Using a Token Economy to Treat Escape-Maintained Problem Behavior Without Extinction

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Using a Token Economy to Treat Escape-Maintained Problem Behavior Without Extinction

Natalie Andzik 1, Elle Smith 2, and Nancy Neef 2

Abstract
The use of extinction procedures when treating escape-maintained problem behavior can be undesirable and impractical for practitioners to use. To mitigate the risks associated with escape extinction, we explored the effectiveness of a delayed reinforcement token system without the use of extinction in school and home settings to treat escape-maintained problem behavior of students with autism spectrum disorder. In lieu of escape extinction (e.g., blocking), the researchers implemented a 30 s break contingent on problem behaviors and a token (to be exchanged at the end of the session) contingent on compliance. The results of a multiple probe design indicated substantial increases in compliance and reductions in problem behavior for all four participants. These findings suggest that extinction is not necessary to eliminate escape-maintained problem behavior in children with autism.

Keywords
escape-maintained behavior, token economy, compliance, school settings

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Problem behavior is often maintained by social negative reinforcement via escape from task demands or other forms of aversive stimulation. In an epidemiological study of the behavioral function of self-injurious behavior, for example, social negative reinforcement was found to account for the largest proportion of the 152 cases examined (Iwata et al., 1994). Treatment involving extinction of the escape behavior (e.g., by continuing to present the task so that misbehavior is no longer reinforced by its removal) has proven effective, and often necessary, when used alone and in conjunction with other interventions (Mason & Iwata, 1990; McCord et al., 2001; Slocum & Vollmer, 2015). However, escape extinction (EE) can have undesirable side effects such as extinction bursts (Ducharme & Van Houten, 1994), spontaneous recovery (Kazdin, 1994), worsening topographies of behavior (Vanderplanck, 1995), aggression (Lerman & Iwata, 1995), and negatively affecting students’ perceptions of academic tasks and their choices to engage in learning opportunities (Austin, 2019). These potential side effects can be problematic to the individual (e.g., worsening of the target behavior) and program implementers (e.g., require use of dangerous physical restraint); they may result in reluctance of practitioners to use EE (McConnachie & Carr, 1977) and premature termination of the treatment program (Slocum & Vollmer). To address these concerns, researchers
have evaluated methods for treating escape-maintained behavior without the use of extinction (Athens & Vollmer, 2010; Lalli et al., 1999; Ward et al., 2017).

Findings from several studies have suggested that when compliance is positively reinforced, EE is not needed to reduce escape-maintained problem behavior (Carter, 2010; DeLeon, et al., 2001; Lalli et al., 1999; Piazza et al., 1997; Slocum & Vollmer, 2015). Lalli et al., for example, compared the effects of positive reinforcement (immediate edible), negative reinforcement (30 s break), and non-contingent reinforcement, with and without extinction, and found that the rates of problem behavior were lower and compliance was higher for all five participants during the contingent positive reinforcement without extinction condition.

Although findings from studies have continued to demonstrate success in treating escape-maintained behaviors without the use of extinction, they have not been conducted in typical settings (Payne & Dozier, 2013). Thus, further research is needed to examine issues that may affect implementation in everyday environments. In particular, parents or teachers may object to the exclusive use of food as positive reinforcement (as used in Payne & Dozier, 2013; Piazza et al., 1997; and Slocum & Vollmer, 2015 studies). In addition, immediate access to the reinforcer (e.g., Athens & Vollmer, 2010; Carter, 2010; Hoch et al., 2002; Payne & Dozier, 2013; Slocum & Vollmer, 2015) may be either undesirable (e.g., to the extent that reinforcer consumption or engagement disrupts task performance) or impractical in typical environments where teachers, clinicians, and parents often have other competing responsibilities. Satiation may be a problem (e.g., Athens & Vollmer), and the rich to lean transition resulting from removal of a preferred item following the allotted time with the reinforcer (e.g., 10 s with a toy) may evoke misbehavior.

