Active Teacher Participation in Functional Behavior Assessment for Students With Emotional and Behavioral Disorders Risks in General Education Classrooms

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ABSTRACT: This study presents functional assessment data from two second-grade students with behavior and academic problems. Functional assessment procedures included interview, observation, functional analysis, and intervention. Functional analysis conditions, conducted by the classroom teacher, with coaching from the researcher, indicated multiple functions for the behavior. Intervention consisted of teacher attention (praise) and points, and self-management of appropriate responses during group instruction. Intervention during independent seatwork consisted of modeling by the teacher to decrease task difficulty, the use of "help tickets" to request assistance from peers or the teacher, and social attention for task completion. Results indicated improved on-task and decreased disruptive behaviors during function-based intervention. The use of functional assessment in general education settings is discussed.

■ Students at risk for emotional and behavioral disorders (EBD) present a multitude of behaviors that impede the learning process and challenge general education classroom teachers (Kauffman, 1999; Walker, Stiller, Severson, Feil, & Golly, 1998). Behaviors include disruptive behaviors, poor interaction skills, attention problems, noncompliance to instructional directives, and subsequent limited progress in achievement (Kamps, Kravits, Rauch, Kamps, & Brown, 2000). Some problems relate to setting events (e.g., sickness, prior conflicts) (Shores et al., 1993) and general risk factors, such as disadvantaged neighborhoods, low socioeconomic status, and single-parent families (Walker et al., 1998). Environmental variables and interaction patterns between students and their teachers and between students and their peers further influence the day-to-day performance and behavioral repertoires of students with risks of EBD. Such environmental variables include classroom structure and rules, schedules, quality of instruction, opportunities for active student response, appropriate curriculum and content coverage, and school climate (Greenwood, 1991; Gunter & Denny, 1998; Kamps, 2001). Teacher–student–peer interaction patterns that influence students' behaviors include attention to appropriate and inappropriate behaviors, feedback regarding student academic and behavioral performance, supervision of students, reinforcement schedules, delivery of consequences, and general interaction styles (e.g., punitive versus positive or corrective) (Kamps et al., 1995; Shores et al., 1993; Wehby, Symons, & Shores, 1995).

Functional analysis methodology and functional behavior assessment (FBA) can help practitioners determine the relationships between behaviors and environmental variables, thus aiding in the design of more efficient and effective classroom interventions (Iwata, Kahng, Wallace, & Lindberg, 2000). From a prevention standpoint, FBA can play an important role in general education and prereferral interventions. When given efficient FBA procedures, trained staff (e.g.,

school psychologists, special educators) can assist general education teachers with highly disruptive students to (a) run brief functional analysis conditions, and (b) use the data to strategically design interventions to improve behaviors within their general education classrooms.

For several decades FBA has been used successfully with persons with developmental disabilities (DD) to treat a variety of harmful behaviors, such as aggression, self-injury, tantrums, and stereotypy (see Hanley, Iwata, & McCord, 2003, and Iwata et al., 2000 for a review). FBA is designed to generate hypotheses about antecedents and consequences that trigger or maintain behaviors, while functional analysis actually manipulates the hypothesized maintaining variables using an experimental design to demonstrate control (Ervin et al., 2001; Iwata, Vollmer, & Zarcone, 1990). Currently there exists a small but growing literature base, with several recent reviews reporting the usefulness of the methodology with students at risk and with EBD in applied settings, such as homes and schools (Heckaman, Conroy, Fox, & Chait, 2000; Lane, Umbreit, & Beebe-Frankenberger, 1999). In a recent review of 100 school-based FBA studies, 56 of the 278 participants had a DSM-IV behavior disorder or EBD (Ervin et al., 2001). Experimental studies report (a) the successful implementation of FBA procedures, including direct observation, indirect methods, and functional analysis (Lane et al., 1999); (b) similar functions (i.e., attention, escape) of disruptive behaviors in the EBD at-risk population as in DD groups (Dunlap et al., 1993; Sasso et al., 1992; Taylor & Romanczyk, 1994); and (c) the effectiveness of FBA in intervention planning (Ervin et al., 2001).

Several empirical studies serve as exemplary models for implementation of FBA procedures within classroom settings (see Radford, Aldrich, & Ervin, 2000 for a review). Ervin and colleagues (2000) conducted FBAs for three students with attention-deficit/hyperactivity disorder (ADHD) that exhibited high rates of inappropriate behavior, with occasional major disruptions, in their classroom in a residential school setting. Descriptive assessment included direct observation and indirect methods of interviews with teachers and students, followed by hypothesis development and testing of escape and attention conditions using functional analysis. Data collected during functional analysis and follow-up intervention indicated higher rates of appropriate behavior during (a) self-monitoring conditions (i.e., attention for appropriate behavior), (b) limited visual contact with peers, (c) teacher proximity (attention), and (d) active engagement during instruction (note taking, computer lessons, manipulative science materials). The authors concluded that environmental influences served an important role in the maintenance of behaviors and that different variables maintained behaviors for each individual despite a presumed similar biological basis (ADHD).

McComas, Goddard, and Hoch (2002) also demonstrated the effects of student preference in a recent FBA study with a 9-year-old boy whose destructive behavior was being negatively reinforced by escape in the form of breaks from required tasks. The authors compared extinction (which showed decreases in destructive behaviors but no increase in engagement), negative reinforcement (which showed decreases in destructive behaviors with no increases in engagement), and negative reinforcement combined with preferred activities (which showed decreased destructive behaviors and engagement at nearly 100%). This study expanded the literature about EBD by adding a particular dimension (preference) to the negative reinforcement condition, illustrating the need to include individualized conditions as a component of FBA. Additional studies have shown the usefulness of FBA for students at risk/with EBD, with data-based support demonstrating the relationship of teacher and peer attention (e.g., Doggett, Edwards, Moore, Tingstrom, & Wilczynski, 2001; Lewis & Sugai, 1996; Taylor & Romanczyk, 1994), and environmental and antecedent variables to student behaviors (Ervin et al., 2000; Kern, Maher, Choutka, & Sokol, 2002).

An emerging literature addresses the feasibility of teachers conducting functional analysis procedures. In one study, Lewis and Sugai (1996) trained a general education teacher to run functional analysis conditions; that is, teacher attention plus peer extinction, peer attention plus teacher extinction, and extinction (extinction functioning as a control). Peer attention, rather than teacher attention, was demonstrated as maintaining off-task behavior. A function-based intervention was developed, based on these findings, with peers delivering attention for on-task behavior and providing tutoring (additional social attention) for appropriate behavior.

In a second example, experimenters used lecture, readings, video instruction, and role

play to train three teachers to conduct functional analysis sessions to test attention and escape conditions (Moore et al., 2002). Teachers were able to correctly respond to behaviors (i.e., follow the functional analysis protocol) during simulated and real classroom sessions, showing integrity with limited time spent in training. Similar reliability in teacher implementation of functional analysis conditions (attention, escape, and control) were reported by Mueller, Edwards, and Trahant (2003), with additional findings of teachers' preferences for reinforcement schedules as a component of function-based intervention planning.

Despite these and other examples, there is still a paucity of FBA and functional analysis research as a prevention tool (e.g., to reduce challenging behaviors and prevent acceleration, later more serious behaviors, and placement in restrictive settings) for students at risk for EBD. Further, studies that do exist are inconsistent in the use of FBA procedures, with considerable gaps in research to practice (Quinn et al., 2001; Sasso, Conroy, Stichter, & Fox, 2001). In addition, few studies are conducted in public schools with general education teachers actively participating in conducting the functional analysis conditions (Lewis & Sugai, 1996; Mueller et al., 2003; Symons, McDonald, & Wehby, 1998), while others call for determination of the efficiency and necessity of teachers' involvement (Scott et al., 2004).

