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EVALUATION OF STIMULUS CONTROL OVER A COMMUNICATION RESPONSE AS AN INTERVENTION FOR STEREOTYPICAL RESPONDING

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Stereotypical behavior maintained by automatic reinforcement often does not result in harm but may be undesirable in some situations. In the current investigation, participants were 2 individuals who engaged in nonharmful stereotypical responses shown in an analogue functional analysis to be insensitive to social contingencies. After bringing these responses under stimulus control using differential punishment, both participants learned a mand to terminate punishment for stereotypy. We also assessed whether the mand could be brought under stimulus control.

Key words: developmental disabilities, differential reinforcement, function-based intervention, punishment, stereotypy, stimulus control

Stereotypical behavior consists of repetitive vocal or motor responses presumed to be maintained by automatic or sensory reinforcement (Athens, Vollmer, Sloman, & Pipkin, 2008; Bodfish & Lewis, 2002). Although some stereotypical responses are harmful in all situations (e.g., automatically reinforced self-injury), other such responses are problematic only under particular conditions. For example, stereotypical rocking of a student with intellectual disabilities might be permitted in a chair in the back of the classroom but not at his or her desk, where the behavior could be disruptive to learning. In such situations, an intervention could involve teaching the student when it is acceptable to emit the stereotypical response (e.g., Doughty, Anderson, Doughty, Williams, & Saunders, 2007; Piazza, Hanley, & Fisher, 1996).

Doughty et al. (2007) used differential punishment to bring nonharmful stereotypical behavior under stimulus control in three persons with intellectual disabilities such that participants emitted stereotypy almost exclusively in the presence of a discriminative

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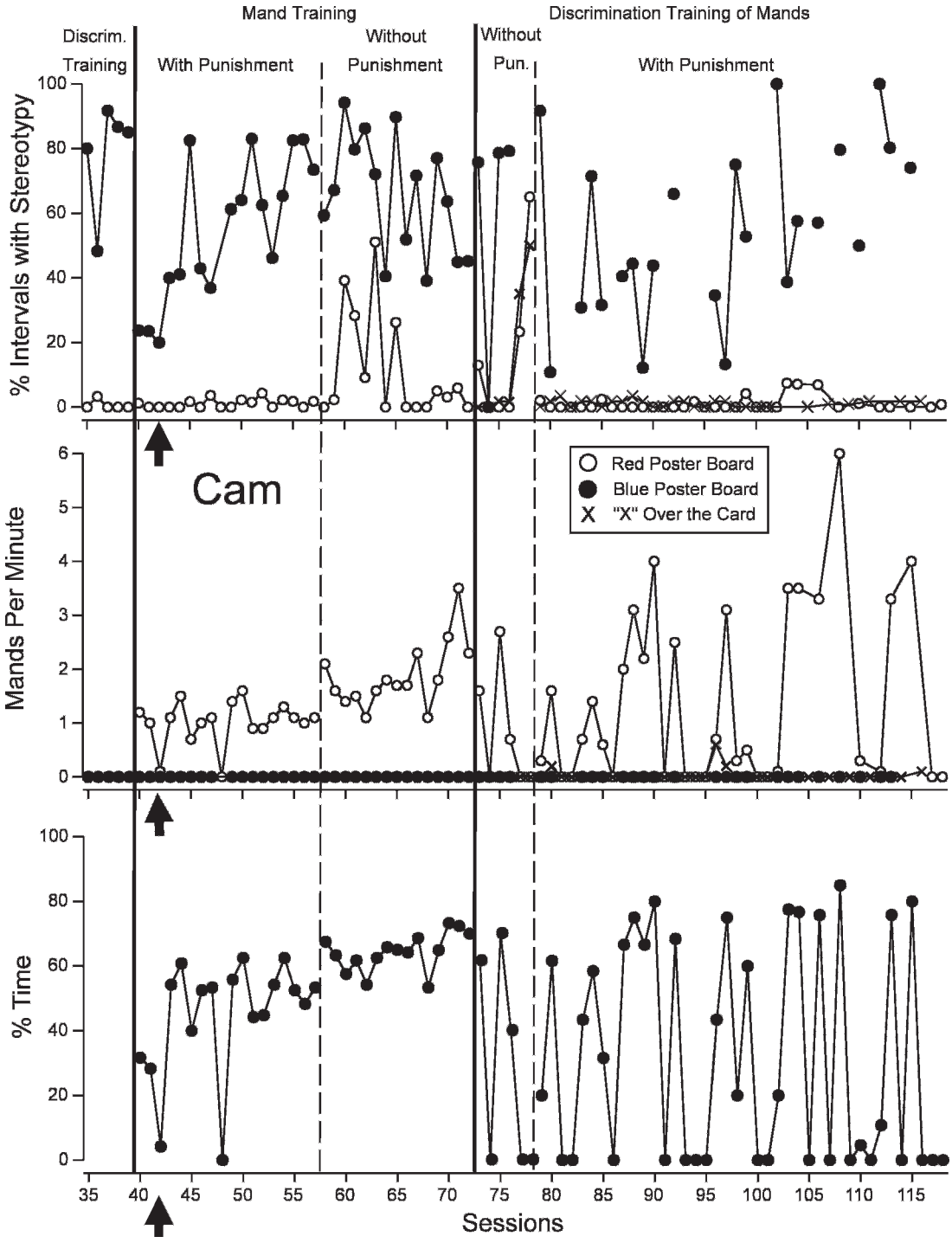

