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# The Effect of Preteaching Reading Skills on the On-Task Behavior of Children Identified With Behavioral Disorders

Michelle Beck and Matthew K. Burns  
University of Minnesota

Matthew Lau  
Minneapolis Public Schools

*ABSTRACT: Research has consistently demonstrated that preteaching activities led to increased academic outcomes and increased academic outcomes improve behavioral variables. The purpose of this study was to determine the effect of a preteaching intervention on time spent on task for children identified with a behavioral disorder (BD). A **single-subject multielement design** found that time on task during reading instruction increased after participating in a preteaching intervention for 2 children identified with a BD. This finding suggests an effective intervention with clearly differentiated data. However, the percentage of intervals that the students were on task increased to only approximately 66%. Limitations and directions for future research are discussed.*

■ An estimated 489,000 students are classified with an emotional disturbance (National Center for Education Statistics, 2004), which is often associated with aggressive behavior, poor academic and social functioning, and disruptive off-task behavior (Kehle, Bray, Theodore, Zhou, & McCoach, 2004). The relationship between behavioral problems and academic difficulties is complex. Perhaps some students with behavioral disorders (BDs) exhibit academic difficulties prior to being evaluated for BD and their frustration with academic tasks is linked to off-task and disruptive behavior (Huesmann, Eron, & Yarmel, 1987). Other students with challenging behaviors may exhibit the behavioral concerns prior to their academic difficulties. This type of student may enter school without the appropriate social-emotional skills to successfully participate in the educational process and therefore fall further behind academically as a result (Talbot & Coe, 1997).

It appears that academic difficulties and disruptive behaviors form a cycle of aversive behavior and academic failure (Cullinan, Osborne, & Epstein, 2004). The result of this cycle of failure can be educationally catastrophic in that more than 50% of students diagnosed as emotionally or behaviorally disordered drop out of school (U.S. Department of Education, 2002). Yet most interven-

tions for children with BDs tend to focus on managing the behavioral difficulties and frequently ignore any academic deficits (Rivera, Al-Otaiba, & Koorland, 2006).

Reading is perhaps the most important academic skill a child can learn, and failure to do so could have lifelong negative implications (Snow, Burns, & Griffin, 1998). Moreover, reading interventions for children with behavioral difficulties could be especially important given their link to improved social competence. Previous research consistently found that reading interventions with children identified with BDs led to improved reading and behavioral outcomes (Lane, 1999; Lane et al., 2002; Lane, O'Shaughnessy, Lambros, Gresham, & Beebe-Frankenberger, 2001; Locke & Fuchs, 1995; Spencer Scruggs, & Mastropieri, 2003; Sutherland & Snyder, 2007; Wehby, Falk, Barton-Arwood, Lane, & Cooley, 2003). In fact, reading interventions resulted in small to moderate effects on social variables as well, which were approximately the effect size values for interventions explicitly designed to address social outcomes (Wanzek, Vaughn, Kim, & Cavanaugh, 2006).

The link between behavioral outcomes and academic skills was first suggested when Gickling and Armstrong (1978) demonstrated that children taught at an instructional level, using Betts (1946) classic definition of the

term, demonstrated higher rates of on-task behavior. Subsequent research has continuously supported increased on-task behavior when students were presented an appropriate level of challenge (Burns & Dean, 2005; Treptow, Burns, & McComas, 2007). Moreover, rates of on-task behavior decreased dramatically, whereas rates of disruptive behavior increased when students identified as BD were presented with difficult material, but a more appropriately challenging task led to higher rates of on-task behavior and decreased disruptive behavior (DePaepe, Shores, Jack, & Denny, 1996). These findings could be due to off-task behavior serving as an escape mechanism for students who were asked to complete difficult problems (McComas, Hoch, Paone, & El-Roy, 2000), but the causal mechanism is unknown and likely idiosyncratic for each student.

There are several ways to present students with less challenging materials including selecting materials that represent a closer match to the students' skill levels (Treptow et al., 2006). Alternatively, unknown items within an assigned learning task could be pretaught to better match student skill and task demands (Burns, 2007). Preteaching is any instruction that occurs prior to the primary academic lesson (Rose, 1984) and has been consistently shown to increase reading and math skills among struggling learners (Browder & Xin, 1998; Burns, 2002; 2007; Burns, Dean, & Foley, 2004; Rose, 1984). A comparison between previewing reading passages, using incentives, and presenting less difficult reading material found that previewing reading material with children experiencing reading difficulties was the most effective of these interventions (Jones, Harmon, & Wickstrom, 2001). However, research with preteaching has studied the effects on academic skills and has less frequently investigated behavioral outcomes, which could be important given the relationship between academic and behavioral difficulties (Rivera et al., 2006).

