An Experimental Evaluation of Positive Behavior Support in a Community Preschool Program

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Although positive behavior support (PBS) has been established as an effective approach for resolving the challenging behaviors of many populations, little research has evaluated PBS with children under the age of 4 years. In addition, few studies have considered the effectiveness of PBS delivered via consultation in typical childcare and preschool settings. This study was conducted to examine the effects of PBS implemented by typical classroom staff for two 3-year-old girls in a community-based preschool accredited by the National Association for the Education of Young Children. Within the context of A-B-A-B designs, the data indicated reductions in challenging behaviors and increases in engagement for both girls in two separate group contexts. Fidelity data indicated that some components of the PBS plans were implemented but others were not. The findings support the efficacy of PBS with young children in natural settings while raising questions for future research regarding the utilization and efficiency of PBS support plans.

Positive behavior support (PBS) is a well-established strategy for addressing problem behaviors in children. Defined as a collaborative and values-based approach for developing effective, individualized interventions for people with problem behaviors (Carr, Horner, et al., 1999; Koegel, Koegel, & Dunlap, 1996; Lucyshyn, Dunlap, & Albin, 2002), the PBS model uses functional assessment-based interventions (e.g., antecedents, naturalistic teaching, curricular modification) to reduce problem behaviors and achieve meaningful improvements in quality of life (e.g., enhanced relationships, improved lifestyle, independence).

Functional assessment refers to “a process for gathering information that can be used to maximize the effectiveness and efficiency of behavioral support” (O’Neill et al., 1997, p.3). Using a combination of direct behavioral observation, interviews, and other low-inference data collection procedures (e.g., permanent product, record reviews), functional assessment gives parents and professionals the opportunity to understand the function of a child’s behavior, as well as the environmental variables found to maintain or predict its occurrence. Ultimately, functional assessments are used to identify interventions that directly target the function of a child’s behavior.

PBS interventions derived from functional assessments generally include multiple components. The elements of PBS intervention (or support) plans typically include strategies for teaching the child new skills through guidance, prompting, and reinforcement in natural contexts. The skills targeted for instruction should be functional, communicative replacements (Carr & Durand, 1985; Dunlap & Fox, 1999) or ones that are physically incompatible with the child’s challenging behaviors. PBS plans also include modifications or rearrangements of antecedent stimuli that are associated with a challenging behavior. The antecedent stimuli may be features of environmental context, social stimuli, or activities. For instance, a number of studies have demonstrated that individualized revisions of instructional curricula can yield substantial and beneficial changes in behavior (e.g., Dunlap, Kern-Dunlap, Clarke, & Robbins, 1991). Antecedent manipulations are intended to prevent challenging behavior by introducing stimuli associated with desirable responding and removing or ameliorating stimuli associated with challenging behaviors. Another common component of PBS plans concerns the consequences of challenging behavior (Sulzer-Azaroff & Mayer, 1991). This usually involves the removal
of reinforcing events, tangibles, or interactions that may follow challenging behaviors and the use of positive reinforcement to increase or maintain the occurrence of particular appropriate behaviors.

The efficacy of PBS has been demonstrated with an increasingly diverse array of populations, including children with behavior disorders, multiple disabilities, developmental delay, and autism spectrum disorders. Likewise, studies have been conducted with both elementary and secondary school–age participants. Although such demonstrations have expanded the field, limited applications currently exist in regards to preschool-age children (Dunlap & Fox, 1999; Lawry, Danko, & Strain, 1999; Umbreit & Bos, 1997).

Research on PBS has also been conducted across a variety of complex community environments. Studies have been conducted within homes, general and special education classrooms, libraries, churches, banks, restaurants, and stores (Kern & Dunlap, 1999; Shukla, Kennedy, & Cushing, 1999; Vaughn, Dunlap, Fox, Clarke, & Bucy, 1997). Although some of the strongest demonstrations of PBS have been conducted within such natural environments (Carr, Levin, et al., 1999; Clarke, Worcester, Dunlap, Murray, & Bradley-Klug, 2002; Dunlap, Foster-Johnson, Clarke, Kern, & Childs, 1995; Lucyshyn, Albini, & Nixon, 1997), studies of preschoolers conducted in these environments are relatively scarce (Blair, Umbreit, & Eck, 2000; Dunlap & Fox, 1999; Frea, Arnold, & Vittimberga, 2001; Schepis, Ownbey, Parsons, & Reid, 2000). This may be due to a number of factors, including the difficulties of obtaining reliable and stable data in complex childcare settings, problems in ensuring integrity in the implementation of interventions, and the limited number of researchers who are active (and funded) in conducting applied research in natural childcare and prekindergarten settings.

