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Teaching Children With Autism Spectrum Disorders to Mand for the Removal of Stimuli That Prevent Access to Preferred Items

M. Alice Shillingsburg, Marcus Autism Center and Emory University School of Medicine
Nicole M. Powell and Crystal N. Bowen, Marcus Autism Center

Mand training is often a primary focus in early language instruction and typically includes mands that are positively reinforced. However, mands maintained by negative reinforcement are also important skills to teach. These include mands to escape aversive demands or unwanted items. Another type of negatively reinforced mand important to teach involves the removal of a stimulus that prevents access to a preferred activity. We taught 5 participants diagnosed with autism spectrum disorders to mand for the removal of a stimulus in order to access a preferred item that had been blocked. An evaluation was conducted to determine if participants responded differentially when the establishing operations for the preferred item were present versus absent. All participants learned to mand for the removal of the stimulus exclusively under conditions when the establishing operation was present.

Key words: abolishing operation, autism, establishing operation, language training, mand, negative reinforcement

Mands have been emphasized as important for replacing (Carr & Durand, 1985) and preventing problem behavior. Specifically, mands maintained by negative reinforcement can establish an appropriate means to refuse or delay nonpreferred stimuli or activities in lieu of problem behavior that could otherwise develop as a means of communication for children with language delays. Research has shown that such mands can be taught by offering nonpreferred items to an individual and then removing them contingent upon saying ''no'' or emitting other appropriate refusal responses (e.g., Drasgow, Halle, Ostrosky, & Harbers, 1996; Duker, Dortmans, & Lodder, 1993; Neef, Walters, & Egel, 1984; Reichle, Rogers, & Barrett, 1984; Shillingsburg, Kelley, Roane, Kisamore, & Brown, 2009; Sigafoos, Drasgow, Reichle, O'Reilly, & Tait, 2004). Behavioral interventions targeting mands for breaks from instructional demands have also been studied in the literature on functional communication training (e.g., Lalli, Casey, & Kates, 1995; Winborn, Wacker, Richman, Asmus, & Geier, 2002). Another scenario in which a mand to remove a stimulus may occur involves removal of a stimulus that prevents access to a preferred activity. For example, a typically developing individual might be engaged in a preferred activity, such as watching TV, and something or someone obstructs his view. It is unlikely that the individual would emit a mand for the TV, but instead would mand for the person to move. Under similar conditions, children with language delays may be more apt to request the preferred activity or engage in a variety of other responses (e.g., problem behavior, physically attempting to move the obstruction).

Situations in which people or activities interfere with a preferred activity may occur frequently in the natural environment. Teaching appropriate responses to these situations can provide an effective means of obtaining reinforcement, potentially evading problem behavior that can sometimes develop in individuals with language delays. Thus, the purpose of the current study was to teach children with language delays to vocally mand for the removal of an obstructing

Nicole M. Powell is currently at Nationwide Children's Hospital, Center for Autism Spectrum Disorders, Columbus, Ohio.

Correspondence concerning this article may be addressed to: Crystal Bowen, Marcus Autism Center, 1920 Briarcliff Road NE, Atlanta, GA, 30329. (e-mail: crystal.bowen@choa.org).

stimulus (to access a preferred activity) and evaluate whether they differentially emitted the mand only when obstructing stimuli were present (i.e., in the presence of the establishing operation [EO]).

METHOD

Participants and Setting

Five participants were selected for this study. Tommy was a 4-year-old male diagnosed with autism. He emitted one to three word vocal mands, some mands for information, and differentiated use of yes/no when manding. Josh was a 3-year-old male diagnosed with autism who emitted one- to two-word vocal mands and differentiated use of yes/no when manding. Abby was a 4-year-old female diagnosed with autism who emitted one- to three-word vocal mands. Jenny was a 5-year-old female diagnosed with pervasive developmental disorder-not otherwise specified and partial fetal alcohol syndrome who emitted one- to four-word vocal mands. Julian was an 8-year-old male diagnosed with autism who emitted one- to four-word vocal mands, mands for information, and differentiated use of yes/no when manding. All participants consistently responded to receptive instructions, tacted common items, and completed intraverbal ''fill-ins.''