The purpose of the present study is to add to the literature by providing an FBA experiment within a public-school general education classroom with clearly defined procedures and active teacher involvement. Two students screened as "at risk" for EBD in a second-grade classroom participated. Procedures in the study included direct observation, teacher interview, hypothesis development, functional analysis, and intervention. Research questions included (a) What conditions appear to maintain disruptive classroom behaviors, and conversely under what conditions do appropriate behaviors occur?; (b) Can the teacher assist in implementing the FBA procedures through structured interview information, and further can the teacher reliably implement the functional analysis conditions within the natural environment given other classroom responsibilities?; and (c) Do classroom-based functional assessment and functional analysis lead to effective intervention?

Method

Participants and Setting

Patricia, a 7-year-old African American girl, was showing risk for academic and behavior problems. She was selected from a group of participants in a larger study. In the study, students in four elementary schools were screened using systematic nomination and assessment procedures as outlined in two validated instruments: Systematic Screening for Behavior Disorders—SSBD (Walker & Severson, 1992), and the Dynamic Indicators of Basic Early Literacy Skills—DIBELS (Good & Kaminski, 1996).

Behavioral screening procedures consisted of several stages, including nomination by teachers as having a behavioral problem (using a list of objective criteria), use of a teacher rating scale with criteria for maladaptive and adaptive behavior, and direct observation of on-task and social interaction behavior. Academic screening consisted of nomination of students by teachers as having an academic problem using a list of grade-level criteria, and the DIBELS assessment of delays in early reading skills (nonsense word fluency, oral reading fluency).

Researchers then provided group and individual consultations for intervention planning. Patricia met screening criteria for both risk factors. A functional assessment interview with her teacher indicated that Patricia was academically noncompliant to instructional demands, frequently talked out during class, and was off task (e.g., out of seat, talking to peers) during independent work time. Task completion was a daily problem. The teacher reported that Patricia was below average in reading and math skills.

Michael, a 7-year-old African American boy, also met screening criteria for having behavioral and academic risks. The functional assessment interview with Michael's teacher indicated that Michael had trouble attending to task and was frequently off task. Disruptive behaviors included fidgeting, talking out, playing with items, and making noises. The teacher noted that Michael was below grade level in reading, with delays on the DIBELS for oral reading fluency, but at grade level in math. Michael received speech services.

Patricia and Michael attended the same second-grade classroom in an urban, culturally diverse elementary school. The school was a charter elementary designed to provide direct instruction using reading mastery,

language for learning, and connecting math concepts curricula. Class sizes were small (13 to 16 students were in second grade) and generally well structured during instructional periods due to the nature of the curriculum. In addition, effective instructional practices were used; for example, students were placed at their instructional levels with mastery across content, high rates of individual and group responding were solicited during lessons, and systematic student feedback for performance was provided.

All observations were conducted in the second-grade classroom during reading and language arts instruction for Patricia, and during language and math for Michael. Group instruction and independent seatwork periods were included in the observations. Tasks within the sessions were 20 to 30 minutes in length. Group instruction in reading consisted of teacher-led activities, (including phonics, vocabulary, oral reading, and comprehension questions), and independent tasks in student workbooks matched to the group lesson. Language instruction included basic concepts, grammar, and critical thinking led by the teacher, with some independent practice that utilized worksheets or writing tasks to reinforce the group lesson.

Dependent Variables and Measurement

On-Task Data

Student on-task data were recorded using the protocol from the SSBD screening tool. "On task" was defined as attending to the teacher or materials as directed (e.g., completing assignments, listening to the teacher, getting materials together, reading a text) and not engaging in disruptive behaviors. Observers noted the start and stop times of sessions, and a stopwatch was used to provide the duration of on-task behavior (i.e., the stopwatch was turned on when the student was appropriately engaged and turned off when the student stopped engagement behaviors). The duration of on-task time was divided by the total time of the session and multiplied by 100 to compute percent of on-task behavior.

Student Compliance

Compliant behavior was also recorded as an indication of engagement and classroom behavior. Academic compliance was defined as following instructions or answering a question within 5 seconds of the stimulus presentation. It included teaching trials, answers or responses to teacher questions, and beginning task instructions (e.g., "read this word" and "start on your handwriting"). Compliance to behavioral requests was also required to occur or begin within 5 seconds. Examples of behavioral requests included "sit in your chair," "everyone put your things away now," "line up for lunch row one," and "everyone needs to be at their own table."

Disruptive Behaviors

Disruptive behaviors included *out of seat/area* (e.g., not sitting in chair or leaving assigned area without permission), *negative verbal statements toward peers or adults* (e.g., arguing, taunting, name calling, and inappropriate talk such as verbal behaviors to peers during seatwork and talking out without raising hands), *noncompliance to behavior or academic demands* (e.g., refusal or not initiating compliance within 5 seconds), *aggression* (e.g., hitting, kicking, pushing, throwing objects at a person), and *disruptive behavior* that does not meet the other definitions (e.g., making noises with objects and property destruction or misuse).

Antecedents, Consequences, Functions

Immediately following the coding of each disruptive behavior, the antecedent event (demand, hard task, group, unclear, peer transition, or other), the consequence (reprimand, seat change, teacher attention, peer attention, point/privilege loss, time out, ignore, or none), and the possible function (teacher/peer attention, tangible, stimulation, or escape from task or person) were coded. The definitions of these descriptive codes are presented in the appendix A.

Teacher Behaviors

The first teacher-behavior category was a general category: *teacher-delivered attention for appropriate student behaviors*. It included verbal praise statements, physical gestures of reinforcement (e.g., hugs and pats), and tangibles, such as tokens or points. It also included requests for students to give themselves a pat, high five, etc.

The second category of teacher behavior was *reprimands* (see appendix A), which included statements indicating disapproval

that were typically delivered in a stern voice, such as "That is inexcusable"; "Why are you out of your seat?"; and "Some people are going to lose recess minutes if they keep talking." Instructions to comply (e.g., "Sit down now!") were not counted as reprimands even if delivered in a stern voice.

Data-Collection Procedures

Classroom observations (descriptive assessment) lasted from 40 to 90 minutes. All data were recorded as frequency counts except for "on task," which was recorded as percent of session. For purposes of the study, several probes were conducted during each observation. These probes matched the length of the academic activity (e.g., 30-minute reading group, 20 minutes to complete workbook). Each academic activity, as well as format changes within the subject matter, prompted a distinct observation probe. For example, reading instruction that consisted of large group followed by independent seatwork, followed by large group review comprised three observation probes. To standardize the data, frequency data were converted to rate and then converted back to a frequency comparable to a 15-minute session. This allowed for comparisons across sessions and conditions. During functional analysis, conditions were changed after 15 minutes to allow testing of two conditions within each activity.

Data sheets were designed to include an acronym for each behavior, and the observer marked the code acronym on the sheet for each occurrence. With each occurrence of inappropriate behavior, the observer coded the antecedent, consequence, and potential function. Thus, these data served as observation/descriptive assessments that contributed to the functional assessment. In addition, the data sheet included codes for student compliance (academic and behavioral) and teacher behavior (praise/reprimands). The start and stop times, academic subject, and instructional arrangement (large group, small group, independent) were also recorded. All observations were conducted by the first and second authors, both of whom had previously reached 80%+ reliability using the coding system in two prior years. During that training, observers learned codes, practiced a minimum of three sessions with a proficient observer, and conducted reliability coding sessions until two sessions with 80%+ agreement were completed.

Reliability

Reliability data for student and teacher behaviors were collected across 14 sessions for Patricia (19%), and across 2 sessions for Michael (8%). For disruptive behaviors, the mean percentage agreement across conditions was 92% (59–100), for academic compliance 94% (69–100), for praise 84% (0–100), and for reprimands 93% (0–100). Low rates reflected low incidence during sessions. On-task reliability was collected for six sessions (8%) for Patricia ($M = 93\%$) and two sessions (8%) for Michael ($M = 96\%$).

