Noncontingent Escape Access to Self-Reinforcement to Increase Task Engagement for Students with Moderate to Severe Disabilities

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Abstract: This study determined the effectiveness of noncontingent escape access to self-reinforcement, as a student-directed intervention. Three students successfully used a break card to systematically decrease inappropriate behavior maintained by negative reinforcement while increasing task engagement. In addition, teachers completed an Intervention Rating Profile-15 that assessed the social acceptability of this intervention. All teachers indicated that self-reinforcement was socially acceptable for classroom settings and they would recommend it to other teachers.

Implementation of antecedent-based interventions diverges considerably from response-based interventions. Rather than imposing a consequence following the occurrence of a problem behavior, antecedent-based interventions focus on the reducing the likelihood of problem behavior occurring initially (Luiselli, 1998). Antecedent-based interventions are used as proactive and preventative strategies. Antecedent interventions typically involve an environmental rearrangement. That is, stimuli or events that occur prior to the problem behavior are altered in some manner to reduce the probability of occasioning the occurrence of the problem behavior. Developing antecedent-based interventions require identifying the variables or conditions that are associated with the problem behavior. A critical first step involves conducting a functional behavioral assessment (Dunlap & Kern, 1993). The outcome of a functional assessment is the identification of environmental variables associated with the occurrence or absence of the problem behaviors. Asmus et al. (2004) examined the data of 138 individuals who performed behaviors including aggression, disruption, destruction, and stereotypic responses. Results indicated that when the inappropriate behavior was observed, distinct conditions for the behavior were identified in 96% of the cases. This information is directly pertinent to intervention development in that the implicated variables can be modified to produce an antecedent intervention.

In particular, the use of self-management has been recognized as a viable antecedent-based intervention (Koegel, Harrower, & Koegel, 1999; Smith & Nelson, 1997; Wehmeyer, Agran, & Hughes, 1998). Rather than relying on a teacher directed approach in which teachers are fully responsible for delivering instruction, monitoring behaviors, and delivering consequences, there is a shift to increase student's responsibility (Wehmeyer, Agran, & Hughes, 2000). Agran (1997) described four strategies of self-management including self-monitoring or self-recording, self-assessment or self-evaluation, self-instruction, and self-reinforcement. While the functional properties of some of these strategies may differ, self-management strategies enhance the student's ability to manage their own behavior and act more independently.

One of the most frequently researched self-management strategies is self-monitoring and

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self-recording (e.g., Gilberts, Agran, Hughes, & Wehmeyer, 2001; Hughes et al., 2002; Webber, Scheurmann, McCall, & Coleman, 1993). Self-monitoring and self-recording consists of students being taught to discriminate between targeted and desired behaviors and to record its occurrences during a predetermined activity or timeframe. Self-monitoring interventions have proven to be effective in reducing sensory-related behaviors (Koegel & Koegel, 1990), disruptive behaviors (Koegel et al. 1999), noncompliance (Agran et al., 2005; O’Reilly, Lancioni, Gardiner, Tieman, & Lacy, 2002); and increasing task completion (Hughes et al.), academic performance (Gilberts et al.; Hughes et al.; Koegel et al.), and physical activity (Todd & Reid, 2006). Self-monitoring interventions also have been effective with students with moderate disabilities (Agran et al.; Hughes et al.; O’Reilly et al.; Rankin & Reid, 1995), severe intellectual disabilities (Agran et al.; Ganz & Sigafoos, 2005; Koegel et al.; Mancina, Tankersley, Kamps, Kravits, & Parrett, 2000), and autism (Gilberts et al.; Koegel & Koegel; Todd & Reid). Although self-monitoring has demonstrated positive improvements with various academic and social behaviors for students with mild to severe disabilities including autism, Agran et al. and Ganz and Sigafoos noted that self-monitoring continues to be underutilized.