None of the participants requested the removal or termination of a stimulus that prevented access to a preferred item or activity. When a preferred stimulus was obstructed, participants requested the item by name, attempted to move the obstruction, or emitted no response while attempting to view around the obstruction. The study's preparation included blocking their view of the television or computer screen while a preferred movie or computer game was playing. Preferred games and videos were identified by consulting with each participant's treatment team and subsequent direct observation by the experimenters.

Sessions were conducted in a private therapy room for Tommy and a large classroom for all other participants. Teaching stations contained a table, chairs, preferred edibles, teaching materials, toys, and a TV/DVD unit or computer.

Data Collection and Interobserver Agreement

Trial-by-trial data were collected on independent mands during baseline and post-training, and independent and prompted mands during treatment. The primary dependent variable was a mand for removal of the obstruction. An *EO-present mand for removal* was defined as a mand emitted by a participant (i.e., ''move please'' or ''excuse me'') when an item was obstructing the view of the TV or computer screen. If the mand for removal occurred within 5 s of the onset of obstruction and prior to the prompt it was scored as a correct response. If the participant emitted the correct mand for removal following a vocal prompt from the therapist, the mand was scored as prompted. An *EO-absent mand* was scored if a mand for removal was emitted when there was no obstruction and the preferred item was readily available. An *item mand* was scored if the participant emitted an alternative mand, such as a mand for the actual item being obstructed (e.g., ''Computer''). All other responses or absence of a response were scored as incorrect.

Interobserver agreement (IOA) was assessed by a second observer simultaneously recording data independent of the primary observer. An agreement was defined as both observers recording that a response occurred or did not occur on a given trial. Mean IOA for all trials was calculated by dividing the number of agreements by the number of agreements and disagreements and converting the ratio to a percentage. Mean IOA was 99.4% (range, 66.7%–100%) for Abby and assessed for 58.8% of trials, 98.6% (range, 66.6%–100%) for 26.6% of Julian's trials, and 95.8% (range, 50%–100%) for 64.2% of Josh's trials. IOA for both Jenny and Tommy was 100% and assessed for 36.6% and 27.8% of trials, respectively.

Experimental Design

An adapted alternating treatments design (Sindelar, Rosenberg, & Wilson, 1985) was utilized within participants to evaluate the effects of mand training in the presence and absence of a putative EO. A nonconcurrent multiple-baseline design across participants

was also used to demonstrate replication of the treatment effects of mand training.

Procedures

Mands for removal were initially assessed during baseline trials. Treatment trials were then conducted and after mastery criterion was met, mands for removal were assessed during post-training trials. Throughout all phases, data were collected under two different conditions, an EO-present condition and an EO-absent condition (described below). The two conditions were presented in an alternating fashion. An average of 11, 8, 12, 9, and 7 trials were conducted each day for Tommy, Josh, Abby, Jenny, and Julian, respectively.

Baseline and post-training. Baseline and post-training trials were conducted identically. Trials were initiated when the child emitted an indicating response for the preferred activity. An indicating response was defined as the child reaching for or making eye contact with the target preferred item for at least 3 s (e.g., watching the movie for 3 s). Following an indicating response, either an EO-present or EO-absent trial was initiated. During an *EO-present* trial, the therapist obstructed the child's view of the preferred item by placing an object (e.g., the experimenter's binder, papers, or clipboard) in front of the screen. Obstructions were implemented in a manner that mimicked a naturally occurring accidental obstruction. For example, the therapist would ''accidentally'' let his or her folder fall in front of the TV screen. During obstructions, a 5-s delay was provided to allow the participant to mand for the removal of the obstruction. No prompts were provided during this interval. If the child emitted a mand for the target item, emitted a mand for removal, or 5 s elapsed with no response, the obstruction was removed and the trial was terminated (i.e., the participant was allowed to return to the activity with no further interruptions). During an *EO-absent* trial, the participant had access to the preferred item. The therapist did not obstruct the view of the preferred item, but stood in the same location as in the EO-present condition, near the preferred item holding the obstructing stimulus. The EO-absent trial was terminated after 5 s elapsed. Trials were conducted at least 30 s apart and regular activities from each participant's programming were implemented between trials.

