

AN ANALYSIS OF PARENT-IMPLEMENTED BEHAVIOR SUPPORT PLANS:  
THE EFFECTS OF IN-HOME CONSULTATION ON TREATMENT  
INTEGRITY AND REDUCTIONS IN CHALLENGING BEHAVIOR

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## ABSTRACT

Young children with autism spectrum disorders often exhibit challenging behaviors across a variety of settings. These behaviors frequently interfere with children's development, with full participation in inclusive educational and community-based activities, and with a family's overall quality of life. Recent research has supported function-based approaches to understanding and managing challenging behavior, and the importance of family involvement in planning and implementing behavior support plans is frequently cited as a critical component for meaningful outcomes. Unfortunately, few studies have actually examined parents' implementation of multi-component behavior support plans within natural contexts such as family routines. Furthermore, the use of multiple outcome measures to evaluate the overall effectiveness of a behavior support plan is limited. The purpose of this study was to address limitations in this literature. Specifically, this study evaluated (a) the level of treatment integrity of parent-implemented behavior support plans within established family routines, (b) the effects of individualized consultation within the natural environment on treatment integrity, and (c) the relationships between treatment integrity, reductions in children's challenging behavior, and other outcome measures. A single-subject, multiple baseline across participants design was used. Results indicated that levels of treatment integrity increased following in-home consultation and that increased levels of treatment integrity resulted in meaningful reductions in children's challenging behavior as measured by direct observation data and parent report outcome measures.

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Per diagnostic criteria, young children with autism spectrum disorders experience deficits in two critical developmental areas: communication and social interaction. The limitations in communication skills and social development place children with autism at significant risk for developing pervasive, challenging, and maladaptive behavior. Challenging behaviors exhibited by young children with autism are observed in many topographical forms, and can include physical aggression, tantrums, noncompliance, property destruction, and other disruptive behaviors.

These challenging behaviors are problematic for several reasons. First, the behaviors often interfere with a child's development in areas such as socialization and self-care. Second, the behaviors interfere with a child's full participation in inclusive educational programs and community-based activities. Third, the behaviors often interfere with a family's quality of life. For example, many parents report high levels of stress, difficulties completing necessary daily activities, and active avoidance of previously-enjoyed community-based and socially-oriented activities. Without a doubt, providing services to address challenging behavior is of critical importance; without intervention, it is unlikely that the challenging behaviors will disappear (Horner, Carr, Strain, Todd, & Reed, 2002). Recent trends in the reduction of challenging behavior include the use of functional assessment procedures, implementation of multi-component behavior support plans, and the active involvement of parents as full participants in the behavior change process. However, the number of empirical studies evaluating these trends is limited.

The purpose of this study was to address limitations in the literature related to behavior support plans being implemented in natural environments (e.g., home, store) by parents of children with autism. A limited number of studies have been published that include parents as implementers of comprehensive multi-component interventions. Even fewer studies have examined the treatment integrity of parent-implemented interventions and the relationships between treatment integrity, child outcomes (i.e., reductions of challenging behavior) and meaningful family outcomes (i.e., quality of life). These, and other, limitations will be discussed in the introduction of this paper, along with a review of frequently-recommended practices for managing the challenging behavior of young children with autism. The introduction concludes with the specification of the research questions addressed in this study.

#### *Recommended Practices: Functional Assessment of Challenging Behavior*

The use of functional assessment procedures is frequently recommended when addressing the challenging behaviors of children with autism spectrum disorders (e.g., O'Neill et al., 1997; Horner et al., 2002). Functional assessment (FA) involves the implementation of one or more procedures for the purpose of identifying relationships between a specific behavior and related environmental variables. A variety of approaches exist for conducting functional assessments of challenging behavior and can be organized within three categorical methods: (a) Indirect methods, (b) Direct Observation methods, and (c) Experimental methods. Indirect assessment methods typically involve gathering information from parents,

teachers, and other care providers through the administration of questionnaires, rating scales, checklists, or other interviews. Examples of Indirect assessment methods include the Aberrant Behavior Checklist (ABC; Aman & Singh, 1986; 1994) and the Functional Assessment Interview (FAI; O'Neill et al., 1997). Direct observation assessment methods involve collecting data on the behavior of interest as it occurs in relation to natural environmental events. Direct observation methods include Antecedent-Behavior-Consequence recording (ABC) and scatterplot recording (e.g., Touchette, MacDonald, & Langer, 1985). Experimental assessment methods involve the systematic and controlled manipulation of antecedent or consequent events to test hypotheses regarding functional relationships between behavior and environmental events. The experimental assessment method is often referred to as a functional analysis (e.g., Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994).

O'Neill et al. (1997) report that a functional assessment can be considered complete when five primary outcomes have been achieved: (1) clear description of the challenging behavior, (2) identification of the events, times, and other variables that reliably predict when the behavior will and will not occur, (3) hypothesis regarding the function of the behavior, (4) a hypothesis statement regarding the behavior and its related antecedent and consequent variables, and (5) direct observation data that support the hypothesis statement. While the goal of the functional assessment is to identify the function of the behavior and the antecedent and setting event variables that reliably predict the occurrence and non-occurrence

of the challenging behavior, the purpose of completing the FA is to gather information that can be used to develop an informed intervention plan.

Empirical research in the fields of behavior analysis, psychology, special education, and related disciplines have consistently identified function-based approaches as the most effective method for understanding and intervening on challenging behavior (e.g., Scotti, Evans, Meyer, & Walker, 1991). In fact, a review of interventions addressing the challenging behavior of young children with autism identified one variable that consistently increased the likelihood of an intervention's success: the use of functional assessment procedures to inform interventions (Horner et al., 2002). Given the assertion that the use of functional assessment procedures increases the likelihood of identifying a successful intervention, one can understand the inclusion of functional assessments within the realm of best practices for managing the challenging behavior of young children with autism. Unfortunately, a recent review noted that only 56% of published studies addressing the challenging behavior of young children with autism reported having completed a functional assessment prior to the development of a treatment plan (Small, 2007).

*Recommended Practices: Function-Based Treatment for Challenging Behavior*

As mentioned above, the purpose for completing the functional assessment is to gather information that can be used to inform the development of an intervention, also frequently referred to as a behavior support plan (BSP). The behavior support plan is essentially a set of explicit instructions that detail one or

more steps to be taken in an effort to reduce the occurrence of a child's challenging behavior. Although a number of empirically supported strategies exist for managing maladaptive behavior, and it is possible that these strategies may be used in isolation, the current trend involves the development and implementation of comprehensive, multi-component behavior support plans (e.g., Dunlap & Fox, 1999; Lucyshyn, Horner, Dunlap, Albin, & Ben, 2002; Moes & Frea, 2002). Data supporting these multi-component behavior support plans are extremely limited, however, resulting in recommendations for further research evaluating the effectiveness of multi-component plans (e.g., Albin, Dunlap, & Lucyshyn, 2002; Horner et al., 2002; Small, 2007).

Behavior support plans typically consist of four primary components; the results of the functional assessment guide the selection of the specific strategies that are included within each of the four components. *Preventative strategies* involve antecedent manipulations made in an effort to reduce the likelihood that the challenging behavior will occur. Such strategies include, for example, the use of visual schedules, transition warnings, and the establishment of consistent routines (e.g., Lucyshyn et al., 2002). *Teaching functionally equivalent replacement skills/behaviors* involves explicitly teaching the child to use an alternative behavior in place of the challenging behavior. Young children with autism often emit a challenging behavior (e.g., tantrum) in place of some other socially-appropriate communicative behavior (e.g., requesting an item). Replacement behaviors that achieve the same outcome as the challenging behavior (e.g., functional

communication) are typically selected (e.g., Braithwaite & Richdale, 2000; Campbell & Lutzker, 1993; Carr & Durand, 1985). Implementation of a *reinforcement plan* is critical to teaching the child that socially-appropriate behavior results in the desired outcome; the replacement behavior must be reinforced so that it ‘works’ for the child. *Consequent procedures* must be clearly outlined and specify how adults and others should respond to occurrences of the challenging behavior. Consequent procedures typically involve removing the reinforcing events and interactions that maintain a challenging behavior. In other words, the consequent procedures aim to disrupt the response-reinforcer relationship. These four components (i.e., prevention, teaching replacement behaviors, reinforcing alternative behaviors, and specified consequences) are consistently identified as critical components of comprehensive behavior support plans (e.g., Buschbacher, Fox, & Clarke, 2004; Dunlap & Fox, 1999; Horner, Sugai, Todd, & Lewis-Palmer, 2000; Horner et al., 2002).

#### *Recommended Practices: Family Considerations*

*Family Considerations: Assessment and Intervention Implementation.* The importance of family involvement in educational and behavioral planning has been noted throughout the literature, and supported by influential organizations (e.g., Division of Early Childhood, 1999; Dunlap, Newton, Fox, Benito, & Vaughn, 2001; Horner et al., 2002; Lucyshyn, et al., 2002). Family involvement throughout each stage of planning (i.e., FA, hypothesis development, behavior support plan development, implementation, and monitoring) serves many functions. First,

involving parents in the assessment of challenging behavior will likely provide unique information related to the challenging behavior – those variables that may increase or decrease the likelihood of the challenging behavior. Data suggest that involving parents in the assessment phase is associated with improved treatment effects (Horner et al., 2002), and may result in the development of more durable interventions (Buschbacher et al., 2004). Unfortunately, a recent review of 25 empirical studies addressing the challenging behavior of young children with autism found that only 28% of the studies involved parents in the assessment of their children’s challenging behavior (Small, 2007).

Second, involving parents in both the hypothesis and behavior support plan development stages allows them to participate in problem-solving, understanding behavioral function, and identifying strategies that may promote positive behavior and reduce challenging behavior. Parent participation in these phases may also increase the probability of efficient responding to novel challenging behaviors in the future. Third, supporting parents in the consistent implementation of behavior support procedures teaches parents new skills, and promotes generalization of child behavior (Dunlap et al., 2001). Unfortunately, few studies evaluate interventions delivered by parents, and even fewer have actually examined parents’ implementation of *multi-component* behavior support plans to reduce the challenging behavior of their young children with autism (Conroy, Dunlap, & Clarke, 2003; Dunlap & Fox, 1999; Horner et al., 2002; Small, 2007).

*Family Considerations: Contextual Fit.* Including parents in all steps of the assessment, intervention development, and intervention implementation processes increases the likelihood that the interventions will be maximally individualized and practical. It is of critical importance that the behavior support plan reflects the need and resources of, or “fit,” the environment(s) in which it will be implemented. This fit between the behavior support plan and the contexts in which it will be implemented is often referred to as “contextual fit,” and can have a direct impact on the level of treatment integrity. It is unlikely that parents will consistently implement a behavior support plan if they find that the plan is difficult to implement, or if the plan conflicts with the family’s established routines (Albin, Lucyshyn, Horner, & Flannery, 1996; Buschbacher & Fox, 2003; Kincaid, Knoster, Harrower, Shannon, Bustamante, 2002; Moes & Frea, 2002). However, very little empirical data exist on the relationship between contextual fit and other variables such as treatment integrity (i.e., the correct implementation of the behavior support plan) or treatment acceptability.

*Family Considerations: Interventions within Family Routines.*

Implementing behavior support plans within established family routines has garnered much attention within the recent years (e.g., Albin et al., 1996; Buschbacher et al., 2004). Lucyshyn et al. (2002) suggest that behavioral supports provided to families of young children with challenging behavior could be improved by developing family-centered behavior support plans and focusing on the implementation of behavior support plans within family routines (e.g.,



mealtimes, common transitions such as preparing for bed). Fox, Dunlap, and Philbrick (1997) also recommend implementing behavior support plans within established routines for several reasons. First, matching behavioral supports to family routines simultaneously addresses two important issues: the challenging behavior and important family events that are disrupted because of the behavior. Second, the routines provide an ideal opportunity to develop interventions with strong contextual fit. Finally, Fox (1997) suggests that by identifying specific and established opportunities for parents to implement the behavior support plan, the likelihood of parents having to complete “extra work” is reduced, and the likelihood of the intervention’s maintenance is increased. Two recent studies have demonstrated positive effects from implementing behavior support procedures within the context of family routines (e.g., Buschbacher, et al., 2004; Moes & Frea, 2002); however, the authors of these studies indicated that additional research is needed with respect to the implementation of interventions within naturally occurring family routines.

*Recommended Methodological Practice: Treatment Integrity*

Equally important as teaching parents to implement behavior support plans and to have ‘ownership’ of them is conducting on-going monitoring (with additional coaching and support as needed) within the intervention environment. This ongoing monitoring is apt to increase the likelihood that the behavior support plan will be implemented as designed and is necessary for a valid evaluation of the intervention’s effectiveness. This variable, the correct implementation of the

independent variable, is typically referred to as treatment integrity (Peterson, Homer, & Wonderlich, 1982). To improve the validity of a treatment evaluation, treatment integrity data should be collected as parents and other caregivers implement behavior support plans within homes, schools, and community settings (Cooper, Heron, & Heward, 2007). Failure to measure treatment integrity may result in incorrect conclusions regarding treatment efficacy (Cooper et al., 2007). For example, one may erroneously attribute changes in a child's maladaptive behavior to a specific intervention when, in fact, the intervention was not implemented correctly. Likewise, one may erroneously assume that an intervention failed to affect behavior change when, in fact, the intervention was not implemented correctly.

