught was the word itself with no approximations. However, if the participant could not say the word, it was modified by dividing it into syllables or by accepting a close approximation of the word. For example, Libro (li, i, iii, o, ooo, bo, b), Cookie (cu, ki, i, o,

ooo, u), Bola (bo, la, o, a, ooo, aaa, bu). Once the participant reached the criterion of 44% correct or better over two consecutive sessions, the criterion has been achieved to start treatment on the second tier. After achieving a criterion of 44% correct or better over two consecutive sessions on the second behavior the third one started. Correct responses were followed by social praise and access to the item. Requesting, as taught by mand training, was considered mastered when the requests of the participant were 88% correct or better over two consecutive sessions.

### Experimental Design

A delayed multiple design consisting of one stimulus class of manding opportunity that the experimenter classified into three categories (i.e., book, food, and ball) was used for a child. The effect of mand training was evaluated as the first step in establishing an echoic repertoire for the child with autism, using a delayed multiple baseline design. In order to control for order effects, the first participant's verbal behavior (libro) was trained first through mand training. Then a second verbal behavior (cookie) was added. And finally, the last stimulus class (bola) was added and putting other behaviors on extinction. That design across participant's verbal behavior confirmed the effectiveness of the independent variables. The total stability of the baseline performance of the child provided an ample basis for starting the echoic mand training program.

### Social Validity

The social validity was assessed in three areas: social significance of the target behavior, appropriateness of the procedures, and social importance of the results (Schwartz & Baer, 1997). The social validity questionnaire addressed questions if parents agree or disagree that "Modeling words was important for my child to learn to request for "cookie" during snack time" or if "Modeling words intervention helped

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my child to interact with his peers and siblings" (See Appendix B). The significance of increasing the described vocal behaviors improved student success in day to day living. This allowed more access to his family members and peers by communicating his needs and wants. The social validity of the intervention was assessed through a post survey questioning addressing the acceptability of the three components mentioned.

### Interobserver Agreement

Two observers simultaneously but independently collected data of the first communicative form that occurred during baseline and all communicative forms that occurred during intervention. Each opportunity, or trial, consisted of the antecedent procedure, the response and the consequence. On each trial, an agreement was scored if the experimenter and the second observer both scored a response as correct or incorrect; otherwise, a disagreement was scored. Point-by-point agreement was calculated for each session by dividing the number of agreements by the sum of agreements and disagreement, and multiplying by 100%. Agreement checks were conducted on 33% of Johnny's baseline, with agreement of 100% on the occurrence of "libro", 99% on the occurrence of "cookie", and 100% on the occurrence of "bola." Agreement checks were conducted on 35% of Johnny's intervention, with mean interobserver agreement of 94% (range, 90-100%) on the occurrence of "libro." Mean interobserver agreement of 94% (range, 90-100%) on the occurrence of "libro" 96% (range, 89-100%) on the occurrence of "cookie", and mean interobserver agreement of 98% (range, 90-100%) on the occurrence of "bola."

### Treatment Integrity

A second observer scored the experimenter's behavior for 35% of all training sessions. Trials were scored as correct if (a) the correct instruction was delivered (i.e., participant was given 2 s for eye contact, the S<sup>DA</sup> "What?" or

just "That"? (Esto?) and (b) consequences associated with the targeted operant were delivered (i.e., praise and item was given immediately; the requested item for mand after echoic). Incorrect trials were scored if (a) incorrect instructions were delivered or if no consequences were no delivered. Appendix C contains all the treatment components that were evaluated. Treatment integrity was calculated by dividing the number of correct trials by the total number of trials and converting the outcome to a percentage. Scored trials were implemented correctly during baseline and intervention in 100% and 96 % (ranged 90-98) of opportunities across all three-target behavior.

## Results

As shown in Figure 1 no mands occurred during baseline phases. Johnny met the criterion of two consecutive sessions at 88% in 49 training sessions for the mand "libro." He required 22 sessions for the target mand "cookie" and 27 sessions for the target mand "bola" to reach the master criterion. Figure 1 shows the three elements of baseline logic. First, affirmation of the consequence in leg 1 was observed as there was an increase in responding. Thus, not only was the prediction for behavior "libro" in Figure 1 verified by long and stable baseline for behavior "cookie" and "bola," but the last unchanged data points of the baseline for behavior "bola" also served as verification of the prediction made for behavior "cookie."