These limitations might be circumvented through the use of token reinforcement. With token systems, behavior is reinforced (with tokens) according to one schedule (the token production schedule) and is subsequently reinforced according to a second order schedule involving opportunities to trade tokens for back-up reinforcers (the exchange-production schedule) at a particular ratio (the token-exchange schedule) (Hackenberg, 2009).

Researchers have demonstrated that tokens, as conditioned reinforcers, can be as effective as the terminal reinforcers for which they are exchanged (e.g., Kelleher & Gollub, 1962; Sousa & Matsuzawa, 2001). To the extent that tokens operate as generalized reinforcers exchangeable for a variety of preferred stimuli (Skinner, 1953), they may minimize reliance on food (e.g., candy, snacks) or on specific motivational conditions. In addition, early basic research showed that tokens serve as a means to delay the delivery of the terminal reinforcer following the demonstration of a desired behavior (see Hackenberg, 2009), which can be particularly advantageous when immediate access to a preferred stimulus is not possible or desirable. Indeed, basic research findings suggest that token systems may promote greater tolerance to delays than interventions that involve only primary reinforcers (Estle et al., 2007; Odum & Rainaud, 2003). Thus, the use of tokens may offer an alternative to procedural variables that potentially impede the application of research-based treatments for escape-maintained behavior. It can be easily integrated into existing systems given the wide use of token economies in applied settings (Hackenberg, 2018). The purpose of the present study, therefore, was to explore the effectiveness of using a token system in school or home settings to treat escape-maintained problem behavior without the use of extinction.

Method

Participants

Participants were four children who attended private special education schools for individuals with autism spectrum disorders (ASD). All participants engaged in problem behavior during academic tasks as evidenced by individualized education plan (IEP) goals, teacher and parent reports, and observations. Danny was a 4-year old white male who communicated vocally using sentences and could follow two-step
directions. Eve was a 5-year old white female who communicated with one-word utterances and could follow single step directions. Aaron was a 5-year old black male who communicated in complete, grammatically correct sentences and followed multistep directions. Lance was a 5-year old white male who was also diagnosed with cystic fibrosis. He spoke in complete multi-word sentences and followed three step directions. Danny, Eve, and Aaron were found eligible for special education services under the category of autism spectrum disorder by their home school districts according to the Multidisciplinary Education Team Report. Each child was given a medical diagnosis of autism by a medical professional and this was shared with us by the teachers, but the researchers were not allowed access to these reports.

**Setting**

Sessions with Danny, Eve, and Aaron were conducted 1:1 in a room at their school. Generalization sessions were conducted during regular tasks in their classrooms. Sessions with Lance were conducted in a bedroom in his home as the research team did not have approval to work with him in school. Tasks were selected based on IEP goals, teacher reports, classroom observations, and teacher report of instructional and frustration levels for each student. Tasks for Danny included tracing numbers, letters, and shapes; determining what is next in an AB sequence; and identifying the largest number from an array of four numbers. Tasks for Eve included selecting named colors, numbers, and shapes, and completing single digit addition problems with the use of manipulatives. Tasks for Aaron included color by number worksheets, counting coins up to 80 cents, and alphabetizing a five-word sequence. Tasks for Lance included writing his first and last name, cutting out shapes, and writing his phone number and address.

**Dependent Variables & Measurement**

Data were collected on problem behavior and compliance. Problem behavior was defined individually based on the topography exhibited by each participant and included blocking (using hands or arms to cover the task, preventing further prompting) for Danny, Aaron, and Lance; destruction (using hands or arms to push away, knock over, or rip materials) for all four participants; and aggression (striking the experimenter with hands or feet and pulling her hair or clothing) and elopement (moving more than 0.6 m away from the task) for Eve and Lance. When Lance or Eve engaged in aggression, the experimenter attempted to block contact. Blocked aggression was recorded as an occurrence of problem behavior. Rate was used to measure problem behavior by dividing the number of occurrences of problem behavior by the duration of active demands (total time during which demands were in place) in each session. Compliance was recorded when a task was completed without the occurrence of problem behavior. Some tasks were academically challenging and required physical prompting to help the participant complete the task.