Despite these significant implications, a recent review of 25 published studies evaluating interventions for the challenging behavior of young children with autism identified only six studies that collected some information regarding treatment integrity, and only two studies that actually reported data on levels of treatment integrity (Small, 2007). The extremely limited data with respect to treatment integrity impede an analysis of the relationship between treatment integrity and the effectiveness of interventions. Further research in this area is clearly warranted.

#### *Variables Impeding Recommended Practices*

As noted above, recommended practices in the management of challenging behavior of young children with autism spectrum disorders involve three global

events. First, a comprehensive functional assessment should be completed. Second, a multi-component behavior support plan should be developed and implemented, with built-in procedures for monitoring the plan's effectiveness. Third, parents and other natural caregivers should be included as full team members throughout the entire process. Unfortunately, a number of professional, family, and external variables such as family income and marital status may interfere with meeting these best practices (Becker-Cottrill, McFarland, & Anderson, 2003).

Following recommended practices to manage the challenging behavior of young children with autism is often very time-consuming. This is illustrated through the description of the functional assessment as well as the processes involved in developing, implementing, and monitoring the effects of the behavior support plan. Although families typically regard the management of their child's challenging behavior as extremely critical to the family's overall well-being, finding the time to fully participate in the process can be a challenge, particularly for single-parent families, families with two full-time working parents, and families with multiple children in the home. At this time, data are not clear with respect to the precise amount of parent education/training required, or the level of treatment integrity required to achieve meaningful outcomes with respect to the child's challenging behavior and the family's overall functioning.

Fox, Dunlap, and Powell (2002) describe a second impediment to families' efforts to secure assistance in managing the challenging behavior of their children. Specifically, they reported that families often experience a great deal of difficulty

in retaining qualified professional help as applied behavior analysts, positive behavior support providers, and behavioral psychologists trained in this area may be difficult to locate or, if successfully located, providers may not be accepting new clients or may have a lengthy wait-list for their services. Finally, families who do find available and qualified professionals then face the challenge of paying for the services, which can be quite expensive (Fox et al., 2002; Jacobson & Mulick, 2000). Unfortunately, families experience a significant amount of difficulty finding and retaining services that can meet the behavioral needs of their children.

#### *Purpose and Research Questions*

The purpose of this study was to address limitations in the literature related to behavior support plans being implemented in natural environments (e.g., home, store) by parents of children with autism. First, a limited number of studies have involved parents as implementers of empirically-evaluated multi-component interventions addressing the challenging behavior of young children with autism (Small, 2007). Horner et al. (2002) noted that there exists a “real need for more research on the feasibility of using behavioral interventions in typical contexts by typical support agents,” (p. 435). Second, little data exist regarding the level of treatment integrity of parent-implemented interventions as it relates to child outcomes (i.e., reductions of challenging behavior) and meaningful family outcomes (i.e., quality of life). Recently, recommendations have been made for future research to examine the relationship between increased levels of treatment integrity and reductions in children’s challenging behavior (e.g., Duda et al., 2004).

Finally, the use of multiple outcome measures (e.g., quality of life measures and contextual fit measures *in addition to* child outcome measures) is sparse (Kincaid et al., 2002). This study was formulated as a response to these documented needs.

Specifically, the following questions were addressed:

1. Without in-home support, what is the integrity with which parents implement a multi-component behavior support plan?
2. Does the addition of individualized consultation in the natural environment affect the level of treatment integrity (i.e., fidelity with which parents implement the behavior support plan)?
3. Does a relationship exist between treatment integrity and reductions in challenging behavior?
4. Do levels of treatment integrity and reductions in challenging behavior correspond to a family's self-reported quality of life?
5. Do levels of treatment integrity and reductions in challenging behavior correspond to parents' reports about the contextual fit of the behavior support plan?

## Method

### *Recruitment of Participants*

Participants were recruited through a developmental disabilities center at a university-affiliated medical center located in a large metropolitan area. The center provides a variety of services for children with developmental disabilities and their families, including assessment, treatment, and family support services. Families

were provided with information about the study if (a) the child for whom assessment or treatment was being sought met criteria for a diagnosis of an autism spectrum disorder, (b) the child exhibited challenging behavior according to parent report, and (c) the child was between the ages of 2 to 5 years of age. Families were recruited on a first-come, first-serve basis. Although the participants recruited for this study are largely representative of the population of families seen in the behavior management clinic, they did all report difficult family relations and high levels of stress. Information about the study was provided verbally in conjunction with a review of the informed consent. Consent was obtained in writing from each parent participant prior to their participation in the study. Participants were given ample opportunity to ask questions prior to giving consent, and were informed of their right to withdraw from the study at any time, without penalty (See Informed Consent, Appendix A).

### *Participants*

Participants in this study included five children and their families. Two of the child participants were twin siblings, and therefore, four families participated in the study. Each child participant was diagnosed with an autism spectrum disorder and exhibited more than one challenging behavior for which the families were seeking help. Each parent participant reported that their child was not receiving any in-home support to address issues related to challenging behavior at the time of recruitment, despite each parent's attempt to secure in-home support.

*Shayla.* Shayla was 5 years, 1 month old at the beginning of the study. Shayla was diagnosed with autism and experienced several medical conditions including cerebral palsy, a seizure disorder, and a feeding disorder. Shayla had been hospitalized numerous times due to seizures and complications with her Gastrostomy Tube (G-tube) and Vagal Nerve Stimulator (VNS). Shayla received special education services which were provided in her local public school setting. She received no in-home support to address behavioral needs. Shayla communicated using vocal words and short phrases, some approximations of American Sign Language and conventional gestures, and some use of picture symbols.

Shayla lived at home with her mother and father; she had no siblings. Shayla's mother experienced some medical complications and was unable to work; her father worked full time. Per parent report, the family experienced significant financial stress. Shayla was described by her parents as energetic, active, and requiring constant supervision. Given the number of medical complications that Shayla had experienced, her parents expressed significant concerns regarding her challenging behavior, and the increased risks she experienced as a result of her challenging behavior. Specifically, Shayla's parents reported that Shayla exhibited aggressive behavior, noncompliance, and tantrum behaviors. Aggressive behavior included any occurrence of hitting, scratching, pinching, kicking, or throwing objects at others. Noncompliant behavior included any occurrence of failure to follow one-step instructions provided by an adult. Tantrum behavior included

screaming, crying, and/or throwing self on the floor. Tantrum behaviors often included occurrences of property destruction (e.g., wiping objects off tables, kicking toys, etc.).

*Davis.* Davis was 3 years, 3 months old at the beginning of this study. Davis was diagnosed with an autism spectrum disorder at 3 years, 1 month of age following a comprehensive diagnostic evaluation completed by a multidisciplinary team. During the diagnostic evaluation, Davis's parents reported concerns regarding tantrum behavior, and the family was referred to the outpatient behavior management clinic for an assessment and treatment of the tantrum behavior. Davis communicated primarily through the vocal use of short phrases and sentences. He was often observed to exhibit immediate and delayed echolalia as well as perseverative (repetitive) verbalizations. Some instances of echolalia appeared to be social in nature (e.g., for the purpose of communicating with another person); other instances were observed during solitary play and did not appear to have a social component. At the time of recruitment, Davis received special education services through his public school system and attended an inclusive preschool program four afternoons per week. Davis received no in-home support to address his behavioral needs.

Davis lived at home with his mother, father, older sister, and older brother. Davis's mother worked as a nurse, part-time in the evenings. Davis's father worked full-time and traveled several times per month for work-related business. Davis's sister was reportedly healthy and doing well in school. Davis's brother experienced



communication delays as a younger child and was reportedly diagnosed with Attention Deficit Hyperactivity Disorder.

Davis was described by his mother as “fun-loving,” happy, and interested in many things. However, Davis’s mother expressed concerns about the frequent disruptive behaviors that Davis exhibited. Specifically, she stated that Davis exhibited disruptive behavior, “when he can’t get his own way.” Davis’s mother also described that it was difficult to transition from one activity or location to another, particularly if Davis did not want to stop doing what he was previously doing (e.g., to stop playing with toys to go get ready for school). Specifically, Davis was reported to say (often with increased volume), “no,” when given an instruction to transition, and was also reported to scream, whine, and/or fall to the floor frequently throughout the day, primarily in response to adult-delivered instructions. In addition to the disruptive and noncompliant behaviors described above, Davis’s mother stated that Davis frequently got out of his chair during meals, which was disruptive to the mealtime routine.

*Mick.* Mick was 2 years, 6 months at the start of the study. Mick was diagnosed with autism at the age of 2 years, 4 months following a comprehensive diagnostic evaluation. Global developmental delays were also noted at that time. Mick exhibited no socially-appropriate functional communication skills; he communicated his needs and wants through inappropriate behavior such as grabbing, hitting, screaming, and throwing. At the point of recruitment, Mick was receiving no early intervention services. Approximately 2 months after the point of

recruitment, Mick began receiving early intervention services in his home including speech and language therapy, occupational therapy, and specialized developmental services; the total duration of services approximated 3 hours per week. Neither Mick nor his family received any in-home support to address issues related to the challenging behavior.

Mick lived at home with his mother, father, and younger brother. Mick had two older half-sisters who also lived in the house part-time. At the time of the study, Mick's mother was a full-time homemaker, and Mick's father worked full-time construction. Mick's younger brother appeared to be developing within normal limits, and was not receiving any out-of-home care or services.

Mick was described by his mother as a "sweet boy" who was smart, but frustrated by his difficulties communicating. Mick's mother also described him as a very active child who did not sleep well, required constant supervision, and liked things to be a certain way. Mick's mother reported that Mick exhibited a number of challenging behaviors, some of which were directed at his younger brother. Specifically, Mick was reported to exhibit aggressive, tantrum, and destructive behaviors. Aggressive behaviors included any occurrence of hitting, biting, slapping, kicking, or pinching directed at another person. Tantrum behaviors included any occurrence of screaming or crying, not resulting from injury, and lasting longer than 2 seconds in duration. Occurrences of disruptive behavior included throwing or kicking objects and occurred during episodes of tantrum behavior; they were neither reported nor observed to occur in isolation.

*Galen.* Galen was 2 years, 8 months at the time of recruitment. Galen was diagnosed with autism at 2 years, 2 months of age following a comprehensive diagnostic evaluation by a multidisciplinary team. Galen exhibited global developmental delays. He communicated primarily through the use of gestures and inappropriate behavior; Galen's parents reported using a "process of elimination" to determine what Galen might want at any given moment. At the time of recruitment, Galen was receiving 2 hours per week of in-home early intervention services (one hour each of speech and language therapy and occupational therapy) and attended a play group for 4 hours per week. No in-home supports were being provided to address issues related to behavior management. In fact, per parent report, early intervention providers did not respond to the parents' requests for assistance in addressing Galen's challenging behavior.

Galen lived at home with his mother, his father, and his twin brother, Johnny, who also participated in this study. Galen's mother was a full-time homemaker. Galen's father worked full time; his work schedule was erratic and he often worked overnight shifts. During their participation in this study, Galen's parents were expecting their third child. Galen's mother was experiencing complications with her pregnancy and was limited in terms of her ability to move.

Galen's parents described Galen as a "strong headed" child who easily became upset when things did not go according to his plan. His parents also described Galen as an active child who did not sit in chairs and did not sleep well. Galen's parents expressed concern about aggressive and tantrum behaviors.

Aggressive behaviors included hitting, biting, and pushing others. Tantrum behaviors included screaming or crying not as a result of injury, often accompanied by jumping up and down and/or falling to the floor.

*Johnny.* Johnny was 2 years, 8 months at the time of recruitment, and was the twin brother of Galen. Johnny was diagnosed with autism and global developmental delays at 2 years, 1 month of age. He was also identified as exhibiting global developmental delays. Johnny communicated through the limited use of gestures (e.g., pushing away, reaching), non-word vocalizations, and challenging behavior. At the time of recruitment, Johnny was receiving 6 hours per week of in-home early intervention services (two hours each of speech and language therapy, occupational therapy, and services with a developmental specialist) and attended a play group for 4 hours per week. Like his brother Galen, Johnny received no in-home support to address issues related to behavior management despite his parents' attempts to secure these supports.

Johnny's parents described Johnny as an "independent," happy, and "easygoing" boy who smiled a lot. Johnny's parents reported that Johnny did not play with toys in an appropriate manner, but often played in repetitive ways and became upset when another person interrupted the play, when the toys were broken, or when the toys were out of place. Johnny's parents expressed concerns regarding these repetitive behaviors in addition to Johnny's tantrum and destructive behaviors. Tantrum behaviors included crying and whining for longer than 3 seconds and not resulting from an injury; destructive behavior included throwing

toys, often down a flight of stairs. Table 1 provides summary data for the children and families who participated in the study.

Table 1

*Child Participant Information*

Child	Parent Participant(s)	Child's Age	Target Challenging Behaviors
Shayla	Mother and Father	5 yrs, 1 mo.	Aggression, Noncompliance, Tantrum
Davis	Mother	3 yrs, 3 mos.	Disruption, Noncompliance, Out of Chair
Mick	Mother	2 yrs, 6 mos.	Aggression, Tantrum
Galen	Mother	2 yrs, 8 mos.	Aggression, Tantrum
Johnny	Mother	2 yrs, 8 mos.	Tantrum, Disruption

*Settings*

The study took place in two broad settings. Some study-related activities took place at an outpatient behavior management clinic located at a university-based medical center in a large metropolitan area. Other study-related activities took place within children's natural environments, including home settings and other community settings such as restaurants and stores.

