

ACQUISITION OF MANDS AND TACTS WITH CONCURRENT ECHOIC TRAINING

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Previous studies have identified a number of effective teaching procedures to increase verbal behavior in individuals with developmental disabilities. However, few studies have evaluated modifications of treatment procedures when children fail to acquire communication skills. In the present investigation, a 4-year-old boy with autism failed to acquire unprompted mands and tacts during mand-only and tact-only training. Results indicated that combining echoic training with mand or tact training increased unprompted manding and tacting.

DESCRIPTORS: echoic training, language acquisition, mand, tact, verbal behavior

Although children diagnosed with autism have deficits in communicative speech, a number of studies have shown effective procedures for teaching children functional verbal behavior (e.g., mands, tacts; Kelley, Shillingsburg, Castro, Addison, & LaRue, 2007; Wallace, Iwata, & Hanley, 2006). Bourret, Vollmer, and Rapp (2004) evaluated the utility of an assessment to prescribe effective mand training based on specific patterns of participant responding during the assessment. For example, 1 participant displayed vocal mands only when prompted by the therapist, and treatment involved prompt fading. However, the study evaluated only three specific types of treatments based on participants' responding during the assessment. As such, these specific treatments may only be relevant to individuals with patterns of responding that are similar to those in the Bourret et al. study. In addition, the authors did not specify treatments for acquisition of tact repertoires. Thus, it remains unclear

what steps should be taken when a child fails to acquire a verbal operant during training.

Previous studies have evaluated whether a combination of training procedures would be more effective than function-specific teaching methods (e.g., tact-only training) when individuals fail to acquire a mand or tact. Carroll and Hesse (1987) evaluated whether mand-tact training would be superior to tact-only training when teaching tacts to typically developing children. Fewer trials were required to acquire tacts when training procedures were combined (i.e., during mand-tact training) than in tact-only training. Similarly, Sigafoos, Doss, and Reichle (1989) found that manding emerged when mand training was combined with previously trained tact prompting. During mand training trials, participants first manded to gain access to a preferred item (e.g., soda, yogurt, juice); however, they were unable to consume the item without subsequently manding for an appropriate utensil (e.g., a bottle opener, spoon, or straw). Results indicated that participants did not mand for utensils unless a tact-training trial preceded mand-training trials. Thus, additional research is necessary to evaluate combinations of verbal operant training procedures when children fail to acquire verbal operants with mand-only or tact-only training. The purpose of the present investigation was to evaluate whether concurrent echoic

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and tact or mand training would result in acquisition of previously unlearned verbal operants.

METHOD

Participant and Setting

Hal, a 4-year-old boy who had been diagnosed with autism, was enrolled in a program specializing in intensive early intervention, and was selected for participation in the investigation based on his language deficits (e.g., he rarely emitted functional, vocal verbal behavior, although he engaged in high rates of vocal stereotypy). All sessions were conducted in Hal's individual treatment room that contained a chair, table, and relevant session materials. Hal, the therapist, and data collectors were present during each session. The therapist conducted sessions 2 to 5 days per week with at least one session, consisting of 12 trials, for each target verbal operant each day. The therapist presented trials approximately once every 10 to 45 s, depending on when Hal responded in the prompting sequence and the amount of time he took to consume the reinforcer.

Response Measurement and Interobserver Agreement

Correct vocalizations were divided into prompted and unprompted responding for each targeted verbal operant (juice, music, cookie). A correct *unprompted* vocalization was defined as stating the name of the presented item (juice, music, cookie or a close approximation, e.g., "juica" for juice) either during (a) the 5 s prior to or (b) the 5 s following the appropriate prompt. A correct *prompted* vocalization was defined as stating the name of the presented item within 5 s of the echoic prompt (e.g., "say 'juice'"). Paper-and-pencil data were recorded for each session by the therapist and an independent observer. Interobserver agreement was calculated by dividing the number of agreements by the total number of agreements

and disagreements, and this ratio was converted to a percentage. Interobserver agreement was collected for 50%, 54%, and 27% of juice, music, and cookie sessions, respectively, and was 100% for all responses.

Procedure

The therapist conducted a paired-choice preference assessment (Fisher et al., 1992) prior to assessment and training sessions to identify preferred items for use in training (e.g., the top three toys and one food). The therapist delivered the four highest ranked items following correct responding during the tact baseline, tact training, and echoic training sessions.

Target verbal operants (i.e., juice, music, and cookie) were selected for inclusion in the evaluation based on observations of Hal emitting each operant on at least two occasions prior to the investigation and parent identification of these items as highly preferred. The results of an assessment based on procedures described by Kelley, Shillingsburg, Castro, Addison, LaRue, and Martins (2007) showed that the targeted verbal operants did not serve as mands, tacts, or intraverbals.

Mand baseline. Mand baseline and training sessions were conducted only after Hal had at least 5 min without access to the target item. The trial began when the therapist held the juice, music (i.e., a CD player), or cookie out of reach but within view and waited 5 s for the correct vocalization. If he did not emit the correct vocalization, the therapist delivered the verbal prompt, "What do you want?," and waited 5 s for a response. The therapist delivered 20-s access to the music, one drink of juice, or one small piece of cookie if Hal emitted the correct vocalization at any point during the trial. If he emitted no vocalization or an incorrect vocalization, there were no differential consequences.

Mand training. The procedures were similar to the mand baseline except that if Hal did not emit the correct vocalization either prior to or within 5 s of the verbal prompt, "What do you want?,"

the therapist delivered an echoic prompt (e.g., “say ‘music’”). If Hal emitted the correct vocalization following the echoic prompt, the therapist delivered 10-s access to the music, a smaller piece of cookie, or a smaller drink of juice than he had received when he responded to the verbal prompt, “What do you want?”