Task demands were defined as the presentation of a task within an activity. For example, when Aaron was asked to count coins on a worksheet, each of the seven problems was an individual demand. If a demand was provided and the participant did not engage in the task or made an error, a least to most prompting hierarchy (i.e., verbal, model, physical) was used to guide the participant through the task. Each level of prompting was followed by a 10 s response interval. Although the student may have required three prompts to complete the task, the initial demand was still in place and thus was counted as one opportunity to demonstrate compliance. When prompting was used, the demand was scored as “compliant” if no problem behavior occurred. Each time a demand was given, it counted as an opportunity for compliance and was scored as compliance or non-compliance. At the end of each session, the percentage of compliance was calculated by dividing the number of occurrences of compliance by the total number of opportunities.

**Interobserver Agreement (IOA) and Procedural Fidelity**
Prior to data collection, the second author used video recordings of each participant to train one data collector (a board-certified behavior analyst). Training included scoring occurrences of problem behavior and compliance following each demand. The scores of the primary and secondary data collectors were compared, and disagreements during training were resolved by reviewing the video clips and the written definition until an agreement was reached. Five training sessions were completed before the secondary observer met the mastery criterion of at least 90% agreement across three consecutive sessions. The secondary data collector observed and independently scored 36% of the baseline and 34% of treatment sessions. IOA was calculated using a point-by-point comparison for compliance by dividing the total number of agreements by the total number of agreements plus disagreements. Agreements were scored when both observers recorded an occurrence or nonoccurrence. IOA for problem behavior was calculated using the exact count per interval method. Each demand served as a “trial.” During each session, if no problem behavior occurred, compliance was recorded and an average percentage across tasks was noted. When problem behavior did occur, the frequency was recorded. At the end of the task, IOA was computed by dividing the number of agreements (i.e., occurrence of compliance or frequency of problem behavior) by the total of agreements plus disagreements for both compliance and problem behavior per trial (i.e., demand). Agreements were scored when both observers recorded an occurrence or non-occurrence. IOA during baseline ranged from 88% to 100% (M = 98%) for problem behavior and was 100% for compliance. IOA during treatment ranged from 97% to 100% (M = 99.7%) for problem behavior and was 100% for compliance.

The secondary data collector used video recordings and an experimenter-created checklist to assess procedural fidelity for 36% of baseline and 34% of treatment and generalization sessions. The observer recorded a check or minus for each step on the checklist that the experimenter did or did not follow, respectively (presenting the demand, allowing 10 s for a response, providing least to most prompting of the response as needed, allowing a break if problem behavior occurred, and presenting a token if the task was completed in the absence of problem behavior during the token economy condition). Procedural fidelity was calculated by dividing the number steps completed (plus) by the total number of opportunities. The baseline treatment integrity ranged from 97% to 100%, (M = 99.4%) steps completed correctly. During the treatment condition, the percentage of steps completed correctly ranged from 97% to 100% (M = 99.1%).

**Pre-experimental Procedures**

**Preference assessment.** A Multiple Stimulus Without Replacement (MSWO) preference assessment was conducted with each student to determine what backup reinforcers to use. These procedures were modified from those of DeLeon and Iwata (1996). The researchers used MSWO to directly assess the participants’ preference for five preselected items based on observations and recommendations from parents, teachers, and/or therapists. The participants were initially presented with all five items and were prompted to “choose one.” After selecting an item, the participant was given 1 min to interact with it before returning it to the experimenter. Selected items were not re-presented in the array of choices and the process was repeated until all items were selected. The top three most highly preferred items (selected first) were given as terminal reinforcers at the end of each treatment session. Danny’s preferences included Curious George® and Daniel Tiger® videos from the PBS Kid’s app. Eve’s preferences included Mickey Mouse Clubhouse®, Kate and Min-Min®, and Chocolate Town® videos on the Disney Junior app. Aaron’s preferences included, “TouchMath 1–9” YouTube video by Jackie Fraifield, and coloring with markers. Lance’s highly preferred items were, “The Toy Reviewer” videos on YouTube and the “Little Dentist” application.