The purpose of the current study was to examine the effect of preteaching unknown reading items to students identified with a BD on time on task during reading instruction. Therefore, 2 students diagnosed with a BD and who exhibited low levels of on-task classroom behavior and low reading skills participated in a multielement design with on-task behavior being the dependent variable. It was hypothesized that preteaching unknown reading

items to children identified with a BD would increase time on task during classroom reading instruction.

## Method

### Participants

Two elementary-age students with BDs were chosen to participate in this study. Both students attended one elementary school in central Minnesota and participated in a special education resource room on a daily basis. They were selected for participation in the study because they were diagnosed with a BD, participated in a special education program for behavioral difficulties, and received reading instruction in a general education classroom.

The first student was a 6-year-old Caucasian boy in kindergarten named Michael (fictitious name). He was diagnosed with a BD in the fall of the current school year under the Minnesota criteria of aggressive, hyperactive, or impulsive behaviors that are developmentally inappropriate for the student's age (Minnesota Department of Education [MDE], 2006). An initial screening of his on-task behavior during reading instruction indicated that he was engaged in task-relevant behavior 51% of the time. A screening of his academic skills indicated that he correctly identified the sounds for seven letters and did not correctly read any words from the school district's kindergarten sight-word list.

The second student named Christopher (fictitious name) was a 9-year-old African American boy in the third grade. He was diagnosed with a BD by school staff members during the fall of his kindergarten year under the criteria of withdrawn or anxious behaviors, pervasive unhappiness, depression, severe problems with mood, or feelings of self-worth defined by the behavior of isolating himself from peers (MDE, 2006). He also was deemed eligible under the criteria of aggressive, hyperactive, or impulsive behaviors that are developmentally inappropriate for the student's age (MDE). An initial screening of his on-task behavior during reading instruction suggested that he was engaged in task-relevant behavior 45% of the time. A recently administered norm-referenced test of reading, as part of his special education eligibility evaluation, resulted in an age-based standard score range of 59 to 69 ( $M = 100$ ,  $SD = 15$ ).

## Setting

The school that both students attended served approximately 500 students in kindergarten through fifth grades, 38.6% of whom were eligible for the federal free or reduced price lunch program. A majority of the students who attended the school were Caucasian (70%), 13% were African American, 6.6% were Hispanic, 8.9% were Asian American, and 1.6% were Native American. All observations took place within the student's general education classroom, and all preteaching activities occurred in a quiet hallway outside of the classroom.

## Dependent Variable

The dependent variable for this study was **on-task behavior**, which was selected because it is the most common behavior problem for which students are referred to school psychologists (Bramlett, Murphy, Johnson, Wallingsford, & Hall, 2002), has been consistently linked to academic outcomes (Gettinger & Stoiber, 1999), and is the most readily observable of behavioral indicators (Gettinger & Seibert, 2002). Each student's on-task behavior was observed and recorded in the general education classroom during reading instruction. **Observations were conducted with a momentary time sampling with 10-second intervals for the duration of the reading task.** On-task behavior was defined as attending to the assigned reading material (e.g., appearing to silently read material, writing, raising hand to ask for assistance, and listening to a teacher explain directions), which was based on Shapiro (2004). Off-task behavior was defined as not having eyes orientated toward the assigned material. Some examples of off-task behavior include talking to a peer about something other than the assigned task, staring out the classroom door, being out of seat, and randomly flipping pages in the assigned task (Shapiro, 2004).

Momentary time sampling has been shown to effectively measure on-task behavior for typically developing students as well as students with BDs (Gunter, Venn, Patrick, Miller, & Kelly, 2003). The intervals in which the students were rated as being on task were divided by the total number of intervals and multiplied by 100 to create a percentage of on-task intervals, which served as the dependent variable for the study.

## Procedures

The observations of on-task behavior occurred during reading instruction. For Michael, classwide reading instruction involved chorally responding to explicit instruction of letter sounds and individually completing worksheets of letters and letter sounds. Michael was seated at a table with four other students during instruction, which was delivered by one female classroom teacher. The preteaching condition took place at 8:30 a.m. in the morning and required approximately 20 min. Reading instruction for Michael occurred at 9:00 a.m.

On-task observations for Christopher were also conducted during classroom reading instruction, which involved independent silent reading, writing activities, and completing reading worksheets. Students in Christopher's classroom were seated in rows of individual desks, and reading instruction was delivered daily by the female classroom teacher at 1:20 p.m. The preteaching activity occurred at 1:00 p.m., directly before classroom instruction, and required approximately 15 to 20 min to complete.