Figure 1. For Cam, percentage of intervals of stereotypy is depicted in the top panel and mands per minute in the middle panel. The bottom panel depicts the percentage of session spent in the blue poster board component (the component correlated with no punishment). The arrow indicates a change in duration of access to the no-punishment conditions, following a mand, from 20 s to 1 min. In all panels, responding in the presence of stimuli correlated

stimulus correlated with the absence of punishment. In the current investigation, we extended the results of Doughty et al. to determine whether 2 of those participants would emit a mand that produced access to a stimulus condition wherein stereotypy was not punished. We also assessed whether the mand could be brought under stimulus control.

METHOD

Participants and Setting

Cam was a 40-year-old man with limited communication who had been diagnosed with profound intellectual disabilities and Down syndrome. Tom was a 45-year-old man who had been diagnosed with severe intellectual disabilities and was profoundly deaf and legally blind (although he could see objects at close range), with no receptive or expressive language. Analogue functional analyses suggested that the stereotypy of both participants was maintained by nonsocial sources of reinforcement (Doughty et al., 2007). The study occurred in a laboratory room equipped with stimuli relevant to the condition, one-way observation, and video- and audio-recording equipment. All sessions lasted 10 min and occurred several times per week.

Operational Definitions, Data Collection, and Interobserver Agreement

Cam's stereotypy was finger waving, defined as moving two fingers back and forth repeatedly at or above waist level with eyes directed toward his fingers. Tom's stereotypy was hand and arm flapping, defined as moving his arms or hands through the air repeatedly at or above waist level by bending at the wrist or elbow. All stereotypical responses were coded using partial-interval recording across consecutive 5-s intervals. For both participants, the mand was picking up a communication card and handing it to the experimenter.

Interobserver agreement was assessed across a minimum of 33% of the sessions in each phase. Total agreement coefficients for stereotypy for Cam and Tom, respectively, were 98% (range, 94% to 100%) and 93% (range, 84% to 99%) for discrimination training, 99% (range, 95% to 100%) and 93% (range, 87% to 99%) for mand training, and 99% (range, 98% to 100%) and 98% (range, 97% to 99%) for discrimination training of mands. Total agreement coefficients for manding for Cam and Tom, respectively, were 91% (range, 0% to 100%) and 100% for mand training and 98% (range, 75% to 100%) and 97% (range, 91% to 100%) for discrimination training of mands.

Procedure

Prior to beginning the current experiment, the stereotypy of both participants was brought under stimulus control using differential punishment, and those data are published in Doughty et al. (2007). In that study, different antecedent stimuli were correlated with the presence (being seated facing a red poster board on the wall for Cam, no wristband for Tom) or absence (being seated facing a blue poster board on the wall for Cam, wristband for Tom) of punishment following stereotypy. Punisher delivery was a 1-s hands-down procedure; the experimenter manually guided the participant's hands down to his sides following stereotypy, preventing further responding at that moment.

Prior to beginning mand training, communication training was conducted using most-to-least prompting beginning with hand-over-hand physical guidance and fading prompts to teach the participants to emit the mand independently. The punishment contingency and the stimuli associated with punishment were in

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historically with delivery of punishment (red poster board), no punishment (blue poster board), and communication extinction (X over the communication card) are depicted by open circles, filled circles, and asterisks, respectively.

