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Use of Brief Functional Analysis and Intervention Evaluation in Public Settings

David Cihak
University of Tennessee
Paul A. Alberto
Laura D. Fredrick
Georgia State University

Abstract: Educational experience in the community provides students with moderate and severe intellectual disabilities the opportunity to learn and rehearse skills they need to participate fully in community environments. The degree to which students with intellectual disabilities participate in their communities is often dependent on their ability to demonstrate appropriate behaviors when in public settings. For students with intellectual disabilities who exhibit socially inappropriate behavior, access to community programs may be limited or even denied. The purpose of this study was to investigate the identification and selection of interventions for inappropriate social behaviors maintained by negative reinforcement in public community settings. Four high school-age students with moderate to severe intellectual disabilities participated in a brief functional analysis to identify maintaining contingencies of target behaviors. Based on the resulting hypotheses, antecedent-based and response-based interventions were designed and compared. Results indicated that the antecedent-based intervention of self-operated auditory prompts worked as effectively as or better than the response-based intervention. In addition, teachers' social validity of intervention in public settings assessed the acceptability of both interventions. Teachers indicated that auditory prompts were socially acceptable for vocational training in public community settings.

If students with moderate and severe intellectual disabilities are to acquire and maintain community employment, they need to participate in educational programs within natural environments. Educational experiences in the community provide students with intellectual disabilities the opportunity to learn and to rehearse skills they need to fully participate in community environments (Brown et al., 1979). The degree to which students with intellectual disabilities participate in their communities is often dependent on their ability to demonstrate appropriate behaviors in the community (Carr & Carlson, 1993). For students who exhibit inappropriate behaviors, access to these programs may be limited or even denied (Alberto, Taber, & Fredrick, 1999). Moreover, inappropriate social behaviors are the most frequent reason students with intellectual disabilities fail to acquire or maintain employment (Greenspan & Scholtz, 1981; Reitman, Drabman, Speaks, Burkley, & Rhode, 1999).

Research has shown that training in natural settings may facilitate the acquisition of skills needed within those settings. The literature refers to *natural settings* as schools, homes, and community settings. Hughes (2003) distinguished between natural private community settings and natural public community settings. *Natural public community settings* are environments where the general public visits, conducts business, or works (e.g., grocery stores, malls/department stores, restaurants, banks, schools). Conversely, *natural private community settings* are environments where the general public is usually not present (e.g., supported homes, private homes, supported workshops, detention centers). With this in mind, a student's vocational training may occur in a private or public community setting.

When students engage in inappropriate behavior, regardless of the setting, current best practice for assessing inappropriate behavior and for identifying an appropriate intervention plan is functional analysis (FA) or functional behavioral assessment (FBA). FA has been conducted successfully in clinical settings (Iwata, Vollmer, & Zarcone, 1990) and in school settings (Broussard & Northup, 1995). Moreover, FA has been extended successfully in nonschool

and natural settings, including homes (O'Reilly, Lancioni, King, Lally, & Dhomhnail, 2000), group homes (Reichle, Drager, & Davis, 2002), vocational training settings (Wallace & Knights, 2003), supported workshops (Umbreit, 1997), and public environments (Hughes, 2003).

As FA research progressed to more natural settings, adaptations to standard FA methodologies were explored (e.g., Northup et al., 1991; Sasso et al., 1992). One variation of FA procedures came to be referred to as brief-FA (Northup et al., 1991). The brief-FA reduced the length of experimental sessions and the overall number of sessions. The major benefit of the brief-FA is that it takes a considerably shorter amount of time to complete. For example, initial FA procedures used a multi-element design and involved multiple assessment sessions (e.g., 50–60) of up to 30-min each (Iwata et al., 1994; Northup et al., 1991). The average length of time to conduct the brief-FA and isolate a behavioral function is 90 min (e.g., Asmus et al., 2004; Broussard & Northup, 1995, 1997; Cooper et al., 1992; Derby et al., 1992; Wallace & Knights, 2003). The reduction in the amount of time necessary to identify a function of behavior is a key consideration for FA in public community settings.

Because fewer experimental sessions are conducted, fewer data points are available for visual interpretation (Derby et al., 1992). A variation for collecting brief-FA data is to collect the data within sessions. Within-session analysis procedures facilitate the generation of data points (Vollmer, Iwata, Zarcone, Smith, & Mazaleski, 1993). The additional data points permit improved visual analysis techniques to examine data trends, means, and other variations both within and between experimental conditions (e.g., Cooper et al., 1992; Derby et al., 1992). For example, a 15-min session can be divided into 15 blocks of 1-min generating 15 data points, thereby allowing extended analysis (Vollmer et al., 1993) to ascertain behavioral reactions to positive or negative reinforcement and identify extinction bursts due to withholding reinforcement within sessions. Also, data can be graphed cumulatively to analyze data trends.

Another adaptation of FA procedures is the programming of discriminative stimuli (S^D) to facilitate differential responding. Derby et al. (1992) noted during a large-scale evaluation of brief-FA that unclear outcomes were obtained, possibly resulting from discrimination failures. Multiple treatment interference due to rapidly changing conditions is a major disadvantage of the multi-element design (Higgins & Baer, 1989). Such effects may either prolong the assessment or obscure the outcome entirely. With this in mind, Conners et al. (2000) suggested the inclusion of programmed discriminative stimuli, or salient cues, to facilitate discrimination among FA conditions. For example, Conners et al. conducted FA procedures in different-colored rooms, which corresponded to different functional conditions. The results indicated that all participants performed differentiated responses with the insertion of salient cues. Conversely, when salient cues were withdrawn, half of the participants' behavioral function could not be identified.

The results of FA have led to the continued validation of various treatment options in applied settings, including response-based interventions and antecedent-based interventions. For example, Mueller, Edwards, and Trahant (2003) noted that differential reinforcement of alternative behaviors (DRA) is a common response-based intervention used by classroom teachers. DRA involves identifying a replacement behavior that can serve the same function as the problem behavior and providing reinforcement after occurrences of the behavior (Iwata, Vollmer, & Zarcone, 1990). Mueller et al. found DRA more effective than noncontingent reinforcement (NCR) and differential negative reinforcement of alternative behaviors (DNRA) at reducing problem behaviors, and teachers rated DRA procedures socially acceptable for all students.

DRA interventions have been applied successfully to reduce inappropriate behaviors, including aggression, property destruction, task refusal, or noncompliance (e.g., Harding, Wacker, Berg, Barretto, & Rankin, 2002), and classroom disruption (e.g., Ogier & Hornby, 1996; Piazza, Moes, & Fisher, 1996). DRA also has been applied in various settings, including schools (e.g., Didden, Duker, & Korzilius, 1997; Mueller et al., 2003), community settings (e.g., Carr & Carlson, 1993), and home environments (e.g., Lucas, 2000). Additionally, Meyer (1999) improved students' off-task behavior when teaching an alternative behavior that matched the function of the FBA.

Researchers also have noted the importance of antecedent-based interventions (Iwata et al., 1994; Kern, Choutka, & Sokol, 2002). Instead of imposing a consequence following the occurrence of an inappropriate behavior, antecedent-based interventions focus on reducing the probability of the inappropriate behavior initially occurring (Luiselli, 1998). Developing antecedent-based interventions requires identifying the environmental variables or conditions that are associated with the inappropriate behavior and modifying those conditions before the behavior occurs.