During intervention phases, the students were pretaught unknown reading items before their reading class. Preteaching items for Michael included letter sounds, whereas Christopher was pretaught unknown words from upcoming reading tasks. The classroom teachers provided the researchers with the stimulus materials to be used for reading instruction that day. For example, the teacher identified pages from the reading basal that would be covered or specific letter sounds that were going to be taught. Next, a sound/word search (Gravois & Gickling, 2002) was conducted to identify unknown stimuli. The students sat individually with the researcher during the word/sound search. The researcher first pointed at a stimulus the student would encounter in his reading instruction that day and asked the student to orally provide the corresponding sound for a letter or the correct pronunciation for a word. The student's response was counted as correct if it was accurately stated within 2 s and incorrect if it was inaccurately stated or required more than 2 s to provide the correct response.

Rivera and colleagues (2006) questioned the use of reading interventions for children with BDs that did not represent one of the National Reading Panel (NRP; 2000) areas of instruction (i.e., phonemic awareness, pho-

**TABLE 1**  
**Procedures for Incremental Rehearsal**

1. **Unknown 1**, Known 1;
2. **Unknown 1**, Known 1, Known 2;
3. **Unknown 1**, Known 1, Known 2, Known 3;
4. **Unknown 1**, Known 1, Known 2, Known 3, Known 4;
5. **Unknown 1**, Known 1, Known 2, Known 3, Known 4, Known 5;
6. **Unknown 1**, Known 1, Known 2, Known 3, Known 4, Known 5, Known 6;
7. **Unknown 1**, Known 1, Known 2, Known 3, Known 4, Known 5, Known 6, Known 7;
8. **Unknown 1**, Known 1, Known 2, Known 3, Known 4, Known 5, Known 6, Known 7, Known 8.

Note. Each word/letter was modeled and the student orally stated each before beginning.

tics, fluency, and vocabulary/comprehension). Thus, we examined the effect of preteaching during phonetic and contextual reading instruction. Clearly, teaching a student letter-sound relationships would fall within the area of phonics, but sight-word instruction does not necessarily fall into NRP instructional categories (Rivera et al., 2006). However, we taught the students words to enhance reading fluency because rapid word recognition was found to be a precursor to fluent reading (Carnine, Silbert, Kameenui & Tarver, 2004).

Preteaching unknown items identified through a word search procedure in previous research led to generalized application of the skill and increased frequency with which reading tasks were completed at an instructional level (Burns, 2007). Items to be taught and known items were written in black ink with a landscape orientation on three-inch by five-inch index cards.

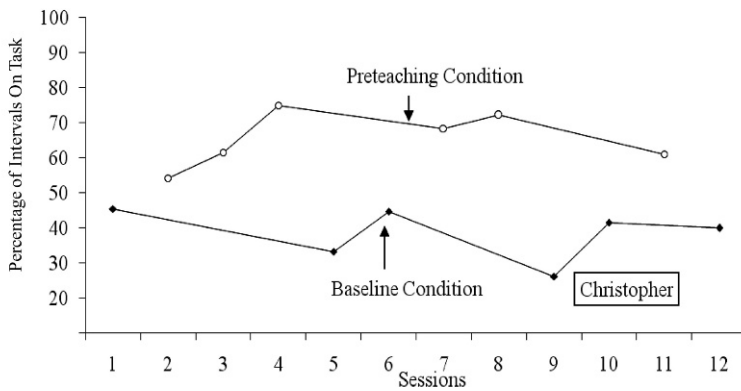
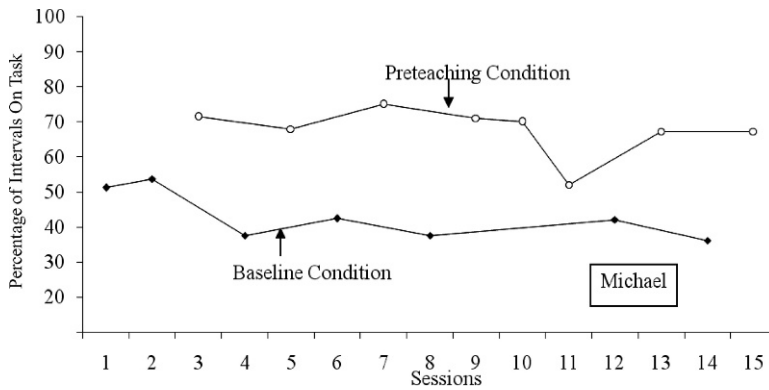
*Treatment condition.* After identifying the known and unknown items (words or letter sounds), the unknown words or letter sounds were pretaught using incremental rehearsal (IR; Tucker, 1989). Thus, each individual unknown stimulus was presented one at a time in the order presented in *Table 1*. Each presentation of the unknown word/letter involved having the child state the correct sound for the letter or pronunciation for the word followed by a verbal reinforcement (e.g., good). Those to which an incorrect response occurred were provided the correct response. After completing the rehearsal sequence displayed in *Table 1*, the first unknown item became the first known (Known 1), the previous Known 8 was removed, a new unknown (Known 1) was added to the stack, and the process started over again. This