Functional Assessment (FBA) Procedures

The FBA consisted of two phases. Phase 1 included teacher interview, direct observation/descriptive assessment, and hypothesis development. Phase 2 included functional analysis for testing (a) the conditions hypothesized to be maintaining the students' disruptive behaviors, and (b) potential interventions based on conditions maintaining appropriate behavior. Following these two phases, function-based interventions were developed. These procedures followed those previously used in studies with students with behavioral risks (e.g., Ervin et al., 2000; Kamps et al., 1995).

Phase 1 Assessment and Hypothesis Development

The *teacher interview* was conducted using a modified version of a standardized instrument (O'Neill et al., 1997) and procedures developed as part of individualized support within schoolwide positive behavior support (Todd, Horner, Sugai, & Colvin, 1999). The interview consisted of questions regarding the topography of the behaviors, conditions under which behavior occurred, possible functions, prior strategies for dealing with behavior, and conditions under which the student performs well.

The experimenters conducted direct observations (descriptive assessments) using the observation procedures previously described. Direct observation procedures were part of a protocol of assessments completed for all students participating in the larger study. These data were used to help develop hypothesis statements and for comparison purposes during functional analysis and intervention conditions. Data were thus not designed to determine

function or intervention, rather to contribute to design of conditions (e.g., to observe the type of naturally occurring attention delivered for disruptive behavior in order to simulate during functional analysis). Observations occurred during initial assessments for five groups and five independent work sessions for Patricia and four groups and one independent work session for Michael.

Hypothesis development followed completion of these activities and summaries of the data. The decision to move forward to the hypothesis development and functional analysis phase was made even though data in the initial assessment conditions were not all stable, which is typically a criteria for changing conditions. Patricia showed an increase in being on task during group, Michael showed a decrease in disruptive behavior. Change to the next phase, functional analysis, was made in spite of these trends, with the knowledge that the analysis would provide a clearer demonstration of the function of behaviors with control of testing conditions.

A collaborative meeting was held with the teacher and experimenters. Agreement on the following hypotheses was reached based on the interview, observation data, and additional input from the teacher.

Patricia. Conditions that appeared to maintain off-task behavior for Patricia were escape and attention. Based on a structured interview, the teacher reported that continual prompting and reminders of class rules following disruptions were ineffective for improving the student's behavior and task completion. She also hypothesized that misbehaviors were attention seeking (from the teacher and peers) and to escape work.

Observation data supported the teacher's view. During the initial assessment (sessions totaling over 2 hours), frequencies for behaviors were *out of seat* (7), *talking with peers or talk outs* (69), *other disruptive* (18), and *noncompliance* (58). The level of compliance was about equal to noncompliance, with 67 occurrences, and the level of teacher praise was low, with a frequency of 2. On-task behavior averaged from 40 to 70% across both group and independent work, with one low session (2%) during which students were directed to practice their story, a less structured assignment than usually given. Most common antecedents to behaviors were *instructional grouping variables* (e.g., lack of supervision during independent work, sessions with limited feedback), with a frequency of 89, and *demands* at 62. Recorded frequencies for potential function were *escape* (57), *teacher attention* (36), *peer attention* (32), *tangibles* (9), and *stimulation* (19).

These data and teacher input suggested multiple functions for the inappropriate behaviors. The teacher, after reviewing these data, hypothesized that talking and off-task behaviors were means to escape the task, and that interacting with peers was more reinforcing than struggling with a difficult assignment. The teacher further stated that she was often unavailable to help with assignments due to instruction of additional small groups. She agreed that Patricia would use help cards with peers for academic assistance (given several peers to choose from), and further that help from peers would potentially replace the peer attention from non-task-related talking. She also agreed that teacher attention for appropriate behavior would be a more effective strategy than "nagging" behavior, and that a point system would improve responding in group, and thus potentially be more reinforcing than attention due to noncompliance.

Michael. Multiple functions of behaviors were similarly identified for the second student. Conditions maintaining behaviors for Michael appeared to be escape, stimulation, and attention. The teacher's concerns for Michael were attention problems, frequent off-task behavior, including high levels of fidgeting, activity, noise making, talking to peers, and talking out during group lessons. Michael was in the same language group as Patricia, thus some of the same class conditions were present (e.g., low rates of praise for appropriate behavior, teacher attention to disruptive behavior with prompting of class rules). Direct observation data (1 1/2 hours over five sessions) confirmed the teacher's concerns for inappropriate behaviors. Frequencies for behaviors were *out of seat* (8), *talking with peers or talk outs* (148), *other disruptive* (35), and *noncompliance* (22). The level of compliance was 71 occurrences, and the level of teacher praise was low, with a frequency of 4. Initial assessment of on-task behavior averaged 60–80%. Antecedents recorded for the behavior were *instructional grouping variables*, with a frequency of 204, and *demands* at 26. Recorded frequencies for potential function were *escape* (24), *teacher attention* (74), *peer attention* (61), *tangibles* (0), and *stimulation* (62).

Based on the input from the researcher and the data, the teacher hypothesized that the primary function for behavior during group was to seek teacher and peer attention, and

stimulation (e.g., fidgeting, noise making). She hypothesized for Michael, similarly to Patricia, that increases in teacher attention for appropriate behavior using increased praise and points would decrease disruptive behaviors and increase on-task behavior. She further agreed with the hypothesis that, because the stimulation function appeared to be an individual rather than environmental variable, a self-monitoring strategy might improve attention to the group and independent work.

Phase 2 Functional Analysis

The interview and direct observation data (see Phase 1) suggested multiple functions of behavior for both students. As noted in appendix B, the test conditions for the functional analysis were thus structured to confirm variables maintaining disruptive behaviors and variables maintaining appropriate behavior, as well as to better design intervention. Conditions were structured to occur in the natural setting (the second-grade classroom) with the teacher managing the manipulation of conditions during group and independent instructional arrangements. Functional analysis conditions for determining behavioral function for Patricia consisted of (a) teacher attention to negative (off-task) behaviors (e.g., stating class rule), (b) escape (off-task behavior ignored with no additional prompts to work), and (c) peer attention to negative behavior. Conditions to test the intervention included (a) teacher attention to appropriate behaviors with praise and points, and no attention to disruptive behaviors; (b) help cards given to the teacher, i.e., appropriate requests for brief escape and assistance to complete work (no escape); and (c) peer ignoring of negative behavior and peer attention if requested with help card. Matching assessment conditions were tested for Michael for (a) teacher attention, (b) teacher ignoring condition for self-stimulation, and (c) teacher praise and points for appropriate behavior and ignoring of disruptive behavior.

Functional analysis procedures consisted of 15-minute sessions, with 1–2 sessions per activity (group or independent), depending on the classroom schedule. All functional analysis conditions and intervention testing conditions are described in appendix B. Conditions for sessions were counter-balanced to include both attention and escape protocols as is typically done in FBA studies, with the addition of conditions testing the potential praise/points intervention as listed above. For example, if

escape was the first condition for one session, it would be the second condition for the next day's session. Each activity included at least one each of escape and praise/points conditions or attention and praise/point conditions. This same schedule was used for both group and independent activities. A decision was made after the initial sessions to not test peer conditions for Patricia (escape/attention) as frequently due to time constraints.

Intervention Procedures

The functional assessment, including functional analysis information, was used to design an intervention for Patricia. Teacher attention (reminders of class rules) was shown to maintain disruptive behavior. Teacher attention to appropriate behavior (praise/points) was demonstrated to show decreased disruptive behavior and increased on-task behavior. The escape condition (teacher ignoring incomplete work or nonresponse) maintained off-task behavior, and help/modeling conditions showed increased performance. Given these findings, intervention for group instruction during reading and language arts consisted of (a) increased levels of teacher attention (praise) and points for appropriate behaviors, with lottery tickets for occasional tangible reinforcement; (b) self-recording of responses during group choral responding (e.g., use of a golf counter); and (c) limited reminders of class rules (i.e., attention to inappropriate behavior). Intervention during independent work included the use of (a) modeling of two-to-three responses by the teacher at the beginning of the task to decrease task difficulty, (b) "help tickets" as a means to request academic assistance from peers or the teacher and allow brief escape from the task, and (c) increased social reinforcement (attention) for task completion. The use of the self-management component (counting responses in group) was added as an additional contextual support to increase student attention to his/her appropriate behaviors, and in consideration of the teacher's ongoing instructional and monitoring requirements as classroom teacher.