Another type of self-management strategy is self-reinforcement. In most classrooms, teachers arrange contingencies by identifying expected behaviors and the consequences for performing those behaviors. Self-reinforcement allows students to be involved in administering their own reinforcing consequences. Students were taught successfully to self-administer tokens (Shapiro & Klein, 1980), coins (Rusch, Mc Kee, Chads ey-Rusch, & Renzaglia, 1988), and stars (Shapiro, McGonigle, & Ollendick, 1980). Most often, self-reinforcement procedures were taught in conjunction with self-monitoring and self-recording. Shapiro and Klein taught four students with mild intellectual disabilities to reinforce themselves for engaging in on-task behavior. Students were taught using a three-step fading procedure. The teacher first gave the students tokens from a container placed directly in front of the student. The teacher then verbally prompted the students to take the token. Finally, the teacher motioned to the student to take the token without verbal prompts. All students maintained on-task behaviors when self-reinforcing. In a follow-up study, Shapiro et al. used self-reinforcement to increase on-task behaviors for five students with mild to moderate intellectual disabilities. Similarly, students were taught using fading prompt procedures. A cup of stars was placed directly in front of each student. The teacher verbally prompted students, who were observed on-task, to take a star and place it on a chart. Music also was paired with the teacher’s prompt. Teacher prompts then were gradually reduced over seven sessions. Results indicated that when self-reinforcement training was provided, on-task behaviors maintained at levels analogous when the teacher administered the reinforcer.

Transitioning from teacher-directed to student-directed management programs must be gradual and students must be explicitly taught to use self-reinforcement. Hughes and Agran (1992) suggested teaching self-reinforcement strategies included several training components. Individuals first learn to discriminate and label the problem behavior. Next, role-playing is used to teach self-evaluation of the person’s behavior or actions. At times, picture prompts, displaying appropriate and inappropriate behaviors, are used to represent discriminating behaviors. After self-evaluating, individuals self-administer a reinforcer. With similar training packages, previous self-reinforcement studies have shown that students with mild and moderate intellectual disabilities can learn to self-reinforce and improve academic, work, and social behaviors.

Self-reinforcement procedures are often dependent upon self-monitoring procedures. Mahoney and Thoresen (1974) noted self-monitoring sets the stage for self-reinforcement. Students must first determine that the target behavior has occurred prior to reinforcing themselves. DiGangi and Maag (1992) investigated the relationships of self-monitoring and self-reinforcement. Results indicated that neither strategy was as effective as when used in combination to decrease inappropriate verbalizations. Agran (1997) noted research was needed to examine the specific relationships between self-reinforcement and self-monitoring.
Ganz and Sigafoos (2005) used self-monitoring and self-reinforcement to increase task completion and asking for help. Students first choose a reinforcer, which they received contingently upon performing the target behavior. Students then were taught how to use a token system. One student was required to place tokens from a container to a self-monitoring board after performing the behavior while another student was required to snap blocks together to monitor the target behavior occurrence. After the students earned all their tokens or snapped all blocks, the students received their choice reinforcer. Agaran (1997) suggested ensuring that the student was actually managing their own behavior; the student must be free to partake in the reinforcer at any time, whether or not a particular response was performed. However, in the self-reinforcement studies noted (Gangi & Maag, 1992; Ganz & Sigafoos; Gardner, Cole, Berry, & Nowinski, 1983; Shapiro & Klein, 1980; Shapiro et al., 1980), students only had access to reinforcement contingent on the performance of the target behavior. Therefore, to ensure that students are actually managing their own behavior, the student should have the opportunity to self-administer reinforcers noncontingently.

Noncontingent reinforcement (NCR) involves the delivery of reinforcers that is response independent. Mace and Lalli (1991) used NCR to treat vocalizations of students with moderate intellectual disabilities. NCR resulted in near elimination of the students' vocalizations. Vollmer, Iwata, Zarcone, Smith, and Mazaleski (1993) compared the effects of differential reinforcement of other behaviors (DRO) and NCR on self-injurious behaviors of students with developmental disabilities. Results indicated that both interventions were functionally equivalent. However, Vollmer et al. suggested NCR has several advantages over DRO including a relative easiness of implementation. In most applications of NCR, reinforcers were initially delivered under dense schedules that produced higher rates of reinforcement than those during baseline. These dense NCR schedules may produce decreases in responding by altering the establishing operation (Michael, 1993) for problem behavior. That is, NCR produces a state of satiation as a result of frequent reinforcer delivery.

