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Technical and Applied Features of Functional Assessments and Behavioral Intervention Plans

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ACCEPTANCE

This dissertation, TECHNICAL AND APPLIED FEATURES OF FUNCTIONAL ASSESSMENTS AND BEHAVIORAL INTERVENTION PLANS, by SHANNON MICHELLE HAWKINS, was prepared under the direction of the candidate's Dissertation Advisory Committee. It is accepted by the committee members in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the College of Education, Georgia State University.

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ABSTRACT

TECHNICAL AND APPLIED FEATURES OF FUNCTIONAL BEHAVIORAL ASSESSMENTS AND BEHAVIOR INTERVENTION PLANS
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When conducted correctly, functional behavior assessments (FBAs) can help professionals intervene with problem behavior using function-based interventions. Despite the fact that researchers have shown that effective interventions are based on function, recent investigators have found that most behavioral intervention plans (BIPs) are written without regard to the function of students' problem behaviors as documented in their FBAs. This study was conducted to examine the overall technical adequacy of FBAs and BIPs within one educational system to evaluate reliance on the outcomes of FBAs in the development of BIPs. The technical and applied features of a randomly selected sample of 134 FBA/BIPs of students with disabilities, ages 3-21 years, who were receiving services due to their severe emotional and behavioral disorders (SEBD) or autism spectrum disorders (ASD) within the Georgia Network of Educational and Therapeutic Services (GNETS) were analyzed. In addition, similarities and differences between function-based strategies specified in BIPs were examined. Logistic regression was used to reveal the probability that a given behavioral function can predict which intervention(s) might be chosen. A series of chi-square tests of independence and a multinomial logistic regression model were used to examine how BIP component variables, demographic variables, behavioral function variables, and behavioral intervention variables related to each other statistically. Components described as critical in research literature for conducting FBAs and developing BIPs were absent from a

significant number of the student files. Results suggest few of the prescribed interventions were likely to be related to function. The findings extend research on FBAs and BIPs, particularly as they are used with students with SEBD and autism, documenting that a significant number of BIPs are developed without regard of the function of the problem behavior.

TECHNICAL AND APPLIED FEATURES OF FUNCTIONAL BEHAVIORAL ASSESSMENTS AND BEHAVIOR INTERVENTION PLANS

by

Shannon M. Hawkins

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TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

ABA	Applied behavior analysis
ADHD	Attention deficit with hyperactivity
AO	Abolishing operation
APA	American Psychiatric Association
ASD	Autism spectrum disorders
BEP	Behavior Education Program
BIP	Behavior intervention plan
CICO	Check-in/check-out
CLASS	Contingencies for Learning Academic and Social Skills
CWPT	Class-wide peer tutoring
DA	Direct assessments
DCATS	Data Collection and Tracking System
DNRA	Differential negative reinforcement of alternative
DNRO	Differential negative reinforcement for other behavior
DPR	Daily progress report
DR	Differential reinforcement
DRA	Differential reinforcement of alternative behavior
DRI	Differential reinforcement of incompatible behavior
DRL	Differential reinforcement of low rates of behavior
DRO	Differential reinforcement for other behavior
DSM	Diagnostic and Statistical Manual of Mental Disorders
EBD	Emotional and behavioral disorders
ED	Emotional disturbance

EO	Establishing operation
EXT	Extinction
FA	Functional analyses
FAO	Functional Assessment Observation form
FAST	Functional Analysis Screening Tool
FBA	Functional behavioral assessment
FCT	Functional communication training
FM	Fixed momentary
GNETS	Georgia Network of Educational and Therapeutic Services
GTID	Georgia Testing Identification number
IA	Indirect Assessments
IDEA	Individuals with Disabilities Education Act
IEP	Individualized educational plan
IQ	Intelligence quotient
ISS	In-school suspension
LD	Learning disability
LSCI	Life Space Crisis Intervention
KWL	Know What Learn
MAS	Motivational Assessment Scale
MO	Motivating operation
NCA	Noncontingent attention
NCE	Noncontingent escape
NCR	Noncontingent reinforcement
ODD	Oppositional defiant disorder