Antecedent-based interventions include increasing interest in activities, changing schedules or routines, conducting pre-activities, providing choices, and using self-operated auditory prompts (SOAP). SOAP alters the antecedent conditions by shifting stimulus control from the discriminative-producing event to an alternative stimulus to occasion-appropriate social behavior (Alberto et al., 1999; Taber, Alberto, & Fredrick, 1998). Self-operated auditory prompts incorporate the use of a Walkman®-type device to occasion a desired behavior. An individual wears the device and hears prompts to perform the desired be-

havior. The SOAP research has shown that the intervention can reduce inappropriate vocalizations, off-task behavior (Alberto et al., 1999), and stereotypic behaviors (Davis, Brady, Williams, & Burta, 1992). Moreover, SOAP has been applied successfully in schools (Davis et al., 1992; Taber, Seltzer, Heflin, & Alberto, 1999), vocational centers (Steed & Lutzker, 1999), and public community settings (Alberto et al., 1999; Hughes, 2003; Taber et al., 1998). For example, Hughes (2003) matched auditory prompts to particular functions of behavior to increase on-task and prosocial behaviors in public community settings. That is, students whose behavior functioned to escape from tasks were provided auditory prompting reminders of future breaks, which provided an alternative option for attaining escape rather than engaging in problem behavior.

With procedural adaptations, such as fewer sessions, reduced session duration, within-session analysis, and programmed discriminative stimuli, FA has become more efficient while continuing to be effective at identifying maintaining environmental variables. Thus, the purpose of this study was to extend the research on FA variations to public community settings. This study explored the identification and selection of interventions for inappropriate behaviors maintained by negative reinforcement in a public community setting. The following were the specific research questions:

1. Do adapted brief-FA procedures identify the maintaining variables of behavior in a public community setting?
2. Is there a difference in the effectiveness of antecedent-based intervention (i.e., SOAP) and response-based intervention (i.e., DRA) procedures in a public community setting?
3. How do teachers regard the social validity or social acceptability of antecedent-based and response-based interventions implemented in public community settings?

Method

PARTICIPANTS AND SETTING

Four students participated based on the following: (a) high school attendance; (b) age range from 15 to 21 years old; (c) level of cognitive functioning within the moderate to severe range of intellectual disability (IQ 20–55); (d) regular participation in community-based vocational training (CBVT) in a public community setting; (e) performance of inappropriate behavior while in the community, which impedes job training; (f) ability to complete all steps of the job task independently; (g) parental permission; and (h) verbal agreement to participate after a description of the study activities and exposure to the study materials. In addition, a teacher functional assessment interview (O'Neill et al., 1997) indicated an escape function. This inclusion criterion was used so that the same treatments could be evaluated across students. After teachers recommended students for participation, the primary investigator observed each student at a public community job-training site to confirm that he or she met participation criteria. Table 1 presents student characteristic information.

All phases of the study occurred while students attended community-based vocational training (CBVT). Four public community settings were used to assess the students' targeted behavior. Two different grocery stores and two different department stores were chosen due to the convenient location to the school and students' neighborhoods. Specific FA conditions occurred at different locations within the store. For example, all control conditions were conducted in the stores' employee breakroom because of the absence of work demands and the availability of noncontingent social attention. All attention conditions occurred at unused cashiers' check-out registers because of the ease of obtaining attention from a relatively large number of people. Escape conditions occurred in various loca-

Table 1. Student Characteristics

Student	Age	Years in school	Disability	IQ	Target behavior
Haley	17	14	SID	35[a]	Outburst: yelling and attempting to throw task materials on the floor
Anne	16	13	MOID	42[b]	Inappropriate touching: attempting to touch oneself in the genital region of the body
Gail	17	14	MOID	48[a]	Vocalizations: high-pitch noise that could be heard from a distance of 10 ft.
Kyle	18	15	MOID and Autism	50[a]	Leaving the work area: walking 10 ft. away from the assigned work area

Note. SID = severe intellectual disability; MOID = moderate intellectual disability.
[a]*Wechsler Intelligence Scale for Children*–4th ed. (Wechsler, 2003). [b]*Stanford-Binet Intelligence Scale* (5th ed.; Roid, 2004).

tions, including a flower department, store isle, bakery section, and a home accessories department because of the related work tasks. All students participated in CBVT three times a week for a total of 9 hours.

MATERIALS

Students wore standard work uniforms and were provided the materials needed to perform tasks. For example, when students stocked shelves, they were supplied with store items that needed to be placed on a shelf directly in front of them. For the food preparation task, the student was given frozen cookies, which needed to be placed on an empty cooking tray. Other materials included flowers to sort and picture frames to stock. In addition, a D-Link DMP-110 model MP3® player was used to deliver auditory prompts during the self-operated auditory prompting (SOAP) intervention. Students attached the MP3 player to their pants waistband with the wire for the earpiece worn under their uniform.

RESPONSE MEASUREMENT AND RELIABILITY

The target inappropriate behavior was identified by each student's teacher. Although Haley demonstrated a variety of disruptive behaviors, her teacher was most concerned with frequent outbursts. *Outbursts* were defined as yelling and attempting to throw task materials on the floor. Anne's teacher was concerned with *inappropriate touching*, defined as an attempt to touch oneself in the genital region of the body. For Gail, the target behavior was loud vocalizations. *Vocalizations* were defined as emitting a high-pitch noise that could be heard from a distance of 10 feet. Kyle's teacher was concerned with his leaving the immediate work area to wander to other locations within and outside of the store. *Leaving the work area* was defined as walking 10 feet away from the assigned work area. Event recording was employed to record the number of target behaviors during all sessions.

The alternative behavior for all students was task engagement. *Task engagement* was defined as directing eyes toward the work activity, performing a step of the task, manipulating task materials, and refraining from engaging in 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. Data for both the target and alternative behaviors were collected by the investigator.

The investigator trained the teacher as reliability observer. Reliability data were collected on each student's target behavior during a minimum of two sessions for each phase (functional analysis, intervention analysis, and intervention evaluation) of the study. If reliability fell below 90%, then the investigator provided additional training for the second observer. Reliability estimates for target behaviors were calculated by dividing the smaller number of observed occurrences by the larger number of observed occurrences and multiplying by 100. Mean agreements for target behavior were 100% for Haley, Gail, and Kyle and 99% (range, 99%–100%) for Anne. Reliability estimates for task engagement were calculated by dividing agreements by agreements plus disagreements and multiplying by 100. Mean agreements for task engagement were as follows: Haley, 98% (range = 95%–100%); Anne, 96% (range = 93%–100%); and Gail and Kyle, 100%

Procedural integrity was assessed during functional analysis, intervention analysis, and intervention evaluation sessions. The second observer recorded the behavior of the investigator, who implemented the sessions, during a minimum of two sessions for each phase throughout the study by checking whether each behavior occurred on a checklist. 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). Investigator behaviors consisted of (a) instructing students to task; (b) implementing a system of least prompts (i.e., verbal, gesture, and physical guidance); (c) delivering reinforcement during the brief-FA, intervention comparison, and intervention evaluation phases; (d) removing task materials during escape conditions; (e) providing contingent attention during attention conditions; and (f) supplying an MP3 player during intervention comparison and evaluation phases. The mean procedural integrity was calculated for each student throughout each phase of the study. The mean procedural integrity was as follows: Haley, 97% (range = 95%–100%); Anne, 94% (range = 90%–100%); Gale, 98% (range = 97%–100%); and Kyle, 99% (range = 99%–100%).

PROCEDURE

Overview

The investigator conducted all procedures. FA procedures were conducted to confirm the results of the teacher interview. Students then were exposed to a brief intervention comparison to identify a potentially effective intervention, which was further examined in a more extended evaluation.

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 Northup et al. (1991) and Vollmer et al. (1993). The assessment conditions included escape from task demands, attention, and control. Students participated in one 10-min session for each condition, with a 10-min break between conditions. For analysis purposes, data from each session were plotted by 1-min intervals.

The specific procedures for each student differed slightly because different materials were used at each CBVT setting. During the escape condition, Haley worked in the flower department of the store and was required to sort two types of flowers, according to color, into large wooden barrels. Anne worked in the bakery department and was required to place 20 frozen cookies on a cooking tray. Cooking trays were marked to show where to place each cookie. Gail was required to stock canned items in a grocery isle. Kyle worked in a home accessories department and was required to stock picture frames according to size. Based on the teacher interview, each task was considered difficult yet could be completed independently. In addition, each student's task was previously associated with high levels of the inappropriate target behavior.