Intervention for Michael was designed using the functional analysis data (i.e., determined functions of behavior and conditions promoting increased on-task behavior). Intervention thus consisted of praise and points during group instruction, limited attention to inappropriate behaviors, and a lottery reinforcement system. During independent work, Michael used a self-

monitoring sheet to record on-task and off-task behavior at 1–2 minute intervals. This self-management component was used for the same reasons cited for Patricia, and also to serve as an alternate to automatic reinforcement from self-stimulation. Increases in on-task behavior and decreases in disruptive behaviors were reinforced after a preset number of intervals of on-task behavior.

Experimental Design and Measurement

Experimental conditions consisted of direct observation/descriptive assessment, functional analysis/hypothesis testing, intervention, reversal, and reinstatement of intervention (ABAB). Thus a reversal design (Baer, Wolf, & Risley, 1968) was used to test the effects of use of increased praise, points, and lottery during large group, and the help tickets during independent work time for Patricia. An AB (baseline/intervention) design was used for Michael, as conditions started later for him and the school year was ending. The data/conditions for Michael, though less extensive, are included because they provide replication of the procedures. Initial assessment data for disruptive behaviors (upward trend or high levels, one or more per minute) was used to determine change to the next condition.

Results

Patricia

The results of descriptive assessments, functional analysis, and intervention for Patricia are presented in *Figures 1* and *2*. Experimental analysis using alternating treatments confirmed the hypotheses statements developed by the teacher and researchers.

Phase 2 Functional Analysis

Highest rates of disruptive behaviors during group instruction assessment were noted during the escape (teacher ignores) condition, with a mean of 38 per 15-minute block. The attention condition (i.e., when the teacher frequently repeated class rules) also showed high levels, with a mean of 27. Lower frequencies occurred during the use of social attention for appropriate behavior (praise/points), with a mean of 12. On-task behavior followed a similar pattern, with lower levels during teacher attention (*M* = 64%) and the escape/ignore conditions (*M* = 64%), compared to higher levels during praise/points (*M* = 76%).

During independent seatwork assessments, behavioral patterns were more variable and there were generally lower rates of disruptive behaviors, ranging from 0–5 during the escape condition, 0–12 during the use of help tickets (but with a decreasing trend in the last few probes), and only 2 data points during a peer ignore condition (0, 5 occurrences of disruptive behavior). During the escape condition (teacher ignored off-task behaviors), on-task behavior was at its lowest levels, with a mean of 55%. During peer attention (peers were coached to chat with Patricia), on-task behavior was somewhat higher, with a mean of 79%, but highest when the help tickets were used (*M* = 91%), and when peers ignored Patricia's talking behaviors (*M* = 89%).

Intervention. During intervention sessions for group instruction (praise/points), Patricia's disruptive behavior remained fairly low, with a mean of 5.5 compared to the initial mean of 15. During the reversal condition (teacher attention; i.e., stating rules when disruptive behavior occurred) the behaviors increased for the two sessions (43, 24 occurrences), and then dropped to low frequencies again, with a mean of 5.8 when the intervention was reinstated. On-task behavior similarly improved during the intervention, with means of 92% and 90% compared to the initial assessment and reversal means of 59% and 77%, respectively.

During independent work time, intervention (help tickets) levels of disruptive behaviors were lower, with a mean of 1.6, compared to the initial mean of 14.6. With the reversal, the behaviors only increased slightly and then remained low during the final intervention phase, with a mean of 1.5. On-task behavior followed a similar trend, with higher engagement during the intervention (*M*s = 93% and 91%) compared to initial assessments (37%).