With this in mind, NCR may be used to examine if students are actually self-managing.

In addition, the applications of noncontingent escape (NCE) techniques have emerged as a promising intervention for escape maintained problem behavior (Vollmer, Marcus, Ringdahl, 1995). NCE is the removal of an aversive stimulus (e.g., demand, task) independent of a student's response delivered on a fixed-time schedule. NCE has also been referred to as fixed-time escape (FTE) by Reed, Ringdahl, Wacker, Barretto, and Andelman (2005). Davenport (1968) suggested that NCE may reduce students' motivation to engage in behavior maintained by negative reinforcement in the form of escape from demands. NCE was used successfully to reduce self-injurious (Vollmer et al.) and disruptive behaviors (Colman & Holmes, 1998). Students in both studies were verbally prompted by the investigator to "take a break" on a fixed-time schedule. Fixed-time schedules were increased systematically by 30 sec or 1 min intervals and students were allowed 20 to 30 min to escape from tasks. Moreover, Colman and Holmes included data on compliance, and the results indicated increased levels following NCE. Reed et al. also noted the positive effects of NCE or FTE for increasing compliance and reducing property destruction and aggressive behaviors. Similarly, students received breaks from tasks by the investigator; however, the schedule was either dense (45 sec or 60 sec) or lean (i.e., 150 sec or 170 sec). During FTE lean-schedules, students were observed engaging in low levels of problem behaviors and high levels of compliance. Conversely, during FTE dense-schedules, students were observed engaging in moderate levels of problem behaviors and low levels of compliance. Although previous studies demonstrated successful applications in changing behaviors, the interventions were instructor or teacher-directed. With this in mind, if NCE or FTE included a picture cue (e.g., break-card) for students to self-administer the break then it may be used to examine if students are actually self-managing.

The purpose of this study was to examine the effects of noncontingent escape access to self-reinforcement as an antecedent-based strategy on inappropriate behavior maintained by negative reinforcement or an escape func-
tion of behavior. Specifically, what are the effects of NCE on inappropriate and appropriate behaviors when students are provided the use of a break-card to self-reinforce? Also, this study sought to determine teachers' perceptions of change as a result of the intervention.

Method

Participants and Setting

Three students participated based on the following (a) middle school attendance, (b) age range from 11 to 14 years old, (c) level of cognitive functioning within the moderate to severe range of mental retardation (IQ 20–55), (d) regular participation in classroom vocational training, (e) performance of inappropriate behavior which impedes job training, (f) able to complete all steps of the job task independently, (g) parental permission, and (h) verbal agreement to participate following being told of the study activities and viewing the materials. Additionally, all students had a confirmed function of behavior of negative reinforcement in the form of escape from demands.

Three teachers recommended students for participation. The primary investigator observed each student in the classroom to confirm the students met the participating criteria. Final selection was determined after a brief-FA confirmed the function of behavior as escape from work tasks. Brief-FA were conducted by the primary investigator. Adele was 12 years old with a full-scale IQ of 48. Barron and Camilla were 13 years old with a full-scale IQ of 50 and 40, respectively. IQ's were assessed using the Wechsler Intelligence for Children (Wechsler, 1991) for Adel and Camilla. The Stanford Binet (Thorndike, Hagen, & Sattler, 1986) was used to assess Barron. According to teachers' reports, students were able to complete individual tasks independently, however, each student would usually engage in some form of off-task behavior to avoid or escape the task. In addition, all phases of this study occurred in each student's school resource classroom.

Materials

Materials consisted of five three by five inch index cards. Each card was colored read with the word break written on it. Task materials consisted of a storage organizer, colored reams of paper, copy machine, flowers, and wooden barrels. A stapler, magazines, radio, games, and toys also were used.