Replication was achieved when similar results were obtained with each verbal behavior following the introduction of the same intervention. Following the implementation of treatment with the second stimulus, an increase in the response "cookie" was observed, replicating the results obtained with the first leg. An increase in the response "bola," was also replicated in the third leg. These results suggest that the intervention may be responsible for the increase in vocalization.

As the social validity questionnaire was applied, it

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was found that the study had a high social validity with respect to goals, procedure, and outcomes. Johnny's mother found the intervention was beneficial for her child. The supervisor involved with the child determined that echoic intervention could be used for other participants to increase vocalization. The researcher found in the study the positive effects of using echoic intervention and established that such intervention could be used with other students exhibiting the same or similar behaviors.

## Discussion

This study demonstrated positive effects of echoic prompts and manipulating of Establishing Operations (EOs) on three verbal behaviors in a nonverbal child with autism. During baselines, Johnny never responded with any vocalization. There was an increase in vocalization when intervention was implemented systematically and each behavior was eventually mastered. Parents were satisfied with the results because they have observed their child manding mostly for cookies outside of the session. A functional relationship between high levels of independent manding and the onset of the echoic prompts and EO manipulations were replicated across three different mands.

This finding was consistent with the results of Lamarre and Holland (1985) and Pertusdottir, Car and Michael (2005). The objective of this study was to increase three manding to a nonverbal child with autism. The results of this study were socially significant. While social validity was formally assessed, manding for items to eat, to read, and to play appeared to be an important skill for that child with autism when he was placed in settings where he needed to express his wants and needs. This crucial skill allowed for that child to effectively learn from the environment in a way that many typically development children do.

These results also supported and extended the conclusion of previous researchers that manding should be the starting point for training learners with limited verbal repertoires (Shafer, 1994). Establishing a mand repertoire as



the foundation for acquiring subsequent verbal behavior also appeared to follow more closely the usual course on language acquisition in infants (Drash& Tudor, 1999).Echoic prompts and manipulating EOs are a good way to teach verbal operants in nonverbal children with autism.

This was a new study with one child learning three mands. Researcher did not know whetherthat procedure worked with other kids to learn a lot of mands. A limitation to the current study that warranted discussion was that because only one participant was included, replication of theses procedures with other participants was needed. Though Johnny's manding generalized across three verbal behaviors in one setting, some learners may require teaching with more scenarios before generalized manding was observed. Other ways to promote generalization might include training with multiple instructors and with multiple exemplars of items (i.e., different toys and food). In the future people should run similar procedures but with multiple baseline design across participants and settings.

Results from this investigation raise the question of whether echoic training or motivating operation as an independent variable would have been helped the child's language acquisition skills or the success was due to the combined treatment. A future study could address this limitation by incorporating a strategy for maintaining reinforces value and effectiveness during the assessment of generalization (Fisher et al., 1992; Mason, McGee, Farmer-Dougan, &Risley, 1989). The motivation as an antecedent variable alone needs to be addressed (Michael, 1993).

The mand training procedure could be refined. In the study, it appeared that the mand and echoic prompt procedures might have been more efficient if there had been fewer verbal discriminative stimuli. The participant sometimes made imitative responses to the discriminative stimuli "That?" (Esto as "to or o") rather than responding to the imitative prompts "Libro." Such problems could perhaps

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be avoided by using as few discriminative stimuli as possible in the training procedure, especially with participants with strong imitative histories. In summary, the echoic intervention and motivating operations package treatment appears to be a powerful teaching tool for a child with autism and can be effective in teaching language skills.

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**Table 1**  
**Profile of Participant**

Standardized Assessment <sup>a</sup>	Results
Childhood Autism Rating Scale CARS2-ST	Severe Autism Spectrum Disorder
Developmental Assessment of Young Children <sup>b</sup> -2	Communication Subtest: 10 months
HELP <sup>c</sup> (Hawaii Early Learning Profile) Birth to 3 years	Expressive Vocabulary: 11-14 months

Note. This table displays the participant assessments and target reinforcers and forms. <sup>a</sup>Participant was assessed by a psychologist prior to the study.

<sup>b</sup>Developmental Assessment of Young Children was administered by the instructor prior to the study.

