

Using a tactile prompt to increase instructor delivery of behavior-specific praise and token reinforcement and their collateral effects on stereotypic behavior in students with autism spectrum disorders

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ABSTRACT

This study evaluated the effectiveness of a tactile cue, the Gentle Reminder™, as a prompt to increase instructor use of behavior-specific praise and token reinforcement. First, instructors were told to deliver reinforcement when a student was engaged in behavior that was incompatible with stereotypy. They were then told they would feel a vibration every 10 minutes to remind them to use reinforcement for these behavior. A tactile prompt was then programmed to vibrate every 10 minutes. It was expected that the teacher's use of reinforcement would increase and in turn, this would lead to a reduction in the level of student stereotypic behavior. A multiple baseline design across participants was used to evaluate the effects of the tactile prompt on instructor behavior and the collateral effects on student stereotypic behavior. After implementation of the tactile prompt, instructors' use of reinforcement for behavior incompatible with stereotypy increased systematically across all three instructors. The instructor's use of reinforcement increased more than once every 10 minutes when the tactile cue was implemented. In addition, there was a decrease observed in the level of the students' stereotypic behavior after introduction of the tactile prompt and the instructor's increased use of reinforcement.

KEYWORDS: teacher training, tactile prompt, reinforcement, autism, stereotypic behavior, behavior-specific praise, token reinforcement

STUDENTS DIAGNOSED WITH AUTISM spectrum disorders require specialized intervention by well trained professionals who are able to effectively implement teaching procedures based in applied behavior analysis (Lovaas, 1987). To develop competent teachers who can positively affect their students, it is important that supervisors provide effective training for the teachers (Weiss, 2005). Didactic training alone, however, is not sufficient for building adequate skills in instructional staff (Noell & Witt, 1999). Furthermore, instruction without in-vivo training has been shown to be only minimally effective as a training method (McClannahan & Krantz, 1993).

Instructor training with students with autism spectrum disorders has focused mostly on areas such as discrete trial instruction (Sarokoff & Sturmey, 2004) and functional analyses (Phillips & Mudford, 2008). There is little research, however, detailing effective procedures to train instructional staff to adhere to behavior intervention plans or to consistently apply interventions (Kraemer, Cook, Browning-Wright, Mayer, & Wallace, 2008; Sterling-Turner,

Watson, Wildmon, Watkins, & Little, 2001). Instructional staff may require prompting to implement newly learned procedures consistently, thereby maximizing student success (Petscher & Bailey, 2006). A tactile prompt is an unobtrusive, effective option for providing a cue for staff to perform particular skills that they have previously learned. For example, Petscher and Bailey (2006) used a tactile cue as part of a treatment package to increase accurate implementation of a classroom token economy along with instructor self-monitoring. The participants were instructional assistants who had less than 1 year of experience working in a classroom setting.

The current study evaluated the effectiveness of a tactile cue, the Gentle Reminder™, used as a prompt to increase instructor delivery of behavior-specific praise and token reinforcement for behavior incompatible with stereotypy for students with autism spectrum disorder. In turn, it was expected that the increased delivery of reinforcement for behaviors incompatible with stereotypy would, in turn, lead to a reduction in the frequency of student stereotypic behavior.

» METHOD Participants

Three instructors who worked in a school program for students with autism participated. Dana, age 22, worked in the school