OHI	Other health impairments
OSS	Out of school suspension
PBS	Positive behavior support
PBQ	Problem Behavior Questionnaire
PMAB	Prevention and Management of Aggressive Behavior Program
RIRD	Response Interruption/Response Redirection
SA	Structural analysis
SAM	Student Achievement Model
SD	Discriminative stimulus
SEBD	Severe emotional and behavioral disorders
SPSS	Statistical Package for the Social Sciences
SSP	Stimulus–stimulus pairing
SOAP	Self-operated auditory prompt
TO	Time-out

CHAPTER 1

THE TECHNOLOGY OF FUNCTIONAL BEHAVIORAL ASSESSMENTS AND BEHAVIOR INTERVENTION PLANS

Problem behavior in schools is a major concern of teachers and parents (Skiba & Sprague, 2008) and an ongoing threat to effective classroom management, proactive discipline, and safety in schools (Algozzine, Christian, Marr, McClanahan, & White, 2008). Undesirable student behavior often is addressed using coercive methods such as punitive and sometimes aversive strategies (Scott, Liaupsin, Nelson, & McIntyre, 2005; Skiba, 2002). Commonly, students are removed from the classroom or school setting (e.g., suspension and expulsion) as a means to curtail undesired behavior (Martinez, 2009). At rates disproportionate to their numbers in school, students with disabilities have been suspended and expelled from school as a consequence of their challenging behavior (Christle, Nelson, & Jolivette, 2004; Martinez, 2009; Skiba, 2002). An additional problem is that students who are African American receive suspensions or are expelled disproportionately more frequently than students of other racial-ethnic backgrounds (Lewis, Butler, Bonner, & Joubert, 2010; Skiba et al., 2011; Tobin &Vincent, 2011; Vincent & Tobin, 2011; Wallace, Goodkind, Wallace, & Bachman, 2008).

Recognizing that increasing numbers of suspensions and expulsions suggested that these consequences were ineffective in inhibiting problem behavior, the federal government approved amendments to the Individuals with Disabilities Education Act (IDEA) in 1997, which improved protection of students with disabilities against

ineffective and unwarranted disciplinary practices. The 1997 reauthorization mandated the use of functional behavioral assessments (FBAs) for students who bring weapons or drugs on campus, or whose violent behavior warrants change of placement. The IEP team must consider conducting a FBA when the behavior problems are a manifestation of a disability, and a FBA and behavior intervention plan (BIP) are required for a disciplinary change in placement for behavior that is a manifestation of the child's disability (Zirkle, 2009). If a change of the student's placement (as well as a suspension exceeding 10 days) is a consequence of the behavior and a BIP is not incorporated in the student's individualized educational plan (IEP), a FBA and BIP must be developed within 10 days following the placement change (Yell & Shriner, 1998). If a plan has been constructed already, it must be evaluated and adapted, if needed, to manage the behavior (IDEA, 2004). The most recent version of IDEA (2008) mandates that positive behavioral interventions must be considered by the IEP team if students' behaviors interfere with their learning or the learning of others (§ 300.324).

Using an understanding of the variables that influence behavior, positive behavior support (PBS) is an applied science of empirically-validated strategies used to decrease problem behavior and improve quality of life by improving a student's environment and teaching prosocial skills (Carr et al., 2002; Dunlap et al., 2010; Tobin, Lewis-Palmer, & Sugai, 2001). Primary (universal, Tier 1) supports are implemented school-wide classroom-wide; and include evidenced-based teaching methods, classroom and school-wide ecological arrangement, clearly defining and teaching behavioral expectations, direct instruction of social skills, precorrection procedures, proximity control, and school-wide reinforcement systems (Turnball et al., 2002). Secondary (Tier 2) supports are

usually implemented in small groups of students; and include social skills training and groups, role playing, empirically validated intervention programs, self-monitoring, and tutoring (Mitchell, Stormont, & Gage, 2011; Simonsen, Jeffrey-Pearsall, Sugai, & McCurdy, 2011; Turnball et al., 2002). Tertiary (Tier 3) supports focus on individual students and include FBAs, function-based interventions, modifications of the environment, increased support from school psychologists and counselors, planned ignoring of inappropriate behavior, contingency adjustments, time-out, and medication (Simonsen et al., 2011; Turnball et al., 2002).