Treatment. All treatment trials were initially conducted by a researcher. Trials were initiated and obstructions were arranged as described above. The researcher removed the obstruction after all correct, independent, or prompted mands for removal during EO-present trials. If the participant manded for the preferred item, the response was scored and ignored and the obstruction continued for 5 s.

In the *EO-present condition*, teaching was conducted using a constant time delay (CTD; Schuster, Gast, Wolery, & Guiltinan, 1988) procedure starting with a 0-s delay. Following the indicating response, the therapist obstructed the preferred activity and immediately provided the controlling prompt for the mand for removal. The controlling prompt consisted of a full vocal prompt for the mand ''Excuse me'' for Josh, Abby, and Jenny and ''Move please'' for Tommy and Julian. If the participant emitted the correct response within 5 s of the controlling prompt, the therapist immediately removed the obstruction and allowed the participant a minimum of 30-s access to the preferred item. If a correct response did not occur within 5 s of the controlling prompt the trial ended and the obstruction was removed. Thus, a correct mand for removal resulted in immediate removal of the obstruction, whereas lack of responding or incorrect responding resulted in the obstruction remaining for 5 s. Some procedures were modified for Abby due to a lack of consistent responding. Abby had a history of problem behavior that occurred in the presence of novel therapists, therefore at trial 69, her regular daily therapist began conducting teaching trials to eliminate a potential competing EO for attention from the novel researcher. It also appeared that 5 s of obstruction was not sufficient to evoke the mand for Abby; thus, beginning at trial 84 the controlling prompt was issued every 5 s until the response was emitted or up to 3 min to increase the duration of obstruction.

During the *EO-absent condition*, trials were identical to the procedures described in baseline and post-training. Mands for

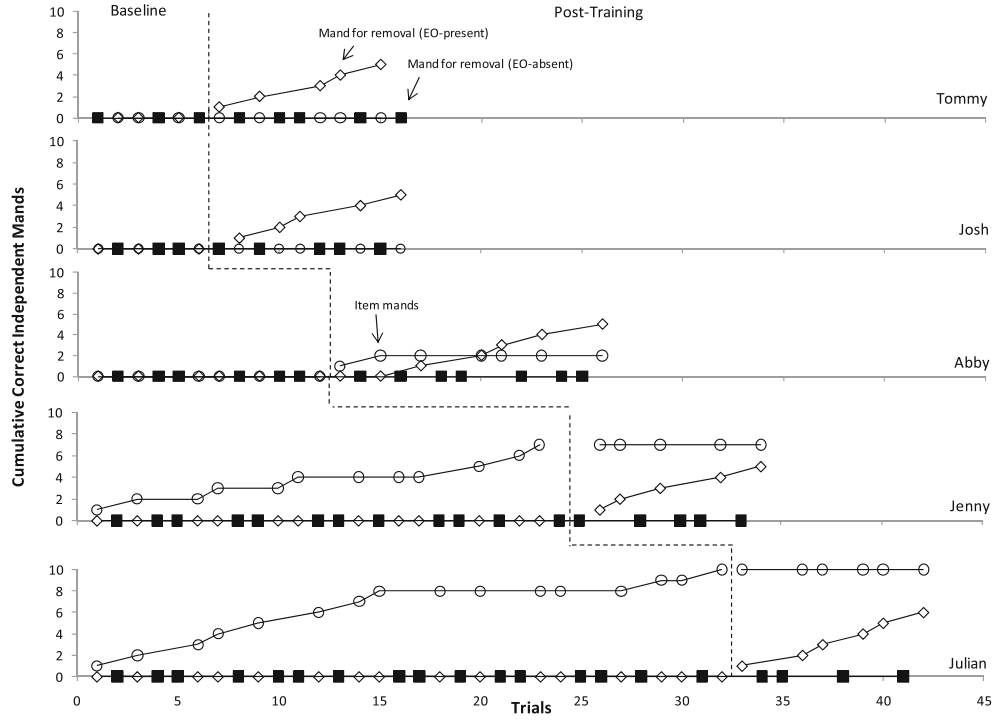

Figure 1. Cumulative number of correct independent mands for removal when an EO was present (open diamonds) and absent (closed squares), and cumulative number of item mands (open circles) during baseline and post-training trials for each participant.

removal during EO-absent trials were recorded but ignored.