Response Measurement and Reliability

The target inappropriate behavior was reported by each student's teacher. Adele demonstrated a variety of disruptive behaviors. The behavior problem that Adele's teacher was most concerned with was frequent outbursts. Outbursts were defined as yelling and attempting to throw task materials on the floor. Barron's teacher was concerned with loud vocalizations. Vocalizations were defined as a high pitch noise that could be heard from a distance of 10-feet. Camilla's teacher was concerned with Camilla's sitting on the floor. Sitting on the floor was defined as Camilla's body on floor with legs crossed. Target behaviors were confirmed by the investigator during functional analysis procedures. For all sessions, the investigator recorded the occurrences of the students' target behavior via paper and pencil using a continuous 10 s partial-interval recording. Reliability estimates for target behavior were calculated by dividing agreements by agreements plus disagreements and multiplying by 100%. Agreements were defined as identically marked intervals, and disagreements were defined as intervals that contained different recordings between observers. Mean agreements for target behavior were 98% (range, 95–100%) for Adele, for Barron, 96% (range, 93–100%), and for Camilla, 100%.

The alternative behavior for all students was task engagement. Task engagement was defined as directing eyes towards the work activity, performing a step of the task, or manipulating task materials in the absence of the target inappropriate behavior. For all sessions, the investigator recorded the occurrences of the students' task engagement via paper and pencil using a continuous 10 s partial-interval recording. Reliability estimates for task engagement were calculated by dividing agreements by agreements plus disagreements and multiplying by 100%. Agreements were defined as identically marked intervals, and disagreements were defined as intervals that
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Procedural integrity also was assessed during functional analysis and self-reinforcement sessions. The second observer recorded the investigators behavior during a minimum of two sessions for each phase throughout the study. Procedural integrity was derived from dividing the number of observed behaviors by the number of planned behaviors and multiplying by 100 (Billingsley, White, & Munson, 1980). Procedural behaviors included (a) instructing students to task, (b) implementing a system of least prompts, (c) delivering reinforcement, (d) removing task materials, (e) providing attention, and (f) supplying break cards for self-reinforcement. The mean procedural integrity was calculated for each student throughout each phase of the study. The mean procedural integrity were 94% for Adele, (range, 90–100%), for Barron, 98%, (range, 97–100%), and 99% (range, 99–100%) for Camilla.

Procedure

Overview. The investigator conducted all procedures in the classroom setting. Brief-FA procedures were conducted to confirm the results of the teachers' interviews. Students then were exposed to a self-reinforcement intervention that was further examined.

Pretreatment Assessment

Teacher interview. Teachers were interviewed by the investigator to identify the student target behaviors. A semi-structured interview (O'Neill, et al., 1997) narrowed and defined the range of variables that occasioned and maintained the behavior of concern. Primary and secondary reinforcers also were identified.

Brief functional analysis. Following the teacher interview, a brief-FA was conducted to experimentally confirm the results of the interview. The brief-FA included a series of conditions similar to those described by Iwata, Dorsey, Slifer, Bauman, and Richman (1982/1994) and Northup et al. (1991). The assessment conditions included escape from task demands, attention, and control. Students participated in one 10 min session for each condition, with a 15 min break between conditions.

Escape Condition. Based on the teacher interview, each task was considered difficult, yet could be completed independently. Moreover, each student's task was associated previously with high levels of the inappropriate target behavior. Adele was required to stock paper according to color into a storage organizer. Barron was required to make copies using a copy machine. Camilla was required to sort two types of flowers according to color into large wooden barrels.

A three-prompt procedure was used for all students to encourage task completion. The first prompt was a verbal task request. If no response was initiated within 5 s, verbal and gestural prompts were used. If no response was initiated within 5 s, the investigator physically guided the student's hand as the verbal request was repeated. If the student responded correctly and engaged in the task during either of the first two prompts, verbal or physical attention was delivered. Contingent on the presence of target behavior, the investigator removed the task and turned away for 15 s. After 15 s, the investigator, again, presented the task and prompting sequence.

Attention. During the attention condition, all students were required to use a stapler to staple a two-page newsletter. For all students, teachers considered stapling an easy task and not associated previously with high levels of inappropriate behaviors. Stapling was a task that had not been previously associated with high levels of inappropriate behaviors based on the teacher interview. The investigator ignored all behaviors except the target behavior, for which the investigator provided attention with a verbal statement.