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.

During the attention condition, all students worked at an unused check-out register at the front of the store. Students were instructed to clean the register's counter that was not being used. For all students, teachers considered cleaning registers an easy task and not associated previously with high levels of inappropriate behaviors. The investigator ignored all behaviors except the target behavior, for which the investigator provided attention with a verbal statement.

During the control condition, all students were observed in the break room during their scheduled breaks. Several vending machines and magazines were available, and co-workers were coming and going. The break room was considered an enriched environment 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 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 highest 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.

Brief Intervention Comparison

Overview. Each student was exposed to one antecedent-based intervention (i.e., SOAP) and one response-based intervention (i.e., DRA) in a public community setting. Both interventions were presented daily and alternated. All sessions occurred for 10-min with a 10-min break between sessions. The work areas were identical to those used during the escape condition of the brief functional and confirmatory analyses. During the intervention sessions, task materials were not removed contingent on inappropriate behaviors, and more intrusive prompting procedures (e.g., physical guidance) were not implemented if inappropriate behaviors were observed. Thus, students could still engage in target and nontask engagement behaviors.

An alternating treatment design was used to compare the two interventions. The comparison continued until there was a difference in levels of target behaviors across interventions or until at least four sessions of each treatment were presented with no differences in target inappropriate behavior (Mueller et al., 2003). If no difference occurred after four sessions, then the social validity measurement determined which intervention procedure to use during the intervention evaluation phase. The intervention determined more effective or more socially acceptable was further examined in an intervention evaluation phase.

SOAP. Prior to initiating the intervention, each student participated in a pretraining phase to learn how to operate the SOAP device (i.e., MP3 player and headphones). This pretraining, similar to that conducted by Alberto et al. (1999), occurred in store breakrooms. During pretraining, each student was presented with the SOAP device with a prerecorded two-step instruction (Taber, Seltzer, Heflin, & Alberto, 1999). Students were instructed to turn on the player, listen to the auditory recordings when played, verbally repeat what was heard, and then engage in the prompted behavior. The auditory recordings prompted students to stand up and walk to the vending machine. Each session was composed of two trials in which the student heard the two-step direction once. Students were

required to reach 100% criterion for two consecutive sessions.

After reaching criterion, the students were required to wear and operate the MP3 player. The MP3 player was equipped with prerecorded auditory prompts matched to the students' escape from demands function similar to those described by Hughes (2003). Auditory prompts were recorded in an unfamiliar man's voice. Based on the teacher interview, teachers reported that the type of voice did not appear to affect the students' target behaviors. Auditory prompts included (a) "It's time to start your work"; (b) "When you are finished, you will get a break"; (c) "You'll be on break soon"; and (d) "It's almost break time."

In addition, a fifth or sixth individualized auditory prompt described an appropriate behavior incompatible with each student's target behavior. For Haley, the prompts were "Haley, keep working using a quiet voice," and "Haley, keep using your hands to sort the flowers." Anne's additional prompt was "Anne, keep using your hands to arrange the cookies." For Gail, the fifth prompt was "Gail, keep working using a quiet voice." Kyle's prompt was "Kyle, keep working in your area." Auditory prompts were recorded on a fixed time (FT) 30-s schedule (i.e., auditory prompts were delivered once every 30 s). After the tape was turned on, no additional operation of the equipment was required, as the MP3 player was programmed to loop and continuously repeat the auditory prompts. Each set of auditory prompts was delivered at least four times per session. To avoid student confusion when specific prompts occurred at inappropriate times, such as "It's time to start you work" toward the end of each SOAP session, the investigator told all students prior to turning on the MP3 player, "If you are working, then keep working, but if you are not working, then follow the prompt." When the 10-min session was complete, students were instructed to turn off their MP3 players.

DRA. The investigator reinforced task engagement on a FI (fixed interval) 30-s/LH (limited-hold contingency) 1-s schedule. With FI, reinforcement is delivered as soon as a behavior occurs after a specific, predetermined interval of time. With LH, time during which the reinforcer is available is restricted. Alberto and Troutman (2006) suggested that under a LH contingency a student must respond more quickly to earn reinforcers compared to just an interval schedule where a student may delay responding and still be reinforced. To implement a FI 30-s/LH 1-s schedule, the student had 1 s at the end of every 30-s interval to perform task engagement to receive a token reinforcer and verbal praise. The investigator stated the alternative behavior when delivering the token. All students had prior experience using a token system and were familiar with its procedures. Following the session, tokens were exchanged for access to preferred items (e.g., snack, drinks). If the student was not engaged in the task or was engaged in the target behavior within 1 s after the end of the 30-s interval, no consequences were delivered and the FI 30-s/LH 1-s interval was reset.

Intervention Evaluation

Following the brief intervention comparison, an intervention evaluation was implemented. Because SOAP was the more effective, or the more socially acceptable treatment, it was evaluated across work days. Procedures used during the SOAP intervention phase were identical to the brief intervention comparison phase consisting of auditory prompts delivered on an FT 30-s schedule. The SOAP intervention was then withdrawn. Intervention and intervention withdrawal phases were alternated, consistent with an A-B-A design (Barlow & Hersen, 1984). Target behaviors were ignored across all phases of the evaluation.

The criteria for intervention withdrawal occurred when data indicated the target inappropriate behaviors were 50% less than the mean obtained during brief–FA escape phase for three consecutive data points. The criteria to reinstate the intervention phase occurred when the mean of the intervention withdrawal phase returned to within close proximity of the mean of the baseline obtained during the brief-FA phase and trended in the opposite direction of intervention.

Social Validity

Before teachers were informed of the results of the brief intervention comparison, each teacher was given an adapted *Intervention Rating Profile* (IRP-15; Martens, Witt, Elliott, & Darveaux, 1985) to assess both intervention procedures. Following this intervention evaluation, teachers were informed of the results of both interventions and again completed an adapted IRP for the effective or preferred intervention used during the intervention evaluation phase.

The IRP-15 is a 15-item Likert-type scale that assesses general acceptability of interventions. The Likert scale ranges from 1 (*strongly disagree*) to 6 (*strongly agree*). The IRP-15 was adapted specifically for public community settings, and three items were added for a total of 18 items. New items represent the public community setting where the intervention occurred: (a) the supervisor will find this intervention acceptable for the company's environment, (b) co-workers will find this intervention acceptable for the company's environment, and (c) patrons will find this intervention acceptable when they are in this place of business. Total scores generated by the IRP-15 range from 15 to 90 and 18 to 108 on the adapted IRP. Higher scores indicate better acceptance of interventions and ratings above 52.5 are considered to reflect acceptability by the rater (VonBrock & Elliott, 1987). Similar to the IRP-15, the adjusted acceptability indicator was determined by multiplying 3.5 (the average rating for an acceptable item) by 18

(the new total of items). Therefore, a total rating above 63 reflects intervention acceptability by the rater.

Results

FUNCTIONAL ANALYSIS

The brief-FA results indicated that levels of target behavior were consistently greater during the escape condition than the attention and control conditions (see Figures 1–4). Students also were less engaged with the task during the escape condition, than in the attention and control conditions. The brief-FA for all students showed identical functions of behavior in the form of escape from demand maintained by negative reinforcement.

Haley

Figure 1 displays Haley's brief-FA. During the standard assessment phase, Haley demonstrated 9 outbursts during the escape condition, 3 during the attention condition, and 1 during the control condition. Similar levels of responding also occurred during the confirmatory analysis with 9 and 11 outbursts during the escape conditions and 3 outbursts during the attention condition. The mean percentage of intervals of task engagement during the standard assessment and confirmatory analysis was the lowest throughout the escape conditions with a mean of 30% intervals of task engagement during escape condition, 82% intervals during the attention condition, and 85% intervals during the control condition. During the confirmatory analysis phase, Haley engaged in a mean of 33% and 30% intervals during the escape conditions and a mean of 72% intervals during the attention condition. The brief-FA results indicated that Haley's outbursts were negatively reinforced in the form of escape from demand.