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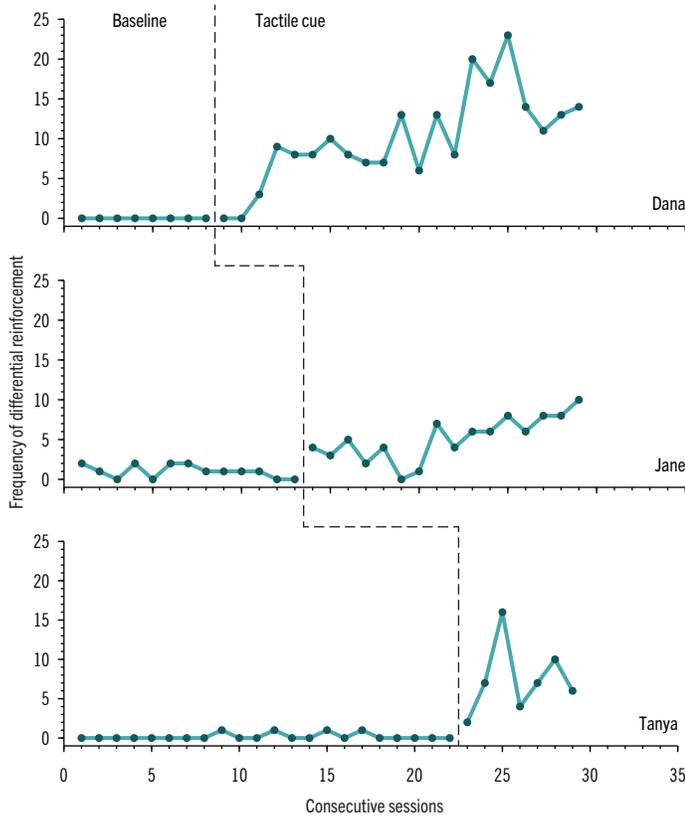


Figure 1. Frequency of reinforcement (behavior-specific praise and token reinforcement) delivery by instructors to student participants across baseline and training sessions.

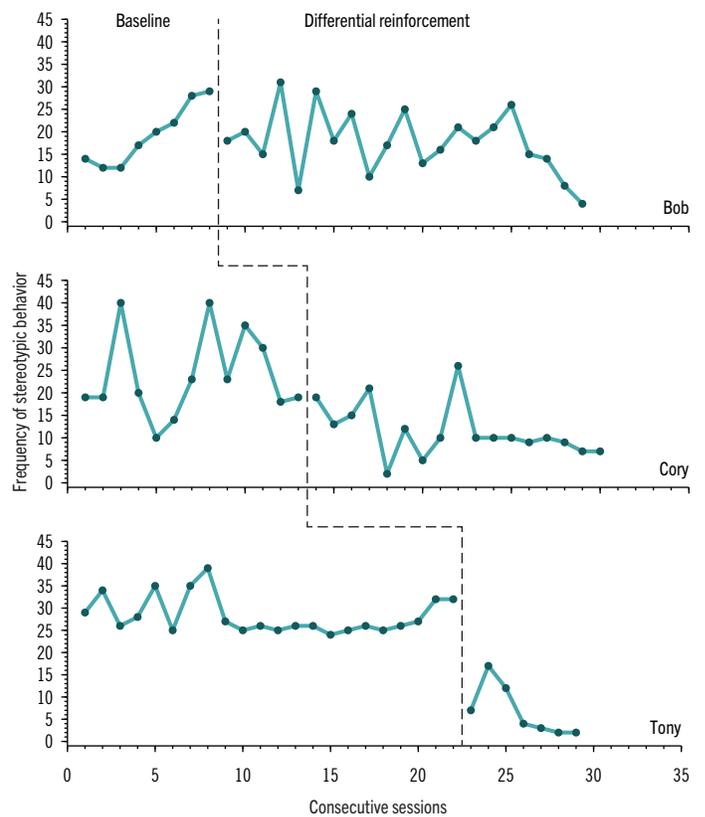


Figure 2. Frequency of stereotypic behavior emitted by student participants across baseline and training sessions.

program for 15 months prior to the onset of the study. Jane, age 20, worked in the school program for 12 months. Tanya, age 20, worked in the school program for 18 months. Instructors were selected for the study because they inconsistently implemented differential reinforcement for appropriate behavior when instructing their assigned students.

In addition, three students diagnosed with autism spectrum disorder participated. Bob, age 7, Cory, age 5, and Tony, age 10, had all attended the school for 3 months prior to the onset of the study. The students were chosen to participate because they engaged in high rates of stereotypic behavior that interfered with their learning. Bob engaged in twisting his hands together, clapping or flapping his hands, or hand gazing. Cory’s stereotypic behavior included twisting his hands together, clapping, laying his hands palm up on a staff member, or hand gazing. Tony engaged in rubbing his finger tips together, hand flapping, and twisting his hands together.

For the study, instructors and students were paired as follows: Dana with Bob, Jane with Cory, and Tanya with Tony.