To further support the utility of PBS as an evidence-based practice for preschoolers and their families, additional empirical demonstrations are needed. Studies also need to be conducted in the manner with which PBS is likely to be employed—as a consultative problem-solving model that can be applied both within and across a variety of typical settings. Although the literature base has provided ample support for the efficacy of PBS, questions of feasibility and integrity of implementation will remain until further demonstrations are conducted within naturalistic preschool environments. However, such studies by themselves would not adequately prove that PBS is reflective of best practices for preschoolers and their families. Effective demonstrations of PBS in typical settings must be produced, and the extent to which PBS intervention plans are implemented with fidelity must be explored (Wolery, 1994). Attention should be paid to the extent to which, and ease with which, PBS intervention plans can be implemented by parents, childcare providers, and teachers, and with the degree of fidelity and consistency required to ensure meaningful outcomes.

The current study expanded the evaluation of PBS as a model of support for young children in typical community preschool settings. In this study, PBS was delivered within an inclusive preschool environment, via consultation, to provide support for two preschool-age girls with problem behaviors. Functional assessment–based intervention plans for each child were developed in collaboration with families and preschool staff. Measures were collected using time series data to document levels of engagement and problem behaviors, and social validity of the effects and procedures was assessed. In addition, video recordings were used to examine aspects of the fidelity with which PBS components were implemented.

**METHOD**

**Participants**

Children were selected as participants if they were enrolled in an inclusive preschool program and their teacher requested assistance with their behavioral challenges. The first participant was Vanessa, a 3-year-old girl diagnosed with Down syndrome. Vanessa often experienced difficulties in social interactions with peers, who tended to avoid her. She rarely used verbal communication but occasionally whispered in short sentences. Teachers expressed concerns about Vanessa’s behavior, noting that she had become increasingly aggressive when she did not get her own way and when children avoided interacting with her. Vanessa had difficulty remaining on-task, did not respond to teacher redirection, frequently ran away from the area, mouthed objects, and disrupted other children (e.g., wrestling children to the ground).

The second study participant was Layla, a 3-year-old girl who had been evaluated for physical, developmental, and speech concerns. Layla exhibited a number of problem behaviors, including excessive crying and whining that occurred particularly when limits were set. In addition, Layla appeared to prefer playing alone—she tended to avoid interactions with peers, and her interactions with adults were limited to responses rather than initiations. Layla’s teacher and other preschool staff members reported that she would scream and cry for prolonged periods of time when asked to share, when she or her clothes got dirty, or when limits were set. Peers teased Layla about being a crybaby and would usually take advantage of her if they wanted a toy she was using.

**Setting**

The study was conducted within a small, faith-based inclusive community preschool accredited by the National Association for the Education of Young Children. The
private preschool had a 20-year history of providing services to typically developing children and children with developmental disabilities. For children from ages 1 year to 5 years, the program ran a half-day and used the HighScope curriculum. Enrollment included children who were developing typically as well as children with developmental delays. Of the preschool's total enrollment, approximately one fourth had developmental delays or an identified disability. The study was conducted in a classroom for 3- and 4-year-olds, and daily attendance ranged between 6 and 12 children. The classroom was staffed daily by the teacher and a paraprofessional, who had 9 years of experience working as an aide with young children.

The classroom staff selected two whole-class activities—opening circle and planning—for the intervention. The staff chose these two activities because they were considered the most problematic ones in the children's daily routine. Opening circle was the first group activity of the day and consisted of sharing a book, singing a song, or engaging in other language-based activities. During opening circle, the entire class sat on the carpet, facing the teacher and a window in the background. Following opening circle, the children transitioned to a structured small-group activity that often involved puzzles, crafts, or theme-based activities. Planning followed the small-group activity and was conducted with the entire class seated on the carpet. Planning consisted of a period of brief physical activity (e.g., dancing, moving, playing with puppets), which was followed by center time, in which each child had choices.

**PBS Consultation Procedures**

The PBS process used in this study has been described extensively in the literature (Hieneman et al., 1999; Horner et al., 1990; Koegel et al., 1996). The procedures included team development, functional assessment, support plan development, and intervention, as described later. All steps were facilitated by university-based PBS consultants (the first and fourth authors).

**Team Development.** The first step was to form a team consisting of the child's parents, the preschool teacher, the classroom paraprofessional, the preschool director, the assistant preschool director, and the PBS consultants. The consultants facilitated meetings in which the purpose was to identify roles and present the PBS model. Two formal team meetings of 1 hour each were conducted prior to the intervention. These meetings were used to introduce the PBS approach, describe the elements of the model, develop goals for the target children, and agree on roles to be assumed by each team member. Subsequent team consultations were conducted on an as-needed basis throughout the day. These interactions, which occurred throughout the study, included feedback and suggestions from the consultants, questions and concerns from the classroom staff, and exchanges of information among family members, staff, and consultants.

**Functional Assessment.** In the next step, the PBS consultants conducted individualized functional assessments for Vanessa and Layla. Multiple data sources—including interviews with teachers and other preschool staff members using a revised version of the *Functional Assessment Interview* (FAI; O’Neill et al., 1997)—were used in both assessments. In this first step of the functional assessment process, the interview was administered to the preschool staff members to obtain detailed descriptions of each child's problem behaviors, the events believed to predict those behaviors, their perceived functions, previously attempted strategies, and circumstances that the staff members associated with both occurrences and nonoccurrences of a behavior. Upon completion of the interviews, the consultants conducted systematic behavioral observations to identify problematic routines and individual problem behaviors to be targeted for intervention. They then developed operational definitions of dependent variables and collected data via videotapes that would be scored later by trained observers. Finally, the consultants reviewed records to obtain background information about potential factors influencing each participant's behavior, such as medical records describing pertinent diagnoses, medications, and hearing/vision screening results.