Families made two visits to the outpatient behavior management clinic. During the first visit, initial assessments were completed (these assessments are

described in further detail in the *Measures* section of this paper). During the second visit to the outpatient clinic, data were reviewed, a multi-component behavior support plan (BSP) was developed, and brief training on implementation of the BSP procedures was completed. Further detail about these activities is provided in the *Experimental Procedures* section of this paper.

The second setting in which this study was conducted involved the children's natural environments, including homes, stores, and restaurants. Additional training, feedback, and direct observations of children's behavior and parents' implementation of the behavior support plans during routine activities were conducted in the natural environments (this is described in further detail in the *Experimental Procedures* section of this paper).

#### *Experimental Design*

A single-subject, multiple baseline across participants design was used, and replicated across two cohorts of participants (Barlow & Hersen, 1984). The design controls for threats to internal validity including history, reactivity, and testing/observation. The single-subject experiment was replicated across two cohorts, providing some indication of external validity, which would not be possible if the experiment did not include a replication.

#### *Experimental Procedures*

(A) *Baseline Phase*. The baseline phase began with an initial appointment to the outpatient behavior management clinic, during which a functional assessment of the child's challenging behavior was initiated. Procedures that were currently in

place for the outpatient clinic were maintained during this phase. During the initial appointment, several events took place. First, the Functional Assessment Interview (FAI; O'Neill et al., 1997) was administered to each family. The FAI is a parent-interview measure designed to collect information about events that are functionally related to challenging behaviors and about routines that are particularly challenging for families. Second, additional and relevant educational, developmental, and medical information was discussed. Third, direct observations of the child's behavior were conducted; activities were semi-structured to evoke the challenging behavior as needed to evaluate variables related to the behavior (e.g., parents may have been asked to engage in specific play activities with their child or to deliver specific instructions to their child). Finally, parents were provided with Antecedent-Behavior-Consequence (A-B-C) data sheets and asked to record data on their child's challenging behavior over a two-week period.

In addition to these practices currently in place, in-home observations were conducted twice weekly during targeted routines (in-home observations are not typically provided by this clinic). The targeted routines were selected by families, having been identified as regularly occurring routines during which challenging behavior was typically observed. The routines that were targeted for each child are listed in Tables 2 – 6. The observations were conducted by the clinician who met with the family at the outpatient clinic. No specific instructional support was provided to the family during these baseline observation visits. That is, no recommendations were provided to families during this phase regarding strategies

to assist them in managing the challenging behavior (recommendations were provided at the beginning of Phase B). Although it is possible that some reactivity may have occurred (i.e., the family may have behaved differently due to the presence of an observer), it was anticipated that the reactivity would fade with the dense schedule of repeated observations.

*(B) Behavior Support Plan Only Phase.* Approximately two weeks after the initial appointment, each family returned to the outpatient behavior management clinic for a follow-up appointment. Once again, current clinic procedures were maintained as the parent-collected data and the clinician's direct observations were reviewed and a multi-component behavior support plan was developed. Each behavior support plan included (a) prevention procedures, (b) procedures for teaching functionally equivalent and socially appropriate replacement behaviors, (c) reinforcement procedures for the replacement behaviors and the absence of the challenging behavior, and (d) consequent procedures. Parents were provided with a written document describing each of the components of the behavior support plan. The recommended procedures were reviewed with the parents, rationales provided, and opportunities to practice most of the procedures within the clinic setting were structured. Tables 2 – 6 provide a summary of the components included in each child's individualized behavior support plan.

Twice-weekly in-home observations continued to take place during this phase. Once again, the weekly in-home observations were not typical practice of the clinic, but were conducted in order to collect data for this study. Measures of



treatment integrity (i.e., the fidelity with which parents implemented the multiple components of the behavior support plan) and measures of child behavior were conducted during each visit. No additional, specific instructional support was provided to the family during these observation visits.

*(C) Behavior Support Plan + In-Home Consultation.* In-home consultation was provided during the final phases of the study (Phase C1 and Phase C2). The goal of these phases was to provide feedback, additional training, and other supports for parents to increase the level of treatment integrity. For example, if parents were observed to implement 40% of preventative procedures, additional training and feedback was provided to increase the percentage of preventative procedures implemented. Likewise, if parents were accurately implementing consequent procedures in only 50% of opportunities, training was provided to increase the percent of opportunities that consequent procedures were accurately implemented. The in-home consultation was not the typical practice of this clinic; the consultation was provided in order to conduct this study and answer the research questions.

The in-home consultation took place during the twice-weekly home visits. Although the consultation was individualized to meet each family's unique needs, consistent procedures included positive feedback for the procedures being implemented, discussion about the procedures not being used, rationales, modeling, and in-vivo coaching. In addition, data collected during the in-home observations (i.e., parents' implementation of the behavior support procedures and the measure

of the child's challenging behavior) were shared with the parents at the end of visits to allow for objective feedback and discussion about the intervention effects.

Phases C1 and C2 are differentiated by the presence (C1) and absence (C2) of in-vivo coaching provided during the observation. During Phase C1, the observer coached families through implementation of the behavior support procedures during the direct observation session(s). In addition, feedback was provided following each session in Phase C1, and additional opportunities for modeling and coaching were provided as necessary. For Shayla and Davis, in-vivo coaching (i.e., Phase C1) was provided during only one visit. For Mick, Galen, and Johnny, in-vivo coaching was provided during two visits.

During Phase C2, no feedback was provided during the direct observation. Instead, during Phase C2, direct consultation was provided following each observation. If a parent asked questions about the behavior support plan prior to the observation, feedback was given prior to the observation. Otherwise, all feedback during Phase C2 was provided after the observation. During the final home visit, parents were asked to complete additional outcome measures that are described in the *Measures* section of this paper.

Table 2

*Summary of Components Included in Shayla's Individualized Behavior Support*

*Plan*

Targeted Routine	Prevention Procedures	Replacement Skills	Reinforcement Procedures	Consequence Procedures
After-school routine: Snack and Play	<ul style="list-style-type: none"> <li>• Procedures for giving instructions</li> <li>• Transition Warnings</li> <li>• Choices</li> <li>• Predictable schedules</li> <li>• Visual schedules</li> <li>• Recognizing precursors</li> </ul>	<ul style="list-style-type: none"> <li>• FCT: Functional Communication Training</li> <li>• Independent Play Skills</li> </ul>	<ul style="list-style-type: none"> <li>• Attention and praise for compliance, use of FCT, independent play</li> <li>• Couch non-preferred activities between preferred activities</li> </ul>	<ul style="list-style-type: none"> <li>• Follow through with instructions (3-step guided compliance)</li> <li>• Time out procedures</li> </ul>

Table 3

*Summary of Components Included in Davis's Individualized Behavior Support Plan*

Targeted Routine	Prevention Procedures	Replacement Skills	Reinforcement Procedures	Consequence Procedures
Dinner routine	<ul style="list-style-type: none"> <li>• Procedures for giving instructions</li> <li>• Transition Warning</li> <li>• Food Choices</li> <li>• Visual depiction of expectations (e.g., First-Then Board)</li> <li>• Consumption monitoring checklist and contract</li> </ul>	<ul style="list-style-type: none"> <li>• FCT: Functional Communication Training</li> <li>• Waiting</li> </ul>	<ul style="list-style-type: none"> <li>• Attention and praise for compliance, use of FCT, eating, and remaining in seat</li> <li>• Arrange preferred food to follow non-preferred food</li> <li>• Dismiss from table upon consumption of targeted amount of food</li> </ul>	<ul style="list-style-type: none"> <li>• Follow through with instructions (3-step guided compliance)</li> <li>• Ignore disruptions</li> <li>• Redirect back to chair when necessary and refer to schedule</li> </ul>

Table 4

*Summary of Components Included in Mick's Individualized Behavior Support Plan*

Targeted Routine	Prevention Procedures	Replacement Skills	Reinforcement Procedures	Consequence Procedures
Play routine with sibling	<ul style="list-style-type: none"> <li>• Procedures for giving instructions</li> <li>• Transition Warning</li> <li>• Provide Multiple Toys</li> <li>• Choices</li> </ul>	<ul style="list-style-type: none"> <li>• FCT: Functional Communication Training</li> <li>• Share toys with sibling (giving)</li> </ul>	<ul style="list-style-type: none"> <li>• Attention and praise for use of FCT, sharing with sibling, compliance</li> </ul>	<ul style="list-style-type: none"> <li>• Follow through with instructions (3-step guided compliance)</li> <li>• Ignore aggressive and tantrum behaviors</li> <li>• Attend to sibling if sibling is target of aggression</li> </ul>

Table 5

*Summary of Components Included in Galen's Individualized Behavior Support*

*Plan*

Targeted Routine	Prevention Procedures	Replacement Skills	Reinforcement Procedures	Consequence Procedures
Play activities with sibling	<ul style="list-style-type: none"> <li>• Procedures for giving instructions</li> <li>• Transition Warning</li> <li>• Providing Multiple Toys</li> <li>• Carpet squares</li> <li>• Choices</li> <li>• Visual schedule</li> <li>• Turn taking with attention</li> </ul>	<ul style="list-style-type: none"> <li>• FCT: Functional Communication Training</li> <li>• Turn-taking</li> <li>• Waiting</li> </ul>	<ul style="list-style-type: none"> <li>• Attention and praise for use of FCT, sharing with sibling, compliance</li> <li>• Couch non-preferred play activities between preferred play activities</li> </ul>	<ul style="list-style-type: none"> <li>• Immediately prompt communication if possible</li> <li>• Ignore subsequent tantrum, aggression</li> <li>• Follow through with instructions (3-step guided compliance)</li> </ul>

Table 6

*Summary of Components Included in Johnny's Individualized Behavior Support*

*Plan*

Targeted Routine	Prevention Procedures	Replacement Skills	Reinforcement Procedures	Consequence Procedures
Play activities with sibling	<ul style="list-style-type: none"> <li>• Procedures for giving instructions</li> <li>• Transition Warning</li> <li>• Providing Multiple Toys</li> <li>• Carpet squares</li> <li>• Choices</li> <li>• Visual schedule</li> <li>• Turn taking with attention</li> </ul>	<ul style="list-style-type: none"> <li>• FCT: Functional Communication Training</li> <li>• Turn-taking</li> <li>• Waiting</li> </ul>	<ul style="list-style-type: none"> <li>• Attention and praise for use of FCT, sharing with sibling, compliance</li> <li>• Couch non-preferred play activities between preferred play activities</li> </ul>	<ul style="list-style-type: none"> <li>• Guide to retrieve thrown toy – no verbal attention</li> <li>• Follow through with instructions (3-step guided compliance)</li> <li>• Immediately prompt communication if possible; ignore subsequent tantrum</li> </ul>

## *Measures*

*Functional Assessment Interview (O'Neill, et al., 1997).* The Functional Assessment Interview (FAI) was administered once to each family at the beginning of the study for the purpose of obtaining information from each child's parent to assist in the development of an informed behavior support plan. The FAI is well-used indirect functional assessment measure and a necessary antecedent to developing a multi-component behavior support plan. The FAI is an interview measure designed to collect information about events that are functionally related to a child's problem behavior. That is, information is collected to determine *when*, *where*, and *why* the target problem behaviors are exhibited. More specifically, four primary goals are achieved through the administration of the FAI: (1) a description of the problem behaviors, (2) identification of general and specific physical and environmental factors that predict the occurrence and nonoccurrence of the problem behaviors, (3) identification of the functions that the problem behaviors serve for the child and the factors that maintain the behavior, and (4) development of a hypothesis statement describing the relationship between environmental events/situations, the problem behaviors, and their functions. The information was used in conjunction with direct observation data to develop the behavior support plans that were implemented by parents.

*Measure of Treatment Integrity (Sample Attached as Appendix B).* The Measure of Treatment Integrity was necessary to address each of the five research questions. This measure involved the direct observation of parents' implementation



of behavior support plan procedures within targeted routines, and individualized data sheets were developed for each family based upon the components included in the behavior support plan. Data were collected twice weekly in natural environments during targeted routines. The observations for Shayla, Mick, Galen, and Johnny were all 30-minutes in duration; the observations for Davis were 20-minutes in duration. Davis's observations were reduced to 20-minutes due to the nature of the family's mealtime routine. The data collected during these observations yielded the following information:

- Preventative procedures: percent of procedures implemented correctly
- Reinforcement procedures: frequency with which specific praise statements and other presumed reinforcing procedures were delivered. These data were collected for Davis and Mick.
- Consequent Procedures: percent of opportunities for which consequent procedures were correctly implemented.

Individualized data sheets were developed, and allowed the observer to monitor the implementation of each component of the behavior support plan. For example, if four prevention procedures were listed on a behavior support plan, each of the four prevention procedures was also listed on the Treatment Integrity data sheet. Therefore, the Treatment Integrity data sheet included all components of each participant's behavior support plan. When collecting data, the observer marked a (+) on the data sheet when specific components were implemented

correctly, and a (-) on the data sheet when specific components were implemented incorrectly. For those items measured with frequency recording (e.g., delivery of reinforcement), the observer marked individual tally marks to record the frequency of the behavior. Please refer to Appendix B for a sample Treatment Integrity data sheet. These data allowed for an evaluation of treatment integrity across the three phases of the study.