Michael

The results for descriptive assessments, functional analysis, and intervention for Michael are presented in *Figures 3* and *4*. Experimental analysis using alternating treatments supported the hypotheses generated by the teacher and researchers. The findings were confirmed also in a brief intervention phase, which lasted 3 days, prior to the end of the school year.
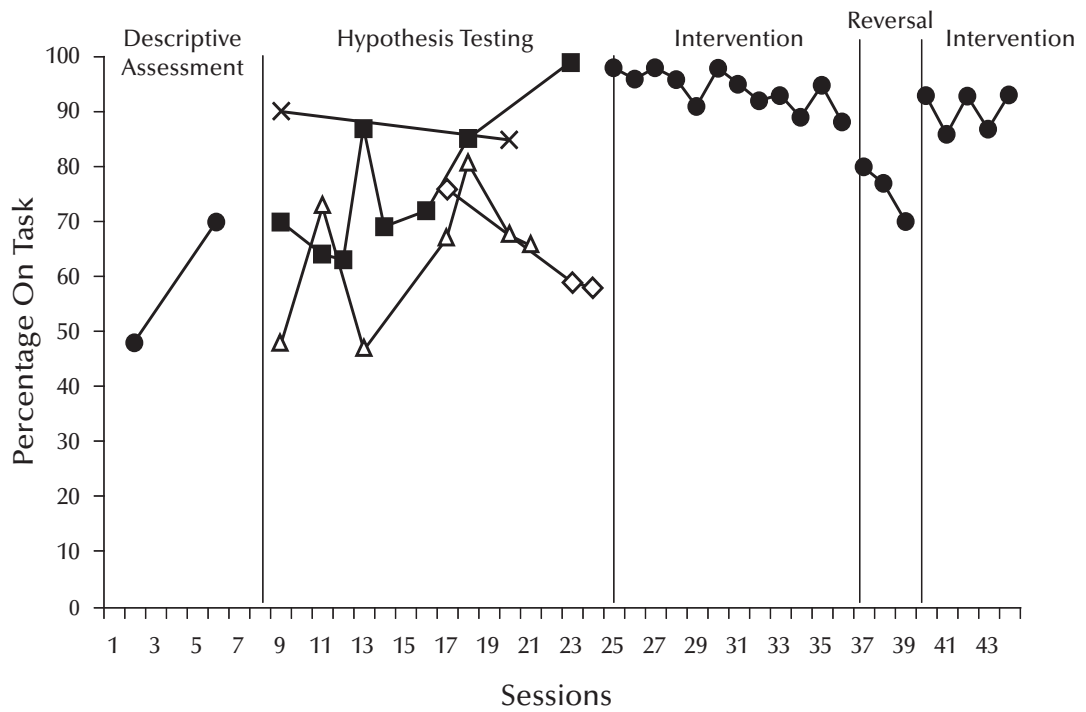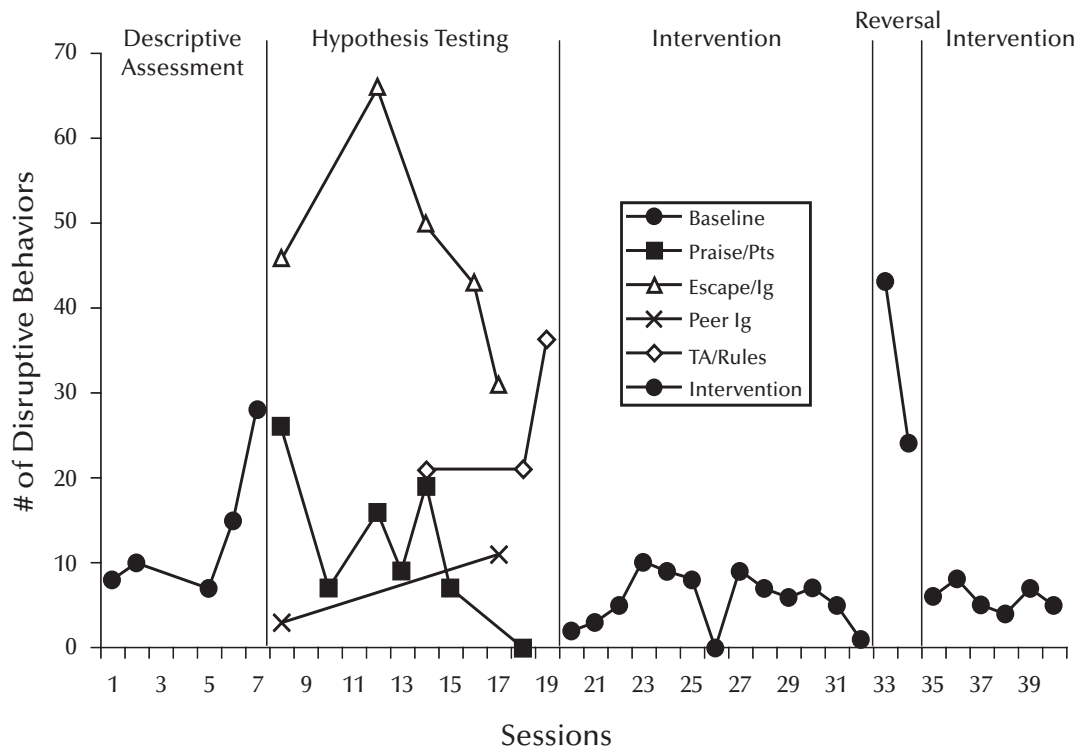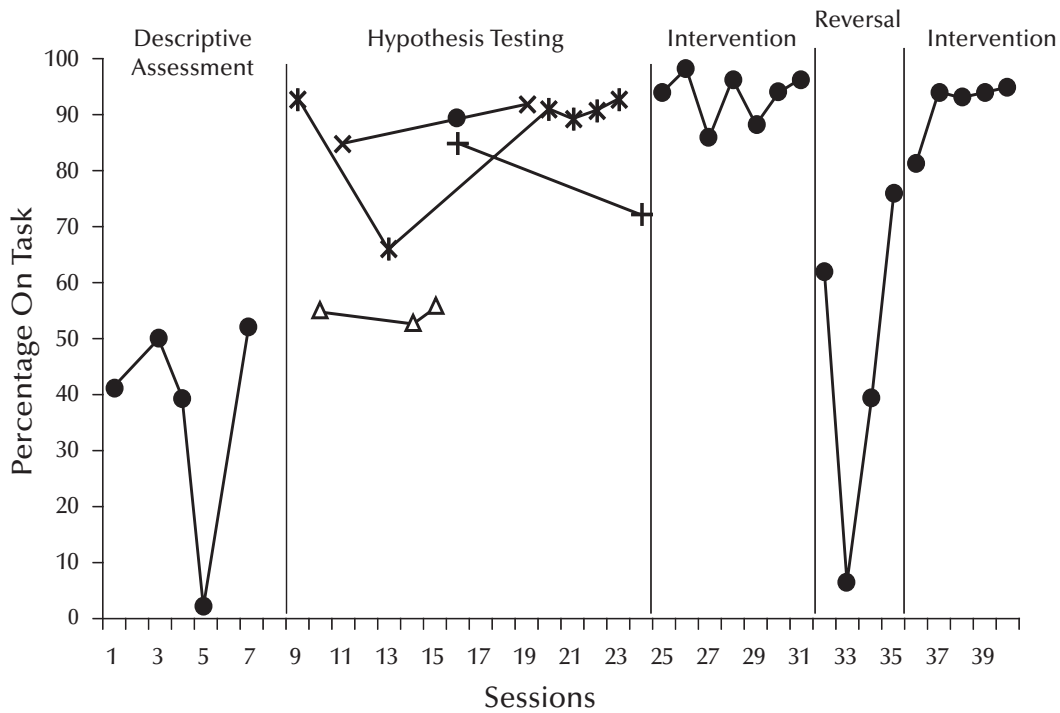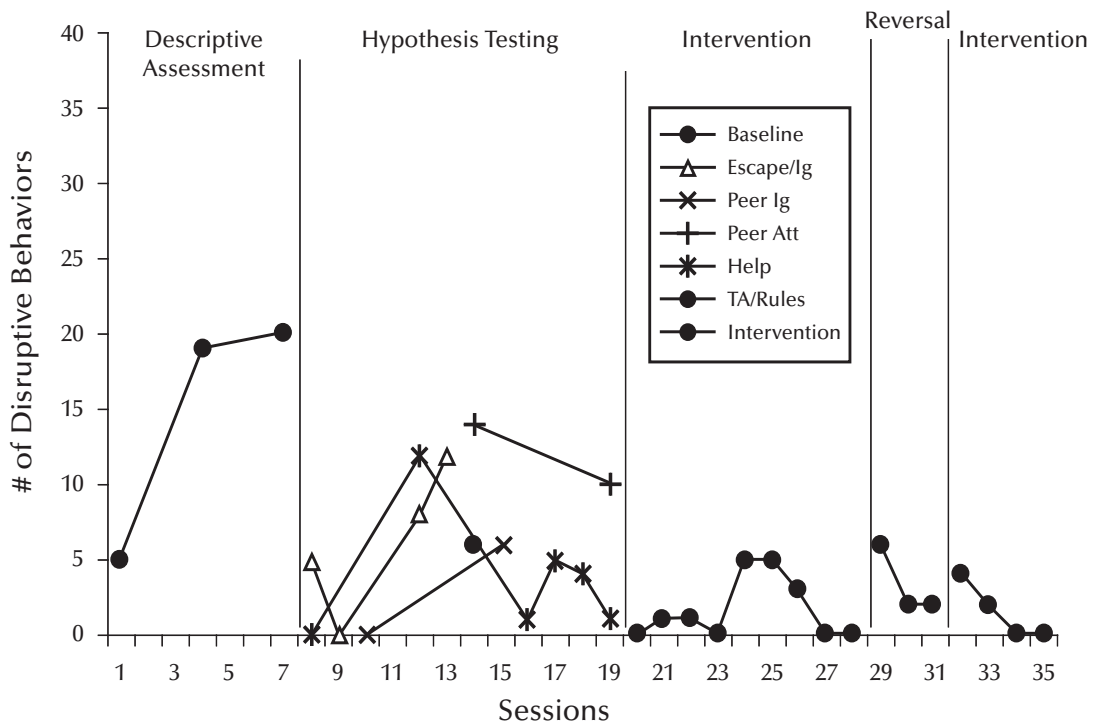
Figure 1. Patricia's Group Activities