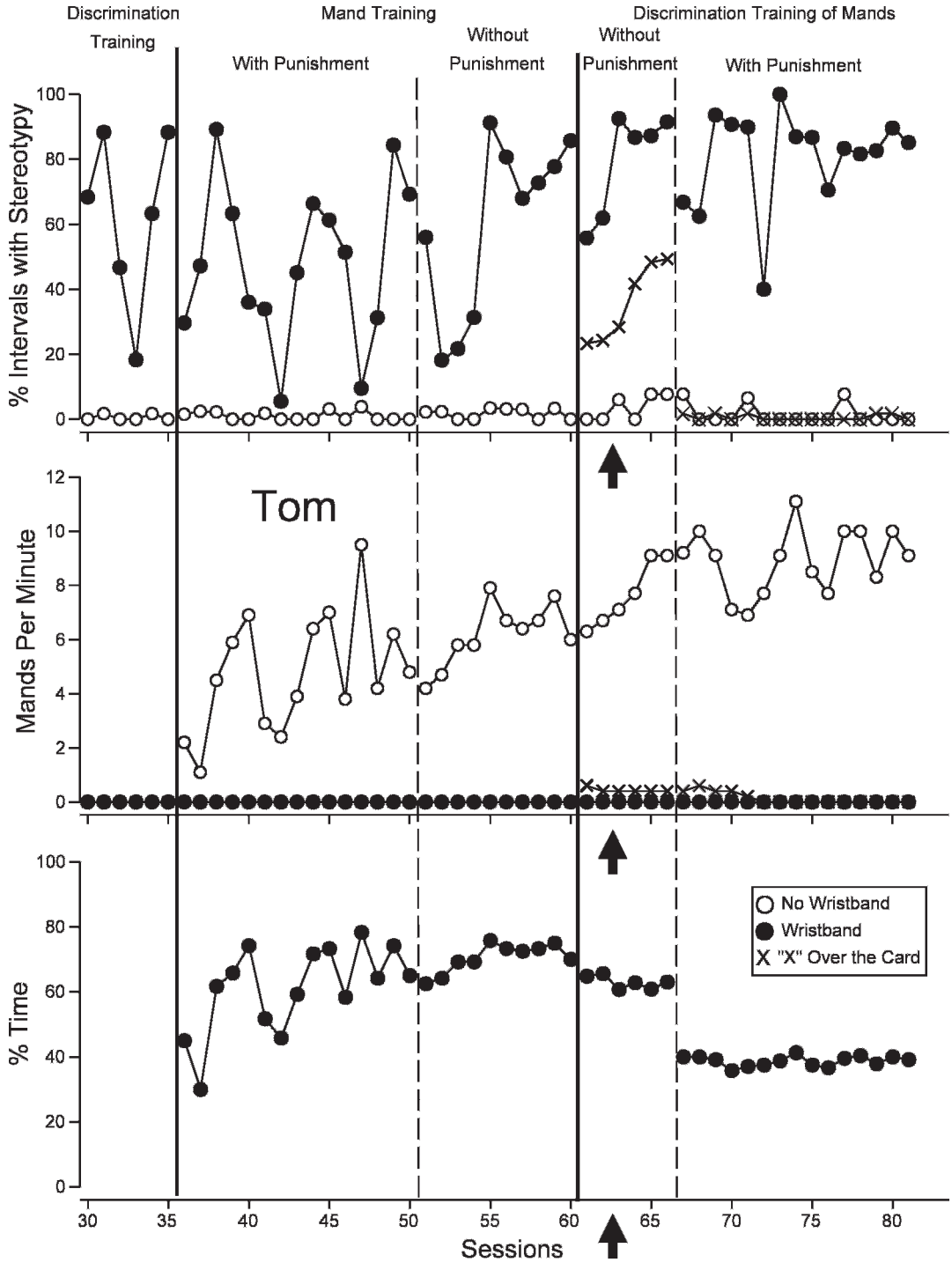

Figure 2. For Tom, percentage of intervals with stereotypy is depicted in the top panel and mands per minute in the middle panel. The bottom panel depicts the percentage of session time spent in the wristband component (the component correlated with no punishment). The arrow indicates when the communication card was moved to a new location. In all panels, responding in the presence of stimuli correlated historically with delivery of punishment (no

effect until the participant emitted the mand, and manding produced 20 s of the no-punishment condition (indicated by the blue poster board for Cam and the wristband for Tom). In both conditions, the manding card was readily accessible. Independent manding occurred after six sessions with Cam and two with Tom. Following 15 sessions of independent manding, the mand training phase began; prompting never occurred in this or subsequent phases. After the third session of mand training for Cam (arrow in Figure 1), the duration of the no-punishment condition was increased to 1 min because Cam often did not begin to emit stereotypy until after about 40 s. Thus, he was not functionally exposed to the no-punishment contingency.

To determine whether continued delivery of the hands-down procedure was necessary to maintain response suppression in the punishment condition, the punishment contingency was eliminated. All other aspects of the procedure remained the same: The stimulus previously correlated with punishment was in place (red poster board for Cam, no wristband for Tom), the communication card was available, and manding produced the stimulus correlated with the no-punishment component (blue poster board for Cam, wristband for Tom), but there was no change in the contingencies because the therapist never implemented the punishment procedure when the participants engaged in stereotypy during this phase.