Control. During the control condition, all students were observed during scheduled free time activities. During free time, students had access to leisure materials including computer, radio, magazines, games, and toys. Free time was considered an enriched activity with an abundance of visual and auditory stimulation in which relatively few target behaviors occurred according to the teacher interview. No demands were presented during the con-
control condition and the investigator provided noncontingent attention to the student. In addition, no specific reinforcement (i.e., escape, attention) was provided following target inappropriate behaviors. The investigator recorded if an inappropriate behavior occurred, which also counted as an interruption in task-engagement.

**Confirmatory analysis.** Students participated in three additional sessions immediately following completion of the functional analysis. The condition with the highest level of target behaviors during the brief-FA (i.e., escape) was repeated twice, alternated with the condition that produced the second most occurrences of target behaviors (i.e., attention). This analysis was conducted to verify the consistency of the occurrence of the target behavior across specific conditions. Escape and attention condition sessions were identical to those conducted and analyzed during the previous standard assessment phase.

**Self-Reinforcement Training**

Students were taught to use a break card by their teacher. Training took place over three weeks during tasks associated with escape behavior. These structured training sessions were conducted twice daily for 10 min. For example, Adel’s task involved stocking paper according to color. The investigator engaged her in the task for several minutes, introduced a step that was difficult, and then verbally and physically prompted her to touch and deliver the break card to the investigator. After Adel presented the break card, Adele was provided with 2 min break. A digital timer was used to alert Adel when break was over and to begin work. Prompts were withdrawn for each student using a combination of fading techniques including delayed prompting. The investigator waited 5 s before prompting students to use a break card to allow each student to respond independently. Fading continued until the student used the break card without any verbal or physical prompts. This criterion was considered met when the student delivered the break card five consecutive times independent of verbal, gesture, or physical prompts (Adele and Barron met criterion after 10 school days, and Camilla met criterion 16 school days).

**Non-Contingent Escape Self-Reinforcement**

After students reach training criterion, students were provided with five break cards to use to request a break from task. The same task used during the brief-FA also was used in self-reinforcement. Students could access reinforcers noncontingently. Similar to training, students were provided a 2 min break after delivering the break card to the teacher. A digital timer again was used to alert students when break was over and to begin work.

**Fading break cards.** Contingent on the reduction of target inappropriate behavior, which criterion equals 50% interval occurrence less than the previous phase for three consecutive sessions, break cards were systematically reduced by one. That is, five break cards to four break cards, and then four break cards to three break cards, and so on. When the student was provided three break cards, a withdrawal of the intervention was conducted for three sessions. The no break card phase allowed the teacher to examine student target and replacement behaviors absent of intervention. The criteria to reinstate the intervention phase occurred when the trend of the intervention withdrawal progressed in the opposite direction of intervention.

**Design**

An abbreviated multielement design (Sindelar, Rosenberg, & Wilson, 1985) was conducted during the brief-FA phase. To verify student responding under specific conditions, a confirmation phase was performed. That is, the condition (escape) which resulted in the most target inappropriate behaviors was repeated twice alternated between the conditions (attention) which resulted in the second most occurrences of target inappropriate behavior. A changing criterion with an imbedded withdrawal designs was used to evaluate the effects of self-reinforcement on target and alternative behaviors (Barlow & Hersen, 1984). Experimental control for changing criterion designs is demonstrated when changes in the target behavior match precisely, or correspond closely to, at least three shifts in performance criteria (Horner et al., 2005). Moreover, with the application of a withdrawal
design, conclusions of intervention effects are strengthened by comparing no intervention to reinstatement of the intervention (Kazdin, 1982).

**Social Validity**

At the conclusion of the study, the three teachers were asked to complete the Intervention Rating Profile (IRP)-15 (Martens, Witt, Elliot, & Darveaux, 1985). The IRP-15 is a 15 item Likert-type scale that assesses general acceptability of interventions. The Likert scale ranges from one-strongly disagree to six-strongly agree. Higher scores indicate greater acceptance of the intervention and ratings above 52.5 are considered to reflect acceptability by the rater (Brock & Elliott, 1987).