Setting

The study took place in a school program that served students with autism spectrum disorders and was based on the principles of applied behavior analysis. The study was carried out in each of the students’ respective classrooms. Each classroom held tables, desks, and chairs for the students and instructor, bookcases, and shelving units containing student curriculum materials.

Materials

A tactile device, The Gentle Reminder™, was used to provide a vibrating tactile prompt to the instructors. Additionally, tokens, in the form of pennies, were used as part of a token economy. Back-up reinforcer choices were selected based on parent and teacher report and consisted of food items, preferred toys, books, and computer games.

Design

A multiple-baseline design across instructors was used to assess whether the tactile cue would increase instructor use of differential reinforcement for the absence of stereotypic behavior. Additionally, a second multiple-baseline design across students was used to assess whether the frequency of student stereotypic behavior decreased as a function of the instructors’ increased use of differential reinforcement.

Response definitions and data collection

To be scored as a correct delivery of reinforcement, instructors were required to provide both behavior-specific praise and a token contingent on student behavior incompatible with stereotypy (e.g., hands at sides, hands in lap, hands on a table, sitting up straight, and feet flat on the floor). Behavior-specific praise consisted of the instructor vocally identifying the correct behavior in which the student was engaged (e.g., “Your hands are down, you are sitting nicely.”). Tokens delivered were part of a token economy

in which students could access their back-up reinforcer for every 10 tokens earned. Instructor delivery of reinforcement was scored as occurring in the presence of the tactile prompt when it was delivered within 2 seconds of the vibration. If reinforcement was delivered at any other time, it was scored as occurring in the absence of the prompt.

Stereotypic behavior was defined individually for each student. Bob's stereotypic behavior included a variety of inappropriate hand movements. These were defined as twisting hands together in a wringing motion other than when washing, drying or applying lotion to hands, clapping hands together with the exclusion of appropriate clapping during a show or when other students were clapping, flapping one or two hands or hand gazing which involved eye orientation toward one or two hands for more than 2 seconds. Tony's stereotypic behavior included inappropriate hand and finger movements. They were defined as rubbing fingertips together (at least 2 movements in the opposite direction), flapping one or two hands or twisting hands together in a wringing motion with the exclusion of washing, drying or applying lotion to hands washing his hands. Cory's stereotypic behavior included inappropriate hand movements. They were defined as twisting hands together in a wringing motion with the exclusion of washing, drying or applying lotion to hands washing his hands, clapping hands together with the exclusion of appropriate clapping during a show or when other students were clapping, laying one or two hands palm facing upward on any part of a staff member's body or hand gazing which involved eye orientation toward one or two hands for more than 2 seconds. To be scored as an instance of stereotypic behavior, each response was required to have at least a 2 second interval between its offset and the onset of the next response.

Procedure

During baseline, instructors engaged in a typical 30 minute teaching session with the student participant in their dyad. The tactile device was worn by the instructor but was not turned on. The instructors were told to provide behavior specific praise and tokens for correct responses by the students for the typical daily instructional materials as well as for behavior incompatible with stereotypy.

During training, the same 30 minute teaching sessions occurred and the tactile device was worn by the instructor. During training, the device was preset to vibrate every 10 minutes for a total of 3 times during the 30 minute session. The instructors were given the same directions provided during baseline but were also told that each time they felt a vibration (tactile cue), they should provide behavior specific praise and token reinforcement if the student was engaged in behavior incompatible with stereotypy at the time the tactile cue occurred.

Interobserver agreement

Interobserver agreement (IOA) data were collected on the frequency of token delivery and behavior specific praise by instructors during 35% of the sessions for both baseline and training. The primary observer was the instructor. The second observer wore a tactile device set to vibrate at the same interval as the instructor's to record when the vibration was delivered. This allowed the ob-

servers to record the instructor delivery of reinforcement in both the presence of the tactile cue and in its absence. IOA was computed by dividing the number of agreements by the total number of agreements plus disagreements and multiplying by 100. For Dana, IOA for delivery of reinforcement was 100% during baseline and 94% (range 93–98%) during the training phase. For Jane, IOA was 97% (range 95–100%) during baseline and 94% (range 92–100%) during training. For Tanya, IOA was 100% during baseline and 99% (range 98–100%) during training.