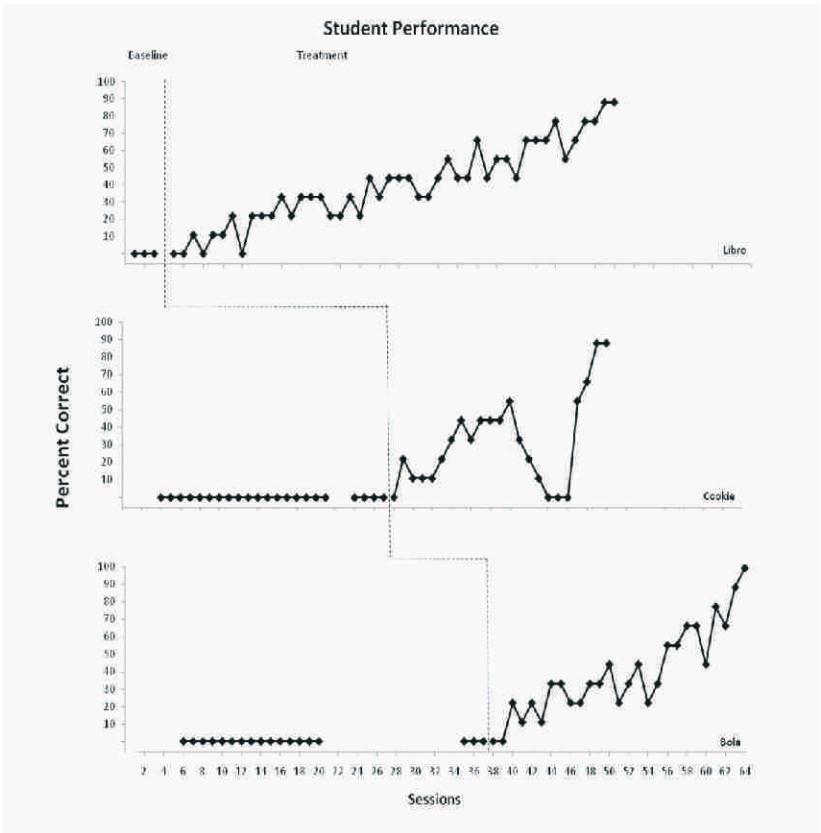


Figure 1. Percentage of correct vocalization for libro, (top), cookie (middle), and bola (bottom).

Appendix A

Data Sheet

SP: "Whant?"

Response:

Objective

Date:

Teacher:

Date:

Teacher:

Target				Total	Target				Total
	Y N P	Y N P	Y N P			Y N P	Y N P	Y N P	
	Y N P	Y N P	Y N P			Y N P	Y N P	Y N P	
	Y N P	Y N P	Y N P			Y N P	Y N P	Y N P	

Date:

Teacher:

Date:

Teacher:

Target				Total	Target				Total
	Y N P	Y N P	Y N P			Y N P	Y N P	Y N P	
	Y N P	Y N P	Y N P			Y N P	Y N P	Y N P	
	Y N P	Y N P	Y N P			Y N P	Y N P	Y N P	

Date:

Teacher:

Date:

Teacher:

Target				Total	Target				Total
	Y N P	Y N P	Y N P			Y N P	Y N P	Y N P	
	Y N P	Y N P	Y N P			Y N P	Y N P	Y N P	
	Y N P	Y N P	Y N P			Y N P	Y N P	Y N P	

Date:

Teacher:

Date:

Teacher:

Target				Total	Target				Total
	Y N P	Y N P	Y N P			Y N P	Y N P	Y N P	
	Y N P	Y N P	Y N P			Y N P	Y N P	Y N P	
	Y N P	Y N P	Y N P			Y N P	Y N P	Y N P	

Date: \_\_\_\_\_ Teacher: \_\_\_\_\_ Date: \_\_\_\_\_ Teacher: \_\_\_\_\_

Target				Total	Target				Total
	Y N P	Y N P	Y N P			Y N P	Y N P	Y N P	
	Y N P	Y N P	Y N P			Y N P	Y N P	Y N P	
	Y N P	Y N P	Y N P			Y N P	Y N P	Y N P	

Date: \_\_\_\_\_ Teacher: \_\_\_\_\_ Date: \_\_\_\_\_ Teacher: \_\_\_\_\_

Target				Total	Target				Total
	Y N P	Y N P	Y N P			Y N P	Y N P	Y N P	
	Y N P	Y N P	Y N P			Y N P	Y N P	Y N P	
	Y N P	Y N P	Y N P			Y N P	Y N P	Y N P	

Date: \_\_\_\_\_ Teacher: \_\_\_\_\_ Date: \_\_\_\_\_ Teacher: \_\_\_\_\_

Target				Total	Target				Total
	Y N P	Y N P	Y N P			Y N P	Y N P	Y N P	
	Y N P	Y N P	Y N P			Y N P	Y N P	Y N P	
	Y N P	Y N P	Y N P			Y N P	Y N P	Y N P	



Appendix B

Developing a Social Validity Measure for Parents

The purpose of this questionnaire is to obtain information about the Modeling –word intervention that will help in the future to increase children’s communication and social skills.