All behavior support plans included more than one recommended prevention procedure (please refer to Tables 2 – 6 for specific procedures included within each behavior support plan). Some procedures were only implemented one time (e.g., presenting a visual schedule); other procedures may have been implemented several times within a routine (e.g., providing warnings prior to making a transition). Therefore, there may have been multiple opportunities to implement a specific procedure, and it became necessary to establish a criterion for considering a procedure to have been implemented correctly. A criterion was established such that for those procedures that were implemented more than one time, the procedure must have been implemented correctly in a minimum of 75% of opportunities to meet criterion.

*Measure of Child Behavior (Sample Attached as Appendix B).* This measure involved the direct observation of children's behavior during targeted routines and was necessary to address research questions involving the relationships between reductions in challenging behavior and other outcome variables. As described above, the observations for Shayla, Mick, Galen, and Johnny were all 30-minutes

in duration; the observations for Davis were 20-minutes in duration. Data were collected twice weekly in natural environments during targeted routines, and yielded the following information:

- Frequency and/or Duration of targeted challenging behavior.  
Frequency data were collected for all targeted behaviors. Duration measures were used in addition to frequency measures to monitor changes in tantrum behavior for Mick and Galen.

*Quality of Life Questionnaire* (Adapted from Kincaid, D., Knoster, T., Harrower, J. Shannon, P., & Bustamante, S., 2002. Attached as Appendix F). This measure was necessary to address research question four (i.e., the potential correspondences between quality of life and levels of treatment integrity and reductions in challenging behavior). At the end of the study, families were asked to complete a Quality of Life Questionnaire. Parent participants were asked to respond to 20-items using a 5-point Likert Scale. The questionnaire allowed for an assessment of the impact of the intervention on global outcomes, such as the child's emotional well-being, interpersonal relationships, and social inclusion of the child. This was one measure of the social validity (e.g., Wolf, 1978) of the effects of the intervention.

*Family Impact Survey* (Attached as Appendix G). The Family Impact Survey was a second measure of the social validity of the effects of the intervention, and served as a more global assessment of changes as they related to families' overall levels of stress, comfort, and participation in typical day-to-day

activities. Results of this survey were also used to assess the potential correspondences between quality of life and levels of treatment integrity and reductions in challenging behavior (research question four). Parent participants were asked to complete this survey at the beginning and at the end of the study. The Family Impact Survey consisted of questions addressing seven day-to-day activities (e.g., going out to eat; visiting others' homes). Three questions were asked regarding each activity, providing a total of 21 items within the survey. The first question addressing each activity related to the frequency with which an activity is completed (e.g., "How often do you ..."). The second question addressing each activity related to the parent participant's satisfaction with his/her child's behavior during the activity. The last question involved a parent's assessment of how comfortable (or uncomfortable) each parent felt with respect to their ability to manage their child's behavior in the specified activity. Questions regarding frequency were presented in an open-response format. Questions regarding satisfaction and comfort level were presented using a 6-point Likert Scale.

*Contextual Fit Survey (Adapted from Horner, Salentine, & Albin, 2003; Attached as Appendix H).* The Contextual Fit Survey measured the social validity of the procedures of the intervention, and was used to address research question five (i.e., whether levels of treatment integrity and reductions in challenging behavior correspond to parents' reports about the contextual fit of the behavior support plan). At the end of the study, parents were asked to complete the 16-item self-report survey, responding to each item using a 6-point Likert Scale. The survey

was designed to evaluate the compatibility between the behavior support plan and the family ecology. Specific questions addressed the ‘goodness of fit’ related to a family’s resources, abilities, goals, and values.

#### *Interobserver Agreement*

For the Measure of Treatment Integrity and the Measure of Child Behavior, interobserver agreement was conducted on seven observations (8% of the observations). Each of the seven observations was videotaped by the researcher during the home visit. A second, trained observer then observed the videotape independent of the primary researcher, and recorded data on the parents’ implementation of the behavior support procedures and the children’s challenging behavior.

Interobserver agreement was assessed with the use of a total agreement calculation (Poling, Methot, & LeSage, 1995). Total agreement was determined for each component of the behavior support plan (e.g., total agreement was calculated for each prevention procedure and each consequence procedure) and each child behavior. Percent of agreement was calculated by comparing the two observers’ data, then dividing the smaller number by the larger number and multiplying by 100. The agreement for parent implementation of the procedures ranged from 70% to 100%, with a mean of 92.4%. The agreement for the frequency of children’s challenging behavior ranged from 80% to 100%, with a mean of 95%.

## Results

### *Treatment Integrity and Children's Challenging Behavior*

Overall, the data demonstrate a limited increase in parents' implementation of recommended prevention and consequent procedures were observed following the clinic-based training. More significant increases in treatment integrity (i.e., parents' implementation of the recommended procedures) were observed following the in-home consultation. Accordingly, reductions in children's challenging behavior were observed when levels of treatment integrity were improved (i.e., following the in-home consultation).

Figure 1 displays the treatment integrity data and the data for the challenging behavior for Shayla and Davis. Figure 2 displays the treatment integrity data and the data for the challenging behavior for Mick, Galen, and Johnny. The treatment integrity data correspond to the primary y-axis. The data depicting the children's challenging behavior correspond to the secondary y-axis. The treatment integrity data include lines for two composites (i.e., sets) of data. The red squares represent the percent of prevention procedures that were implemented correctly by the parent. The blue triangles represent the percent of opportunities in which recommended consequent procedures were implemented correctly. The data representing the frequencies of children's challenging behavior are marked by black open circles, connected by the dashed line.

In addition to the data presented in Figures 1 and 2, Tables 7 – 11 present a summary of treatment integrity data and child behavior data for each participant,

averaged across each experimental condition. The data presented in Tables 7 – 11 include (a) the average percent of preventative procedures implemented correctly per condition, (b) the average percent of opportunities in which consequent procedures were implemented correctly per condition, and (c) the average frequency of targeted challenging behavior per condition.

*Shayla.* Over the course of the study, Shayla's parents significantly increased their implementation of the recommended behavior support procedures, and reduced frequencies of challenging behavior were observed to correspond with the increased levels of treatment integrity. Shayla's parents did demonstrate an increase in their correct use of preventative procedures following the clinic-based training, and additional increases in their correct implementation following the in-home consultation (see Figure 1 and Table 7). A similar pattern of improved performance following the in-home consultation was observed with respect to their use of recommended consequent procedures. In fact, Shayla's parents demonstrated correct use of the consequent procedures only one time (or .04% of opportunities) following the clinic-based training. However, their correct use of the consequent procedures increased significantly following the in-home consultation and remained high thereafter (96% of opportunities during the final phase of the study).

The frequency of Shayla's challenging behavior did not appear to be reduced compared to baseline levels (Phase A), partially due to the low frequency of challenging behavior observed during baseline observations. Two points are worth noting with respect to Shayla's behavior. First, while it is *not* believed that

Figure 1

Multiple Baseline Across Participants: Cohort A

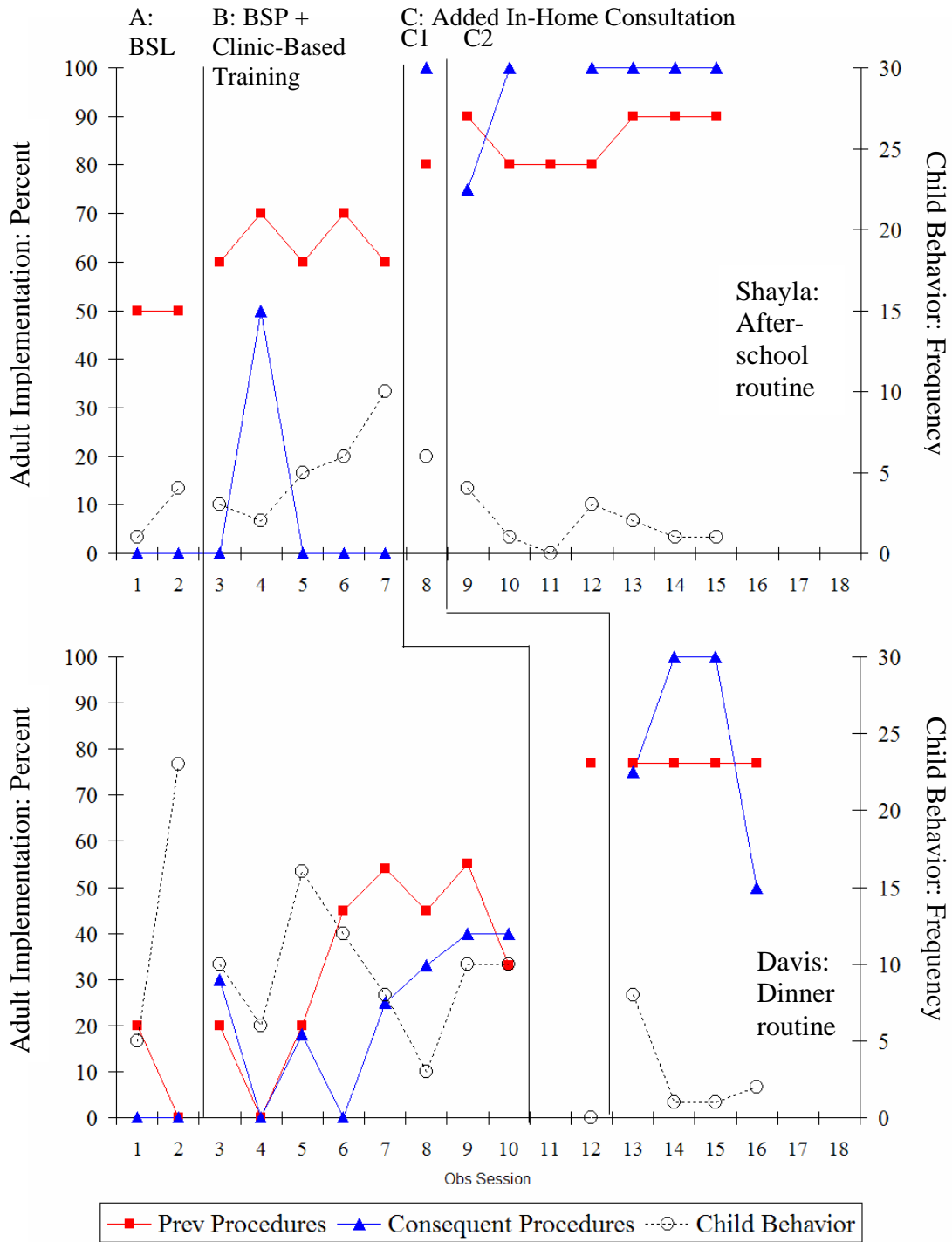
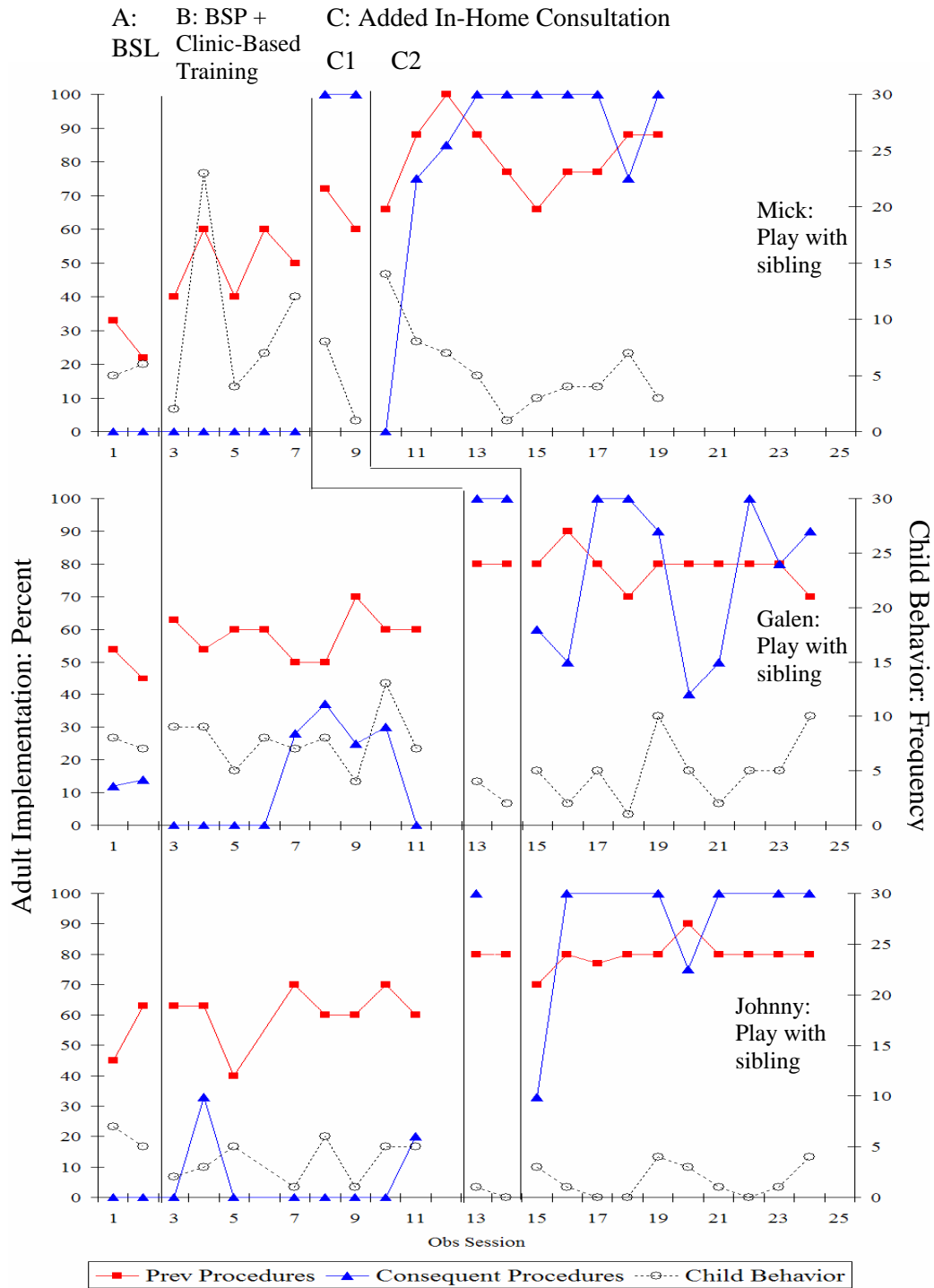