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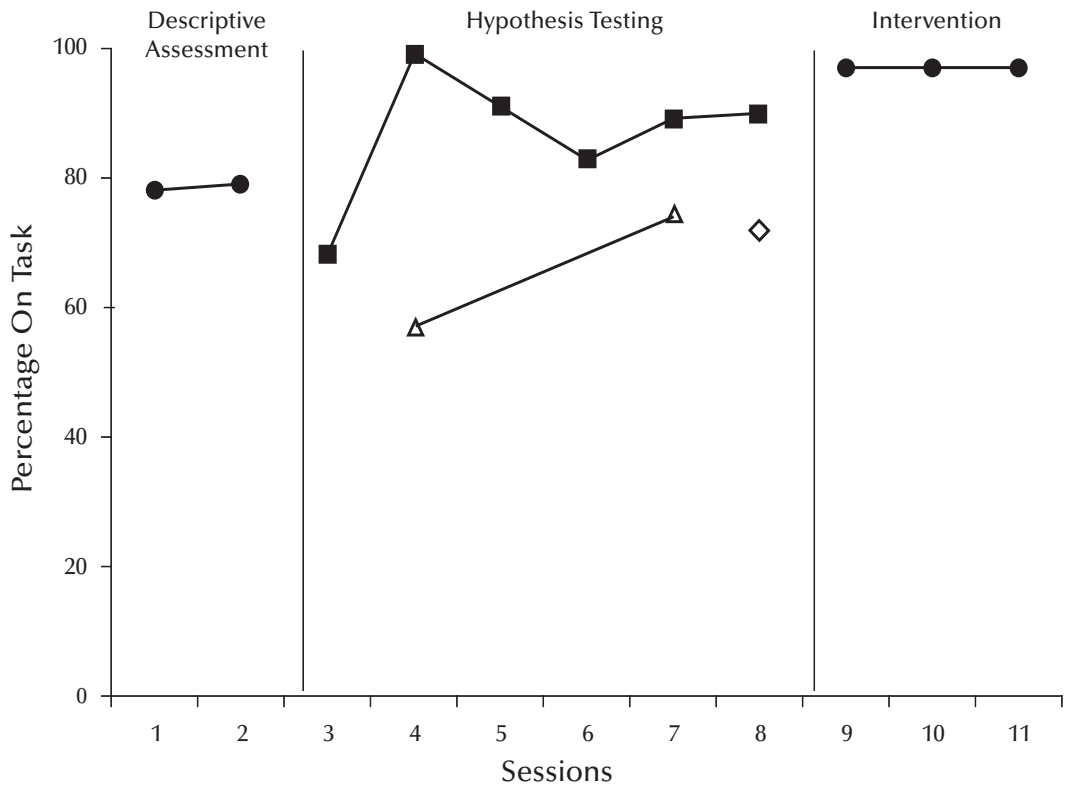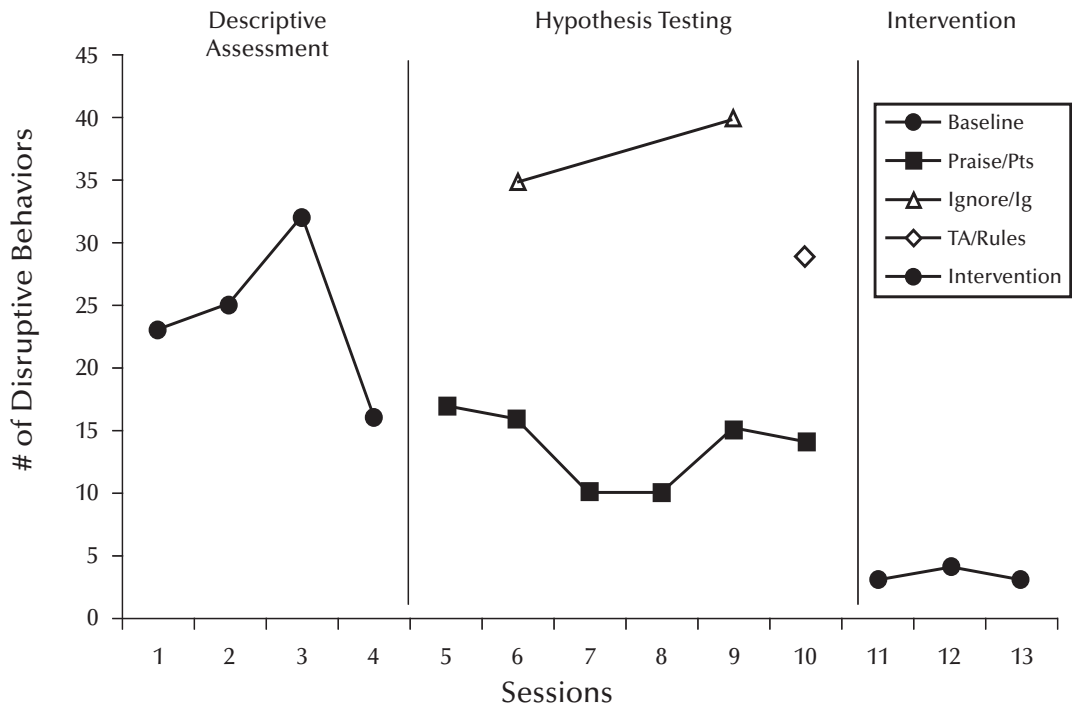
Figure 2. Patricia's Independent Work
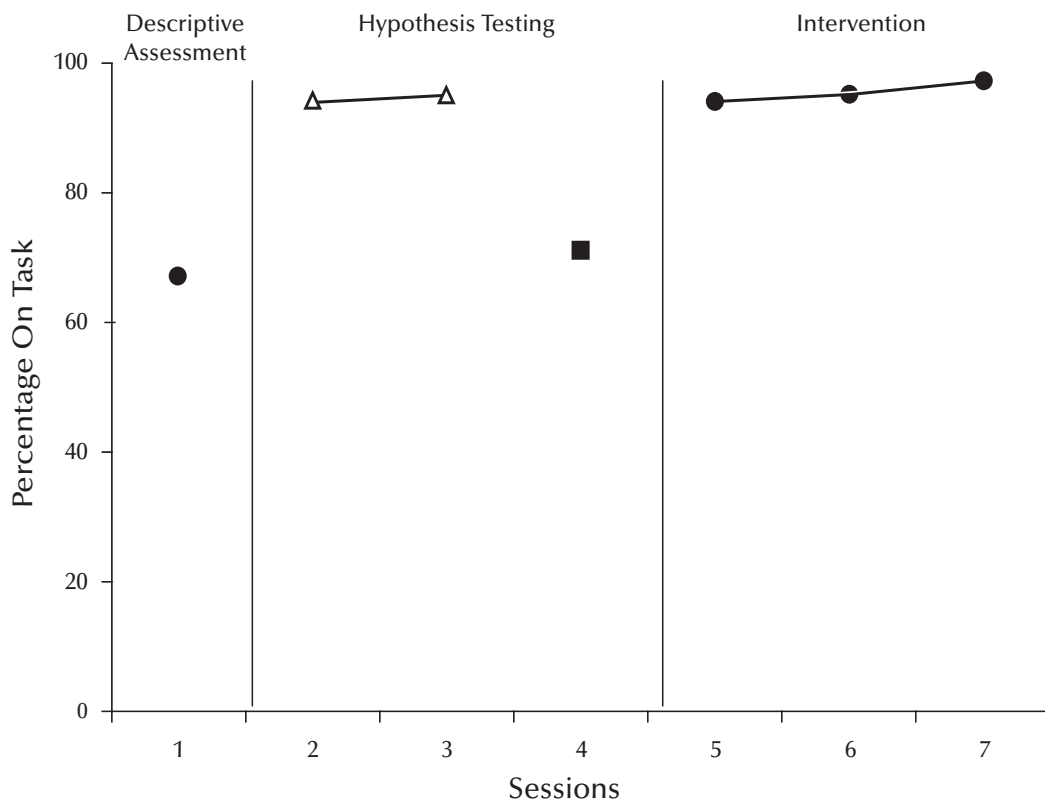
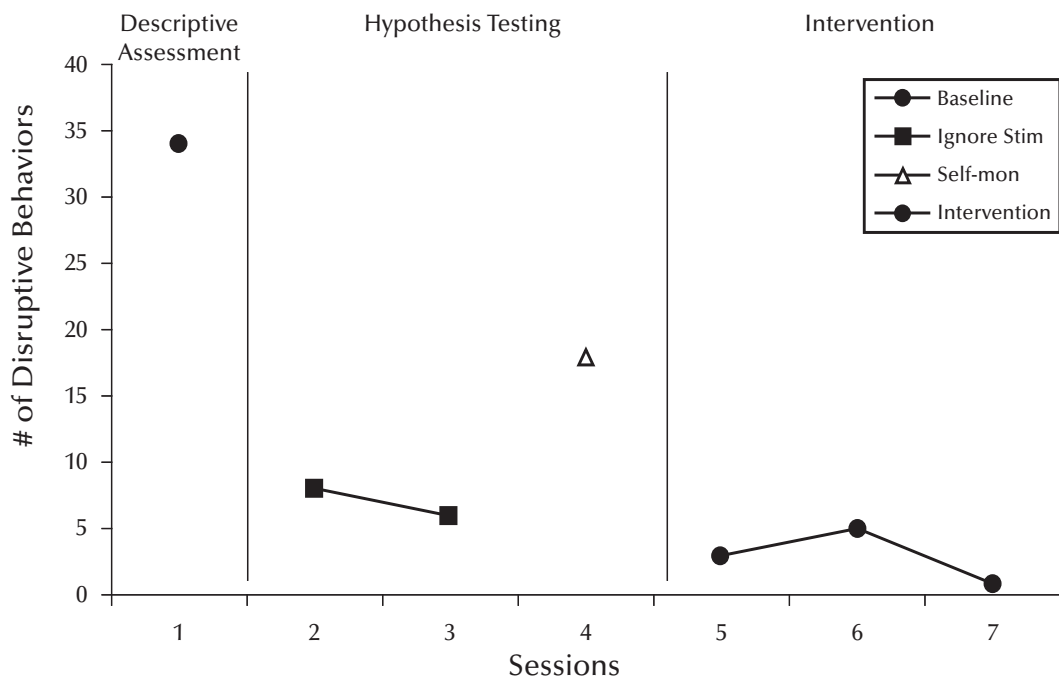**Figure 1. Michael's Group Activities**