**Results**

Figures 1, 2, and 3 show the percentage of intervals in which students performed target and task engagement behaviors across brief-FA and self-reinforcement phases. For Adele (see Figure 1), the mean percentage of intervals of outbursts during the brief-FA across conditions included, escape 53.6%, attention 6.5%, and control 5%. The mean percentage of intervals of task engagement during the brief-FA across conditions included, escape 46.3%, attention 93.5%, and control 95%. The brief-FA results indicated that Adele's outbursts were negatively reinforced in the form of escape from demand. For Barron, the mean percentage of intervals of vocalizations during the brief-FA across conditions included, escape 70.6%, attention 10%, and control 0%. The mean percentage of intervals of task engagement during the brief-FA across conditions included, escape 29.3%, attention 90%, and control 100%. The brief-FA results indicated that Barron's vocalizations were negatively reinforced in the form of escape from demand. For Camilla, the mean percentage of intervals of sitting on the floor during the brief-FA across conditions included, escape 76.3%, attention 16.5%, and control 2%. The mean percentage of intervals of task engagement during the brief-FA across conditions included, escape 23.7%, attention 83.5%, and control 98%. The brief-FA results indicated that Camilla's sitting on the floor behaviors were negatively reinforced in the form of escape from demand.

During self-reinforcement, Adele's outbursts decreased to a mean of 37.8% intervals and task engagement increased to a mean of 63.2% intervals when five break cards were made available to self-reinforce (see Figure 1). Adele's outbursts continued to decrease to a mean of 16% intervals and task engagement
increased to a mean of 84% intervals when four break cards were available. When three break cards were available, Adele’s outbursts decrease to a mean of 7.4% intervals and task engagement increased to a mean of 92.6% intervals. However, when break cards and the opportunity to self-reinforce were withdrawn, Adele’s outbursts increased to a mean of 16% intervals and task engagement decreased to a mean of 84% intervals. During the reimplementation of three self-reinforcement break cards, Adele’s outbursts decreased to a mean of 10% intervals and task engagement increased to a mean of 90% intervals. Outbursts further decreased to a mean of 3.8% intervals and 0% intervals when provided with two and one self-reinforcement break cards, respectively. Task engagement increased to a mean of 96.3% intervals and 99.3% intervals when two and one break cards were made available to self-reinforce.

For Barron (see Figure 2), self-reinforcement decreased vocalizations to a mean of 39% intervals and task engagement increased to a mean of 61% intervals when five break cards were available to self-reinforce. Barron’s vocalizations continued to decrease to a mean of 15.4% intervals and task engagement increased to a mean of 84.6% intervals when four break cards were available. When three break cards were available, Barron’s vocalizations decrease to a mean of 8.6% intervals and task engagement increased to a mean of 91.4% intervals. However, when break cards and the opportunity to self-reinforce were withdrawn, Barron’s vocalizations increased to a mean of 24% intervals and task engagement decreased to a mean of 76% intervals. During the reimplementation of three self-reinforcement break cards, Barron’s vocalizations decreased to a mean of 14.3% intervals and task engagement increased to a mean of 85.7% intervals. Vocalizations further decreased to a mean of 5.5% intervals and 2.3% intervals when provided with two and one self-reinforcement break cards, respectively. Task engagement increased to a mean of 94.5% intervals and 97.6% intervals when two and one break cards were made available to self-reinforce.

For Camilla (see Figure 3), self-reinforcement decreased sitting on the floor to a mean of 53% intervals and task engagement increased to a mean of 47% intervals when five break cards were available to self-reinforce. Camilla’s sitting on the floor continued to decrease to a mean of 25% intervals and task engagement increased to a mean of 75% intervals when four break cards were available. When three break cards were available, Camilla’s sitting on the floor decrease to a mean of 10% intervals and task engagement...
increased to a mean of 90% intervals. However, when break cards and the opportunity to self-reinforce were withdrawn, Camilla’s sitting on the floor increased to a mean of 25% intervals and task engagement decreased to a mean of 75% intervals. During the reimplementation of three self-reinforcement break cards, Camilla’s sitting on the floor decreased to a mean of 14% intervals and task engagement increased to a mean of 86% intervals. Sitting on the floor further decreased to a mean of 4% intervals and 3.6% intervals when provided with two and one self-reinforcement break cards, respectfully. Task engagement increased to a mean of 96% intervals and 96.4% intervals when two and one break cards were made available to self-reinforce.