For all participants, following correct responses to 8 out of 10 consecutive trials in which the last 3 trials were correct with a 0-s time delay prompt procedure, the time delay was advanced to 5 s. Therefore, correct independent responding resulted in immediate removal of the obstruction. Prompted responses resulted in removal following the 5-s delay. If no responding occurred, the obstruction would have been in place for 10 s (i.e., 5 s for the prompt delay plus 5 s following the prompt). The mastery criterion was met when independent correct responding occurred during 9 out of 10 consecutive trials with the last 3 responses correct at the 5-s time delay.

RESULTS

Figure 1 depicts cumulative mands during baseline and post-training trials under EO-present and EO-absent conditions. Data for Tommy, Josh, Abby, Jenny, and Julian are displayed in order from the top to bottom panels. None of the clients emitted mands for the removal of the obstructing stimulus during baseline. Jenny and Julian emitted item mands during baseline. During post-training, all participants acquired the mand for removal and only emitted mands during the EO-present condition. Neither Jenny nor Julian emitted item mands during post-training trials. Abby emitted an item mand on two occasions during post-training despite never emitting an item mand in baseline. Figure 2 depicts cumulative responding during EO-present and EO-absent mand training trials. The opportunity to engage in an independent mand did not occur until the prompt was delayed. After the prompt was delayed, Tommy, Josh, Jenny, and Julian all began to emit independent mands and met mastery criterion within 20 to 34 trials. Abby began emitting errors in the form of mands for the preferred items. Independent responses then increased following changes to the therapist and introduction