Figure 2. Michael's Independent Work

Phase 2 Functional Analysis

During the group instruction assessment, disruptive behaviors were high during the stimulation condition (teacher ignoring), with frequencies of 35 and 40 per 15-minute probe, and during the teacher attention condition (29). Occurrence of disruptive behavior was lower, with a mean of 14 during social attention (praise/points) for appropriate behavior. On-task behavior showed a similar trend, with lower rates during stimulation (66%) and teacher attention for inappropriate behavior ($M = 72\%$), and the highest rates during praise/points conditions ($M = 87\%$).

During independent seatwork, only a few probes were conducted. Disruptive behaviors were fairly low during self-monitoring conditions (self-directed attention) for appropriate behavior, with high rates of on-task behavior ($M = 94\%$). These were in contrast to the one probe during the stimulation/ignore condition, with 18 disruptive behaviors, and 71% on task.

Intervention. Only three intervention sessions were conducted for Michael due to the end of the school year. Data mirrored the experimental analysis conditions, with high on-task behavior (94–97%), and low frequencies (1–5) of disruptive behaviors during self-monitoring (independent seatwork) and during social attention, using praise/points during group instruction.

Teacher Behaviors

Tables 1 and *2* reflect changes in the teacher's behavior by condition in addition to the students' compliance to academic requests (which are directly related to the opportunities or stimuli provided by the teacher). Higher levels of responding were noted for both students during group lessons, when the teacher ignored inappropriate behavior, and when Patricia self-managed (counted) her responses. Teacher praise was somewhat low across conditions, but higher during praise/points conditions. This reflects the teacher's adherence to the request for manipulations during the FBA conditions, with a total count of 57 in nine sessions requiring praise/points for Michael, and 72 in twelve sessions for Patricia.

Discussion

The findings from this study suggest that FBA procedures were successful in determining the function of inappropriate behavior for the two student participants, and further led to effective intervention. The teacher served as an active participant in the FBA process, and students showed improved on-task behavior and decreased disruptive behaviors.

Standardization of FBA Procedures in School Settings

The FBA procedures in this study included a standard protocol of (a) descriptive observation data collection, (b) teacher

TABLE 1
Means (Ranges) for 15-Minute Frequencies of Academic Compliance, Praise, and Reprimands by Condition for Patricia

Condition	Academic Compliance	Teacher Praise	Teacher Reprimand
Group Instruction			
Initial descriptive assessment	8	0.4	0
FBA: Escape/ignore	29	2.5	0
FBA: Teacher attention to inappropriate behavior	6	1.5	0
FBA: Teacher attention to appropriate behavior/praise	47	6	0
Intervention: Praise/points	14	4	0
Intervention: Self-monitoring	66	3	0
Reversal	21	2	0
Intervention: Self-monitoring	72	4	0
Independent Work			
Initial descriptive assessment	3	0.4	0.1
FBA: Model + help tickets	1	0.2	0.2
FBA: Teacher attention to inappropriate behavior ($n = 1$ probe)	0	0	0
FBA: Escape/ignore	1	1	0.3
Intervention: Model + help tickets	3	1	0
Reversal	2	0	0
Intervention: Model + help tickets	0	2	0

interview and collaboration, and (c) functional analysis. Procedures were easily implemented within a public school classroom. Several researchers in the emotional and behavioral disorders (EBD) field have called for FBA standardization, such as is used in this study (Doggett et al., 2001; Sasso et al., 2001). Procedures further fit recommendations to include experimental analysis to determine the function of behaviors (Hanley et al., 2003; Sasso et al., 2001).

Teacher as FBA Participant

An additional important addition to the literature was teacher involvement in the FBA process and the effective implementation of functional analysis sessions while continuing to fulfill regular classroom responsibilities and routines (Ervin et al., 2001; Scott et al., 2004). The teacher applied conditions (e.g., ignoring and giving attention) during 15-minute sessions with nonintrusive cues from the researcher to start the behavior (e.g., prompting with a sticky note to attend to disruptive behaviors using reminders of class rule), and switched easily to the next condition (e.g., ignoring disruptive behavior, giving praise for responding) with a second written prompt. No interruptions were necessary in the classroom schedule to conduct the functional analysis sessions, as these were part of ongoing group instruction or independent work. The initial interview and collaborative review of the initial assessment data offered opportunities for the teacher to be actively involved in the functional analysis. In addition, it appeared enlightening to the teacher to observe immediate changes in the occurrence of disruptive and on-task behavior as conditions were changed. Thus, the FBA in this case served as a method to instruct the classroom teacher as to the critical relationship of her behavior to the students' behavior. We suggest that, given training, school psychologists and behavior specialists could easily serve as coaches to teachers in school-based FBA implementation.

Multiple Functions of Behavior in Natural Settings

In general, these findings suggest that multiple functions and situations maintained students' disruptive behavior in the natural setting. The analysis of descriptive data in planning for the functional analysis concurred with recommendations (Carr, 1994) as to the importance of descriptive direct observation data in identifying important variations (contextually fit modifications) to generic functional categories (e.g., peer versus teacher attention) to determine multiple functions. Data confirmed unique features in independent and group work situations for both escape and attention-maintained behaviors. Determined functions of behavior were similar to those noted in prior research (Lewis & Sugai, 1996; Neef & Iwata, 1994), documenting the relationship of teacher and peer attention to disruptive behaviors. Escape from assigned classwork was also found to be a powerful maintaining variable for off-task behavior, similar to results in other FBA studies (e.g., McComas et al., 2000). For Patricia, ignoring off-task behavior during independent time resulted in escape and subsequent disruptive behaviors. Conditions using help cards to appropriately request brief escape from work and attention in the form of help from the teacher or the peer of Patricia's choice resulted in decreases in off-task behaviors. For Michael, ignoring the

TABLE 2
Means (Ranges) for 15-Minute Frequencies of Academic Compliance, Praise, and Reprimands by Condition for Michael

Condition	Academic Compliance	Teacher Praise	Teacher Reprimand
Group Instruction			
Initial descriptive assessment	11	0	0
FBA: Praise/points	32	5	0
FBA: Ignore	27	2	0
FBA: Teacher attention to inappropriate behavior (*n* = 1 probe)	44	0	0
Intervention: Praise/points	46	9	0
Independent Work			
Initial descriptive assessment (*n* = 1 probe)	0	1	0
FBA: Self-management	5	2	0
FBA: Ignore (*n* = 1 probe)	0	0	0
Intervention: Self-management	1	0	0

behavior and attending to the behavior during group instruction resulted in the same effect, escape from work and high rates of stimulatory behaviors (tapping objects, making noise, fidgeting). Self-management (student recording of on-task behaviors) provided a means for Michael to attend to behavior incompatible with the off-task and stimulatory behaviors. Conditions using self-management (recording of responding) by Patricia also showed increases in on-task behavior. These findings concur with several researchers who report the need to link self-management to function-based intervention procedures (Kern, Ringdahl, Hilt, & Sterling-Turner, 2001). In addition, multiple conditions supporting appropriate behaviors confirmed recommendations to increase attention to antecedents as a component to functional analysis (Ervin, 2000; Iwata et al., 2000; Kern et al., 2002). In the current study, antecedent and consequence conditions that promoted appropriate behaviors included attention (praise or points), use of peer help cards, and self-management.