Anne

Figure 2 displays Anne's brief-FA. During the standard assessment phase, Anne demonstrated 3 inappropriate touches during the escape condition, 2 during the attention condition, and 1 during the control condition. During the confirmatory analysis, Anne demonstrated increased levels of 4 and 5 inappropriate touches during the escape conditions and 1 during the attention condition. The mean percentage of intervals of task engagement during the functional analysis and confirmatory analysis was the lowest throughout the escape conditions. Anne demonstrated a mean of 48% intervals of task engagement during the escape condition, 48% intervals during the attention con-

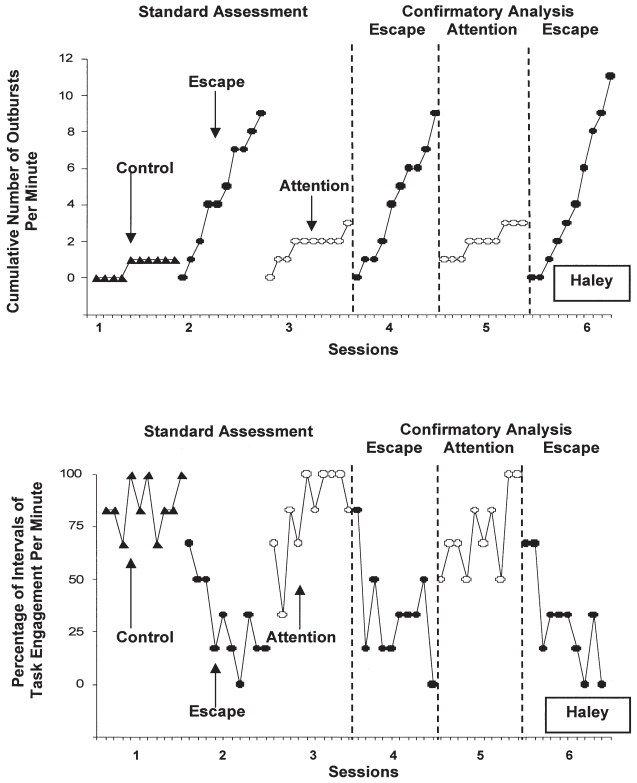

Figure 1. Haley's number of outbursts and percentage of task engagement during brief functional analysis conditions.

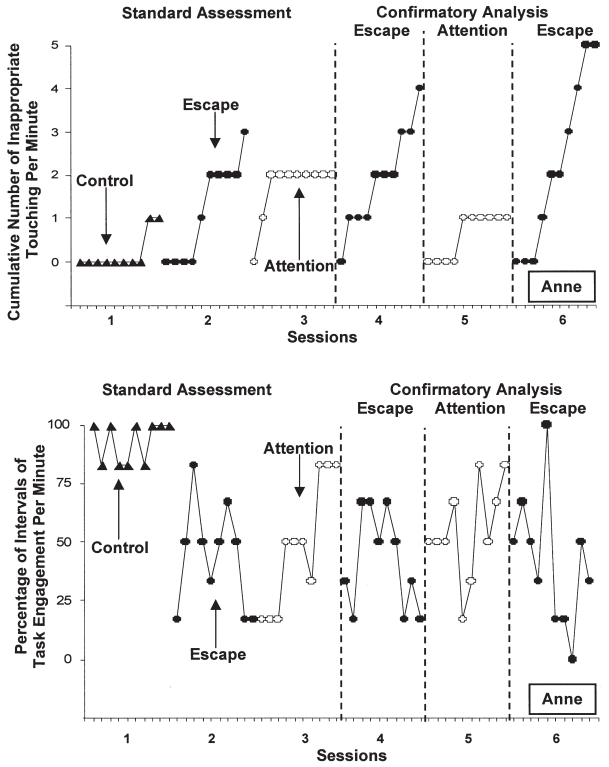

Figure 2. Anne's number of inappropriate touches and percentage of task engagement during brief functional analysis conditions.

dition, and 93% intervals during the control condition. During the confirmatory analysis phase, Anne demonstrated a mean of 42% intervals during the escape the conditions and 55% intervals during the attention condition. The brief-FA results indicated that Anne's inappropriate touches were negatively reinforced in the form of escape from demands.

Gail

Figure 3 displays Gail's brief-FA. During the standard assessment phase, Gail demonstrated 7 vocalizations during escape condition and 2 during the attention and control conditions. During the confirmatory phase, Gail demonstrated increased levels of 12 and 10 vocalizations during the escape conditions and 4 during the attention condition. The mean percentage of intervals of task engagement during the standard assessment and confirmatory analysis was the lowest throughout the escape conditions. Gail demonstrated a mean of 38% intervals of task engagement during the escape condition, 65% intervals during the attention condition, and 82% intervals during the control condition. During the confirmatory analysis phase, Gail demonstrated a mean of 33% and 30% intervals task engagement during the escape conditions and a mean of 58% intervals during the attention condition. The brief-FA results indicated that Gail's vocalizations were negatively reinforced in the form of escape from demands.

Kyle

Figure 4 displays Kyle's brief-FA. During the standard assessment phase, Kyle demonstrated 10 occurrences of leaving the work area during the escape condition, 3 during the attention condition, and 2 during the control condition. During the confirmatory phase, Kyle demonstrated 10 occurrences of leaving the work area during the escape conditions and 3 during the attention condition. The mean percentage of intervals of task engagement during the standard assessment and confirmatory analysis was the lowest throughout the escape conditions. Kyle demonstrated a mean of 32% intervals of task engagement during the escape condition, 72% intervals during the attention condition, and 92% intervals during the control condition. During the confirmatory analysis phase, Kyle demonstrated a mean of 32% and 43% intervals task engagement during the escape conditions and a mean of 68% intervals during the attention condition. The brief-FA results indicated that Kyle's occurrences of leaving the work area were negatively reinforced in the form of escape from demands.

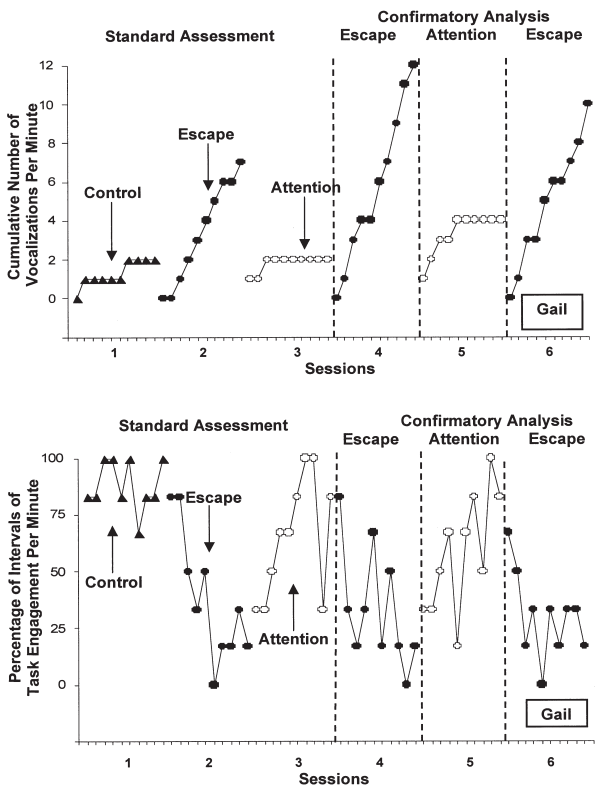

Figure 3. Gail's number of vocalizations and percentage of task engagement during brief functional analysis conditions.