Functional Behavioral Assessments

Whether mandated by law or not, the FBA process can be used to provide early intervention and a preventive approach to discipline before behaviors escalate to extremes that require more intrusive actions or removal from the classroom (Conroy & Davis, 2000; McLaren & Nelson, 2009; Scott & Caron, 2005; Scott, Liaupsin et al., 2005; Tobin & Vincent, 2011). Additionally, FBAs can help address disproportionality as educators examine the context of challenging behavior during the FBA process, and subsequently can adjust environmental variables that contribute to misbehavior before making unnecessary referrals to special education (Lo & Cartledge, 2006; Moreno & Bullock, 2011; Mustian, 2010). Intended for the development of suitable interventions to meet the individual needs of students, *functional assessments* are evaluations of the purpose or function of students' behaviors in relation to their contexts (e.g., surrounding environment; Iwata et al., 2000; Jolivette, Scott, & Nelson, 2000; Scott & Kamps, 2007; Scott, Anderson, &Spaulding, 2008). Interventions that do not consider the function of

the problem behavior can be unsuccessful and/or increase the severity of the behavior (O'Neill et al., 1997).

Countless potential functional relationships between academic variables and problem behaviors can thrive in the school environment, necessitating a sound technology for assessing the individual functional relations particular to each student (Filter & Horner, 2009). The use of function-based assessment to guide behavior supports is an empirically proven technology for enabling practitioners to make informed choices when selecting and designing behavioral interventions (Crone & Horner, 2003). Data collected through the FBA process should facilitate understanding of the antecedents that occasion and the consequences that maintain problem behaviors in or during specific and regular situations or routines (Ingram, Lewis-Palmer, & Sugai, 2005). The distinct components of the FBA process include operationally defining the problem behavior, collecting data, developing a hypothesis for the function of the behavior, and verifying the hypothesis to document a functional relation between the behavior and the environment. Each of these components will be discussed, accompanied by an articulation of concerns emerging during applied practice.

Operational Definitions

The process starts with the development of an operational definition of a specific problem behavior (Steege & Watson, 2009). To be operationally defined, the problem behavior must be described in clear, concrete terms that are measurable. An example of an operationally defined behavior is: James makes insulting comments to peers during small group activities. A behavior is not operationally defined if it is vague or immeasurable (e.g., James is rude toward peers).

One of the findings of an investigation by Van Acker, Boreson, Gable, and Potterton (2005), in which they examined the technical sufficiency of 71 FBA/BIPs that were provided by public school IEP teams, was that 52% of the FBAs contained a problem behavior that was deemed as inadequate for one or more of the following reasons: maladaptive behavior was not operationally defined, several individual problem behaviors were grouped under one category, and/or the IEP team tried to identify a common function when examining multiple behaviors rather than identifying more than one target behavior and then gathering separate data. Even worse, 18% of the FBAs did not identify the target behavior that was assessed.

An operational definition is needed to ensure consistency when observers are collecting data and for the development of a suitable intervention plan. For example, data may have been collected and discussed for several target behaviors (e.g., skipping class, throwing up, insulting teacher) under the nomenclature of one behavior (e.g., avoiding school work), making it nearly impossible to determine the function for the global behavior since individual behaviors may serve different functions, depending on the context or circumstances. The target behaviors should be assessed individually until the data indicate the behaviors serve the same function and could therefore be included in the same response class (Hanley, Iwata, & McCord, 2003).

During applied practice, concerns have been raised regarding practitioners' competence in operationally defining problem behavior. Early in the history of conducting FBAs in classrooms, the researchers wrote operational definitions for teachers (Sasso et al., 1992). Alter et al. (2008) allowed their participating teachers to write

operational definitions for target behaviors and found that the definitions were too broad to produce reliable data collection or differentiated function identification.