Social Validity

Each student’s teacher completed the social validity IRP-15 rating scale. Following the study, all teachers rated self-reinforcement above 53 suggesting the intervention was socially acceptable. Specifically, Adel’s teacher rated break card self-reinforcement an 81, Barron’s teacher rated the intervention a 75 and Camilla’s teacher an 85. In particular, teachers strongly agreed that (a) most teachers would find the intervention procedures suitable for the behavior problem described, (b) the intervention was a fair way to handle the child’s problem behavior, (c) I liked the procedures used in this intervention, (d) I would suggest the use of this intervention to other teachers, and (e) the intervention did not result in negative side-effects for the child.

Discussion

The purpose of this study was to examine the effects of noncontingent access to self-reinforcement as an antecedent-based intervention on inappropriate behavior maintained by negative reinforcement or an escape function of behavior. This study also sought to investigate the effects of NCE on inappropriate and appropriate behaviors when students were provided the use of a break-card to self-reinforce? Additionally, this study examined teachers’ perceptions of change as a result of the intervention. The brief-FA indicated that target behaviors of the three students were maintained by negative reinforcement in the form of escape from demands. The self-reinforcement intervention was designed to match the function of behavior. As demonstrated by the changing criterion and withdrawal design, noncontingent access to self-reinforcement in the form of escape from task decreased students’ target behaviors while concurrently improving task engagement.
These findings confirm previous investigations that demonstrated positive use of self-reinforcement (e.g., Ganz & Sigafous, 2005; Shapiro & Klein, 1980; Shapiro et al., 1980). Student-directed strategies, such as self-reinforcement, provide one means that allow students to manage their own behaviors rather than relying on others to direct and monitor their performance. These results display a functional relationship that noncontingent escape access to self-reinforcement was responsible for decreasing target behaviors and improving task engagement. Moreover, student-directed interventions do not require teachers to monitor student behaviors continuously. Since self-reinforcement was student-directed, teachers could use the intervention while also addressing the needs of other students in the same classroom. This study supports other studies (Agran et al., 2005; Ganz & Sigafous, 2005, Gilberts et al., 2001; Hughes et al., 2002; O'Reilly et al., 2002; Todd & Reid, 2006), which concluded teachers indication of self-management interventions as socially acceptable for students with moderate to severe intellectual disabilities.

These findings extend previous investigations in several ways. First, noncontingent escape access to self-reinforcement was used to ensure that students had access to reinforcers whether targeted behaviors were performed or not. Kazdin (1984) and Agran (1997) suggested that access to reinforcement whether the targeted behavior was demonstrated or not was necessary to determine if students were truly self-managing. This study demonstrated the use of noncontingent access to self-reinforcement as a means of ensuring that students are truly self-managing their behavior, as they could freely partake in reinforcement at any time. This suggests that self-reinforcement may function independent of self-monitoring and self-recording.

Secondly, the noncontingent escape (NCE) self-reinforcement intervention was derived from functional analysis outcomes. The identification of the conditions in which students' demonstrated targeted behaviors assisted in the selection of reinforcement. This study supports previous research in the successful use of NCE techniques for reducing problem behavior and increasing appropriate behaviors (Colman & Holmes, 1998; Reed et al., 2005; Vollmer et al., 1995). The use of break-cards extends the research of NCE or FTE by providing students the opportunity to self-reinforce. In this study, as break-cards or the students' opportunity to self-reinforce were faded to one occurrence, student target behaviors continued to decrease while task engagement increased persistently. Students benefited from the leaner schedule of NCE/FTE, also observed in Reed et al. However, when no break-cards to self-reinforce occurred, student target behavior increased and the level of task engagement decreased.