Upon completion of the functional assessment data collection, the team collaborated to identify themes in those data (i.e., frequently occurring triggers, behaviors, and responses) and to develop hypotheses regarding the functions of each behavior. These hypotheses served as the foundation for designing interventions to prevent the challenging behaviors and develop improved child competencies.

The functional assessment data indicated that Vanessa frequently exhibited problem behaviors (e.g., running away, causing disruptions, mouthing objects, touching adults and peers) when asked to participate in the opening circle and planning routines. On such occasions, Vanessa’s teacher and other preschool staff members often resorted to verbal and nonverbal redirections, and peers frequently yelled or pushed her away. Based on these data, the team developed four hypotheses:

1. The typical function of Vanessa’s behavior was to obtain attention.
2. When provided with opportunities to be successful and obtain positive feedback (e.g., touch, back rub, “high five”).
Vanessa’s rate of problem behavior would decrease.

3. When provided with a high rate of predictability and clear expectations (e.g., beginning and end of a task), Vanessa’s problem behavior would decrease.

4. Vanessa’s engagement would be enhanced if she were to sit at the curve of a horseshoe seating arrangement and next to an adult who could provide prompting and redirection.

For Layla, the functional assessment data indicated that she frequently displayed problem behaviors (e.g., causing disruptions, screaming, crying excessively, touching peers or adults, staring, talking to self) that also distracted the other children. On these occasions, Layla’s teacher and paraprofessional either provided verbal or nonverbal redirection or continued with the activities. Based on this information, the team formulated three hypotheses:

1. Layla’s problem behavior was consistently maintained by escape.

2. Layla’s rate of engagement would increase if the teacher and an age-appropriate peer provided visual prompting and modeling.

3. Layla’s rate of engagement would increase if she was given opportunities to make choices and engage in activities of interest (e.g., throwing a ball, playing with objects in preferred colors).

In addition, the classroom staff members recognized that a newly discovered visual impairment could potentially affect her behavior, and they hypothesized that if Layla was seated directly in front of the teacher, her rate of engagement would increase.

**Intervention Procedures**

The team developed interventions based on the functional assessment data and associated observations that had been conducted during the assessment process. Strategies included changing the way that the group activities were conducted with the entire class and providing individualized support for Layla and Vanessa. Prior to intervention, whole-group activities were generally unstructured, and the children did not have a predictable schedule or routine (e.g., they were allowed to sit in a random arrangement during opening circle and planning). In addition, rates of reinforcement were low (e.g., both Vanessa and Layla were either ignored or nonverbally redirected), opportunities to answer questions and make choices were infrequent, and both Vanessa and Layla were often chosen last for participation in activities and transitions. With these concerns and hypotheses in mind, the team collaboratively developed the following interventions, described next and summarized in Table 1.

**Changes to Group Activities.** After examining the functional assessment data and videotapes of how the group activities were conducted, the team decided that changes in the structure of these activities would be helpful to Vanessa and Layla. As strategies, the team selected supports that are often used in early education classrooms to support the engagement and participation of young children within group activities. Although these strategies were identified through individualized functional assessments for Vanessa and Layla, they were implemented with the entire class because they are recognized as reflecting best practices in the prevention of problem behaviors and the facilitation of learning (Hemmeter, Joseph, Smith, & Sandall, 2001; Sandall & Ostrosky, 1999). First, the team elected to improve classroom structure by seating children in a horseshoe arrangement. Masking tape was used to (a) show the children where to sit, (b) provide enough space for each child to be seated comfortably, and (c) alter the seating arrangement so that Vanessa and Layla were not seated next to one another and so that each child had a direct line of sight to the classroom teacher. Second, the team created an activity schedule (consisting of picture symbols printed on paper in preferred colors that were attached to a small poster board). The purpose of the schedule was to provide a higher degree of structure and predictability through an advanced organizer of activities and visual cues that would indicate when the activity was completed. Specifically, the children were given opportunities to manipulate these picture symbols on the schedule to symbolize the beginning and end of individual activities. Third, the teacher agreed to alternate between high-motor and low-motor activities as a developmentally appropriate means of allowing the children to reestablish attention and maintain higher rates of engagement. Finally, the teacher and the paraprofessional agreed to provide specific verbal expectations to ensure that each of the children knew the distinct beginning and end of each activity.