Collecting Data

Once the problem behavior is operationally defined, personnel can begin the process of collecting data. To document the relationship between the problem behavior and the student's environment (Scott & Caron, 2005), data are collected to determine which context variables serve as antecedents (e.g., discriminative stimuli such as a specific task demand) or as consequences (e.g., peer or teacher attention subsequent to the response) to occasion the behavior (Van Acker et al., 2005). Antecedents are what happen before undesirable behavior to evoke the occurrence, and consequences either maintain or reduce undesirable behavior. Setting events are factors that temporarily affect the influence of antecedents or the value of consequences to affect the probability that the undesirable behavior will occur (Crone & Horner, 2003; Horner, Vaughn, Day, & Ard, 1996).

Van Acker and colleagues (2005) found that context variables that occasioned the problem behavior (e.g., a teacher request) or were a consequence (e.g., removal from class after the student engaged in problem behavior) were identified in 82% of the FBAs they examined. Although, magnitude and/or the rate of the target behavior are collected during the FBA process as well, Van Acker and colleagues found that teams in only 18% of the FBAs documented the frequency and/or described the severity of the problem behavior.

An assortment of information gathering tools and methods are used to collect data leading to the discovery of patterns that occur in students' environments (Alter, Conroy,

Mancil, & Haydon, 2008; Stichter & Conroy, 2005). Data frequently need to be collected across settings as the function of the problem behavior may change in different environments (Lang, O'Reilly et al., 2009; Lang et al., 2010; Umbreit, Ferro, Liaupsin, & Lane, 2007). Both indirect and direct assessments allow educators to predict when, where, and with whom the target behavior is likely to occur.

Indirect assessment. Indirect (informant) assessment includes structured interviews with parents, students, teachers, paraprofessionals, and other personnel who have direct contact with the student. Commercially available checklists, questionnaires, and motivational scales provide insight into the motivation behind a student's problem behavior. Examples of commercially available indirect assessments include the Motivational Assessment Scale (MAS; Durand & Crimmins, 198*8),* Functional Analysis Screening Tool (FAST; Iwata & DeLeon, 1996), and the Problem Behavior Questionnaire (PBQ; Lewis, Scott, & Sugai, 1994)Additionally, indirect self-assessment instruments such as the Classroom Check-Up (Reinke, Lewis-Palmer, & Merrell, 2008) and the Double-Check Self-Assessment (Hershfeldt et al., 2009), for example, can be used to identify teacher behavior and cultural factors that may be contributing to student behavior (Hershfeldt, Rosenberg, & Bradshaw, 2010). Although useful, indirect data are subjective (Alter et al., 2008) and should not be used to develop a BIP; the results of indirect data collection should be verified by observing the student in vivo (i.e., direct data collection; O'Neil et al., 1997). When Cunningham and O'Neil (2007) analyzed the results of various FBA measures for the identification of and ranking of functions of problem behavior for 20 students with EBD, they found results of teacher team and student interviews and direct observations demonstrated closer agreement with results of

brief functional analyses (Wacker & Steege, 1993,) than the results of indirect assessments (e.g. brief rating scales,) which evidenced considerable disagreement among results of raters and functional analyses.

Direct assessment. Direct assessment entails observing and recording environmental factors that influence the problem behavior. Descriptive analysis, functional analysis, and structural analysis are types of direct observation. During descriptive analysis behavior is observed in uncontrolled (i.e., naturally occurring) conditions to quantitatively describe important social interactions and variables that can be used to form hypotheses about how the social environment affects student behavior (Ndoro, Hanley, Tiger, & Neal, 2006). However, because they do not involve experimental manipulations to verify the cause of behavior, descriptive assessments cannot identify precise operant relations (Wacker, Berg, Harding, & Cooper-Brown, 2011).