condition was selected because it has frequently been found to increase retention of items and to be an effective preteaching strategy (Burns, 2002, 2007; Burns & Dean, 2005; Burns et al., 2004).

*Baseline condition.* Baseline and intervention sessions occurred two to three times each week, with one session per day for each student. During baseline phases, the students were observed in their classrooms during reading instruction, and nothing in the students' classroom environment or curriculum was manipulated. Thus, the baseline condition was the usual classroom practice, which is often the case in single-subject research (Kennedy, 2005).

## Experimental Design

The hypothesis was tested with a single-subject multielement design in which the intervention and baseline sessions were presented in a randomly determined order by flipping a coin. A multielement design is an approach to alternating treatment designs that transitions between conditions in a much more rapid manner than in most alternating treatment designs (Kennedy, 2005). Moreover, multielement designs frequently rely on predetermined orders of conditions, as opposed to responding to the data for phase changes. The current study used a randomly determined order because there were only two conditions over a relatively short time period, which generally requires a randomized order to ensure experimental control (Kennedy, 2005). Moreover, a multielement design is an experimental design that is especially applicable to and useful in applied educational settings (Riley-Tillman & Burns, 2009).



**Figure 1.** Percentages of on-task intervals for students during baseline and intervention sessions.

### Procedural Fidelity and Interobserver Agreement

Observations were conducted by two school psychology graduate students and one undergraduate psychology student. All observers received advanced training in behavioral observation methods through coursework and were trained in procedures for this study during one 1-hr training session. One observer was kept blind to the purpose and hypothesis of the study and observed 25% of the intervention sessions with an implementation checklist. The number of items on the checklist that were completed correctly was divided by the total number of items and resulted in 100% of the items being correctly implemented.

Approximately 25% of the data collection sessions were also observed by the independent observer, who was blind to the purpose of the study. The number of intervals in which both observers rated the behavior as on or off task was totaled, divided by the total number of intervals, and multiplied by 100. Interob-

server agreements of on-task behavior ranged across the sessions from 86% to 100%, with a mean agreement for 94.6% of the intervals.

### Results

As shown in *Figure 1*, the preteaching condition led to higher levels of on-task behavior than the baseline condition, with clear differentiation for both students. None of the intervention data presented in *Figure 1* overlapped the highest baseline data point for either student. Michael's mean on-task behavior during baseline sessions was 42.9% ( $SD = 7.0\%$ ), but it increased to a mean of 67.7% ( $SD = 6.9\%$ ) following preteaching. Christopher's mean on-task behavior during baseline sessions was 38.6% ( $SD = 7.5\%$ ) and was 65.4% ( $SD = 7.8\%$ ) during the intervention sessions. Thus, the time on task after preteaching was higher than during the baseline condition.

The variability of the data appeared mostly consistent within the students. The standard deviation of the percentage of intervals that

were rated as on task was essentially equal for both conditions with Michael and Christopher.

## Discussion

As hypothesized, when participants were pretaught unknown items, their on-task classroom behavior increased, with clear differentiation between the two conditions. The current data supported previous research that found increased behavioral outcomes from academic interventions for children identified with a BD (Lane, 1999; Lane et al., 2001, 2002; Wehby et al., 2003), but the effects were larger in the current study than in previous research (Wanzek et al., 2006).

The current findings were also consistent with previous research that found a link between task difficulty and increased numbers of intervals rated as on task (Burns & Dean, 2005; Gickling & Armstrong, 1978; Treptow et al., 2007). Thus, it could be speculated that preteaching brought the students closer to their appropriate level of challenge. However, we did not assess whether the task requirements during reading instruction represented an instructional level for these children. It could also be that preteaching gave the students the impression that the work was easier, which reduced the need for task avoidance (McComas et al., 2000). Perhaps a functional analysis of the students' off-task behavior would have suggested why the preteaching was effective or perhaps identified students for whom this intervention was mostly likely to be successful. Thus, causal mechanism of these findings can only be hypothesized and examined with future research.