Figure 2

Multiple Baseline Across Participants: Cohort B



the behavior of Shayla's parents was influenced by the presence of the observer, it *is* believed that Shayla's behavior was influenced by the presence of the observer. Shayla often remained in close proximity to the observer, frequently looked at the observer, and initiated a high rate of social interactions. However, Shayla's interest in the observer did appear to decrease on days when Shayla was reported to have had one or more seizures. On these days, the frequency of challenging behavior was elevated and the demonstrated interest in the observer was significantly reduced. Second, a review of the data indicates an increasing trend in Shayla's behavior during Phase A, with a continued increasing trend during Phase B. Because only two data points were collected in Phase A, one might consider the possibility that Shayla's behavior would have continued to increase had more data been collected in Phase A, indicating a truer baseline. Nonetheless a review of Figure 1 indicates a decreasing trend in Phase C, following the in-home consultation. With these two points under consideration, conclusions regarding the effect of the behavior support plan on Shayla's behavior should be made with caution.

*Davis.* During the targeted mealtime routine, Davis's mother demonstrated an increase in the correct use of preventative, consequent, and reinforcement procedures following the clinic-based training (see Figure 1 and Table 8). However, following the in-home consultation, Davis's mother was observed to increase her use of the recommended procedures with even greater treatment integrity. Specifically, Davis's mother increased her use of the recommended

Table 7

*Shayla: Mean Percent (and Range) of Treatment Integrity and Mean Frequency (and Range) of Child Behavior Across Experimental Phases*

	Phase A: Baseline	Phase B: Behavior Support Plan and Clinic-Based Training	Phase C1: In-Home Consult: In-Vivo Coaching	Phase C2: In-Home Consult: No In-Vivo Coaching
Prevention Procedures	Mean: 50% (No Range)	Mean: 64% (R= 60 – 70)	Mean: 80% (No Range)	Mean: 86% (R= 80 – 90)
Consequence Procedures	Mean: 0% (No Range)	Mean: 10% (R= 0 – 50)	Mean: 100% (No Range)	Mean: 96% (R= 75 – 100)
Child Challenging Behavior	Mean: 2.5 (R= 1 – 4)	Mean: 5.2 (R= 2 – 10)	Mean: 6 (No Range)	Mean: 1.7 (R= 0 – 4)

prevention procedures from 10% in baseline and 34% following clinic-based training to 77% following in-home consultation. Davis’s mother also increased her use of the recommended consequence procedures from 0% of opportunities in baseline and 23.3% of opportunities following the clinic-based training to 81% of opportunities following in-home consultation. Finally, although not depicted in the graph, the data included in Table 8 indicate that Davis’s mother was observed to reinforce appropriate behavior with increased frequency. During the baseline phase, an average of 5 instances of specific reinforcement for appropriate behavior were observed, compared to 9.38 instances following the clinic-based training and 14 instances per session following the in-home consultation.

Table 8

*Davis: Mean Percent (and Range) of Treatment Integrity and Mean Frequency (and Range) of Child Behavior Across Experimental Phases*

	Phase A: Baseline	Phase B: Behavior Support Plan and Clinic-Based Training	Phase C1: In-Home Consult: In-Vivo Coaching	Phase C2: In-Home Consult: No In-Vivo Coaching
Prevention Procedures	Mean: 10% (R= 0 – 20)	Mean: 34% (R= 0 – 55)	Mean: 77% (No Range)	Mean: 77% (No Range)
Consequence Procedures	Mean: 0% (No Range)	Mean: 23.3% (R= 0 – 40)	Mean: N/A	Mean: 81% (R= 50 – 100)
Reinforcement Procedures	Mean: 5 (R= 3 – 7)	Mean: 6.25 (R= 3 – 9)	Mean: 14 (No Range)	Mean: 14 (R= 11 – 18)
Child Challenging Behavior	Mean: 14 (R= 5 – 23)	Mean: 6.25 (R= 3 – 16)	Mean: 0 (No Range)	Mean: 3 (R= 1 – 8)

The frequencies of Davis’s challenging behaviors (disruption, noncompliance, and out-of-chair) decreased from an average of 14 occurrences per observation in the baseline phase to an average of 3 occurrences during the final phase (during which high levels of treatment integrity were observed). According to the averages presented in Table 8, the frequencies of challenging behavior also appeared to have reduced following the clinic-based training, although conclusions should be made with caution due partially to the fact that only two baseline points were collected, with the second baseline point considerably higher than any other points in the study. Thus, while the average frequency following the clinic-based training (Phase B) was lower than the average frequency during baseline (Phase A),

7 of the 8 points during Phase B lie between the lowest and the highest baseline points. Therefore, conclusions about changes in Davis's behavior as a result of partially increased use of recommended procedures should be made with caution. Conclusions regarding the impact of significantly higher levels of treatment integrity (i.e., during Phase C) on Davis's behavior are more apparent.

*Mick.* Figure 2 and Table 9 present the data for Mick and his mother during a play routine with Mick's younger sibling. Mick's mother demonstrated an increase in the use of recommended prevention procedures from an average of 27.5% of procedures in baseline (Phase A) to 50% of procedures following clinic-based training (Phase B), 66% with ongoing coaching (Phase C1), and 82% of procedures during the final in-home consultation phase (Phase C2). Mick's mother immediately increased her use of reinforcement procedures following clinic-based training from 0 occurrences in baseline to an average of 9.6 occurrences per observation following the clinic-based training. The use of reinforcement procedures continued during the ongoing coaching phase (Phase C1) with an average of 10 occurrences per observation and 13 occurrences per observation during the final phase (Phase C2). However, variability of her use of these procedures was observed during the final phase. Finally, Mick's mother increased her use of the recommended consequent procedures from 0% of opportunities in baseline and 0% of opportunities following the clinic-based training to an average of 84% of opportunities following the in-home consultation (Phase C2).

Table 9

*Mick: Mean Percent (and Range) of Treatment Integrity and Mean Frequency (and Range) of Child Behavior Across Experimental Phases*

	Phase A: Baseline	Phase B: Behavior Support Plan and Clinic- Based Training	Phase C1: In-Home Consult: In-Vivo Coaching	Phase C2: In-Home Consult: No In-Vivo Coaching
Prevention Procedures	Mean: 27.5% (R= 22 – 33)	Mean: 50% (R= 40 – 60)	Mean: 66% (R= 60 – 72)	Mean: 82% (66 – 100)
Consequence Procedures	Mean: 0% (No Range)	Mean: 0% (No Range)	Mean: 100% (No Range)	Mean: 84% (R= 0 – 100)
Reinforcement Procedures	Mean: 0 (No Range)	Mean: 9.6 (R= 6 – 28)	Mean: 10 (R= 6 – 14)	Mean: 13 (R= 3 – 22)
Child Challenging Behavior	Mean: 5.5 (R= 5 – 6)	Mean: 13.6 (R= 2 – 23)	Mean: 4.5 (R= 1 – 8)	Mean: 5.6 (R= 1 – 14)

A review of the data presented in Figure 2 suggests that the frequency of Mick's challenging behavior increased slightly following the clinic-based training; however, an increasing trend in Mick's behavior is noted in the two baseline points, suggesting that perhaps the increase would have happened regardless of any targeted changes in environmental contingencies. Mick's behavior following in-home consultation (Phase C2) appears to have been on a decreasing trend toward the end of his participation. One interpretation of these data is that Mick's true baseline is represented by the combined data in Phases A and B, which is highly probable given the minimal change that was observed in the level of treatment

integrity from Phase A to Phase B. If the combined data do represent a true baseline, then the increased level of treatment integrity observed in Phase C2 appears to have influenced the reduction in challenging behavior observed in Phase C2. A review of the data presented in Table 9 supports the assertion that Mick's behavior increased from baseline following the clinic-based training and decreased following the in-home consultation (and increased levels of treatment integrity).

*Galen.* Figure 2 and Table 10 present the data for Galen and his mother. Galen's mother exhibited a slight increase in her use of prevention procedures following the clinic-based training from an average of 49.5% of procedures in baseline to 58.5% following clinic-based training. A more significant increase in her use of prevention procedures occurred during the in-home consultation phase; Galen's mother averaged a correct use of 80% of prevention procedures during the coaching sessions (Phase C1) and maintained this level of implementation during the final phase of the study (Phase C2).

Significant variability was observed with respect to Galen's mother's use of consequent procedures following the clinic-based training. During baseline (Phase A), Galen's mother used the identified consequent procedures an average of 13% of opportunities, with little variability (i.e., use of procedures ranged from 12% to 14%). Immediately following the clinic-based training, the use of the recommended consequent procedures decreased significantly to 0% of opportunities for 4 consecutive observations, followed by increased use of the consequent procedures for a subsequent 4 observations. A significant increase in her use of consequent

procedures was observed during the coaching sessions (100% during Phase C1), and variability persisted during the final phase of the study (Phase C2), during which the consequences were applied in an average of 76% of opportunities (ranging from 40% of opportunities to 100% of opportunities).

Visual inspection of the data representing the frequency of Galen's challenging behavior suggests that minimal, if any, change occurred. The data presented in Table 10, however, indicate that while no significant reductions in challenging behavior were observed following the clinic-based training (e.g., from Phase A to Phase B), reductions in the average frequency of challenging behaviors were observed during the in-home consultation phases, when increased levels of treatment integrity were observed. Specifically, the average frequency of challenging behavior during baseline (Phase A) was 7.5 occurrences per observation, and the average frequency following clinic-based training (Phase B) was 7.7 occurrences. However, the average frequency when in-vivo coaching was used was 3.0 occurrences and the average frequency during the final in-home consultation phase (Phase C2) was 5.0 occurrences per observation.

It is important to note that although the overall frequency of the behavior (e.g., 7 occurrences per 30-minute observation) may be considered to be infrequent, parents report that seven tantrums in a 30-minute time period present a significant challenge, particularly when the duration of tantrum behavior may last several minutes in duration. Indeed, one quality of the data not presented in Figure 2 or Table 10 involves the overall duration of tantrum behavior. Further analysis of the



data indicated that the average duration of tantrum behavior decreased from 57.5 seconds during baseline (Phase A) to 52.6 seconds in Phase B and 28.3 seconds during the in-home consultation phase (i.e., during the phase in which increased levels of treatment integrity were observed).

Table 10

*Galen: Mean Percent (and Range) of Treatment Integrity and Mean Frequency (and Range) of Child Behavior Across Experimental Phases*

	Phase A: Baseline	Phase B: Behavior Support Plan and Clinic- Based Training	Phase C1: In-Home Consult: In-Vivo Coaching	Phase C2: In-Home Consult: No In-Vivo Coaching
Prevention Procedures	Mean: 49.5% (R = 45 – 54)	Mean: 58.5% (R = 50 – 70)	Mean: 80% (No Range)	Mean: 79% (70 – 90)
Consequence Procedures	Mean: 13% (R = 12 – 14)	Mean: 13.33% (R = 0 – 37)	Mean: 100% (No Range)	Mean: 76% (R= 40 – 100)
Child Challenging Behavior	Mean: 7.5 (R = 7 – 8)	Mean: 7.77 (R = 4 – 13)	Mean: 3 (R= 2 – 4)	Mean: 5 (R= 1 – 10)

*Johnny.* The data for Johnny and his mother are found in Figure 2 and Table 11. As mentioned earlier, Johnny and Galen were twins and lived in the same home. Therefore, the treatment integrity data for Johnny and Galen are representing the behavior of the same person implementing recommended behavior support procedures with two different children. It is interesting to note, therefore, that the trends in the treatment integrity data are very similar across the two children.