Examples of direct assessment include an A-B-C Analysis (Bijou, Peterson, & Ault, 1968) and scatter plots (Touchette, MacDonald, & Langer, 1985). Collecting data on a scatter plot (Symons, McDonald, & Wehby, 1998) can be helpful by providing a visual representation of patterns in the student's behavior throughout and across days. To ensure that each occurrence of target behavior is recorded, and because the process of direct data collection can overburden teachers and affect teaching quality, Moreno and Bullock (2011) recommended that a practitioner other than the teacher of the student should observe and collect data on the target behavior.

Concerns with applied practice. One dilemma faced by professionals involved in the FBA process is that only a few researchers have considered the differentiated

effectiveness of the assortment of FBA methods presently used to assess the behavior of children with emotional and behavioral disorders (EBD); (Alter et al., 2008; Sasso, Conroy, Peck-Stichter, & Fox, 2001). Additionally, researchers have identified concerns about the validity of the assessments being conducted because of the lack of personnel training (Couvillon, Bullock, & Gable, 2009; Van Acker et al., 2005), technical sufficiency (Alter et al., 2008), and consistency among data collectors (Murdock, O'Neill, & Cunningham, 2005).

Couvillon et al. (2009) found that most personnel who conduct FBAs do not have sufficient training to use the assessments correctly and did not receive training on FBAs until they were in their fifth year of teaching. Out of 134 service providers surveyed to measure the amount of training they had received on FBAs, 15% had no training, 6% with up to five years of experience had received training, and 62% with up to 10 years of experience working in schools had received training on FBAs. In addition to effects on data collection, Van Acker et al. (2005) found that IEP teams were significantly more likely to verify the hypothesized behavioral function if one or more members of the team had completed coursework in applied behavior analysis, participated in one or more days of in-service dedicated to FBA/BIP development, and/or had completed two or more days of concentrated in-service training on the development of FBAs/BIPs.

There is a lack of confidence regarding the technical sufficiency and the consistency of indirect assessments (Barton-Arwood, Wehby, Gunter, & Lane, 2003). Indirect assessment methods rely on reports and descriptions of behaviors that are susceptible to more subjectivity and bias then direct assessments (Neef & Peterson, 2007). Alter et al. (2008) found support for the use of direct observations and

inconsistencies in the results of indirect assessments. The results of the two indirect assessments used [the *Functional Assessment Interview;* (O'Neill et al. 1997), and the *Motivation Assessment Scale*; (Durand & Crimmins, 1992)], were not consistent across individuals and were not corroborated by functional analyses (FA). The results of the direct assessment procedure (ABC data collection) matched the results of FA for all participants. The importance of the use of direct observations in natural settings for FBAs (Umbreit et al., 2007) was demonstrated by the level of agreement between the ABC data and the FA, while inconsistencies in the results of the indirect assessments led Alter et al. (2008) to caution against the use of indirect assessments as the sole method used to determine a function of target behavior.

In contrast to the findings of Alter et al. (2008), Tarbox et al. (2009) found the results of FA and indirect assessment methods agreed for the most part while descriptive methods (e.g., ABC data collection) provided inconclusive results. Tarbox et al. (2009) found agreement in the results of three assessment methods (indirect, experimental, and descriptive) for only one out of seven children who had been diagnosed with autism, and concluded that indirect data collection using the Questions About Behavioral Function (QABF; Paclawsky, Matson, Rush, Smalls, & Vollmer, 2000) were more accurate than direct observation. Their conclusions are questionable, however, given the confounds created by their coding decisions and the collection of ABC data within discrete trial training sessions.

Murdock and colleagues (2005) found discrepancies between student and teacher perceptions regarding what constitutes problem behavior during an investigation into the agreement of three data collection methods. The results of direct observations in the

classroom [using the Functional Assessment Observation form (FAO) developed by O'Neill et al. (1997)], student interviews, and teacher interviews for the problem behavior of eight students with disabilities (one student with learning disabilities and 7 students with EBD) were examined. The results of all three methods agreed 64% of the time; however, classroom observations and teacher interviews agreed 93% of the time.