**Functional behavior assessment.** A functional analysis based on the procedures described by Iwata et al. (1994) was conducted with three participants. Sessions were 10 min and included demand, tangible, and
control conditions. During the demand condition, the experimenter continually delivered instruction throughout the session using sequential verbal, gestural, and physical prompts. Each level of prompting was followed by a 10 s response interval. If no response or an error occurred, then the next level of prompt was immediately delivered. Occurrences of problem behavior resulted in a 30 s break from the demand. If problem behavior occurred during the break, it did not produce any programmed consequences. Before the tangible condition, the participant was given a 1-min interaction period with a preferred item. The experimenter then removed the item from the participant to start each session. Occurrences of problem behavior resulted in the item being returned to the participant for 30 s. Control conditions consisted of continuous access to three preferred items, no demands, and continual attention from the experimenter. Occurrences of problem behavior did not result in any programmed consequences.

The function, escape, was determined by comparing the data from the test condition to the control condition for the three participants (see Figure 1). Danny and Aaron’s data indicate that both tangible and control conditions produced low and stable data. Although Danny’s data in the demand condition trended down during sessions three and four, the data trended back up in session five. There was no overlap in data between the demand and control/tangible conditions leading to a conclusion that the function of Danny and Aaron’s behavior was escape. Eve’s data were not as clear as there was a slight overlap in data between sessions one and two of the demand condition. After this overlap, her data in the tangible condition stabilized and then trended down during session five. Although there was not as clear of a relationship between her data and the others, we concluded that the consistent separation between data paths from sessions two through five indicate that the function of Eve’s behavior was escape.

![Figure 1](image-url). Results of functional analysis for three participants.
When a functional analysis was attempted with Lance, he appeared to be manipulating the conditions. For example, he made statements such as, “If I hit you, you will give me the toy back.” After he verbalized the contingencies in each condition, the rate of problem behavior immediately increased. Visual analysis was then impossible to conduct because the data in each condition was high and stable suggesting his behavior was maintained by all four functions. Therefore, interviews were conducted with Lance’s parents and teachers, followed by a descriptive analysis in which the researchers and parents recorded the events preceding and following each occurrence of problem behavior. Analysis of those data suggested escape as the function of Lance’s problem behavior.

*Pre-Experimental Procedures*

*Token training.* Token training was based on the procedures used by LeBlanc et al. (2000). None of the students had experience with tokens prior to this study. The 5 min sessions were conducted immediately before the onset of the experimental procedures. Participants were prompted to comply with demands such as “Touch your nose” or “Clap twice.” Occurrences of compliance were immediately reinforced with a token paired with praise. Participants were given verbal reminders that the tokens would be exchanged for a break with a preferred item at the end of the session and that the more tokens they received, the longer their break would be. Training continued until each participant completed three consecutive sessions without preemptively reaching for the reinforcer before the experimenter prompted, “It’s time to trade in your tokens” at the end of the session.

*Experimental Procedures*

**Baseline.** Baseline followed the same procedure used during the demand condition of the functional analysis. Occurrences of problem behavior resulted in a 30 s break away from work, with no access to preferred reinforcers, and compliance did not produce any programmed consequences. During sessions, demands were presented for 10 min. The timer was paused during breaks for problem behavior. Sessions were terminated after 15 total minutes (i.e., demand plus break minutes).