Discrimination training of mands occurred next. In each session, a two-component multiple schedule was in effect, with each of two 2.5-min components presented twice. The components alternated, and the component that was presented first was determined randomly. One component was the condition in which the stimuli previously paired with punishment were present (red poster board for Cam, no wristband for Tom), and manding resulted in presentation of the stimulus correlated with no punishment (blue poster board for Cam, wristband for Tom). During the second component, mand extinction, the red poster board (Cam) and no wristband (Tom) were present, and an X was placed over (but not covering) the communication card. To facilitate discrimination for Tom, his communication card with the X was moved to a different location after the second session. In this component, use of the communication card had no programmed consequences; the therapist did not present the stimulus correlated with no punishment. In the no-punishment phase, there were no programmed consequences (the hands down was not used) for stereotypy in any component. Because stereotypy increased for both participants, the therapist reinstated punishment following stereotypy during the punishment phase in both components. If the participant manded during the component when the X was not present over the communication card, the therapist provided the stimuli correlated with no punishment (wristband for Tom and blue poster board for Cam), and the therapist did not implement the hands-down procedure. Manding during the communication extinction component of the punishment phase produced no stimulus change (i.e., Tom continued not to wear the wristband and Cam's poster board remained red), and the therapist implemented the hands-down procedure following stereotypy.

RESULTS AND DISCUSSION

Results for Cam and Tom are shown in Figures 1 and 2, respectively. From top to

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wristband), no punishment (wristband), and communication extinction (X over the communication card) are depicted by open circles, filled circles, and asterisks, respectively.

bottom, the three panels show the percentage of intervals with stereotypy, the rate of manding, and the percentage of session time spent in the no-punishment condition following reinforcement of manding. The last six sessions from discrimination training (reported in full in Doughty et al., 2007) are shown in the first vertical panels. Stereotypy (top) almost never occurred in the punishment component.

In the mand training phases, stereotypy occurred almost exclusively in the presence of stimuli correlated with the absence of punishment (blue poster for Cam, wristband for Tom). Manding occurred only in the presence of stimuli correlated with punishment for stereotypy. Cam and Tom spent approximately 64% and 70%, respectively, of each session in the blue poster board and wristband conditions (i.e., the stimulus conditions associated with no punishment). When the punishment contingency was withdrawn during mand training (no-punishment phase), Cam showed a transitory increase in stereotypy, but ultimately, both participants rarely emitted stereotypy in the presence of the stimuli previously correlated with punishment (red poster board for Cam, no wristband for Tom). For both participants, manding continued to occur only in the red poster board (Cam) and wristband (Tom) conditions. Stereotypy increased for both participants during the discrimination training of mands without punishment phase, and the punishment contingency was reinstated after six sessions. Following reinstatement of punishment for stereotypy, stereotypy occurred almost exclusively in the presence of stimuli that had been correlated with no punishment (red poster board for Cam, no wristband for Tom). Note that the missing points in Cam's stereotypy data are from sessions in which he did not mand, and thus no time was spent in the no-punishment component. For both participants, nearly all mands occurred in the red poster board (Cam) and no-wristband (Tom) components, when manding was followed by access to the stimuli correlated with no punishment. Cam's manding rate was more variable across sessions than was Tom's, with no manding observed in many sessions. When discrimination training of mands was introduced, Cam ceased to spend the majority of session time in the blue poster board condition. During some sessions, Cam spent the entire time in the presence of the red poster board (the stimulus correlated with punishment for stereotypy). By contrast, Tom spent approximately 80% of session time in the presence of the wristband (the stimulus correlated with no punishment). During discrimination training of mands, a proportion of each session could not be spent in no punishment (mands were on extinction); the time spent in the mand extinction component was not included in these calculations.

The current study extended the results of Doughty et al. (2007) by assessing the utility of combining stimulus control and communication training. The rationale for this extension was that an intervention that allowed participants to request access to stimulus conditions in which it was appropriate to engage in stereotypy might be more socially valid than an intervention in which stereotypy was never allowed. Further, there likely would be times in which such a request could not be reinforced. Thus, it would be important to bring both stereotypy and the communication response that allowed participants to access stereotypy under stimulus control. We successfully taught mands reinforced by access to no punishment for stereotypy, suggesting that communication training might be a valuable addition to stimulus control interventions for stereotypical responding. Both participants learned to emit the mand during conditions in which manding was reinforced but not when manding was on extinction. These results suggest that communication-based interventions might be successful with individuals who engage in stereotypy that is permissible in some situations.

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