Limitations

Several limitations to the study were noted. Procedures were used with only two participants and one teacher, limiting the generality of the findings, and the intervention period for Michael was very short due to the end of the school year. The findings, however, demonstrate a brief replication for the teacher with a second student and across four settings (group and independent work). A limitation in the study was the lack of procedural fidelity or objectively outlined procedures for training and documentation of teacher implementation of the functional analysis conditions. This is an important need for future research (Moore et al., 2002; Scott et al., 2004). An additional limitation was the variability in initial descriptive data. On-task behavior was increasing for Patricia in group activities; however it was still at 70%, an unacceptable level, and disruptive behaviors in the last session were high (30 or two per minute). A clearer trend in on-task behavior (low rate) was noted in the independent work sessions (50%). On-task behavior was acceptable for Michael in group settings (about 80%), but disruptive behaviors were high (15+ for the 15-minute periods). Thus, more weight was given to the disruptive behavior patterns for both participants in moving to the functional analysis, than to on-task behavior. A final limitation is that

no performance measures were collected to show improvements in student learning. The teacher anecdotally reported that Patricia completed many more assignments and mastered more content.

Conclusion and Implications for Practice

The study demonstrated the effectiveness of FBA, including functional analysis, in designing effective intervention for students with or at risk for EBD in elementary school settings. This provides a replication for FBA procedures that incorporate hypothesis testing, implementation in natural settings (i.e., schools), and active collaboration with classroom teachers (Mueller et al., 2003; Symons, McDonald, & Wehby, 1998). Functions of behavior for participants were experimentally determined, and effective interventions were implemented. Future replications are needed with the EBD population, and with students in general education classrooms. A goal in school settings should be the use of FBA procedures as a prevention strategy, that is, to reduce or eliminate behavior problems early rather than allowing escalation to serious emotional problems and violent behaviors. More studies are needed to specifically address the FBA process in applied settings, with carefully designed conditions for the FBA protocols that link functional categories (attention, escape, tangibles, stimulation) to natural setting variables. An advantage in the current study was testing of conditions that served as antecedents to appropriate behavior, as well as those that maintained disruptive behaviors.

Other research needs to address standardization of FBA procedures (Heckaman et al., 2000), training of school personnel, such as school psychologists, to reliably perform FBAs for students, and collaboration of classroom teachers (Lalli, Browder, Mace, & Brown, 1993; Moore et al., 2002; Sasso et al., 2001). As FBA procedures are used reliably in school settings, practical concerns for the feasibility of interventions suggested by FBA results will be an additional important area of research. As an example, FBA data may show teacher attention as the function of behavior, suggesting teacher attention to appropriate behaviors as an intervention. Investigations with the EBD and at-risk population are needed to determine the leanest schedules for maintaining appropriate behaviors (i.e.,

rates acceptable to teachers), and fading of intervention when possible and thinning reinforcement schedules. Investigations of peers as resources (i.e., attention for appropriate behaviors) may also demonstrate an effective and practical solution to personnel shortages. These procedures have a strong evidence base, as reported in peer tutoring and peer monitoring studies (Greenwood, 1991; Gumpel & Frank, 1999; Kamps, Barbetta, Leonard, & Delquadri, 1994). These identified areas of FBA research may dramatically improve the utility of this methodology for school settings. Finally, continued FBA research may greatly improve the knowledge base for accelerating the appropriate behaviors and academic performance for students at risk for EBD and increasing critical teacher skills necessary for implementation of effective interventions.

AUTHOR NOTE

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Definitions for Antecedents and Consequences to Behaviors

Antecedent Behaviors

Demand: Teacher direction to group or individual is to complete work or comply to behavioral requests and rules. All demands must then be noted as compliance or noncompliance.

Hard task: Appearance of assignment is that the *task is too difficult* for the student.

Group: Antecedent pertains to the *grouping arrangement* or instructional arrangement. Examples are: (a) independent activities wherein students are expected to remain on task for extended time with no supervision, interaction, or feedback from the adult; (b) large group instruction or group tasks with limited feedback or low opportunity to respond.

Unclear: The task or activity appears *too unstructured* for the student, (e.g., vague instructions, no clear assignment or guidelines given, vagueness about where students are to be during the activity).

Peer: Behavior appears to be instigated or provoked by a peer (e.g., student walks by desk and makes a face, student initiates conversation during quiet time).

Transition: Behavior occurs during transition and does not appear to be immediately related to other antecedents.

Other: Antecedent other than those described above.

Consequences for Behaviors

Verbal reprimand: Scolding or negative statement about behavior, given with intent to stop student from misbehavior, and used with a stern or punitive tone ("Stop that right now!" "You are never going to finish your work!" "Get back to your seats!").

Gesture reprimand: Same content as verbal reprimand, but given only with gestures (e.g., grimace, meaningful stare at student with furrowed eyebrows, shaking a finger at student for misbehavior).

Redirect: Requests to do something differently or to do something incompatible with misbehaviors (e.g., "Would everyone check their math assignment to be sure you are finished."; "I need everyone to form a straight line.") *Note*: These are different in tone from reprimands and are like an instruction or demand, rather than punitive.

Seating change: Student or peer is directed to a different seat or area to complete work.

Time out: Student is told to go to time out. Directive must be explicitly stated as time out and may include being sent to hallway, office, or different classroom.

Loss: Loss of privilege or activity *or* a statement that it is going to occur later (e.g., loss of recess, a fine, a call home).

Ignore/None: Teacher ignores the behavior, or no response or consequence is delivered.

Functions of Behaviors

Teacher attention: Behavior is maintained (or reinforced) by teacher attention, may be positive or negative attention. Includes praise and reprimands if these appear to be directly related.

Peer attention: Behavior is maintained (or reinforced) by peer attention, may be positive or negative attention (e.g., peers laugh when student misbehaves, peers respond to inappropriate talking).

Access to tangibles: Access includes obtaining objects or items (e.g., student hits peer and gets the basketball or gets to move up in line, obtains access to computer first after pushing peer). May also be earned rewards such as tokens, tickets, name on goal chart, etc.

Sensory stimulation: Behavior that is not maintained by attention or escape and appears to be sensory reinforcement (e.g., rocking, gazing at spinning items).

Escape (demand): Behavior results in student not having to comply with demand or delaying the compliance.

Escape (activity): Behavior temporarily or permanently enables student to stop working.

Escape (person): Behavior allows student to move away from a particular person.

APPENDIX B
Conditions for Functional Analysis

Function Condition	Definition of Contextual Events, Teacher Behaviors
Escape (allowed)	When disruptive or off-task behavior occurs, the teacher (a) tells student to turn in work incomplete if it is too hard, (b) ignores additional off-task behavior, and (c) gives no further work demands.
Help cards (escape not allowed except briefly using appropriate requests for help)	Before assignment begins, the teacher gives 2–3 one-on-one models/answers to start independent work. During seatwork, the student may use three help cards to ask for assistance from the teacher (or peer).
Teacher attention	When disruptive or off-task behavior occurs, the teacher states the class rule that is being broken.
Teacher ignore (attention only given for appropriate behavior)	The teacher observes displays of engagement and appropriate behavior, then (a) praises behaviors and (b) awards points with lottery drawing for reaching certain number of points. Inappropriate behavior is ignored.
Peer attention	When disruptive behavior occurs, nearby peers are coached to (a) look at the student and (b) whisper and talk to her/him.
Peer ignore	Peers are coached to ignore disruptive and off-task behavior.
Stimulation	When student engages in stimulatory behavior (making noises, tapping, fidgeting), the teacher ignores the behavior.
Self-monitoring	During independent activities, the student records yes or no for "on task" behavior at 2-minute intervals. Behavior is reinforced using a dot-to-dot recording sheet and a reward. The teacher gives praise for quiet and on-task behavior.