**Vanessa.** For Vanessa, the team developed specific interventions that included seating her at the curve of the horseshoe, next to an adult, and with at least one child between her and Layla. During both circle time and planning, one of the classroom staff members agreed to prompt Vanessa through the tasks and engage in proximity control to minimize occurrences of her problem behaviors. Activities were modified to better fit Vanessa’s level of ability. For example, if the motor activity during planning involved throwing an object into a container, the teacher would move the container closer to Vanessa to
Evaluation of PBS 147

accommodate her throwing ability. Similarly, Vanessa’s teacher and paraprofessional also elected to use both specific expectations and opportunities for errorless learning while providing direct instruction. Classroom staff members predicted that if Vanessa was given clearer directions and prompting until successful, her rate of engagement would increase over time. The team also made an effort to allow room for fidgeting—as long as her movements did not appear to distract others, the teacher and staff chose to ignore Vanessa rather than bring attention to her through verbal or nonverbal redirection. Finally, the team developed an intervention for Vanessa when transitioning at the end of the targeted group activities. Because Vanessa frequently exhibited problem behaviors while waiting for her name to be called during transitions, her teacher and paraprofessional decided to choose her first, second, or third when transitioning as a means of preventing occurrences of those behaviors during the wait time.

In addition to the interventions derived directly from the functional assessments, the classroom staff agreed to implement changes in their own behaviors to promote task engagement. The preschool personnel wanted Vanessa to learn age-appropriate replacement behaviors for obtaining attention (e.g., tapping arm, calling name). To promote the learning and maintenance of such replacement behaviors, the staff agreed to pair high rates of specific praise and socially appropriate physical attention with a combination of ignoring inappropriate requests for attention and providing clear and specific redirections.

Layla. A number of intervention components were either implemented specifically for Layla or customized especially for her. For example, in the seating arrangements, Layla was positioned directly across from the teacher and next to an age-appropriate peer. This gave her an optimal view of the teacher and opportunities for additional prompting and peer modeling. Opportunities for choice and preference were also incorporated: Layla was given opportunities to make additional choices (e.g., select songs and movement games) and manipulate materials in preferred colors (e.g., a mini-schedule in blue and purple, her preferred colors). As for Vanessa, classroom instruction included modifying Layla’s activities to better match her skill levels, as well as providing one-to-one prompting, specific expectations, opportunities for errorless learning, and proximity control. Finally, with respect to transitions, Layla was selected first, second, or third and also was transitioned with a peer who could model socially appropriate, expected behaviors.

Design

ABAB designs were used to analyze the effects of the PBS interventions for both children across the two activities of opening circle and planning. The first A phase consisted of collecting baseline data. The first B phase involved implementing the intervention components, which were subsequently withdrawn in the second A phase. Finally, the second B phase reintroduced the intervention components.

Coaching. During the intervention phases, a PBS consultant coached and modeled individualized procedures for the classroom teacher before implementation of each session. The consultant also provided positive feedback at the end of each session to support the teacher’s use of the PBS interventions and to remind the teacher to include in future sessions any components or supports that had not been implemented. The PBS consultant refrained from providing feedback or interrupting the teacher during the group activities to avoid disrupting the activity. Coaching sessions ranged from 5 to 10 min and were conducted prior to the initiation of intervention sessions. The PBS consultant reviewed the targeted strategies, modeled the use of materials or a teaching technique, and

<table>
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<tr>
<th>TABLE 1. Summary of Intervention Components</th>
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<tr>
<td>Intervention Components</td>
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<tr>
<td>Changes to group activity</td>
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<tr>
<td>• Visual activity schedule</td>
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<tr>
<td>• Embedded motor activities</td>
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<tr>
<td>• Seating in horseshoe-shaped arrangement</td>
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<tr>
<td>• Clearly stated beginnings and endings of activities</td>
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<td>• Visual menu for planning activity</td>
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<tr>
<td>Supports for Vanessa and Layla</td>
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<tr>
<td>• Selected 1st, 2nd, or 3rd to take turn (i.e., transitions)</td>
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<tr>
<td>• Increased opportunities to respond to specific questions</td>
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<tr>
<td>• Prompts to ensure successful participation</td>
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<tr>
<td>• Adult sits near to prompt</td>
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<tr>
<td>• Choice whenever possible</td>
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<tr>
<td>• Modify activities to match ability level</td>
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<tr>
<td>• Provide child-directed specific praise</td>
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<tr>
<td>Supports for Vanessa</td>
</tr>
<tr>
<td>• Allow room for “fidgeting”</td>
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<tr>
<td>• Seating (curve of horseshoe near adult and good model)</td>
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<tr>
<td>Supports for Layla</td>
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<tr>
<td>• Transition to group with peer</td>
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<td>• Seating (center of horseshoe, near good models)</td>
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asked the teacher if he or she had questions or needed clarification in regards to implementing the strategies. Immediately following group activities, the PBS consultant commented on strategy use and the children’s behavior during the group activity. The consultant also provided reminders about strategies that had not been implemented.