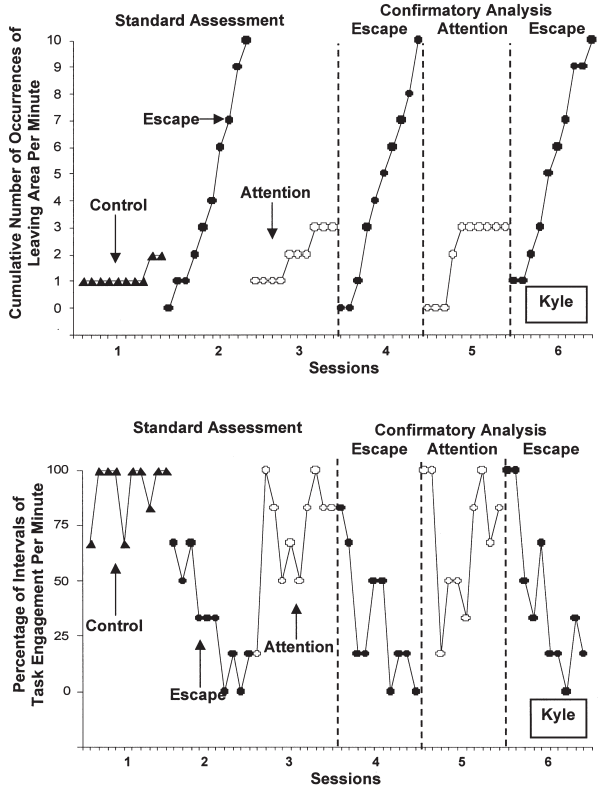

Figure 4. Kyle's number of leaving the work area and percentage of task engagement during brief functional analysis conditions.

INTERVENTION COMPARISON

The results of the brief intervention comparison and intervention evaluation indicated that both interventions were effective at decreasing target behaviors and increasing task engagement for all students. Figures 5 through 8 display the levels of each student's target behavior and percentage of task engagement during the alternating intervention comparison and evaluation phases. The antecedent-based intervention (SOAP) was more effective for Gail and Kyle, and both interventions were equally effective for Haley and Anne. All four teachers indicated a stronger social acceptance for SOAP than for DRA. Since SOAP was more effective or more socially accepted, the SOAP intervention was further evaluated with all students.

Haley

Figure 5 displays Haley's intervention comparison and evaluation for outbursts and task engagement. During the intervention comparison phase, Haley demonstrated slightly fewer outbursts during SOAP ($M = 6$) than DRA ($M = 7$). The mean percentage of intervals of task engagement during SOAP was slightly higher than DRA, with a mean of 50% and 42% intervals, respectfully. During the intervention evaluation phase, Haley's outbursts decreased to 2 occurrences when SOAP was further evaluated. Haley's outbursts increased to 4 occurrences when the intervention was withdrawn and decreased to 2 occurrences when SOAP was reimplemented. Task engagement also increased to a mean of 82% and 85% intervals when SOAP was present and decreased to a mean of 70% intervals when SOAP was withdrawn.

Anne

Figure 6 displays Anne's intervention comparison and evaluation for inappropriate touching and task engagement. During the intervention comparison phase, Anne's inappropriate touching immediately decreased to zero occurrences using either intervention. However, the mean percentage of intervals of task engagement during SOAP was slightly higher than during DRA, with 67% and 64% intervals, respectively. During the intervention evaluation phase, Anne's inappropriate touching maintained at zero occurrences when SOAP was further evaluated. When the intervention was withdrawn, Anne's inappropriate touching increased to 3 occurrences and decreased to zero occurrences when reimplemented. Task engagement increased to a mean of 97% intervals during both phases

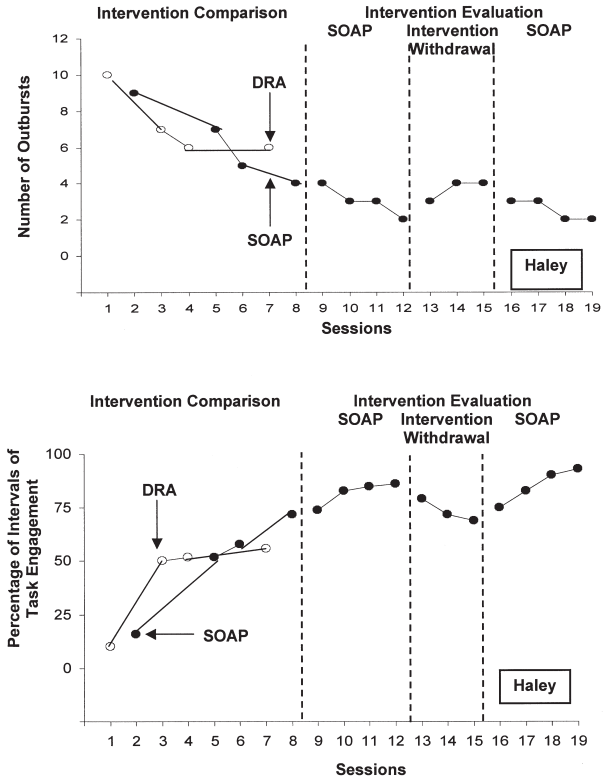

Figure 5. Haley's number of outbursts and percentage of task engagement during the brief intervention comparison and intervention evaluation. *Note.* SOAP = self-operated auditory prompts; DRA = differential reinforcement of alternative behaviors.

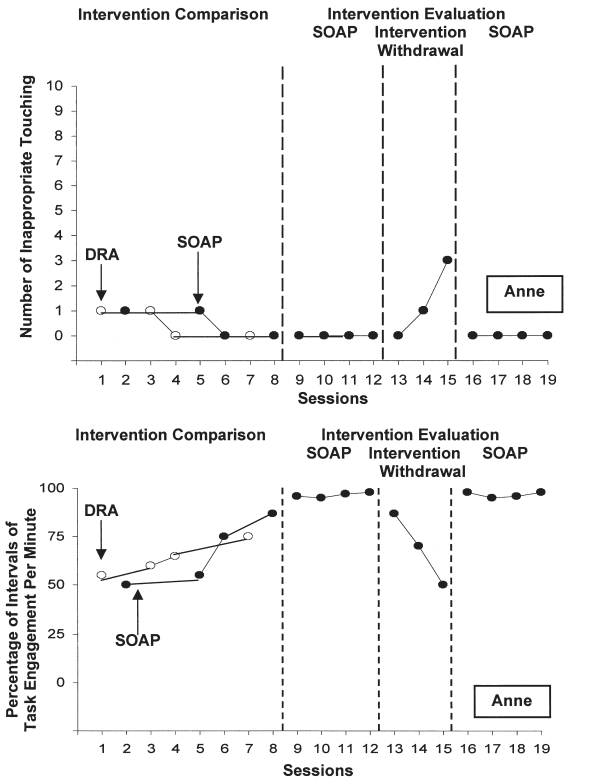

Figure 6. Anne's number of inappropriate touches and percentage of task engagement during the brief intervention comparison and intervention evaluation. *Note.* SOAP = self-operated auditory prompts; DRA = differential reinforcement of alternative behaviors.

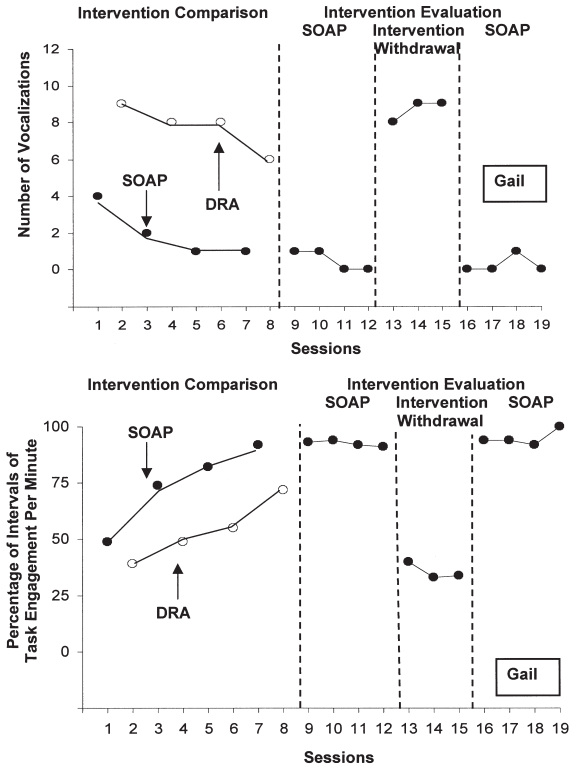

Figure 7. Gail's number of vocalizations and percentage of task engagement during the brief intervention comparison and intervention evaluation. *Note.* SOAP = self-operated auditory prompts; DRA = differential reinforcement of alternative behaviors.