Table 11

*Johnny: Mean Percent (and Range) of Treatment Integrity and Mean Frequency (and Range) of Child Behavior Across Experimental Phases*

	Phase A: Baseline	Phase B: Behavior Support Plan and Clinic- Based Training	Phase C1: In-Home Consult: In-Vivo Coaching	Phase C2: In-Home Consult: No In-Vivo Coaching
Prevention Procedures	Mean: 54% (R = 45 – 63)	Mean: 60.75% (R = 40 – 70)	Mean: 80% (No Range)	Mean: 80% (70 – 90)
Consequence Procedures	Mean: 0% Range: no range	Mean: 6.63% (R = 0 – 33)	Mean: 100% (No Range)	Mean: 87% (R= 33 – 100)
Child Challenging Behavior	Mean: 6 (R = 5 – 7)	Mean: 3.5 (R = 1 – 6)	Mean: .5 (R= 0 – 1)	Mean: 1.7 (R= 0 – 4)

Specifically, minimal (if any) changes in the use of prevention or consequent procedures were observed following the clinic-based training. However, an increased use of prevention procedures and significantly increased implementation of the consequent procedures were observed during the in-home consultation phases. As was observed with Galen, the variability with which the recommended procedures were implemented persisted throughout the study.

A review of the data representing Johnny’s behavior suggests minimal, if any, reduction in behavior following the clinic-based training. This would be anticipated given the minimal changes in parent behavior. However, reductions in the frequency of challenging behavior were observed during the in-home

consultation phases, as would be anticipated with increased, albeit variable, levels of treatment integrity.

### *Family Impact Survey*

Three parents completed both the initial and final administrations of the Family Impact Survey. One parent (parent to both Galen and Johnny) did not complete the survey at the end of the study; therefore, results are only provided for the three parents who completed both administrations. Results suggest that the frequency with which families participated in the specified activities did not change at all over the course of the study. Comparing parent participants' responses from the initial survey to the final survey, results indicated that parents' satisfaction of their child's behavior during the specified activities either remained the same (50% of responses) or improved (50% of responses). Each parent participant indicated increased satisfaction with their child's behavior in at least one activity; one parent indicated increased satisfaction in four of the six probed activities.

Similarly, parents' self-reported comfort level with managing their child's behavior within specified family and community activities either remained the same (50% of responses) or improved over the course of the study (50% of responses). It is important to note that some activities (e.g., going out to eat or playing together) were specifically targeted for some participants while other activities (e.g., visiting the home of a friend or relative) were not targeted during this study. Of those activities that were specifically targeted for a family, parents consistently reported both increased satisfaction with their child's behavior and an

increased level of comfort with their ability to manage their child's behavior in that setting/activity.

The final item on the Family Impact Survey addressed the question of whether or not parents limit family and/or social activities as a result of their child's behavior, and if so, to what degree they limit their activities. Each parent indicated that they do, indeed, limit family and/or social activities as a result of their child's behavior. These responses did not change from the beginning to the end of the study. The degree to which parents indicated that family and/or social activities are limited varied significantly across families. Using the 6-point Likert Scale where 1 = Barely Limited and 6 = Extremely Limited, responses across families ranged from two to six. However, responses within families did not change over the course of the study.

#### *Quality of Life Questionnaire*

Three parents completed the Quality of Life Questionnaire, which assessed the impact of the implementation of the behavior support plan on various aspects of the child's life and experiences. Parents responded to each item using a 5-point Likert Scale where 1 = Much Worse and 5 = Much Better. Overall, results indicated improvements as a result of the implementation of the behavior support plan. The mean rating across all responses was 4.2 (range of 3 – 5). Given that three parents responded to each of the 20 items, a total of 60 items were scored. Improvements, as indicated by ratings of either "somewhat better" or "much better" were noted in 82% (49 of the 60 responses) of the responses. Activities and/or

events that were consistently rated as having improved by all parents included items addressing the child's relationship with his/her family, the child's overall level of happiness, and the parents' overall perception of the family's quality of life. Eleven of the 60 responses noted "no change" as a result of the implementation of the behavior support plan. Of these eleven responses, seven addressed issues related to the child's relationships with his/her peers. Relationships with peers were only addressed with one of the three families completing the survey.

#### *Contextual Fit Survey*

Three parents completed the Contextual Fit Survey, which assessed the extent to which the recommended behavior support plan "fit" each family's natural environment and activities. Three global areas that were assessed included: (a) a parent's knowledge of the procedures included within the plan, (b) a parent's perception of how well the behavior support plan 'fit' the parent's personal values and skills, and (c) a parent's perception of his or her ability to implement the plan. Parents were asked to respond to each of the 16 statements included in the survey according to a 6-point Likert Scale, where 1 = Strongly Disagree and 6 = Strongly Agree.

All parents indicated that they were aware of the elements of the behavior support plan and had received any training that they needed to be able to implement the plan (mean ratings of 6). Parents also indicated that they knew what they were expected to do, were confident in their abilities to implement the plan, and had the skills to implement the plan (mean ratings of 5.3). Regarding values, all parents

reported that the elements of the behavior support plan were consistent with the ways in which the parents believed their children should be treated and indicated that they believed the plan was in the best interest of the child (mean ratings of 6). Each parent also reported their belief that the behavior support plan will help to prevent future occurrences of problem behavior and will likely help their children to be more successful (mean ratings of 6).

Slightly lower ratings were obtained in the areas of Family Support, where mean ratings of 5 (range of 4 - 6) were given to statements such as “My family provides support in the implementation of this behavior support plan” and “My family is committed to investing in the implementation of this behavior support plan.” The lowest ratings were obtained in response to the following two statements: “Implementing the behavior support plan is not stressful” (mean rating 4.3; range 3 – 6) and “The amount of time, money, and energy needed to implement this behavior support plan is reasonable (mean rating 4.6; range 4-6). Together, these data suggest that parents believed that they understood the plan, had received enough training, and believed that the plan was appropriate. However, parents were less confident with respect to their abilities to implement the plan, the support they received from family members, and the amount of stress and resources required to maintain implementation of the plan.

Table 12 presents the average ratings on the social validity measures (e.g., Family Impact Survey, Quality of Life Questionnaire, and Contextual Fit Survey) for each family that completed the social validity measures. In addition, the mean

level of treatment integrity during the final phase of the study and the percent reduction in challenging behavior are presented for each participating family. The percent reduction in challenging behavior was determined by comparing the two data points during the initial baseline observations (Phase A) to the final two data points during the final phase of the study (Phase C2).

Table 12

*Mean Ratings on Social Validity Measures*

	Treatment Integrity: Mean in Phase C2	Challenging Behavior: % Reduction from Baseline	Quality of Life: Mean Rating	Family Impact: Mean Rating (Post)	Contextual Fit: Mean Rating
Shayla	Prevention: 86% of procedures Consequences: 96% of opportunities	60% reduction	3.8	4.5	5.4
Mick	Prevention: 82% of procedures Consequences: 84% of opportunities	89% reduction	3.9	3.8	5.0
Davis	Prevention: 77% of procedures Consequences: 81% of opportunities	9% reduction	4.6	5.4	6.0

Discussion

The purpose of this study was to address limitations in the literature related to behavior support plans being implemented in natural environments (e.g., home,

store) by parents of young children with autism. As stated earlier in this paper, a limited number of studies have involved parents as implementers of multi-component interventions addressing the challenging behavior of young children with autism, and little data exist with respect to the integrity with which parents implement behavior support plans (Small, 2007). Furthermore, recommendations have been made suggesting the use of multiple outcome measures (e.g., Kincaid et al., 2002). In summary, this study was a response to documented needs in the area of managing the challenging behavior of young children with autism. Five research questions were addressed; the results of this study will be discussed as they relate to each of the research questions. The paper will conclude with a discussion of limitations within this study and recommendations for future research in this area.

Overall, parents increased their use of recommended prevention, reinforcement, and consequent procedures following clinic-based training. However, each parent participant demonstrated greater increased use of these procedures (i.e., higher levels of treatment integrity) following the in-home consultation. Direct observation data indicated decreased rates of challenging behavior during the in-home consultation phase compared to the initial rates observed in baseline for 3 of the 5 child participants; the effect of increased levels of treatment integrity on the challenging behavior of the remaining two children is questionable. All parents who completed a Quality of Life Questionnaire reported that implementation of the behavior support procedures had a positive impact on global outcomes such as the child's emotional well-being, interpersonal



relationships, and social inclusion. All parents who completed a Contextual Fit Survey indicated that the recommended behavior support plan ‘fit’ the family’s natural environment and activities. Finally, all parents who completed the Family Impact Survey noted that they did limit social and family activities as a result of their child’s behavior, and while the degree to which they limited their activities did not change over the course of the study, families did report increased comfort levels with their ability to manage their child’s behavior in specific settings and increased satisfaction with their child’s behavior across those settings.

*Without In-Home Support, What is the Integrity with Which Parents Implement a Multi-Component Behavior Support Plan?*

Direct observation data (gathered using the Measure of Treatment Integrity and the Measure of Child Behavior) indicated that in the absence of in-home consultation, parents correctly implemented an average of 53.5% of prevention procedures and correctly implemented the recommended consequent procedures in an average of only 10.7% of opportunities. These data do indicate that parents demonstrated partial implementation of the recommended procedures following clinic-based training; however, the overall level of treatment integrity remained lower than desirable. The use of reinforcement procedures was monitored for two children; parents were observed to increase the frequency with which they delivered attention, praise statements, and other presumed reinforcers from an average of 2.5 occurrences per observation in baseline to an average of 9.5 occurrences prior to the in-home consultation. Together, these data suggest that

parents can learn to consistently implement behavior support procedures within naturally occurring family routines.

*Does the Addition of Individualized Consultation in the Natural Environment Affect the Level of Treatment Integrity?*

Without a doubt, levels of treatment integrity were highest in the experimental phase during which in-home consultation was being provided. Each parent increased their correct implementation of recommended prevention procedures and consequent procedures following in-home consultation. Overall, the average percent of preventative procedures that were implemented correctly increased from 53.5% following clinic-based training only to 79.83% following the addition of in-home consultation. Likewise, the average percent of opportunities for which consequent procedures were implemented correctly increased from 10.7% following clinic-based training only to 84.8% following the addition of in-home consultation. The two parents for whom reinforcement procedures were being recorded also demonstrated an increased use of reinforcement procedures during the in-home consultation phase.

Although one might come to the conclusion that in-home consultation is required to establish high levels of treatment integrity, an alternative explanation for the increased level of treatment integrity must be considered. It is possible that the parents' increased use of the recommended procedures was simply a result of the additional training, and would have been observed had additional training been provided in the clinic or some other setting. That is, these data do not necessarily

mean that the increased rates are due to the additional training being provided *in the natural environment*. Unfortunately, no control was established in this study to evaluate the effect of additional training in other locations. Nonetheless, results obtained in this study indicated that treatment integrity increased following the addition of the in-home consultation.

*Does a Relationship Exist Between Treatment Integrity and Reductions in Challenging Behavior?*

Although no parent consistently implemented the recommended behavior support procedures with 100% integrity, the data do demonstrate that reductions in children's challenging behavior are greatest under conditions where increased levels of treatment integrity are observed. Changes in children's challenging behavior given moderate levels of treatment integrity (i.e., prior to in-home consultation) were minimal (or not apparent) for most, if not all, of the children participating in this study. Changes in children's challenging behavior were much more evident when levels of treatment integrity were higher (i.e., during the in-home consultation phase).

One demonstration of the relationship between increased levels of treatment integrity and reductions in challenging behavior can be observed by reviewing the data for Davis. Minimal changes in Davis's mother's implementation of the behavior support plan was observed following the clinic-based training (from Phase A to Phase B); accordingly, minimal, if any, changes were observed in Davis's behavior from Phase A to Phase B. Once in-home consultation was provided to

Davis's mother during Phase C, levels of treatment integrity increased significantly and, accordingly, reductions in challenging behavior were observed.

While Davis's data provide a nice demonstration of the relationship between increased levels of treatment integrity and reductions in challenging behavior, data for some other children are less convincing. For example, one might consider the data for Galen. Some increased use of the recommended behavior support procedures are observed following clinic-based training, although the use of the procedures is variable and the overall level of treatment integrity remained low. Accordingly, no significant changes were observed in Galen's challenging behavior. Following in-home consultation, increased levels of treatment integrity were observed, although the variability persisted. This level of variability may be related to the minimal changes in Galen's behavior following the addition of the in-home consultation. As mentioned earlier in this paper, Galen's mother was experiencing complications with her pregnancy during most her participation in this study; this variable may have impacted her ability to consistently implement the procedures with integrity.

One consideration not addressed in this study is whether or not specific components of behavior support plans must be implemented with a high level of treatment integrity to yield reductions in challenging behavior. For example, it may be that consequent procedures must be implemented correctly. This hypothesis is plausible given the power of intermittent reinforcement. That is, if a challenging behavior continues to be reinforced intermittently (as might be the case when we

observe inconsistent implementation of the recommended consequent procedures), the behavior may persist for a longer time. The relative contributions of the different components of the behavior support plan may be worth investigating in the future. In the meantime, the data gathered in this study provide some indication that higher levels of treatment integrity do, indeed, correspond to decreased rates of challenging behavior.

*Do Levels of Treatment Integrity and Reductions in Challenging Behavior Correspond to a Family's Self-Reported Quality of Life?*

Three parents completed both the Quality of Life Questionnaire and the Family Impact Survey which were used to assess parents' perceptions of their child's and family's quality of life. Based on the data collected during this study, no conclusions can be definitively made regarding the correspondence between the levels of treatment integrity and self-reported quality of life. Likewise, conclusions drawn between reductions in challenging behavior and self-reported quality of life would be tentative at best.