**Intervention.** Intervention sessions across conditions ranged from 10 to 20 min, with the average session lasting 13 min. Data collection continued in baseline until stability was achieved (i.e., at least 3 consecutive data points reflecting either a flat or decreasing trend in rates of problem behavior or an increase in rates of engagement). Once stability was achieved within the intervention phase (i.e., the first B phase), interventions were withdrawn briefly (i.e., for two sessions in a second A phase) and then reintroduced until stability was achieved once again (i.e., the second B phase).

**Dependent Variables**
The dependent variables in this study were engagement and problem behaviors. *Engagement* was operationally defined as any occurrence when the child appropriately followed the sequence of an activity for the majority of an observed interval. In contrast, *problem behaviors* were operationally defined as any occurrence when the child turned away from the activity, teacher, or peer (under own volition); disrupted others (i.e., played with others’ hair, touched peers or adults); engaged in any verbal or motor activity not directly related to the task at hand; mouthed objects; or left a designated area.

**Data Collection**
Behavioral observations of engagement and problem behaviors were scored from videotaped recordings (via camcorder) obtained during each session of the study. Prior to the study, individuals who had experience in conducting research (graduate students) were trained to use a continuous interval system and practiced scoring operational definitions until a minimum of 80% interobserver reliability was obtained. Observations were scored using a 10-s continuous interval system and expressed as the percentage of observed intervals.

To estimate interobserver reliability, two trained observers independently scored 40% of all videotaped sessions. Interobserver agreement was calculated for both engagement and problem behaviors. Reliability coefficients during the opening circle routine averaged 93% (range = 91–96) for engagement, whereas interobserver agreement for problem behaviors averaged 96% (range = 87–100). Reliability coefficients during the planning routine averaged 95% (range = 87–99) for engagement and 97% for problem behaviors (range = 91–100).

**Social Validation**
Once the intervention was completed, the consultants gave a social validation survey to members of the participant’s support team to evaluate goals, procedures, and outcomes. Two procedures for assessing social validation were used to evaluate the methods and outcomes of the research (Wolf, 1978). The first procedure assessed the perspectives of the teacher and other classroom staff members regarding the usability and effectiveness of the intervention. The second procedure involved asking naive observers to view baseline and intervention video samples and rate the child’s problem behaviors and the instructional context.

**Classroom Staff.** The classroom teacher, paraprofessional, and support staff (i.e., director, assistant director) were given a questionnaire to fill out following the final day of intervention. This questionnaire included six questions designed to assess their opinions about the intervention’s effectiveness, developmental appropriateness, ease of use of procedures, maintenance, and value.

**Naïve Observer.** In the second procedure, three observers who were unfamiliar with the children, setting, and purpose of the study were recruited to observe videotaped vignettes of the participants during the baseline and intervention sessions and to fill out a rating scale following each vignette. Observers who were recruited had skills in observing child behavior and a familiarity with interventions for problem behavior. Ninety-second vignettes from the baseline and intervention videotapes were shown in random order to the three observers. These vignettes were developed by placing session numbers in two containers (one for baseline and one for intervention) and drawing three baseline and four intervention sessions. From those sessions, the middle 90 s were selected for the edited vignette. A research assistant explained the rating scale and indicated to observers which children had been targeted for the observation. The observers completed a rating scale after viewing each of the seven videotape vignettes. The rating scale asked the observers to provide their rating of the target child or children’s level of problem behaviors, the distractibility of the target child/children to other children, the level of engagement of the target child/children, and the difficulty the teacher experienced in managing the children within the activity.

**Procedural Fidelity**
To assess the degree to which intervention components were implemented with integrity, the team collected procedural fidelity data across both routines (opening circle and planning) and conditions (baseline and intervention). Data were obtained on the PBS components that could
be observed completely during the sessions. Due to limitations of the video recordings, only those components that were vulnerable to observation could be assessed (i.e., intervention components that were clearly observable on videotape without interference or blocking). Furthermore, some intervention components (e.g., providing opportunities for active participation, offering choices) had been implemented on a very occasional basis and thus were difficult to observe reliably. These were not included in procedural fidelity data collection. Measured variables included ones that were related to the structure of the environment and activities, as well as some variables related to the teachers’ interactions with the children. The structural variables included participant seating arrangements (i.e., Layla seated across from teacher, Vanessa seated beside the paraprofessional at the curve of the horseshoe) and whether both participants were selected first, second, or third for transitions. The interaction variables were child-specific praise and opportunities to answer specific questions.

Employing the same videotapes used to record the dependent variables, observers scored whether the classroom staff members implemented the structural components for an entire session, part of the session, or not at all. To ensure accurate and reliable data collection, the team implemented a predetermined decision rule stating that procedural fidelity existed only when an individual component was properly implemented for the entire duration of the session (i.e., the entire length of opening circle). Data were expressed as mean percentage of all sessions with fidelity of implementation. The interaction variables (e.g., use of specific praise) were scored as discrete occurrences, resulting in a rate measure (occurrences per minute) for each session.