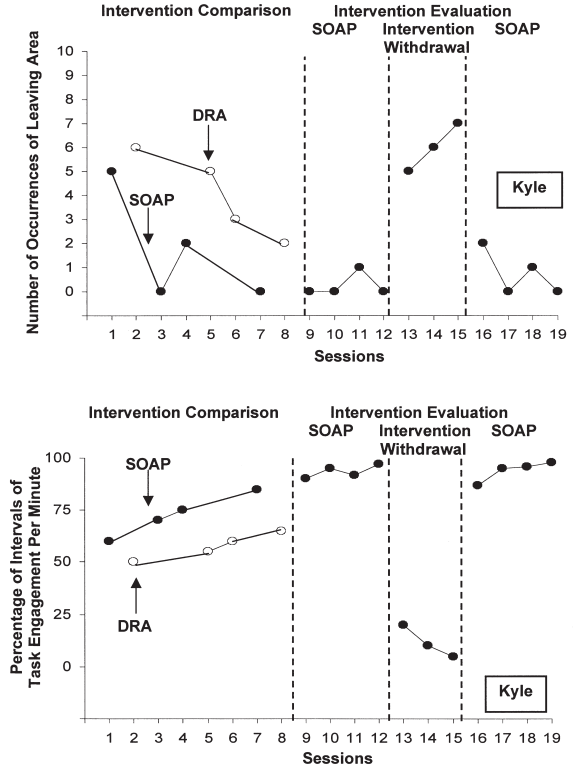

Figure 8. Kyle's number of leaving the work area and percentage of task engagement during the brief intervention comparison and intervention evaluation. *Note.* SOAP = self-operated auditory prompts; DRA = differential reinforcement of alternative behaviors.

when SOAP was present and decreased to a mean of 69% intervals when withdrawn.

Gail

Figure 7 displays Gail's intervention comparison and evaluation for vocalizations and task engagement. During the intervention comparison phase, SOAP was more effective at decreasing vocalizations than DRA. SOAP also was more effective at increasing the percentage of intervals of task engagement. During the treatment evaluation phase, Gail's vocalizations decreased to zero occurrences when SOAP was further evaluated. Gail's vocalizations increased to 9 occurrences when the intervention was withdrawn and decreased to zero occurrences when SOAP was reimplemented. Task engagement also increased to a mean of 93% and 95% intervals when SOAP was present and decreased to a mean of 36% intervals when the intervention was withdrawn.

Kyle

Figure 8 displays Kyle's intervention comparison and evaluation for leaving the work area and task engagement. During the intervention comparison phase, Kyle's leaving the area decreased more with SOAP (M = 2) than DRA (M = 4). SOAP also was more effective at increasing the percentage of intervals of task engagement. During the intervention evaluation phase, Kyle's leaving the work area decreased to zero occurrences when SOAP was further evaluated. When the intervention was withdrawn, Kyle's leaving the area increased to 7 occurrences and decreased to zero occurrences when reimplemented. Task engagement also increased to a mean of 94% intervals when SOAP was present and decreased to a mean of 12% intervals during intervention withdrawal.

SOCIAL VALIDITY

Table 2 presents the adapted IRP ratings completed by each teacher. Following the brief intervention comparison, all teachers rated SOAP above 63, suggesting the intervention was socially acceptable. DRA received two scores above 63 by Haley's and Anne's teachers, suggesting social acceptability. However, DRA also received two scores below 63 by Gail's and Kyle's teachers, suggesting the intervention was unacceptable. The teachers indicated strong disagreement to items that DRA procedures were easy to implement, DRA procedures would not result in negative side effects, they would suggest the intervention to other

Table 2. Teacher-Generated Adapted-IRP Scores for Each Treatment

	Brief treatment comparison		Treatment evaluation
Student	SOAP	DRA	SOAP
Haley	85	74	98
Anne	96	74	98
Gail	79	61	96
Kyle	80	58	96

Note. IRP = *Intervention Rating Profile* (Martens, Witt, Elliot, & Darveaux, 1985); SOAP = self-operated auditory prompts; DRA = differential reinforcement of alternative behaviors. Scores above 63 indicate acceptable intervention.

teachers, they were willing to use the intervention in other community vocational settings, and patrons would find the intervention acceptable when they are in this place of business. After teachers were informed of the results of the brief intervention comparison and were readministered the adapted IRP for SOAP, teacher acceptability ratings increased further. In general, teachers indicated stronger agreement for all items including a willingness to use the intervention in other public vocational settings, a willingness to use the intervention with other students whose behaviors interfere with their work productivity, and suggesting the intervention to other teachers. The teachers also indicated agreement that supervisors, co-workers, and patrons would find the intervention acceptable.

Discussion

An approach for identifying effective and practical community-based interventions by incorporating brief functional analysis, intervention comparisons, and assessment of intervention acceptability was demonstrated in four public community settings. The brief-FA indicated that target behaviors of four students were maintained by negative reinforcement in the form of escape from demands. An antecedent-based and a response-based intervention were designed to match the function of each behavior. As demonstrated by the brief intervention comparison, SOAP procedures worked as effectively as or more effectively than DRA procedures. The effectiveness of the function-based intervention confirmed the hypotheses derived from the brief-FA.

These findings confirm and extend previous investigations that demonstrated brief-FA procedures accurately identify the function of students' inappropriate behavior in a vocational setting (Wallace & Knights, 2003). However, this brief-FA was the first study conducted in a general public vocational setting including the presence of nontrained community members. Unlike Wallace and Knights' brief-FA, conducted in a therapy room of a vocational program setting, the current investigation was conducted in the students' natural environment. Additionally, Wallace and Knights' experimental sessions were 2 min, while extended session lengths were 10 min. Wallace and Knights concluded that the brief assessment identified the function of two of the three participants' disruptive behavior compared to the more extended assessment. However, during this study, the function of behavior was not identifiable after 2-min for all students. Moreover, Haley's and Gail's data would have suggested inaccurate maintaining contingencies that occasioned their outbursts and vocalizations, leading to unsuccessful intervention recommendations. Vollmer et al. (1993) suggested that extinction bursts at the beginning of a session may result in false conclusions of occasioning and maintaining variables, although that explanation is not supported by the minute by minute analyses in the current study. Another explanation is that brief-FA requires immediate discrimination of conditions and control by the relevant contingencies. When immediate discrimination does not occur, Iwata et al. (1994) suggested expanding the length of the assessment. In the current investigation, all students demonstrated differential levels of behavior across the experimental conditions when the length of the session was 10 min.

One possible reason for the occurrence of response differentiation in a relatively shorter period of time than other similar studies (e.g., Hughes, 2003) may have been due to the inclusion of programmed discriminative stimuli (S^D). This study was the first investigation to incorporate the S^D of distinct settings associated with different experimental conditions in a public community environment. These findings support prior research indicating that the inclusion of programmed S^D facilitated discrimination among FA conditions (Conners et al., 2000). Furthermore, although experimental conditions were conducted in distinct locations within the store, each location was relevant to the student's job.