Hypothesized Function of Behavior

All behaviors are motivated by the desire to obtain something or avoid (i.e., escape) something. In the FBA process, function is the purpose the behavior serves (Hanley et al., 2003), and function specifies whether the undesirable behavior is maintained by either negative or positive reinforcement (Ingram et al., 2005). Behavioral function is more expansively described as a differentiated operant consisting of the motivating operation that temporarily renders a reinforcer as a powerful, discriminative stimulus that indicates that reinforcement is accessible, the responses that formerly have produced specific reinforcement, and the type of occasions that reinforce the problem behavior (Michael, 1993; Sasso et al., 2001; Scott & Kamps, 2007).

During the FBA process, the data collected are compared and analyzed to create testable hypotheses or summary statements regarding the function of the behavior to describe the relationships among setting events, antecedents, behavior, and consequences (O'Neill et al., 1997). After discussing the patterns of the contexts and antecedents that precede the behavior and the consequences that follow the occurrence of the target behavior, educators devise a probable explanation for the function of the behavior.

Attention, tangible, escape, and sensory are the four main functions of behavior. Behavior motivated by attention (positive social reinforcement) is commonly the result of

students wanting peers and adults to like them, to give them attention, and to appreciate them and their efforts (Grow, Carr, & LeBlanc, 2009). Tangible-based (positive reinforcement) behavior is motivated by students wanting to gain access to tangible items or desired activities (Alberto & Troutman, 2009). Escape-based (negative reinforcement) behavior is typically motivated by a student's need either to avoid or escape an uncomfortable task or situation (Butler & Luiselli, 2007). Sensory-based (automatic reinforcement) behaviors are not maintained by a purposeful act of another person or social environment (Vollmer, 1994), and typically meet a sensory need for the student exhibiting the behavior.

In applied practice, Van Acker and colleagues (2005) found 25% percent of FBAs did not contain a hypothesis regarding the function of the problem behavior. This encouraging news is that 75% of the FBAs did contain a hypothesis regarding the function of the problem behavior, increasingly the likelihood that subsequent interventions would be effective. Of considerable speculation is why practitioners would not hypothesize a function of behavior after collecting direct and/or indirect data on the problem behavior, and then confusion regarding the basis of the BIP.

Verifying the Hypothesis

The hypothesized function of the target behavior can be verified by manipulating the identified context variables to confirm whether or not the function of the target behavior has been correctly identified (Tiger, Fisher, Toussaint, & Kodak, 2009); the strategies used to verify the hypothesized function should be documented in the FBA (Van Acker et al., 2005). Unfortunately, Van Acker and colleagues (2005) found 61% of IEP teams did not verify the function of the problem behavior.

Methods of verification. The hypothesized function of behavior can be confirmed through methods that include simple observations and complex functional analyses (Scott, Anderson, Mancil, & Alter, 2009). Researchers have not agreed upon a standard protocol to verify the hypothesized function of behavior (Scott et al., 2004), although the experimentally controlled process known as functional analysis [FA; Iwata, Dorsey, Slifer, Bauman, & Richman (1982/1994)] is considered to be a more valid procedure for verifying behavioral function than descriptive methods (Alter et al., 2008). While a correlation between the antecedent or consequent variables and the behavior are determined using descriptive methods, causal relationships are identified through FA (Alter et al., 2008). During a FA, consequences are manipulated to reveal the contributing relation between environmental events and problem behavior (Anderson, English, & Hedrick 2006; Iwata, Dorsey et al., 1982/1994). An analysis of quantitative synthesis data led Herzinger and Campbell (2007) to determine interventions selected on the basis of behavioral functions identified using FA were more successful at affecting behavior improvement than interventions founded on results of other functional assessment methods.