Reliability estimates for procedural fidelity data collection were calculated across individual intervention components and routines for 38% of all sessions scored during opening circle and 33% of all sessions scored during planning. With respect to structural components, the mean percentage of interobserver agreement (IOA) for both presence of schedule and whether Layla and Vanessa were seated apart was 86% during opening circle and 100% during planning. Interobserver agreement for Layla’s seating position in front of the teacher was 100% during opening circle and 71% during planning. In contrast, a mean IOA of 100% was obtained during opening circle for Vanessa’s seating position next to an adult, but a mean IOA of only 57% for seating was obtained during planning. With respect to selection for transitions, the observers maintained 100% IOA for Layla during both routines, 100% IOA for Vanessa during opening circle, and 86% IOA for Vanessa during planning.

Relative to interactional intervention components, IOA coefficients were also obtained. For the use of specific praise, the IOA was 99% for Layla across both routines, whereas agreement for specific praise directed to Vanessa occurred 98% of the time for opening circle and 99% for planning. Finally, the IOA for opportunities to answer specific questions was 100% for both children during both activities.

RESULTS

Data depicting rates of engagement and problem behaviors for both target children are presented in Figures 1 (Vanessa) and 2 (Layla). In both figures, the percentage of intervals in which problem behaviors occurred is plotted on the ordinate and sessions are plotted on the abscissa. Data illustrating Vanessa’s behavior during the opening circle activities (top graph, Figure 1) indicate a higher rate of engagement and lower rates of problem behaviors during the two intervention conditions relative to the two baseline phases. A similar pattern was observed during the planning activities (bottom graph). In other words, both dependent variables showed systematic changes that were associated with the introduction and withdrawal of the assessment-based intervention.

Layla’s data are presented in Figure 2. Although the magnitude of the differences was less for Layla than for Vanessa, the essential functions are replicated for both problem behavior and engagement for opening circle (top graph) and planning (bottom graph). In contrast to the baseline phases, visual analyses indicate that Layla demonstrated a greater rate of task engagement and lesser rate of problem behaviors during the intervention phases for both activities. The percentage of intervals in which engagement was observed was not only less variable but also at a consistently higher level than indicated by data obtained during the baseline phases.

Social Validation

Two procedures to assess social validation were used to evaluate the methods and outcomes of the research (Wolf, 1978). In the first procedure, the teacher and two other preschool staff members anonymously filled out a survey that assessed their opinions on the usability and effectiveness of the intervention. Although the significance of these data is limited because there were only two respondents, it is encouraging that both staff members “strongly agreed” that (a) the interventions were effective, comfortable to use, and developmentally appropriate and (b) they would recommend them to other teachers. In the second procedure, three doctoral-level naïve observers used a 5-point Likert-type scale to report that participants displayed less significant problem behaviors, distracted fewer peers from activities, and displayed more engagement, and the teacher appeared to have less difficulty managing the children within the activity (see Table 2).
Procedural Fidelity

Procedural fidelity data are presented for the opening circle (see Table 3) and planning (see Table 4) routines. For the opening circle routine, an inspection of procedural fidelity data indicated that some intervention components were implemented consistently. With respect to structural intervention components, schedules were followed more consistently, seating arrangements were implemented accurately, and both Layla and Vanessa were differentially selected for transitions. With the exception of the last component (selecting Vanessa for transitions), intervention components were implemented for at least 80% of the sessions during the first intervention phase and for 50% of the sessions during the second intervention phase. In contrast, the interaction components were
implemented with less consistency. Although the rates of specific question-asking for both Layla and Vanessa were higher in the intervention phases than during baseline phases, the rates were still quite low, averaging only one or two questions per session. Rates of delivering praise were also low, and for Layla, there was no systematic difference between the baseline and intervention phases.

In regards to planning (see Table 4), the data indicated rather poor fidelity for most observed variables. The schedule was followed 100% of the time for both intervention conditions, and during no sessions at baseline, but the remaining structural components were not implemented with integrity. No systematic differences between intervention and baseline were found for any of the seating or transition components for either participant. With respect to interactional components, the most striking observation was that neither praise nor specific question-asking was presented with much frequency during any of the experimental phases, and the differences between conditions were meager and, for the most part, unreplicated. The overall picture for the fidelity data suggests some integrity of implementation for the structural

![Graph showing engagement and problem behaviors for Layla during opening circle and planning.](image)

**FIGURE 2.** Percentages of observed intervals of engagement and problem behaviors for Layla during opening circle and planning.
variables, especially during opening circle, but there is very little evidence that the interaction variables were implemented in a systematic or differential manner across conditions.

**DISCUSSION**

The primary purpose of this study was to examine the effects of PBS consultation and intervention for preschool-age children. The findings indicated that the selected interventions were associated with an increase in engagement and a reduction in challenging behaviors for two young girls. For both of these girls, the findings were replicated across two independent contexts—opening circle and planning. In addition, exploratory data indicated that some aspects of the PBS plan (i.e., structural) were implemented with fidelity, but others (i.e., interactional aspects) were not. In aggregate, these findings contribute to the literature and may have implications from two important perspectives related to PBS and the resolution of challenging behaviors of young children.