**Token economy.** The intervention followed the same procedures as baseline, with the addition of the delivery of a token for compliance. A token was given to the student after the occurrence of compliance and before allowing access to the terminal reinforcer after the session. Once a token was awarded, another task was immediately introduced to prevent breaks from occurring for compliance. At the end of each session, participants exchanged their tokens to access the terminal reinforcer and they were offered a choice from the items deemed most highly preferred. The duration of reinforcer access was determined based on the number of tokens collected (i.e., six tokens equated to 1 min with the selected item, or 10 s break per token). The items (listed in the Preference Assessment section) were available only after the completion of the session and participants had no access to them outside of the session (i.e., closed economy).

**Generalization.** Generalization sessions were identical to the procedures during the token economy phase. Generalization was assessed with Danny, Aaron, and Eve in their classrooms during regularly scheduled instruction. During pre-post probes, the classroom teacher delivered instruction and the first author delivered the prompting hierarchy and breaks for problem behavior.

**Experimental Design**

A multiple-probe design across participants (Horner & Baer, 1978) was used to examine the effects of delayed access to preferred stimuli through a token economy on treating escape-maintained problem behaviors without the use of extinction. Concurrent baseline probes were conducted intermittently.
Intervention was introduced for one participant at a time once a stable baseline was achieved for the previous participant. This process was repeated until all participants had been exposed to the intervention. The last three observations for each participant were conducted 2 weeks apart.

Social Validity

Three classroom teachers were given questionnaires to complete anonymously before, during, and after the intervention to assess the acceptability of the goals, procedures, and outcomes of the intervention. Each questionnaire included items rated on a 1 to 5 scale, one being the lowest rating and five being the highest. A list of questions and results can be found in Table 1. Also, the participants’ satisfaction with the intervention was assessed as a behavior correlate by recording the percentage of time each one spent within the original workspace (i.e., 2-feet from where the task was delivered) during baseline compared to intervention.

Table 1. Teacher Responses on Social Validity Questionnaire.

<table>
<thead>
<tr>
<th>Baseline reporting</th>
<th>Range of responses</th>
<th>Average of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>I believe that focusing on reducing problem behavior is important.</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>I believe that increasing compliance is important.</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>I think that my students would be highly motivated to work for tokens that they trade in for a break.</td>
<td>3–4</td>
<td>3.67</td>
</tr>
<tr>
<td>Problem behaviors that are exhibited to escape or avoid a non-preferred task can be eliminated without requiring a student to complete the task before earning a break.</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>During intervention reporting</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I believe that it would be easy to implement the token system from the intervention in my classroom.</td>
<td>3–5</td>
<td>4.33</td>
</tr>
<tr>
<td>I believe it would be easy to give students a 30s break from the task following an occurrence of problem behavior.</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>After completing a task, it would be easy for my students to trade in tokens for a break with a preferred item.</td>
<td>4–5</td>
<td>4.67</td>
</tr>
<tr>
<td>I think that my student(s) will be motivated by this intervention.</td>
<td>4–5</td>
<td>4.67</td>
</tr>
<tr>
<td>Given my current teacher to student ratio, I would be able to implement this intervention with my student(s) during non-preferred activities.</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Post intervention reporting</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>My student(s) problem behaviors were decreased or eliminated because of this intervention.</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>My student(s) compliance increased when he/she was rewarded with a token.</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>I would recommend this intervention to colleagues.</td>
<td>4–5</td>
<td>4.7</td>
</tr>
<tr>
<td>This intervention is something that I would use in my classroom to help my student(s) complete non-preferred tasks.</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Awarding tokens for compliance and a 30s break for problem behavior can treat escape/avoidance behaviors.</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Results

The square data points in Figure 2 show the percentage of compliance for the four participants (see right side y-axis) across baseline and token economy conditions. Open data points represent generalization sessions. For Danny, compliance increased from a mean of 47.7% during baseline (range, 11.6%–71%) to 99.3% with the implementation of the token economy (range, 91%–100%). Increases generalized to the classroom where compliance increased from 50% during baseline to 100% with the token economy. Aaron’s percentage of compliance increased from a mean of 74.2% during baseline (range, 63%–79%) to 100% with the token economy, including in the classroom generalization setting. Eve’s percentage of compliance was highly variable during baseline (range, 0%–83%; M = 42%), but became stable at a high level with the token economy (range, 85%–100%; M = 94.5%) and she complied with 100% of demands in the classroom.
generalization setting. Similar to Eve, Lance’s percentage of compliance was variable during baseline (range, 0%–75%; M = 34.6%), but stabilized at near 100% (range, 97%–100%) with the token economy.