Although the percentage of intervals that were rated as on task increased for both students, it might still be considered too low for a teacher's classroom expectations. Michael was on task an average of 67.7% of the intervals during intervention sessions, and Christopher was on task for an average of 66.7% of the intervals during intervention. A level of time on task that approximates 70% for a kindergarten student identified with emotional and behavioral disorders (EBD) is probably closer to acceptable levels than it would be for a second-grader, even one diagnosed as EBD. There is a long line of inquiry that links increased time on task and increased student learning (Carroll, 1963; Gettinger & Seibert, 2002), but how much time is needed for successful learning to occur

is not clearly established. Therefore, these procedures might best be conceptualized as an academic intervention with positive behavioral outcomes. However, these data do support the link between academic functioning and behavioral difficulties for children identified with a BD. Moreover, adding a contingent reinforcer, or some other intervention identified with a functional analysis, may improve the number of on-task intervals to an even higher level and suggests another area for future research.

The current study did not take instructional efficiency (Skinner, Belfiore, & Watson, 1995) into consideration. Moreover, we did not study the effect this intervention had on reading skills because research has consistently demonstrated the positive effects on generalized contextual reading (Bunn, Burns, Hoffman, & Newman, 2005; Burns, 2002, 2007; Burns et al., 2004; Nist & Joseph, 2008). Instead, we selected an intervention that likely leads to generalization of the skill regardless of a potential lack of efficiency. Current and previous research found that IR required approximately 15 to 20 min to complete (Burns, 2007; Joseph & Schisler, 2007; MacQuarrie, Tucker, Burns, & Hartman, 2002), which is a relatively long period for a one-on-one intervention, but it led to better maintenance and generalization of the skill than more efficient approaches (Burns, 2007; MacQuarrie et al., 2002; Nist & Joseph, 2008). Thus, this intervention should probably be reserved for students with severe deficits or disabilities who require the most intense intervention to be successful. However, additional research is needed to determine if a more efficient approach would lead to similar positive outcomes.

## Limitations of the Current Study

Although these data have potential implications for future research and suggestions for practice, limitations of the data should be considered. First, the task demands of the reading instruction were not assessed, and there was no manipulation of the students' environments during baseline. Therefore, it is unknown if the baseline condition tasks involved more difficult items or if the stimuli in the intervention phases were more inherently interesting to the students. Moreover, the same person implemented the intervention and conducted the observation. Thus, the

students probably knew that they were being observed and may have changed their behavior as a result. However, it should be noted that the same person conducted observations in the baseline conditions as well. In addition, observations of on-task behavior were the dependent variable for the study. Data from momentary time samples of on-task behavior have been shown to correlate highly with larger samples of behavior among students with BDs (Gunter et al., 2003), but the data were somewhat questionable among samples of students without disabilities (Hintze & Matthews, 2004; Spanjer, Burns, & Wagner, 2008). Future researchers could consider additional dependent variables for related lines of inquiry. Finally, no additional interaction was provided for the business-as-usual control condition, which could suggest that the change in behavior was a result of the interaction, not the intervention. Thus, future research should include a condition in which some level of interaction occurs for both conditions prior to observing the students.

Future research could attempt to ameliorate the limitations of the current study. For instance, future research should determine if the students are operating within an instructional level after intervention sessions, assess the difficulty of the baseline conditions, and control for interest between conditions. There are other interesting directions for future research. It might be valuable to continue studying children identified with BDs according to different diagnostic criteria. Specifically, researchers could focus on the different types of BDs such as examining the possible difference between students who have emotional difficulties versus those who have behavioral challenges. Moreover, future research could focus on tasks that involve higher-level skills and concepts while also examining children from older grades. Further research could also determine the effect of preteaching in other subjects such as mathematics and spelling. Finally, the current study used on-task behavior as the dependent variable, but the social validity and importance of on-task behavior could be questioned. Thus, future researchers could study the effects of this intervention on inappropriate classroom behavior and other socially valid outcomes.

The number of students diagnosed with a BD continues to increase, but academic outcomes for them remain a concern (U.S. Department of Education, 2002). The current

data along with the documented link between academic and behavioral functioning suggests that additional research is warranted.

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#### AUTHORS' NOTE

Address correspondence to Matthew Burns, 341 Education Science Building, 56 E, River Road, Minneapolis, MN 55455; E-mail: burns258@umn.edu.

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