Tact baseline. Hal had access to the item for at least 2 min prior to tact baseline sessions. The trial began when the therapist placed the juice, music, or cookie in Hal’s hand or lap. If he did not emit the correct vocalization within 5 s of access to the item, the therapist pointed at the item while delivering the verbal prompt, “What is it?” If he responded prior to or within 5 s of the verbal prompt, the therapist provided brief verbal praise (e.g., “Wow! Great job talking!”) and 20-s access to one of three toys or food items identified as highly preferred in the preference assessment. If Hal did not respond within 5 s or responded incorrectly, there were no differential consequences.

Tact training. The procedures were similar to the tact baseline except that if Hal did not emit the correct vocalization either prior to or within 5 s of the verbal prompt, “What is it?,” the therapist delivered an echoic prompt (e.g., “say ‘music’”). The therapist delivered 10-s access to one of the three preferred toys or a smaller piece of the preferred food following correct responding within 5 s of the echoic prompt.

Echoic training. One session of echoic training, in which the target item was not present, was conducted immediately prior to mand or tact training sessions. A trial began when the therapist provided the echoic prompt (e.g., “music”). The therapist said the word “say” before the target response (e.g., “say ‘music’”) if Hal did not emit the correct vocalization within 5 s of the initial prompt. This second prompt was added to evaluate whether Hal was more likely to echo a response if the target word was preceded by a prompt to say the word, a technique his parents often used. Correct responding to either prompt resulted in

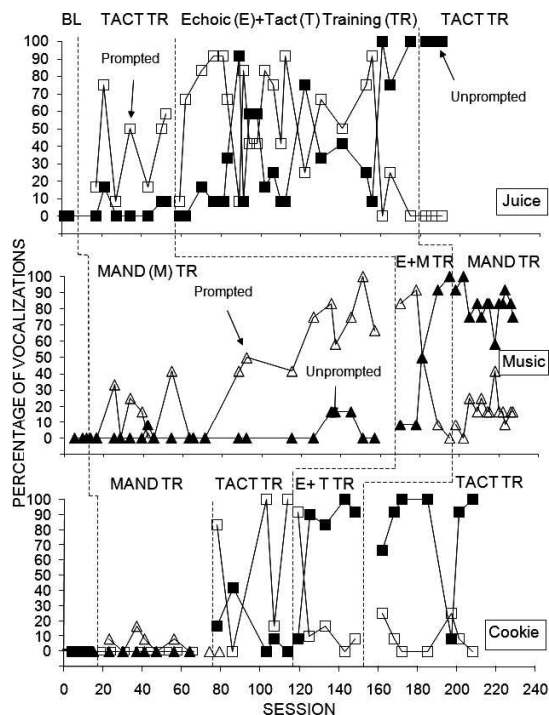


Figure 1. Percentage of vocalizations for juice (top), music (middle), and cookie (bottom). BL = baseline, Tact TR = tact training, E+T TR = echoic and tact training, E+M TR = echoic and mand training, and Mand TR = mand training.

brief praise that did not include the targeted vocalization (e.g., “You are doing a great job talking!”) and 20-s access to one of three preferred toys or foods.

Experimental Design

The effects of concurrent echoic training on acquisition of mands and tacts were evaluated within a reversal design embedded in a multiple baseline design across verbal operants. Initially, mand training was conducted for cookie; however, due to the cookie’s diminished effects as a reinforcer, we initiated tact training with cookie.

RESULTS AND DISCUSSION

Figure 1 shows the results of tact or mand baseline, tact training, mand training, and

combined (i.e., echoic and tact or echoic and mand) training for each of the target verbal operants. Results were consistent across operants in that no unprompted tacts or mands were observed during baseline phases, and tact or mand training (prior to the combined treatment) produced near-zero levels of unprompted responding. When echoic training preceded tact or mand training, unprompted tacting or manding increased to relatively high levels. Although increases in unprompted tacting were gradual for juice, unprompted responding rapidly increased for music and cookie during the combined training phase. When echoic training was removed, unprompted responding remained high across all verbal operants.

Results indicated that initial tact or mand training did not result in the emergence of unprompted mands or tacts. However, when echoic and tact training or echoic and mand training preceded tact and mand training, respectively, high levels of unprompted tacting and manding were observed. High levels of echoic responding were also observed across all operants during combined training (i.e., $M_s = 88\%$, 96% , and 95% for juice, music, and cookie, respectively). One hypothesis for the increase in responding following combined training involves a possible priming effect (i.e., presenting a stimulus that affects responding at a later point in time; O'Brien, Azrin, & Henson, 1969). If priming had occurred by conducting an echoic training session prior to a mand or tact training session, Hal would have been most likely to engage in unprompted responding in the initial three trials of the tact or mand session; however, this was not the case.

A second hypothesis for the obtained results is that echoic training involved more frequent prompts (two prompts were issued during these sessions). Thus, more frequent echoic prompts during mand and tact training may have produced similar results. Future research could

evaluate this hypothesis by including mand and tact training sessions with similar frequencies of echoic prompts.

One limitation of the study was the failure to assess whether tacts or mands would have been acquired eventually without the combined treatment. Although eventual acquisition appears unlikely given a failure to observe increases in unprompted responding during mand training for music following more than 130 sessions, one verbal operant could have remained in mand-only or tact-only training throughout the entire evaluation. In addition, the current results should be interpreted with caution because the procedure was evaluated with a single participant. Future research should evaluate the effects of combined echoic and mand, tact, or intraverbal training in an attempt to identify the operant mechanisms that are responsible for acquisition of unprompted responding.

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