The brevity of the functional analysis conditions was suitable for a public setting. Each student's brief-FA was

conducted during one community trip and behavioral function was identified and verified. Because the target behaviors performed often evoked negative attention from other workers, supervisors, and store patrons, all students were in jeopardy of losing their job placement. Current best practice for assessing inappropriate behavior and for identifying an appropriate intervention plan is a FA, thus abbreviating the process in public settings may minimize potential embarrassment or safety concerns, while continuing to maintain experimental control and rigor.

This study also verified the use of SOAP (antecedent-based intervention) and DRA (response-based intervention) to reduce inappropriate behaviors maintained by negative reinforcement (e.g., Hughes, 2003; Mueller et al., 2003). Both interventions demonstrated the concurrent benefit of increased levels of task engagement when students were prompted or taught an alternative behavior that matched the function of their problem behavior (Hughes, 2003, Meyer, 1999). As Haley, Anne, Gail, and Kyle's target behaviors increased, the percentage of intervals of task engagement decreased. Also, as the students' target behaviors decreased, their time engaged on task increased.

Although SOAP and DRA reduced target behaviors and increased task engagement for all students, individual intervention responsiveness did occur. SOAP was more effective at decreasing targeted behaviors and increasing levels of task engagement for Gail and Kyle. The results demonstrated that SOAP served as a stimulus control for decreasing socially inappropriate behaviors and increasing appropriate work-related behaviors. Additionally, auditory prompting oddities, such as "It's time to start your work," which occurred toward the end of a work session, did not appear to negatively affect student performances. However, other verbal prompts, such as "It's almost break-time," may be a problem during longer work sessions. For example, if the work session is several hours, then a revised prompt may be required.

Gail and Kyle's teachers rated SOAP more socially acceptable than DRA. Specifically, teachers commented that "SOAP permitted students to control their own prompts," "SOAP permitted greater opportunities for students to monitor their own behavior," and "SOAP permitted the teacher to manage groups of students more effectively." In addition, Kyle's teacher noted that SOAP "reduced safety concerns associated with leaving the work area and allowed Kyle to work more independently." Because Kyle's elopement was a serious safety concern, additional staff was often required to support his needs while in the community, particularly given the possibility of becoming lost.

Gail and Kyle's teachers scored DRA as unacceptable. Both teachers commented that such a dense DRA schedule may lead to prompt dependency and that constant verbal prompts in the community setting may create a potentially embarrassing experience for the student. Teachers also indicated greater efficiency with the delivery of the reinforcer with SOAP than with DRA. This possibility highlights the issues associated with translating research findings into applied settings. That is, procedures proven effective and efficient in one setting (e.g., general education classroom, special education classroom, clinical setting) may not be socially acceptable for students, teachers, and parents who must implement the intervention in a community setting. In the absence of this information, a teacher may have implemented an intervention (e.g., DRA) that was less effective (Gail and Kyle) and less preferred (all teachers) than the intervention selected in this study.

Haley's and Anne's data indicated no difference between SOAP and DRA for reducing inappropriate behaviors and increasing task engagement. Both teachers scored SOAP and DRA as socially acceptable for public community settings; however, teachers preferred SOAP. Haley's and Anne's teachers commented that students worked more independently and increased work productivity when SOAP was used, thereby, enhancing student autonomy in the workplace.

STUDY LIMITATIONS

Several limitations of this study may have affected the overall results and interpretations. First, the brief-FA only examined behaviors maintained by negative reinforcement and positive reinforcement in the form of attention. Behaviors maintained by other forms of positive reinforcement or automatic reinforcement may require additional procedural adaptations. Second, DRA may not provide an adequate test as an alternative intervention to SOAP since DRA procedures did not specifically address the efficiency of student responding or the immediacy of the reinforcement. Third, the SOAP treatment and device (MP3 player and headphones) was novel for the students. All students demonstrated no resistant behaviors toward wearing the device and were extremely motivated during the SOAP intervention. Evaluations over longer periods of time are needed to determine maintenance of the intervention effects. Fourth, all problem behaviors were ignored during the intervention comparison and evaluation phases; thus, it is not possible to parcel out the relative effectiveness of extinction from the DRA and SOAP interventions. In fact, the general improvements across the intervention comparison and evaluation phases might be attributed to the extinction component.

FUTURE RESEARCH

Future research is needed to verify the results of the brief-FA and the results of the intervention evaluations. Brief-FA procedures require further investigations in other public community settings because different settings (e.g., restaurants, stores, office buildings) have different environmental antecedents and distractions. Also, individuals in

different settings have varying levels of tolerance for problem behavior. Future research also should attempt to replicate these results across different tasks (e.g., discrete versus chained, self-help versus leisure), natural support instructors (e.g., job coach, co-worker, parent), and functions of behavior (e.g., sensory, multiple functions). Additionally, future research is needed to examine the long-term effects of SOAP to investigate possible novelty influences and the incorporation of intervention fading procedures while maintaining acceptable levels of student behaviors.

ABOUT THE AUTHORS

David Cihak, *PhD, is an assistant professor at the University of Tennessee in the Department of Theory and Practice in Teacher Education. He works in the Modified and Early Childhood Special Education program. His research areas include effective instructional strategies for classroom and public community settings, as well as functional behavior analysis and positive behavioral supports.* ***Paul A. Alberto,*** *PhD, is a research professor of educational psychology and special education at Georgia State University. He is director of the Bureau for Students with Multiple and Severe Disabilities. His research interests concern means for increasing the competence of students with severe disabilities in community settings.* ***Laura D. Fredrick,*** *PhD, is an associate professor in the College of Education at Georgia State University, where she is the director of the Office of Direct Instruction. Her research interests include reading and behavior analysis in general education. Address: David Cihak, Theory & Practice in Teacher Education, A412 Claxton Complex, University of Tennessee, Knoxville, TN 37996-3442.*

REFERENCES

Alberto, P. A., Taber, T. A., & Fredrick, L. D. (1999). Use of self-operated auditory prompts to decrease aberrant behaviors in students with moderate mental retardation. *Research in Developmental Disabilities, 20,* 429–439.

Alberto, P. A., & Troutman, A. C. (2006). *Applied behavior analysis for teachers* (7th ed.). Upper Saddle River, NJ: Prentice Hall.

Asmus, J. M., Ringdahl, J. E., Sellers, J. A., Call, N. A., Andelman, M. S., & Wacker, D. P. (2004). Use of a short-term impatient model to evaluate aberrant behavior outcome data summaries from 1996 to 2001. *Journal of Applied Behavior Analysis, 37,* 283–304.

Barlow, D. H., & Hersen, M. (1984). *Single case experimental designs: Strategies for studying behavior change* (2nd ed.). Needham Heights, MA: Allyn & Bacon.

Billingsley, F. F., White, O. R., & Munson, R. (1980). Procedure reliability: A rational and an example. *Behavioral Assessments, 2,* 229–241.

Brown, L., Branston, M. B., Hamre-Nietupski, S. I., Pumpian, N., Certo, N., & Gruenewald, L. (1979). A strategy for developing chronological-age-appropriate and functional curricular content for severely handicapped adolescents and young adults. *The Journal of Special Education, 13,* 81–90.

Broussard, C. D., & Northup, J. (1995). An approach to functional assessment and analysis of disruptive behavior in regular education. *School Psychology Quarterly, 10,* 151–164.

Broussard, C. D., & Northup, J. (1997). The use of functional analysis to develop peer interventions for disruptive classroom behavior. *School Psychology Quarterly, 12,* 65–76.

Carr, E. G., & Carlson, J. I. (1993). Reduction of severe behavior problems in the community setting using a multicomponent approach. *Journal of Applied Behavior Analysis, 26,* 157–172.

Conners, J., Iwata, B. A., Kahng, S. W., Hanley, G. P., Worsdell, A. S., & Thompson, R. H. (2000). Differential responding in the presence and absence of discriminative stimuli during multielement functional analyses. *Journal of Applied Behavior Analysis, 33,* 299–308.