Within sessions, students were observed initially using their break-cards at the beginning of most session. However, as the study progressed and break-cards were gradually faded to one break-card, students were more likely to save and use the cards later during the session. While satiation effects of fewer demands may explain a decrease in the observation of avoidant behaviors at first, it was less likely when students were provided only one or two break cards per session. Vollmer et al. (1995) suggested similar conclusion in which during early sessions there was relatively no aversive stimulation from which to escape. That is, early sessions relied on alternating establishing operations. During later sessions, the learner schedule of NCE discussed earlier provides a possible conclusion to observations of students saving and using the break-cards later within the session.

Third, self-management strategies frequently promote shifts in stimulus control through manipulation of antecedent conditions. The use of break cards shifted stimulus control from the teacher to the student. By providing an external stimulus (break card) to assist with self-regulation of one's behavior, students were prompted of present and future contingencies in the environment. Self-reinforcement, among other student-directed intervention strategies, provided an effective way to optimize students with moderate to severe intellectual disabilities participation in classroom tasks and activities.

Fourth, this study specifically sought to use NCE self-reinforcement to address task avoidant behaviors. Negative reinforcement in the form of escape from demands or tasks was the most occurring maintaining consequence for students with disabilities (Derby et al., 1992; Vollmer et al., 1995). The use of break-cards extends the research of NCE or FTE by providing students the opportunity to self-reinforce. In this study, as break-cards or the students' opportunity to self-reinforce were faded to one occurrence, student target behaviors continued to decrease while task engagement increased persistently. Students benefited from the leaner schedule of NCE/FTE, also observed in Reed et al. However, when no break-cards to self-reinforce occurred, student target behavior increased and the level of task engagement decreased.

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Third, self-management strategies frequently promote shifts in stimulus control through manipulation of antecedent conditions. The use of break cards shifted stimulus control from the teacher to the student. By providing an external stimulus (break card) to assist with self-regulation of one's behavior, students were prompted of present and future contingencies in the environment. Self-reinforcement, among other student-directed intervention strategies, provided an effective way to optimize students with moderate to severe intellectual disabilities participation in classroom tasks and activities.

Fourth, this study specifically sought to use NCE self-reinforcement to address task avoidant behaviors. Negative reinforcement in the form of escape from demands or tasks was the most occurring maintaining consequence for students with disabilities (Derby et al., 1992; Vollmer et al., 1995). The use of break-cards extends the research of NCE or FTE by providing students the opportunity to self-reinforce. In this study, as break-cards or the students' opportunity to self-reinforce were faded to one occurrence, student target behaviors continued to decrease while task engagement increased persistently. Students benefited from the leaner schedule of NCE/FTE, also observed in Reed et al. However, when no break-cards to self-reinforce occurred, student target behavior increased and the level of task engagement decreased.
Iwata, Pace et al., 1994). This study extends the literature of self-management for students with disabilities in that it specifically addressed the students' function of behavior, which occurs frequently in classroom settings. Additionally, teachers may prefer to use breaks from tasks as reinforcers for appropriate behavior instead of tangible or classroom activity reinforcers. NCE self-reinforcement may provide another intervention option for teachers and students to manage behaviors.

Several limitations of this study may have affected the overall results and interpretations. First, the brief-FA only examined behaviors maintained by negative reinforcement. Behaviors maintained by positive reinforcement and/or automatic reinforcement may require additional procedural adaptations. Secondly, students demonstrated no target behaviors transitioning to tasks from breaks. Students were most likely to demonstrate targeted behaviors after briefly initiating the task in order to avoid the entire task. Third, the use of beginning with five break-cards was arbitrary determined. Fourth, although teacher acceptability of self-reinforcement was evident, student social acceptability was not assessed. Despite the fact that student use of the intervention resulted in positive outcomes and that the self-reinforcement was presented non-contingently, specific student perceptions of this intervention was unknown.

Future research is needed to verify the results of the brief-FA and the results of the NCE self-reinforcement intervention. Future research should attempt to replicate these results across different tasks (e.g., discrete versus chained, self-help versus leisure) and functions of behavior (e.g., attention, sensory, multiple functions). Additionally, future research is needed to investigate the long-term effects NCE self-reinforcement. The generalization NCE self-reinforcement interventions across settings and behaviors also warrant future investigations. Furthermore, future research is needed to investigate student perceptions of self-reinforcement interventions.

References


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