Questions	1: Strongly Disagree	2: Disagree	3: Agree	4: Strongly Agree
1. Modeling words was important for my child to learn to request for “cookie” during snack time.				
2. Modeling words was important for my child to learn to request for “bola” during play.				
3. Modeling words was important for my child to learn to request for “libro” during reading time.				
4. Modeling words was a good manner to teach my child to request items he wants.				
5. Modeling words helped my child to improve his communication skills				
6. My family found this intervention suitable for my child’s language problem				
7. Modeling words effective for my child communicate his needs.				
8. Modeling words proved Effective for my child to decrease his problem behavior				
9. Modeling words helped my child to say “cookie” during snack time				
10. Modeling words helped my child to say “libro” during reading time				

11. Modeling words helped my child to say "bola" during play				
12. Modeling words intervention helped my child to interact with his peers and siblings.				
13. Modeling words was a good way to improve my child's communication problem.				
Total				

#### Developing a Social Validity Measure For Supervisor

The purpose of this questionnaire is to obtain information about the echoic intervention that will help in the future to increase children's communication and social skills.

Questions	1: Strongly Disagree	2: Disagree	3: Agree	4: Strongly Agree
1. It was important for young children to learn how to mand	Disagree			Agree
2. Echoic Intervention was an acceptable intervention for a child to communicate his needs and wants.				
3. Echoic Intervention was an acceptable intervention for the child's behavior problem.				
4. Most teachers found Echoic Intervention appropriate to improve communication skills.				
5. Most teacher found Echoic Intervention appropriate to improve social skills due to				

the lack of language.				
6. I suggested echoic intervention to others teachers.				
7. I would use Echoic Intervention in the classroom setting				
8.The same intervention would be beneficial for a variety of children.				
9. Echoic Intervention was a fair way to handle the child's communication problem.				
10. Echoic intervention was a fair way to handle the child's social problem.				
11. The child is now able to mand for items during play time				
12. The child is now able to mand for food items during snack time				
13. Echoic intervention would help a child to Interact with his peers and siblings.				
14. Echoic Intervention was a good way to improve the child's social problem.				
15. The child is now able to mand for items during reading time				
Total:				

## Appendix C

### Questions of Treatment Integrity

Teacher: \_\_\_\_\_ Date: \_\_\_\_\_ Hour: \_\_\_\_\_  
 Baseline: Questions

	<i>Trial</i> 1	<i>Trial</i> 2	<i>Trial</i> 3	<i>Trial</i> 4	<i>Trial</i> 5	<i>Trial</i> 6	<i>Trial</i> 7	<i>Trial</i> 8	<i>Trial</i> 9
Sat participant at table or rug									
Researcher sat facing participant									
Researcher chose selected Item									
Participant was given 2 s for eye <u>contact</u> by attracting attention									
Present SP "What?" or just "That"? ( <u>Esto?</u> )									
Participant did not say a sound (6 s), reinforce no delivered									
Participant said a sound, (6 s)reinforce is delivered									
If participant said a word other than targeted word instructor gave participant requested item and not targeted item.									
If the participant said the approximation word, the teacher gave the participant the item immediately and did not praise correct responses.									
If child did not say the <u>word</u> within six seconds, or gave an unacceptable form of the word, the reinforce was not delivered									
Total /100									

List

	Intervention Phase								
	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7	Trial 8	Trial 9
Sat participant at table or rug									
Researcher sat facing participant									
Researcher chose selected Item									
Participant given 2 s for eye contact by attracting attention									
Present S <sup>ib</sup> "want?" or That?									
Participant did not say a sound (6 s), reinforce no delivered									
Participant said a sound, (6 s)reinforce is delivered									
If participant said a word other than targeted word instructor gave participant requested item and not targeted item.									
If participant said a word other than targeted word instructor gave participant requested item and not targeted item.									
If child did not say the word within six seconds, or gave an unacceptable form of the word, the reinforce was not delivered									
The experimenter presented the target vocal stimulus once or twice.									
When the participant approximated or matched the stimulus within 6 s stimulus was delivered immediately									

if participant could not say the word, it was be modified by dividing it into syllables or by accepting a close approximation of the word.									
Correct responses was followed by social praise and access to the edible item.									
Error or non-responses were redirected by telling the words again									
Total /100									

Note: To page 49 and 51, the reader is left between the mentioned interpretation and paints for the reader to generate their own ideas and creative about. This is an exercise in creative writing and painting to generate new ideas.