The parents who demonstrated the highest levels of treatment integrity during the final phase of the study (i.e., Shayla's parents) reported, on average, the lowest scores on the Quality of Life Questionnaire. The average rating given by Shayla's parents on the Quality of Life Questionnaire was 3.8, where a rating of 3 indicates "No Change" and a rating of 4 indicates that an activity/variable is "Somewhat Better." However, her parents did report feeling an increased level of comfort in managing Shayla's behavior within family and community-based

activities and improved satisfaction with her behavior within specific family and social activities, as measured by the Family Impact Survey. Together, these data suggest that Shayla's parents observed an improvement in her behavior and feel more confident in their ability to manage her behavior within family and social activities. However, they did not report a significant improvement in Shayla's overall quality of life. It would of interest to probe for additional information with Shayla's parents regarding what types of changes they would want to observe to suggest improvements in Shayla's quality of life. In this case, it may be that the persistent medical complications impede significant improvements in the child's quality of life as reported by her parents.

Regarding reductions in challenging behavior and self-reported quality of life, the data indicate that the parent who reported the highest scores on the Quality of Life Questionnaire (Davis's mother) also observed the greatest reductions in challenging behavior (an 82.9% reduction in challenging behavior). Davis's mother also reported the most significant changes in satisfaction and comfort level as measured by the Family Impact Survey. Specifically, Davis's mother reported increased levels of satisfaction regarding Davis's behavior within 4 of the 6 probed activities. Likewise, Davis's mother reported improved levels of comfort in her ability to manage Davis's behavior within 4 of the 6 probed activities. Together, these data suggest that there may be a correspondence between reductions in challenging behavior and parent-reported quality of life.

*Do Levels of Treatment Integrity and Reductions in Challenging Behavior Correspond to Parents' Reports About the Contextual Fit of the Behavior Support Plan?*

Each parent who completed the Contextual Fit Survey indicated that the behavior support plan developed for their child did, indeed, “fit” the family’s natural environment. Shayla’s parents provided an overall mean rating 5.4; Davis’s mother rated a 6 for each item; and Mick’s mother provided an overall mean rating of 5.0 (where 5 = moderately agree and 6 = strongly agree to each question regarding contextual fit). With little variability in the contextual fit outcome data, few conclusions can be made regarding the correspondence between contextual fit, treatment integrity, and reductions in challenging behavior.

With respect to the correspondence between levels of treatment integrity and contextual fit, Shayla’s parents demonstrated the highest levels of treatment integrity during the final phase of the study, and provided an overall mean rating of 5.4 on the Contextual Fit Survey (range 4 – 6, mode = 6). Shayla’s parents indicated that they understood what was expected, had received the training that they felt was required, believed that the plan was effective, and reported that the plan fit their values as a family. They reported that the plan could be implemented with a reasonable amount of time and money; however, they only moderately agreed that they had the resources to implement the plan. In addition, they moderately agreed that they had the skills to implement the plan, were comfortable implementing the plan, and had the family support to assist them in implementing

the plan. Shayla's parents provided the lowest rating (4 = barely agree) in response to the statement indicating that implementation of the plan is not stressful.

Regarding the correspondence between reductions in challenging behavior and contextual fit, Davis's mother observed the greatest overall reduction in challenging behavior and reported the highest overall scores on the Contextual Fit Survey. Davis's mother provided a rating of 6 (Strongly Agree) for all items in the survey. Further discussion regarding the perceived contextual fit would be helpful, as Davis's mother appeared overwhelmed on many days. The home was very busy with many appointments (e.g., siblings' classes, lessons, etc.) scheduled throughout the week. However, Davis's mother did not report in this measure that implementing the plan was stressful.

Overall, parents indicated that the behavior support plans developed for their children were perceived to "fit" the families' natural environments and activities. Parents who exhibited varying levels of treatment integrity all provided positive responses regarding contextual fit. All parents observed reductions in their children's challenging behavior, however, the parent who observed the greatest reduction in challenging behavior reported the highest ratings on the Contextual Fit Survey.

### *Limitations*

The findings and conclusions discussed in this study may be limited by some important considerations. One limitation is that this design did not control for the impact of additional consultation following the clinic-based training, regardless



of the location of the consultation. For example, Mick's mother did not implement the recommended consequent procedures following the clinic-based training, but immediately implemented the procedures following the in-home consultation. A question remains regarding the significance of the *location* of that training. That is, would the same results have been obtained if the additional consultation was provided in the clinic setting? The implication in this study is that, indeed, in-home consultation results in greater levels of treatment integrity. However, future research should examine the impact of the location through demonstrating tighter experimental control for this variable.

A second limitation in this study involves the inability to state the precise methodology of consultation that yields the best outcomes with respect to treatment integrity. While similar methods of training and consultation were provided in the clinic-based training and in-home consultation, as described in the methods section of this paper, the procedures were individualized to meet the individual needs of each family and child. The modifications made for each family and child were not specifically documented, and no data were taken on the researcher's implementation of training and consultation procedures prohibiting precise replication of these procedures. For example, one parent received moderately more in-vivo coaching than the other parents, and a second parent received many more instances of the researcher modeling implementation of the procedures. These individualized modifications were not documented. Despite this limitation, it is the belief of this researcher that training and consultation methods should be

individualized and responsive to the needs of individual families and children. Therefore, as reflected in this study, each child and family received an individualized intervention based on the results of each participant's functional assessment. Constant across all families was the implementation of the in-home consultation which was in addition to their clinic-based behavioral consultation.

A third limitation is that only two data points were collected in the true baseline phase (i.e., Phase A). Two children demonstrated increased rates of challenging behavior following the development of the behavior support plan and the clinic-based training. One cannot answer the question of whether the increased rates of challenging behavior were the result of some change in parent behavior, or simply the natural trend of the challenging behavior that was not identified in the baseline due to the limited number of points. Therefore, effects of child behavior from Phase A to Phase B should be viewed with caution.

A fourth limitation of this study involves the lack of generalization data. Unfortunately, a number of variables (e.g., time, resources, family variables, researcher moving) prohibited the collection of data across multiple settings, people, and times. An assessment of the generalization of treatment implementation and child behavior, particularly across time, is recommended and would contribute significantly to future studies addressing this topic.

#### *Recommendations for Future Research*

Identifying practices that can best support parents' ability to manage the challenging behavior of their young children with autism is certainly an important

area of research. This study contributed to the literature by demonstrating (a) the impact of providing in-home consultation on parents' implementation of recommended behavior support procedures, (b) the effects of increased levels of treatment integrity on children's behavior, and (c) the possibility of developing multi-component behavior support plans that are acceptable to families, that "fit" with the families' natural context, and when implemented as intended, are effective in reducing the rates of children's challenging behavior. However, experimental demonstrations of parents' implementation of multi-component behavior support plans and the relationship between treatment integrity and reductions in challenging behavior are extremely limited (Horner et al., 2002; Small, 2007). A number of recommendations can be made regarding the need for additional research to address continued limitations in this field.

This study demonstrated that when parents implement multi-component behavior support plans with increased levels of treatment integrity, reductions in children's challenging behavior are observed. However, this study did not address long-term effects on both parent implementation and child behavior. Future research should examine parents' ability to sustain implementation of recommended procedures and the long-term effects of parents' implementation of multi-component behavior support plans on children's challenging behavior. In addition to including outcome measures described in this study (e.g., quality of life measures), future longitudinal research may assess parents' response to the emergence of novel forms of challenging behavior. It is hoped that parents will

respond in an effective and efficient manner as a result of their active participation in assessment the treatment development processes; however, an evaluation of these more distal effects is warranted.

A variety of methods were used in this study to provide training to the parents learning to implement behavior support procedures. Training was provided initially in a clinic-based setting with subsequent in-home consultation. While the global methods used to provide the training and consultation remained consistent across families, the specific delivery of these methods (e.g., the total amount of time spent providing training and consultation, the balance between modeling, coaching, and providing feedback) varied according to individual families' needs. Future research may examine the exact amount and forms of training in a more precise manner as they relate to treatment outcomes. In addition, specification of the parent, child, and family variables that predict response to different methods of training and treatment would be of great assistance to future clinic applications.

Finally, a recommendation is made to conduct component analyses in future research. As mentioned earlier, this study demonstrated that increased levels of treatment integrity result in greater reductions in children's challenging behavior. However, no parent implemented the recommended behavior support plan with 100% integrity. Identifying which behavior support procedures are more or less important to implement with integrity would be valuable information. Clearly, parents of children with autism spectrum disorders experience a great deal of demands and responsibilities. The ability to identify which procedures are more or

less important and to place a greater amount of attention to these procedures may improve efficiency and effectiveness.

In summary, the findings from this study demonstrate that parents can implement comprehensive, multi-component behavior support plans within naturally occurring family routines, and that increased levels of treatment integrity result in greater reductions in children's challenging behavior. In addition, the data suggest that the provision of in-home consultation can positively influence levels of treatment integrity. Finally, although parents reported that their children's behavior continued to significantly affect family and social activities, parents generally regarded the behavior support plans as appropriate, manageable, and as having a positive impact on their children's behavior and on their level of comfort in managing behavior under various settings and activities.

This study contributes to the literature in the area of managing the challenging behavior of young children with autism in several ways and by addressing limitations noted earlier in this paper. First, multiple outcome measures were used and, together, the results indicated that parents of young children with autism do perceive multi-component behavior support plans as manageable, appropriate, and consistent with their values. Second, by collecting treatment integrity data, the study demonstrated that parents can implement these comprehensive behavior support plans within natural family routines. Finally, this study makes a considerable contribution by demonstrating the significant impact that providing supports within the natural setting has on both parents' ability to

implement behavior support plans and children's challenging behavior. That is, providing support within natural environments improved parents' implementation of the behavior support plan and resulted in fewer occurrences of challenging behavior.

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APPENDIX A  
INFORMED CONSENT

## INFORMED CONSENT

*\*This consent form has been modified for inclusion in this document. All identifying information has been removed.*

### Supporting Parents in Managing the Challenging Behavior of Young Children with Developmental Disabilities

#### INTRODUCTION AND BACKGROUND

We would like to invite you and your child to participate in a project designed to assist parents learning to implement behavior support strategies to manage the challenging behavior of children with developmental disabilities. The purpose of this study is to examine the effectiveness of current procedures in an outpatient behavior management clinic in helping parents to implement behavior support procedures, and to evaluate the added benefits of in-home family support. This is an important project as it will help us to better understand how to best provide support and assistance to parents managing the challenging behavior of their children.

You do not have to participate in this research study. It is important that before you make a decision to participate, you read the rest of this form. You should ask as many questions as needed to understand what your voluntary participation will involve.

#### PROCEDURES

We would very much like to include you and your child in this project. If you agree to participate in this project with your child, your participation will last approximately 6 months. Your participation will involve:

- Two visits to an outpatient behavior management clinic at a university-based medical center. Each visit will last approximately 90 minutes. During the first visit, we will conduct an interview (called the Functional Assessment Interview) to gain relevant information related to your child's developmental, educational, medical, and behavioral history. We will discuss the settings and routines that are most challenging for your child and your family. We will also observe your child's behavior as he or she plays with toys and interacts with others. The second visit will occur approximately 3 weeks after the first visit. During the second visit, we will discuss our understanding of your child's challenging behavior, and a detailed behavior support plan will be developed. We will discuss each of

the components included within the behavior support plan, why we believe they are important, how to use them at home and in the community, and opportunities to practice the behavior support strategies will be provided.

- You will be asked to collect information at home (and in community settings if appropriate) about your child's behavior. For example, you may be asked to count the number of times a challenging behavior occurs during a specific mealtime, such as dinner.
- Two times each week, we will schedule a time to come to your home and observe your child during specific routines. We will select routines that are (a) challenging for your child, (b) important to your family, and (c) possible for us to observe. These home visits will be scheduled according to a day/time that is maximally convenient for you and your family.
- Approximately one month after the behavior support plan has been developed, we will share data with you and discuss the effects of the behavior support plan. These data will show potential changes in your child's challenging behavior. In addition, the data will help to identify which behavior support strategies are being implemented, and which strategies are more difficult to implement. We will spend time reviewing the behavior support plan and practicing strategies as necessary.
- After a behavior support plan has been developed and implemented across important family routines, the frequency of home visits will be reduced to twice per month. This will allow us to examine the potential benefit of the continued use of the behavior support strategies.
- At the conclusion of the study, we will ask you to complete two questionnaires: a Quality of Life Questionnaire and a Contextual Fit Survey. These questionnaires will help us to understand how your participation in this project may have affected the life of your child and your family. The information will also let us know how the behavior support plan did or did not fit with your family and your family's values.

## BENEFITS

You and your child are likely to benefit from participation in this project. A primary goal of the project is to assist parents in managing the challenging behavior of their children with developmental disabilities. We will be working with you to implement behavior support strategies designed to reduce your child's challenging behavior.

## RISKS

There are no identified risks to your participation in this project.

## ALTERNATIVES

Participation in this study is voluntary. Deciding not to participate will have no effect on the care or services you receive at the university-based medical center.