![Figure 2](image)

**Figure 2.** Rate of problem behavior and percentage of compliance across participants. 
*Note.* C = compliance; Gen = generalization.

The round data points in Figure 2 (see left side y-axis) show that the intervention produced a substantial, generalized, and sustained reduction in the occurrence of problem behavior per min for all four participants. For Danny, problem behavior per min decreased from a mean of 1.0 during baseline (range, 0.67–1.6) to 0.02 with the implementation of the token economy (range, 0–0.3). Treatment gains generalized to the classroom (represented by open data points); problem behavior decreased from 1.3 per min during baseline to 0 with the token economy. Aaron’s problem behavior per min decreased from a mean of 0.56 during baseline (range, 0.5–0.7) to 0 with the token economy, including in the classroom setting. Eve’s problem behavior per min was variable during baseline (range, 1.9–5.0; M = 3.0) but became stable at a low level with the token economy (range, 0–0.5; M = 0.19). In the classroom generalization setting her problem behavior per min decreased from 3.5 during baseline to 0.1 with the token economy. As with Eve, Lance’s problem behavior per min was high and variable during baseline (range, 0.67–6.0; M = 2.48) but stabilized near 0 with the token economy (M = 0.01).

**Social Validity**

The teachers’ responses on the pre-intervention questionnaire indicated strong agreement with the importance of the goals of reducing problem behavior and increasing compliance. Additionally, the teachers
reported having experience implementing a token exchange. One area of the treatment that could potentially lead to pushback or rejection was the teacher belief that escape-maintained problem behavior could not be treated without extinction. All of the teachers reported that they had previously required students engaging in escape-maintained problem behavior to complete some or all of the work before getting a break.

Concerning the procedures, the teachers strongly agreed that a token exchange for a break at the end of the task could be incorporated into their classrooms, and that their students would be motivated by the intervention. The procedure associated with the lowest score on the survey was the 30 s break following problem behavior. It is likely that this item scored the lowest because it was the opposite of the teachers’ current behavior management plans. When given the chance to take out or modify the procedures of the treatment, none of the teachers offered any suggestions.

The teachers’ indicated that they believed there was a strong connection between the treatment and the students’ decreased problem behavior and increased compliance. Additionally, all of the teachers strongly agreed that they would use the intervention in their classrooms. Possibly the most interesting result from the post-intervention questionnaire was the change in the teachers’ beliefs (ratings increased from 2 to 5) that the problem behavior could be treated without using extinction. All but one teacher strongly agreed that they would recommend the intervention to a colleague. The one teacher who noted only “agree” when recommending to a colleague may have been due to the teacher not feeling confident in her ability to explain the procedure to others.

The social validity assessment also included examining the amount of time the student spent in the work environment as a behavior correlate of the acceptability of the treatment. This was determined by comparing the amount of time spent in the learning environment (2-foot radius from where the task was introduced) during baseline and intervention. During treatment, participants spent significantly more time in the learning environment and demonstrated less problem behavior (resulting in fewer breaks), which increased the total number of learning opportunities and tasks completed. For example, during baseline Lance was exposed to a mean of 21.6 task demands and completed a mean 10 task demands. During treatment, he was exposed to a mean 29 task demands and completed a mean of 28.8 task demands.

Discussion

The purpose of the present study was to explore the effectiveness of using a token system in school or home settings to treat escape-maintained problem behavior without the use of extinction. The procedures used in this study addressed problem behavior maintained by social negative reinforcement, in the form of escape/avoidance, by using a token economy with preferred activities as the back-up reinforcer. All four participants exhibited substantial decreases in problem behavior and increases in compliance when tokens were delivered contingent on compliance. While adding to the established research base that escape extinction is not necessary to eliminate escape-maintained problem behavior (see Payne & Dozier, 2013), findings from this study also compliment and extend the literature in several ways.