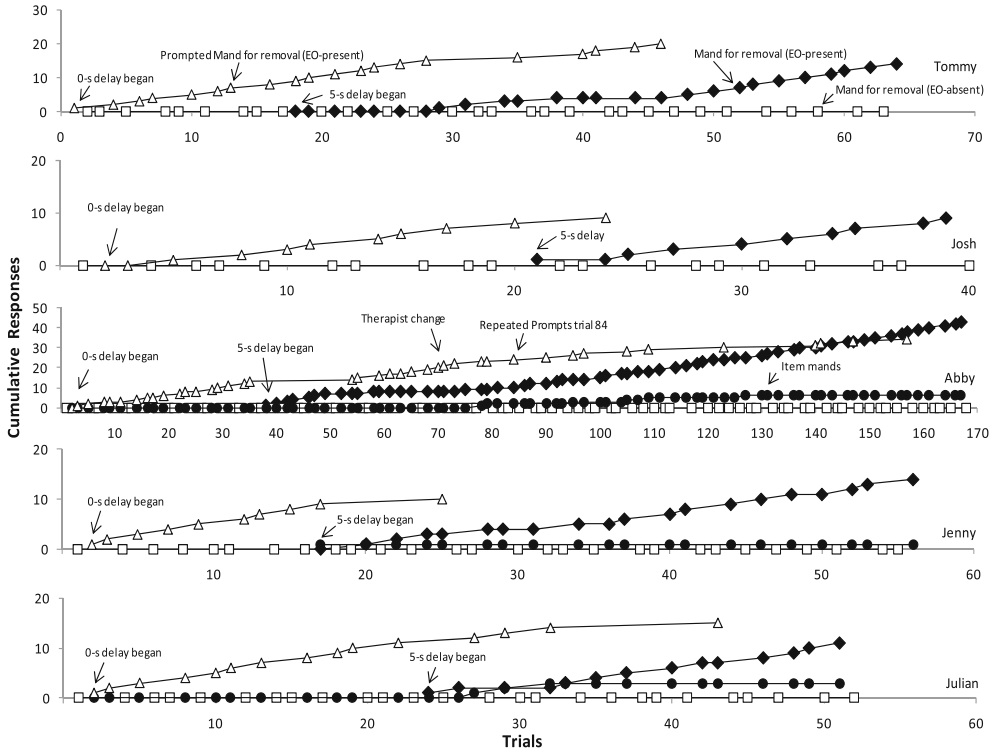

Figure 2. Cumulative number of correct independent and prompted mands when an EO was present (open diamonds) and absent (closed squares) during mand training for each participant.

to repeated presentation of the controlling prompt. Eventually, Abby acquired the response after 84 trials and emitted independent mands for removal under EO-present conditions in post-training.

DISCUSSION

Requesting the removal of an aversive stimulus can serve as an appropriate replacement for challenging behavior and ineffective communication strategies. All participants acquired the mand for removal using a CTD procedure with vocal prompts. Participants emitted the mand only under EO-present conditions, demonstrating differential responding. By including both EO-present and -absent conditions, we reduced the likelihood that responding occurred under faulty stimulus control (i.e., the researcher with the blocking stimulus) and increased the likelihood that the obstruction controlled the response. The results of the current study extend the existing mand training literature demonstrating a protocol effective in teaching mands maintained by negative reinforcement including conditions to observe differential responding.

Some modifications to the teaching procedures were required for Abby, which were made in an attempt to increase the likelihood that the conditions under which we were teaching involved an EO for the obstruction to be removed. It is important to consider these types of variations during instruction, as idiosyncrasies can affect outcomes. A limitation to the current study is that these procedural changes were made simultaneously (i.e., repeated prompts and lengthening duration of obstruction) or very close in time (i.e., changing therapist). Therefore, it is not possible to know which of these procedures resulted in better responding from Abby. Each of these modifications may have had an effect individually or when combined, possibly by altering relevant EOs.

Identifying a specific mand to remove obstructions may allow an individual to more

effectively manage his or her environment. Thus, both the topography of the response and the conditions under which one uses the response are important to consider. The topographies employed in the present study (i.e., excuse me, move please) were selected because the participants were able to readily acquire vocal behavior and the responses were likely in the stimulus class of ''politeness,'' potentially impacting the probability of reinforcement from novel listeners. Future research might replicate the current training procedures with other mand topographies.

Although stimulus generalization was not directly examined, use of the target mands outside of the teaching context was observed. For Jenny, independent mands were observed in the presence of nonprogrammed obstructions during the course of his day. Julian's parent also reported use of the mand in the home environment in the correct context. Though future research should specifically examine generalized use and maintenance, these informal observations suggest that ensuring the mand is taught under appropriate EO conditions may aid in generalization of the skill to functionally similar EO conditions (see Lechago, Carr, Grow, Love, & Almason, 2010).

In the current study, one response topography per participant was taught under similar contexts (i.e., obstructing a screen). Future research could include multiple response topographies across a variety of contexts (e.g., blocking a doorway or preferred area or toy). It is possible that repeated and regular obstruction of a single preferred activity by a single researcher may decrease the value of the preferred activity, reducing the EO and opportunities for teaching. Teaching across responses and contexts may prevent any decrease in the value of the preferred activity over time.

Although we never observed EO-absent mands, this could occur when teaching this response to other individuals. Introducing a consequence (e.g., extinction or redirection) may be needed to reduce such mands. It also may be useful to establish mastery criteria that accounts for errors in the EO-absent condition. For example, making achievement of mastery contingent on EO-present responding (as in the current study), but also contingent on the absence of the mand in the EO-absent condition. Additionally, alternative EO-absent conditions (e.g., blocking a nonpreferred activity) could be arranged to promote differentiation between conditions.

Manding for the removal of a stimulus in order to resume a preferred activity is a useful skill that provides children with language delays with an effective and functional response with potentially great utility in the everyday environment. The current study provides support for a fairly simple procedure to effectively establish such repertoires.

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