## COSTS

There are no costs related to your participation in this study.

## INSTITUTIONAL DISCLAIMER STATEMENT

Although the university-based medical center does not provide free medical treatment or other forms of compensation to persons injured as a result of participating in research, such compensation may be provided under the terms of the (State) Tort Claims Act. If you believe you have been injured as a result of participating in research, you should contact (information removed).

## CONFIDENTIALITY

All of the information we gather about you and your child is kept private and will be identified only by number codes to protect the privacy of each family. If the results of this study are published or presented in public, information that identifies you will be removed.

## QUESTIONS

You have read the information in this form, and your questions have been answered to your satisfaction. You know if you have any more questions after signing this you may contact Person A or Person B. If you have any questions about your rights as a research participant, you may call or write (information removed).

## PARTICIPANT RIGHTS AND WITHDRAWAL FROM THE STUDY

You understand that your participation in this study is voluntary and that the choice not to participate or to quit at any time can be made without penalty or loss of benefits. You understand that not participating or quitting will have no effect upon the medical care or treatment you receive now or in the future at the university-based medical center. The entire study may be discontinued for any reason without your consent by the investigator conducting the study.

CONSENT

You have been given information about this research project and have read this consent form. Information that has been explained to you includes: what will be done, how long it will take, benefits, and risks that may be experienced during this study.

I freely and voluntarily consent to participate in this research study. I have read and understand the information in this form and have had an opportunity to ask questions and have them answered. I will be given a signed copy of the consent form to keep for my records.

\_\_\_\_\_  
Type/Print Subject's Name

\_\_\_\_\_  
Signature of Subject

\_\_\_\_\_  
Time

\_\_\_\_\_  
Date

\_\_\_\_\_  
Type/Print Name of Witness

\_\_\_\_\_  
Signature of Witness

\_\_\_\_\_  
Date

\_\_\_\_\_  
Type/Print Name of Person Obtaining Consent

\_\_\_\_\_  
Signature of Person Obtaining Consent

\_\_\_\_\_  
Date



APPENDIX B

SAMPLE MEASURE OF TREATMENT INTEGRITY AND CHILD  
BEHAVIOR: MICK

Measure of Treatment Integrity: 30-minute direct observation

**PARENT BEHAVIOR**

**PREVENTION PROCEDURES:**

mark (+) if parent uses correctly and (-) if parent uses incorrectly or fails to use

Instruction: Clear, concise, 1-step																				
Instruction: Gesture/visual cues																				
Instruction: Statement form																				
Instruction: follow-through if necessary																				
Instruction: Refrain from extra talk																				
Instruction: Labeled praise																				
Predictability: visual schedule																				
Predictability: label each step																				
Choices																				

**REINFORCEMENT PROCEDURES:**

Tally the number of times the parent uses each of the following:

Reinforcement for Compliance																				
Reinforcement for Communicative Attempts																				
Reinforcement for Appropriate Play																				
Uses "First, then"																				
Reinforcement for 'absence' of Prob Behav (reinforces other appropriate behavior)																				

**CONSEQUENT PROCEDURES:**

mark (+) if parent uses correctly and (-) if parent uses incorrectly or fails to use

Compliance follow-through																				
Tantrum: Ignore																				
Tantrum: Attends after 2"																				
Tantrum: Attends with positive tone																				
Tantrum: Ignores next tantrum																				
Agg: Ignore (no ec, touch, verb)																				
Agg: Attends after 2"																				
Agg: Attends with positive tone																				
Agg: Ignores next tantrum																				

**CHILD BEHAVIOR**

Tally the frequency; measure the duration in seconds

Frequency of Tantrum																				
Duration of Tantrum																				
Frequency of Agg																				

APPENDIX C  
QUALITY OF LIFE QUESTIONNAIRE

### Quality of Life Questionnaire

For the table below, please rate the following items by circling the appropriate response based upon the rating scale below. Answer each question based on your child's, and your family's, life circumstances *following* the implementation of the behavior support plan.

	<b>Much Worse 1</b>	<b>Somewhat Worse 2</b>	<b>No Change 3</b>	<b>Somewhat Better 4</b>	<b>Much Better 5</b>	<b>Not Applicable NA</b>
1. My child's relationships with family members (i.e. parents, siblings) are...	1	2	3	4	5	NA
2. My child's relationship with peers is...	1	2	3	4	5	NA
3. The amount of time my child has spent interacting with peers is...	1	2	3	4	5	NA
4. My child's participation in activities of his/her choice is...	1	2	3	4	5	NA
5. My child's ability to make decisions about day-to-day activities is...	1	2	3	4	5	NA
6. My child's ability to express personal preference is...	1	2	3	4	5	NA
7. The relationships my child has with members of the community (e.g., store clerks, neighbors, servers) are...	1	2	3	4	5	NA
8. The response my child receives from peers is...	1	2	3	4	5	NA
9. My child's ability to engage in leisure activities with peers is...	1	2	3	4	5	NA
10. My child's relationship with teachers and service providers is...	1	2	3	4	5	NA
11. My child's satisfaction with their current education situation is...	1	2	3	4	5	NA

12. My child's access to activities that are personally stimulating is...	1	2	3	4	5	NA
13. My child's willingness to attempt new tasks is...	1	2	3	4	5	NA
14. My child's ability to learn new skills is...	1	2	3	4	5	NA
15. My child's self-confidence is...	1	2	3	4	5	NA
16. My child's emotional stability is...	1	2	3	4	5	NA
17. My child's satisfaction with their level of independence is...	1	2	3	4	5	NA
18. My child's general happiness is...	1	2	3	4	5	NA
19. My child's general health and well being is...	1	2	3	4	5	NA
20. As a result of implementing the behavior support plan, I feel that our family's quality of life is...	1	2	3	4	5	NA

Is there anything else about your child's quality of life that you would like to tell us?

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Adapted from Kincaid, D., Knoster, T., Harrower, J. Shannon, P., & Bustamante, S. (2002). Measuring the impact of positive behavior support. *Journal of Positive Behavior Interventions*, 4, 2, 109-117.

APPENDIX D  
FAMILY IMPACT SURVEY

Please respond to each item below, either by filling in the blank space or by circling the appropriate response based upon the provided rating scale below. The purpose of this questionnaire is to assess the extent to which your child's behavior impacts your day to day activities.

1. How often do you run errands with your child? \_\_\_\_\_

How satisfied are you with your child's behavior during these trips?

1	2	3	4	5	6
Strongly Dissatisfied	Moderately Dissatisfied	Barely Dissatisfied	Barely Satisfied	Moderately Satisfied	Strongly Satisfied

How comfortable do you feel with your ability to manage your child's behavior during these trips?

1	2	3	4	5	6
Very Uncomfortable	Moderately Uncomfortable	Barely Uncomfortable	Barely Comfortable	Moderately Comfortable	Very Comfortable

2. How often do you go out to eat with your child? \_\_\_\_\_

How satisfied are you with your child's behavior during these trips?

1	2	3	4	5	6
Strongly Dissatisfied	Moderately Dissatisfied	Barely Dissatisfied	Barely Satisfied	Moderately Satisfied	Strongly Satisfied

How comfortable do you feel with your ability to manage your child's behavior during these trips?

1	2	3	4	5	6
Very Uncomfortable	Moderately Uncomfortable	Barely Uncomfortable	Barely Comfortable	Moderately Comfortable	Very Comfortable

3. How often do you eat together as a family? \_\_\_\_\_

How satisfied are you with your child's behavior during these mealtimes?

1	2	3	4	5	6
Strongly Dissatisfied	Moderately Dissatisfied	Barely Dissatisfied	Barely Satisfied	Moderately Satisfied	Strongly Satisfied

How comfortable do you feel with your ability to manage your child's behavior during these meals?

1	2	3	4	5	6
Very	Moderately	Barely	Barely	Moderately	Very
Uncomfortable	Uncomfortable	Uncomfortable	Comfortable	Comfortable	Comfortable

4. How often do you have family or other guests visit you at your house? \_\_\_\_\_

How satisfied are you with your child's behavior at these times?

1	2	3	4	5	6
Strongly	Moderately	Barely	Barely	Moderately	Strongly
Dissatisfied	Dissatisfied	Dissatisfied	Satisfied	Satisfied	Satisfied

How comfortable do you feel with your ability to manage your child's behavior at these times?

1	2	3	4	5	6
Very	Moderately	Barely	Barely	Moderately	Very
Uncomfortable	Uncomfortable	Uncomfortable	Comfortable	Comfortable	Comfortable

5. How often do you visit other people's homes (i.e., socially) with your child? \_\_\_\_\_

How satisfied are you with your child's behavior during these visits?

1	2	3	4	5	6
Strongly	Moderately	Barely	Barely	Moderately	Strongly
Dissatisfied	Dissatisfied	Dissatisfied	Satisfied	Satisfied	Satisfied

How comfortable do you feel with your ability to manage your child's behavior during these visits?

1	2	3	4	5	6
Very	Moderately	Barely	Barely	Moderately	Very
Uncomfortable	Uncomfortable	Uncomfortable	Comfortable	Comfortable	Comfortable

6. How often do you sit and play with your child? \_\_\_\_\_

How satisfied are you with your child's behavior during these playtimes?

1	2	3	4	5	6
Strongly	Moderately	Barely	Barely	Moderately	Strongly
Dissatisfied	Dissatisfied	Dissatisfied	Satisfied	Satisfied	Satisfied



How comfortable do you feel with your ability to manage your child's behavior during these times?

1	2	3	4	5	6
Very	Moderately	Barely	Barely	Moderately	Very
Uncomfortable	Uncomfortable	Uncomfortable	Comfortable	Comfortable	Comfortable

7. Do you limit your family and/or social activities because of your child's behavior? Y N

If Yes, to what degree are your activities limited due to your child's behavior?

1	2	3	4	5	6
Barely					Extremely
Limited					Limited

Please add any additional comments about your child's behavior and the impact that your child's behavior has on your family's day-to-day activities:

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APPENDIX E  
CONTEXTUAL FIT SURVEY

## Contextual Fit Survey

Adapted from Horner, Salentine, & Albin (2003) *Self-Assessment of Contextual Fit in Schools*.

Much of it is taken verbatim; wording changes include changing “school” to “home” and “the student” to “my child.”)

The purpose of this questionnaire is to assess the extent to which the elements of the behavior support plan fit the contextual features of your natural family environments. The questionnaire asks you to rate (a) your knowledge of the elements of the plan, (b) your perception of the extent to which the elements of the plan are consistent with your personal values and skills, and (c) your ability to implement the plan consistently within the natural family environments. This information will be used to help us better design practical procedures to support children with challenging behavior. The information you provide will be maintained and reported in a confidential manner as described in the consent letter.

### Knowledge of elements in the Behavior Support Plan.

1. I am aware of the elements of this behavior support plan.

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Barely Disagree	Barely Agree	Moderately Agree	Strongly Agree

2. I know what I am expected to do to implement this behavior support plan.

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Barely Disagree	Barely Agree	Moderately Agree	Strongly Agree

### Skills needed to implement the Behavior Support Plan.

3. I have the skills needed to implement this behavior support plan.

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Barely Disagree	Barely Agree	Moderately Agree	Strongly Agree

4. I have received any training that I need to be able to implement this behavior support plan.

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Barely Disagree	Barely Agree	Moderately Agree	Strongly Agree

**Values are consistent with elements of the Behavior Support Plan.**

5. I am comfortable implementing the elements of this behavior support plan.

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Barely Disagree	Barely Agree	Moderately Agree	Strongly Agree

6. The elements of this behavior support plan are consistent with the way I believe my child should be treated.

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Barely Disagree	Barely Agree	Moderately Agree	Strongly Agree

**Resources are available to implement the plan.**

7. I have the time needed to implement this behavior support plan.

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Barely Disagree	Barely Agree	Moderately Agree	Strongly Agree

8. I have the money, access to the materials, and space needed to implement this behavior support plan.

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Barely Disagree	Barely Agree	Moderately Agree	Strongly Agree

**Family Support.**

9. My family provides support in the implementation of this behavior support plan.

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Barely Disagree	Barely Agree	Moderately Agree	Strongly Agree

10. My family is committed to investing in the implementation of this behavior support plan.

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Barely Disagree	Barely Agree	Moderately Agree	Strongly Agree

**Effectiveness of Behavior Support Plan.**

11. I believe the behavior support plan is effective in achieving targeted outcomes.

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Barely Disagree	Barely Agree	Moderately Agree	Strongly Agree

12. I believe the behavior support plan will help prevent future occurrences of problem behaviors for my child.

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Barely Disagree	Barely Agree	Moderately Agree	Strongly Agree

**Behavior Support Plan is in the best interest of my child.**

13. I believe this behavior support plan is in the best interest of my child.

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Barely Disagree	Barely Agree	Moderately Agree	Strongly Agree

14. This behavior support plan is likely to help my child be more successful.

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Barely Disagree	Barely Agree	Moderately Agree	Strongly Agree

**Behavior Support Plan is efficient to implement.**

15. Implementing this behavior support plan is not stressful.

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Barely Disagree	Barely Agree	Moderately Agree	Strongly Agree

16. The amount of time, money, and energy needed to implement this behavior support plan is reasonable.

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Barely Disagree	Barely Agree	Moderately Agree	Strongly Agree