The results indicate that immediate access to the terminal reinforcer was not necessary. Few if any applied studies have demonstrated the effect of delayed terminal reinforcement (e.g., break with preferred item) by using tokens without extinction. The conditioned reinforcer (token) for compliance directly competed with problem behavior that resulted in an immediate break. Other researchers have suggested that immediate positive reinforcement was more effective than negative reinforcement (i.e., break) because it acted as an abolishing operation by reducing the aversive nature of the sessions (Slocum & Vollmer, 2015). Findings from this study also indicated that positive reinforcement was effective in treating problem behavior, but it may be that tokens acted as the abolishing operation. This type of intervention approach may preserve engagement with learning opportunities by attenuating task aversiveness through remote reinforcement rather than using EE (Austin, 2019). During the token economy condition, participants spent
significantly more time in their classrooms and demonstrated less problem behavior (resulting in fewer breaks), which increased the total number of learning opportunities and tasks completed in the natural setting. However, the uncontrolled nature of a classroom environment with respect to variables such as the type of tasks presented and the rate at which the demands were given should be taken into account when considering applying these strategies in a classroom setting.

By capitalizing on a token economy, findings from this study demonstrated an effective alternative to procedures that potentially hinder the application of research-based treatments for escape-maintained behavior in typical environments (e.g., exclusive reliance on food, immediate access to reinforcers). Approximately 63% of all children with disabilities ages 6 to 21 spend 80% or more of their educational day in general education classrooms (U.S. Department of Education, 2019). This shift in inclusive practices underscores the importance of exploring practical methods that can be implemented in natural settings.

**Limitations and Future Directions**

We probed intervention sessions from a 1:1 setting to the classroom setting for three participants during natural instruction and activities in the participants’ classrooms. Although the results of the location change showed sustained reductions in problem behavior at near zero levels and increases in compliance at or near 100% in comparison to baseline, more frequent evaluations (a minimum of three), with other types of tasks, with the classroom teacher, and in other settings (e.g., music, gym, field trips) are needed. Also, only one probe was taken in the intervention phase and without more data, conclusions about the effectiveness in the classroom setting are limited. Future researchers should also consider measuring the efficiency of the procedures across time, such as collecting data on the frequency of the most intrusive prompts in each session as the intervention phase progresses. Also, Lance was a bit of an outlier given the location difference between his intervention (i.e., home) and the other three participants (i.e., school). Although data indicate the effects of the intervention for Lance were aligned with the other three participants, the location of his intervention hindered testing the effects in a generalized setting. Future researchers should consider evaluating the effects of home-based programs and interventions in the generalized classroom setting.

Implementation of evidence-based practices in everyday environments depends on buy-in of potential users. Before the token economy condition, all of the cooperating teachers reported having students who engaged in escape-maintained problem behavior but, consistent with their practice, none of the teachers expressed belief that escape-maintained problem behavior could be treated without extinction. As such, the researchers decided to implement the baseline and treatment procedures in a controlled setting, and merely probe in the classroom setting. Following the token economy condition, all of the teachers strongly agreed that they would continue to use it in their classrooms and agreed that problem behavior could be treated without using extinction. Considering the need to examine issues that may affect implementation in everyday environments, it would be helpful in future research to conduct pre- and post- observations of the fidelity of teacher and parent use of procedures. Follow-up observations might suggest adjustments needed to maintain usage (e.g., thinning of reinforcement schedules) given the ecology of the particular environment.

**Declaration of Conflicting Interests**

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

**Funding**

The author(s) received no financial support for the research, authorship, and/or publication of this article.
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**Nancy Neef** is an academy professor in the College of Education and Human Ecology at The Ohio State University.