The first implication involves the successful demonstration of PBS with two children in the context of a community inclusive preschool setting. Not only does this study provide evidence of utility for the PBS consultation model, but it also adds to a small but growing literature base demonstrating the potential utility of PBS consultation for preschoolers and their families (Dunlap & Fox, 1999; Fox & Little, 2001; Frea et al., 2001). Specifically, this may be seen to be a valuable addition due to the age of the children: Although research has been conducted on the challenging behaviors of preschoolers, relatively few studies have been conducted in inclusive, community-based settings (Dunlap & Fox, 1999; Frea et al., 2001; Kaiser & Hester, 1997; Lawry et al., 1999; Walker, Stiller, & Golly, 1999). In recognition of this gap within the literature, the present study was conducted entirely within an inclusive community preschool setting utilizing intervention components designed to enhance the behavior of both the individual participants and the entire class.

An important corollary is that this was accomplished via a consultative model, with classroom teachers serving as natural intervention agents. This enhances the ecological validity of the study itself, but it also speaks to its practical utility because additional intervention agents or resources were not required beyond those already allocated by the preschool. Intervention components were only considered relative to the extent to which they could be implemented with ease and integrity. This may be seen as an increasingly important feature, because PBS is rapidly moving from an experimental phase to a phase in which widespread implementation is expected as the norm. In an age of increasingly higher standards, researchers will consistently seek to establish PBS as being an optimal combination of nonaversive and skill-focused interventions that are reflective of the best practices and services available to preschoolers and their families.

The second important implication relates to fidelity data. Although these data were compromised because it was not possible to observe all of the recommended components on the video recordings, they nevertheless point to some potentially useful observations. Findings from this study indicated that natural intervention agents were able to implement supports designed to enhance environmental structure (e.g., following specific seating arrangements, using proximity control, setting predictable routines) with a higher degree of consistency than in interventions that were primarily interactional in nature (e.g., providing specific opportunities for child-directed praise or questions).

**TABLE 2. Social Validation for Naive Observers**

<table>
<thead>
<tr>
<th>Question</th>
<th>Baseline M</th>
<th>Baseline Range</th>
<th>Intervention M</th>
<th>Intervention Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Did the child/children have significant problem behaviors during the activity?</td>
<td>2.22</td>
<td>1–4</td>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td>2. Did the child/children distract the other children during the activity?</td>
<td>2.22</td>
<td>1–5</td>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td>3. Did the child/children have difficulty maintaining engagement in the activity?</td>
<td>1.00</td>
<td>4.83</td>
<td>4–5</td>
<td></td>
</tr>
<tr>
<td>4. Did the teacher have difficulty managing the children within the activity?</td>
<td>2.22</td>
<td>1–3</td>
<td>4.83</td>
<td>4–5</td>
</tr>
</tbody>
</table>

*Note. Questions 1–4 were rated on a 5-point scale (1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree, 5 = strongly disagree).*
The procedural fidelity data from this study raise a number of important questions. First, would there have been greater gains or reductions in problem behaviors if all components had been implemented with fidelity? We do not have the data to suggest an answer to this question, although it seems probable that the interactional components would provide some additive effect (cf. Holmes, Wolery, & Snyder, 1994). It would be extremely useful for future research to examine the relative contributions of intervention components to determine the effect sizes of partial versus complete implementation.

A second question to consider is the following: What factors accounted for the classroom staff’s failure to implement parts of the intervention? Although these individuals contributed to the design of the intervention plan, they did not implement all of its components. Classroom staff members more consistently implemented structural and environmental modifications than strategies requiring individualized, verbal interactions. The reason for this is unknown, but we might speculate that the structural strategies may have been perceived to be more efficient or more feasible by the persons implementing the inter-

### TABLE 3. Component Procedural Fidelity During Opening Circle

<table>
<thead>
<tr>
<th>Component</th>
<th>Baseline 1</th>
<th>Intervention 1</th>
<th>Baseline 2</th>
<th>Intervention 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structural variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Was schedule followed?</td>
<td>14</td>
<td>100</td>
<td>0</td>
<td>83</td>
</tr>
<tr>
<td>Are Layla and Vanessa seated apart?</td>
<td>33</td>
<td>100</td>
<td>50</td>
<td>83</td>
</tr>
<tr>
<td>Is Layla seated directly in front of teacher?</td>
<td>50</td>
<td>80</td>
<td>50</td>
<td>83</td>
</tr>
<tr>
<td>Is there an adult seated in close proximity to Vanessa?</td>
<td>57</td>
<td>80</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>Is Layla selected 1st, 2nd, or 3rd for transitions?</td>
<td>0</td>
<td>80</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>Is Vanessa selected 1st, 2nd, or 3rd for transitions?</td>
<td>33</td>
<td>40</td>
<td>0</td>
<td>33</td>
</tr>
<tr>
<td><strong>Interaction variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Was Layla given child-directed, specific praise?</td>
<td>0.12</td>
<td>0.05</td>
<td>0.06</td>
<td>0.20</td>
</tr>
<tr>
<td>Was Vanessa given child-directed, specific praise?</td>
<td>0.08</td>
<td>0.33</td>
<td>0.06</td>
<td>0.16</td>
</tr>
<tr>
<td>Was Layla given the opportunity to answer specific questions?</td>
<td>0.10</td>
<td>0.18</td>
<td>0.06</td>
<td>0.24</td>
</tr>
<tr>
<td>Was Vanessa given the opportunity to answer specific questions?</td>
<td>0.06</td>
<td>0.13</td>
<td>0.06</td>
<td>0.28</td>
</tr>
</tbody>
</table>