Cooper, L. J., Wacker, D. P., Thursby, D., Plagman, L. A., Harding, J., Millard, T., et al. (1992). Analysis of the effects of task preferences, task demands, and adult attention on child behaviors in outpatient and classroom settings. *Journal of Applied Behavior Analysis, 25,* 823–840.

Davis, C. A., Brady, M. P., Williams, R. E., & Burta, M. (1992). The effects of self operated auditory prompting tapes on the performance fluency of persons with severe mental retardation. *Education and Training of the Mentally Retarded, 27,* 39–50.

Derby, K. M., Wacker, D., Sasso, G., Steege, M., Northup, J., Cigrand, K., et al. (1992). A brief functional assessment technique to evaluate aberrant behavior in an outpatient setting: A summary of 79 cases. *Journal of Applied Behavior Analysis, 25,* 713–721.

Didden, R., Duker, P., & Korzilius, H. (1997). Meta-analytic study on treatment effectiveness for problem behaviors with individuals who have mental retardation. *American Journal of Mental Retardation, 101,* 387–399.

Greenspan, S., & Scholtz, B. (1981). Why mentally retarded adults lose their jobs: Social competence as a factor in work adjustment. *Applied Research in Mental Retardation, 2,* 23–38.

Harding, J. W., Wacker, D. P., Berg, W. K., Barretto, A., & Rankin, B. (2002). Assessment and treatment of severe behavior problems using choice-making procedures. *Education & Treatment of Children, 25,* 26–46.

Higgins, H. A., & Baer, D. B. (1989). Interaction effects in multielement designs: Inevitable, desirable, and ignorable. *Journal of Applied Behavior Analysis, 22,* 57–69.

Hughes, M. A. (2003). *Self-operated auditory prompting systems with verbal prompt matched to function for the reduction of behavior in public community settings.* Unpublished doctoral dissertation, Georgia State University, Atlanta.

Iwata, B. A., Dorsey, M. F., Slifer, K. J., Bauman, K. E., & Richman, G. S. (1994). Toward a functional analysis of self-injury. *Journal of Applied Behavior Analysis, 27,* 197–209. (Reprinted from *Analysis and Interventions in Developmental Disabilities, 2,* 3–20, 1982).

Iwata, B. A., Pace, G. M., Dorsey, M. F., Zarcone, J. R., Vollmer, T. R., & Smith, R. G. (1994). The functions of self-injury behavior: An experimental-epidemiological analysis. *Journal of Applied Behavior Analysis, 27,* 215–240.

Iwata, B. A., Vollmer, T. R., & Zarcone, J. R. (1990). The experimental (functional) analysis of behavior disorders: Methodology, applications, and limitations. In A. C. Repp & N. N. Singh (Eds.), *Perspectives on the use of nonaversive and aversive interventions for persons with developmental disabilities* (pp. 301–330). Sycamore, IL: Sycamore Publishing.

Kern, L., Choutka, C. M., & Sokol, N. G. (2002). Assessment-based antecedent intervention used in natural settings to reduce challenging behavior: An analysis of the literature. *Education & Treatment of Children, 25,* 111–130.

Lucas, R. L. (2000). The effects of time-out and DRA on the aggressive behavior of a spirited two-year-old. *Child & Family Behavior Therapy, 22*(2), 51–56.

Luiselli, J. K. (1998). Intervention conceptualization and formulation, In J. K. Luiselli & M. J. Cameron (Eds.), *Antecedent control: Innovative approaches to behavior support* (pp. 29–44). Baltimore: Brookes.

Martens, B. K., Witt, J. C., Elliott, S. N., & Darveaux, D. (1985). Teacher judgments concerning the acceptability of school-based interventions. *Professional Psychology, Research and Practice, 16,* 191–198.

Meyer, K. A. (1999). Functional analysis and treatment of problem exhibited by elementary school children. *Journal of Applied Behavior Analysis, 32,* 229–232.

Mueller, M. M., Edwards, R. P., & Trahant, D. (2003). Translating multiple as-

sessment techniques into an intervention selection model for classrooms. *Journal of Applied Behavior Analysis, 36,* 563–573.

Northup, J., Wacker, D., Sasso, G., Steege, M., Cigrand, K., Cook, J., et al. (1991). A brief functional analysis of aggressive and alternative behavior in an outpatient setting. *Journal of Applied Behavior Analysis, 24,* 509–522.

Ogier, R., & Hornby, G. (1996). Effects of differential reinforcement on behavior and self-esteem of children with emotional and behavioral disorders. *Journal of Behavioral Education, 6,* 501–510.

O'Neill, R. E., Horner, R. H., Albin, R. W., Sprague, J. R., Storey, K., & Newton, N. S. (1997). *Functional assessment and program development for problem behavior: A practical handbook.* Pacific Grove, CA: Brooks/Cole.

O'Reilly, M. F., Lancioni, G. E., King, L., Lally, G., & Dhomhnail, O. N. (2000). Using brief assessment to evaluate aberrant behavior maintained by attention. *Journal of Applied Behavior Analysis, 33,* 109-112.

Piazza, C., Moes, D., & Fisher, W. (1996). Differential reinforcement of alternative behavior and demand fading in of escape-maintained destructive behavior. *Journal of Applied Behavior Analysis, 29,* 569–572.

Reichle, J., Drager, K., & Davis, C. (2002). Using requests for assistance to obtain desired items and to gain release from nonpreferred activities: Implications for assessment and intervention. *Education & Treatment of Children, 25,* 47–66.

Reitman, D., Drabman, R. S., Speaks, L. V., Burkley, S., & Rhode, P. C. (1999). Problem social behavior in the workplace: An analysis of social behavior problems in a supported employment setting. *Research in Developmental Disabilities, 20,* 215–228.

Roid, G. (2004). *Stanford-Binet intelligence scales* (5th ed.). Rolling Meadows, IL: Riverside Publishing.

Sasso, G. M., Reimers, T. M., Cooper, L. J., Wacker, D., Berg, W., Steege, M., et al. (1992). Use of descriptive and experimental analyses to identify the functional properties of aberrant behavior in school settings. *Journal of Applied Behavior Analysis, 25,* 809–821.

Steed, S. E., & Lutzker, J. R. (1999). Recorded audio prompts: A strategy to increase independent prevocational task completion in individuals with dual diagnosis. *Behavior Modification, 23,* 152–168.

Taber, T. A., Alberto, P. A., & Fredrick, L. D. (1998). Use of self-operated auditory prompts by workers with moderate mental retardation to transition independently through vocational tasks. *Research in Developmental Disabilities, 19,* 327–345.

Taber, T. A., Seltzer, A., Heflin, J., & Alberto, P. A. (1999). Use of self-operated auditory prompts to decrease off-task behavior for a student with autism and moderate mental retardation. *Focus on Autism and Other Developmental Disabilities, 14,* 159–166.

Umbreit, J. (1997). Elimination of problem behavior at work through an assessment- based intervention. *Education and Treatment in Mental Retardation and Developmental Disabilities, 5,* 129–137.

Vollmer, T. R., Iwata, B. A., Zarcone, J. R., Smith, R. G., & Mazaleski, J. L. (1993). The role of attention in the treatment of attention-maintained self-injurious behavior: Noncontingent reinforcement and differential reinforcement of other behavior. *Journal of Applied Behavior Analysis, 26,* 9–21.

VonBrock, M. B., & Elliott, S. N. (1987). Influences of treatment effectiveness information on the acceptability of classroom interventions. *Journal of School Psychology, 25,* 131–144.

Wallace, M. D., & Knights, D. J. (2003). An evaluation of brief functional analysis format within a vocational setting. *Journal of Applied Behavior Analysis, 36,* 125–128.

Wechsler, D. (2003). *Wechsler intelligence scale for children* (4th ed.). San Antonio, TX: Psychological Corp.

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