In contrast to FA, structural analysis (SA; Carr & Durrand, 1985) is used to identify the relationship between the problem behavior and the environment by systematically manipulating the antecedents that are most likely to increase or decrease the occurrence the target behavior (Gage & Lewis, 2010) while keeping the maintaining consequences constant (Peck, Sasso, & Jolivette, 1997; Stichter, Randolph, Kay, Gage, 2009). Stichter, Sasso, and Jolivette (2004) noted that while SA focuses on the potential power of antecedent events to affect pro-social and problem behaviors to drive the

development of interventions, most FA investigations steer toward determining and developing interventions that are based on the maintaining consequences of problem behavior. Given the proactive emphasis in providing positive behavioral supports (Dunlap et al., 2010), manipulation of antecedent events to mitigate problem behavior is justifiable. The category of variables manipulated in SA (e.g., high interest vs. low interest content, Park & Scott, 2009; low structure vs. high structure, Stichter et al., 2009) allows educators to identify and adjust the antecedent variables to occasion appropriate behavior (Stichter & Conroy, 2005).

Researchers confirm antecedent events are important to consider when selecting and designing interventions and SA is a sound tool to increase prosocial behaviors and reduce behavior problems (Stichter et al., 2009). The use of SA to assess environmental and curricular variables led to an intervention that effectively reduced off-task and aberrant behavior of a student with EBD, and supported him to maintain behavior change in the general education environment for at least a year after the investigation (Stichter et al., 2004). Hagan-Burke, Burke, and Sugai, (2007) used data from SA to confirm relations between problem behavior and writing tasks, and then designed an intervention which led to increases in time on task for a student at risk of EBD. Moreover, English and Anderson (2006) found interventions developed considering the results of SA were more successful than interventions based on the results of FA for decreasing the problem behavior of three young children with developmental disabilities.

Park and Scott (2009) used a brief SA procedure to verify hypothesized antecedents by manipulating the antecedents in a manner similar to the way consequences are manipulated in brief FA, (Dunlap et al., 1993). Conditions were replicated and a

checklist was used to measure procedural integrity as each condition of variable manipulation was replicated to demonstrate distinct patterns of behavior. The ensuing antecedent-based interventions led to behavior improvement for three preschool students who were at risk for developing behavior disorders.

Although Payne, Scott, and Conroy (2007) used the results of SA to identify function and subsequently design an intervention that led to an immediate reduction in problem behavior for a student with a mild intellectual disability, they cautioned that SA cannot verify function. Conroy and Stichter (2003) noted that it is difficult to generalize the findings of research on antecedent-based interventions because it is missing a reliable theoretical "framework" and the means by which to verify the component of the operant that alters problem behavior, which in turn affects the reliability of outcomes. Because variable responding is influenced by motivating operations (e.g. satiation, deprivation) and distinct biological events (e.g., allergies, illnesses, sleep deprivation) conducting FA in conjunction with SA would be the best method to pinpoint the operant relations that govern behavior (Wacker et al., 2011).

Concerns with applied practice. Even though FA has been empirically proven and is considered to be a valid procedure for identifying function, there are concerns about its practicality in the natural setting. FA necessitates specialized training for personnel and a controlled setting (analog functional analysis; English & Anderson, 2006). McIntosh, Brown et al., (2008) suggested school personnel rarely use empirically valid FA procedures because of the substantial resources involved and difficulty of adequately training personnel to be able to implement the procedures sufficiently. Additionally, practitioners may hesitate to conduct FAs because of the extensive amount

of time required to conduct them correctly and the risks associated with provoking problem behavior (LaRue et al., 2010). Since proficiency and time are necessary for conducting FAs, Menzies and Lane (2011) recommended that function-based interventions are necessary only for students who have not responded to adequate global and individualized interventions.

Along with questioning the reasonableness of conducting FAs, some researchers have found evidence to question the accuracy of FA results (Solnick & Ardoin, 2010), as results have been found to vary depending on evaluator and setting. The person who conducts the functional analysis may influence the results, subsequently affecting the accuracy of the hypothesis. English and Anderson (2006) found that personnel rated patterns of behavior differently for 3 of 4 students when conducting functional analyses. Furthermore, researchers indicate that setting can affect FA results (Lang, O'Reilly et al., 2009; Lang et al., 2010).