*aPercentage of sessions. bOccurrences per minute.*

### TABLE 4. Component Procedural Fidelity During Planning

<table>
<thead>
<tr>
<th>Component</th>
<th>Baseline 1</th>
<th>Intervention 1</th>
<th>Baseline 2</th>
<th>Intervention 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structural variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Was schedule followed?</td>
<td>0</td>
<td>100</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Are Layla and Vanessa seated apart?</td>
<td>60</td>
<td>33</td>
<td>50</td>
<td>29</td>
</tr>
<tr>
<td>Is Layla seated directly in front of teacher?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>29</td>
</tr>
<tr>
<td>Is there an adult seated in close proximity to Vanessa?</td>
<td>43</td>
<td>33</td>
<td>50</td>
<td>14</td>
</tr>
<tr>
<td>Is Layla selected 1st, 2nd, or 3rd for transitions?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>Is Vanessa selected 1st, 2nd, or 3rd for transitions?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Interaction variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Was Layla given child-directed, specific praise?</td>
<td>0.08</td>
<td>0.10</td>
<td>0.00</td>
<td>0.08</td>
</tr>
<tr>
<td>Was Vanessa given child-directed, specific praise?</td>
<td>0.04</td>
<td>0.21</td>
<td>0.21</td>
<td>0.19</td>
</tr>
<tr>
<td>Was Layla given the opportunity to answer specific questions?</td>
<td>0.05</td>
<td>0.14</td>
<td>0.00</td>
<td>0.08</td>
</tr>
<tr>
<td>Was Vanessa given the opportunity to answer specific questions?</td>
<td>0.03</td>
<td>0.03</td>
<td>0.00</td>
<td>0.02</td>
</tr>
</tbody>
</table>

*aPercentage of sessions. bOccurrences per minute.*
vention. It is conceivable that the classroom staff members attended more to the structural elements of the plan and essentially ignored the more exacting interactional components. This seems to be supported by the social validation data: The staff members strongly agreed that the procedures were feasible, appropriate, and effective, despite evidence that the interactional components were not implemented. Future studies could help determine the variables related to differential implementation as well as the attitudes and perceptions of classroom personnel.

A third question related to procedural fidelity pertains to whether the elaborated process of functional assessment and support plan development was necessary to address the needs of these children. It is quite possible that the structural changes (e.g., schedule following) may have been sufficient in and of themselves to accomplish the behavior changes indicated in Figures 1 and 2. Although this cannot be asserted in the absence of parametric analyses, it is certainly conceivable that the children’s challenging behaviors may have been resolvable with general preventive practices, such as clear scheduling, relationship building, and seating arrangements (Fox, Dunlap, Hemmeter, Joseph, & Strain, 2003; Hemmeter et al., 2001; Sandall & Ostrosky, 1999), and that the more individualized procedures might have been superfluous in this particular case. Although the team (especially the preschool staff members) argued that individualized supports were needed, and although other children in the class were not displaying the disruptive behaviors that Vanessa and Layla did, it is nevertheless quite possible that more diligent attention to quality preventive classroom practices (Hemmeter et al., 2001; Sandall & Ostrosky, 1999) could have precluded the need for the more intensive process of individualized assessment and intervention. Interestingly, in the following school year, both Layla and Vanessa were enrolled in the same class with a different teacher who routinely used preventive classroom practices to support all of her children. This teacher did not perceive Vanessa or Layla to have problematic behaviors. Future research on issues such as environmental design and programmatic efficiency would be a very helpful direction for applied research on behavior support in preschool settings.

Another, related speculation is that the more general preventive (and structural) practices might be easier to implement than those demanding social interaction and clinical judgment. In contrast to structural and environmental modifications, interventions requiring verbal interaction tend to be more elaborate, require more effort to implement with precision, require additional resources, and contribute to frustration on the behalf of both the participant and the person who is implementing the intervention. These are speculations, however, and should be viewed only as suggested areas for further research.

Regardless of the specific reasons, the current data may be seen to contribute to the literature by providing another demonstration of favorable effects via a PBS model. Although important questions about the direct impact of the PBS consultation remain to be answered, the effects on the participants’ levels of engagement and problem behaviors were beneficial and socially validated. We recommend that further research in this area focus explicitly on the process of consultation, implementation by natural intervention agents, and analysis of the most efficient process for achieving needed changes in preschoolers’ behavioral repertoires.

AUTHORS’ NOTES

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