**OBSERVATION:**

Rhochrematic process in electromagnetism pedagogy.

Discreet Variable

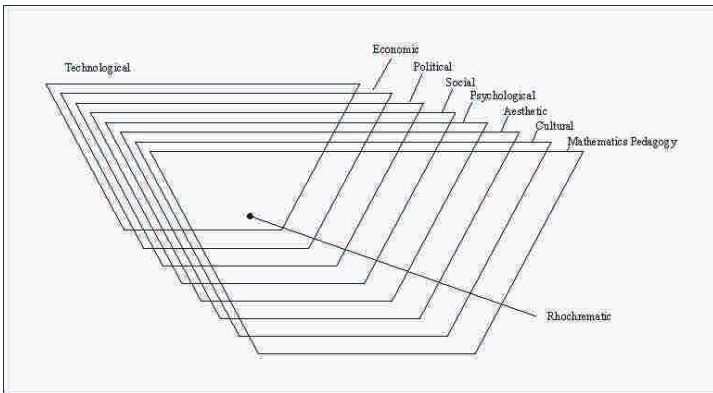
$$\sum_{b1}^{a1} x1 + \sum_{b2}^{a2} x2 + \dots + \sum_{bn}^{an} xn + \dots + \sum_{bk}^{ak} xk$$

Continuous Variable

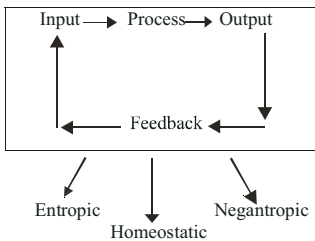
$$\int_{b1}^{a1} x1 + \int_{b2}^{a2} x2 + \dots + \int_{bn}^{an} xn + \dots + \int_{bk}^{ak} xk$$

Integrating the Rhochrematic process in electromagnetism pedagogy.

Integration System



Rhochrematic → The Process of Reprocess  
Process System



$n_1 \dots n_2 \dots n_n \dots n_k$  with Discreet Variable and  
Continuos Variable in the System

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For any explanation, communication and questions to be placed in contact with:

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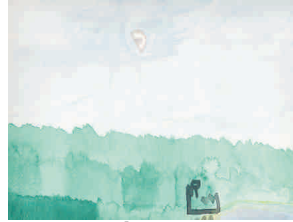
Pediatric Resident at Dr. Verdi Cevallos-Balda Hospital in Portoviejo, Manabí, Ecuador



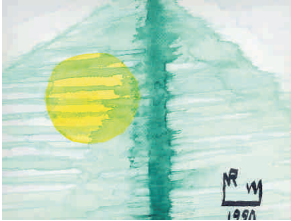
**REPERCUSSIONS IN THE EFFECT OF ECHOIC PROMPTS,  
MOTIVATING OPERATIONS ON MANDING ON A CHILD  
WITH AUTISM AND PAINTINGS IN THEIR STEPS FRACTALS**



**Phase 1**



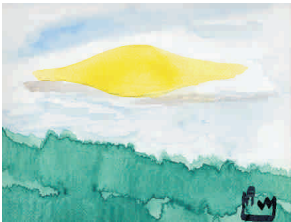
**Phase 5**



**Phase 2**



**Phase 6**



**Phase 3**



**Phase 7**



**Phase 4**



**Phase 8**



**REPERCUSSIONS IN THE EFFECT OF ECHOIC PROMPTS,  
MOTIVATING OPERATIONS ON MANDING ON A CHILD  
WITH AUTISM AND PAINTINGS IN THEIR STEPS FRACTALS**



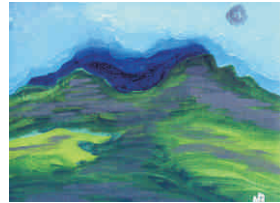
**Phase 1**



**Phase 5**



**Phase 2**



**Phase 6**



**Phase 3**



**Phase 7**



**Phase 4**



**Phase 8**



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