IOA data were also collected for the occurrence of stereotypic behavior by the students. For Bob, IOA was 95% (range 90–100%) during baseline and 96% (range 92–100%) during training. IOA for Cory was 92% (range 90–100%) during baseline and 94% (range 92–98%) during training. Tony's IOA during baseline was 99% (range 96–100%) and during training was 98% (range of 92–100%).

» RESULTS

Compared to baseline levels, there was a systematic increase in the delivery of reinforcement in response to the tactile cue by each of the instructors during the training phase. In addition, the use of reinforcement increased in the absence of the tactile cue across all of the instructors. As seen in Figure 1, for Dana, her delivery of reinforcement increased from a frequency of 0 during baseline to a mean of 10 (range 0–23) during training sessions. Jane's delivery of reinforcement increased from a mean frequency of 1 (range of 0–2) during baseline to a mean of 5 (range 0–10) during training sessions. Tanya's delivery of reinforcement increased from a mean frequency of .2 (range 0–1) to a mean of 7.4 (range of 2–16) during training.

There was also a systematic decrease in the students' stereotypic behavior after implementation of the tactile cue and the increased use of instructor reinforcement for behavior incompatible with stereotypy. As seen in Figure 2, Bob's stereotypic behavior gradually decreased from a mean frequency of 19.3 (range 12–29) during baseline to a mean of 17.6 (range 4–31) during training. Cory's stereotypic behavior decreased from a mean frequency of 23.8 (range 10–40) to a mean of 11.5 (range 2–26). Tony's stereotypic behavior decreased from a mean of 28.3 (range 24–39) during baseline to a mean of 6.7 (range 2–17) during training.

» DISCUSSION

In the present study, there was a systematic increase in instructor use of behavior-specific praise and token reinforcement after implementation of the tactile cue. This increase occurred in the presence of the vibration as well as in its absence. These findings are consistent with those obtained by Petscher and Bailey (2006) who found that a tactile cue was an effective method for increasing the delivery of token reinforcement by instructors to their students.

One interesting finding of the study was the increase in instructor reinforcement delivery in the absence of the tactile cue. Had the instructors only responded to the tactile cue, they would have provided tokens and behavior-specific praise a maximum of 3 times throughout the 30 minute session. This was not the case, however, as the instructors delivered reinforcement in the absence of the cue and increased their use of reinforcement greatly. Thus, minimal

intrusion by the tactile device was needed to produce major gains in instructor behavior. It would be interesting to determine whether even fewer prompts would have been sufficient to produce similar increases in reinforcement delivery by the instructors.

Consistent with the increased delivery of reinforcement by instructors for behavior that was incompatible with stereotypy, each student's frequency of stereotypic behavior decreased substantially. These data are consistent with the notion that additional prompting may be needed for instructional staff to implement procedures consistently, thereby maximizing student success (Petscher & Bailey, 2006). Thus, the use of the tactile prompt in the present study provides one way in which instructional staff may be taught to more consistently apply behavioral interventions (Kraemer et al., 2008; Sterling-Turner et al., 2001).

One limitation of the current study was that instructor and student behavior were only observed in the same dyad. It would be interesting to determine whether the increased delivery of reinforcement by instructors would generalize to new students. Future studies utilizing the tactile prompt should consider programming and assessing generalization of reinforcement delivery

with new student partners as well as across settings. In addition, it may be helpful to add a social validity measure to the study to determine whether instructors rate the intervention as helpful to them, whether they would be likely to use the intervention again, and whether they would recommend the intervention to a peer teacher. Finally, no maintenance data were collected in the present study to determine whether the increased delivery of reinforcement by instructors and the decreased frequency of stereotypic behavior by the students would continue. Although reinforcement delivery did occur in the absence of the vibration cue during training, it would be interesting to determine the effects of systematically fading the device, or by providing probe sessions during which the vibrating cue was not present.

In conclusion, the tactile cue used in the present study was successful in modifying instructor behavior, which led to positive collateral changes in student behavior. Implementing such prompts for instructor behavior requires little effort, and causes minimal disruption and intrusion in the classroom. Additional studies should examine their use for modifying other teacher behavior. ■

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