Challenges in Conducting FBAs

Function Variation According to Context

The results of FBAs conducted in one environment may not correspond with the results of FBAs conducted in another environment, indicating two different functions for the same problem behavior. For example, analog FA (an FA conducted in a laboratory setting) sometimes identifies different variables than those that maintain problem behavior in natural settings (Anderson, Freeman, & Scotti, 1999). Lang et al. (2008, 2010) and Lang, O'Reilly et al. (2009) corroborated this conclusion when they found that different functions appeared to maintain the problem behavior in the different environments. Lang et al. (2010) also noted that the controlling variables and function of

behavior differed across environments as the problem behavior of a student with Asperger syndrome was sensitive to different reinforcers (attention and access to tangibles) in different settings (resource room and classroom). Given that behavioral function may differ by environment, personnel in each environment may need to be proficient at collecting data on problem behavior to identify function.

Practitioners' Ability to Conduct FBAs

Researchers have demonstrated that teachers can successfully conduct FBAs with support of researchers (e.g., Kamps, Wendland, & Culpepper, 2006; Lane, Barton-Arwood, Spencer, & Kalberg, 2007; Nahgahgwon, Umbreit, Liaupsin, & Turton, 2010; Skinner, Veerkamp, Kamps, & Andra, 2009). However there is little research on teachers' abilities to determine function without the help of specialists. One exception is an investigation by Patterson (2009), in which a regular education school teacher conducted an FBA that led to a successful function-based intervention.

Mustian (2010) demonstrated that an extensive 12-hour training package that included foundational skills in applied behavior analysis (ABA), positive behavior supports (PBS), and FBA; instruction provided in stages; multiple examples of modeling; multiple occasions of embedded practice; and coaching and performance feedback in the natural setting led to two general education teacher-participants successfully conducting FBAs without coaching or feedback.

Practitioners' Ability to Use the Results of FBAs

Even when they identify function correctly, practitioners who design behavior interventions may lack the skills necessary to match the results of the FBA to the development of the BIP (Hansford, Zilber, LaRue, & Weiss, 2010). Van Acker and

colleagues (2005) concluded school faculty need systematic training that includes practice with feedback to develop the essential skills for the FBA/BIP process, after they found that most of the FBAs/BIPs they reviewed were not related and were technically inadequate. As mentioned, Couvillon et al. (2009) determined that 15% of 134 service providers had received no training in the FBA/BIP process, and the likelihood of being trained increased with the number of years employed. Unfortunately, most special education professionals leave the field after only three years of employment (Billingsley, 2004).

Need for Guidelines to Conduct FBAs

There is a crucial need for policy and best practice guidelines to address functional assessment methods and BIPs (Sasso et al., 2001). The fact that there is no officially recognized or legal standard definition of the procedures or processes that produce a FBA (Scott & Kamps, 2007) may cause some of the inconsistencies and inadequacy in the FBA process. Upon finding that merely 17 states specify definitions of FBAs/or BIPs, vital components (of FBAs and BIPS) are seldom identified and are not defined, and FBAs and BIPs are not mandatory when behavior obstructs learning, Zirkle (2011) called for further research to address the gap between the field literature and legal requirements. Additionally, Sasso and colleagues (2001) asserted that lack of policy, along with gaps in empirical understanding of functional assessment leads to a conflict between the research-based recommendations and school districts' implementation of procedures, which may result in interventions that are counter-therapeutic.

Practitioners are left to execute FBAs and design BIPs according to their own criteria. Based on their personal level of knowledge on the FBA process, educators may

choose interventions that are commonly used in their schools, but may not be appropriate for the particular functions of unique individual behavior. Additionally, when specialist support is not provided, researchers have indicated that practitioners usually revert to the assessment procedures and interventions with which they are most comfortable (Nahgahwon et al., 2010). For example, the teachers in Blood and Neel's (2007) study indicated that they did not consider information from FBAs to develop behavioral interventions they used in their classrooms. Furthermore, none of the teachers were able to describe the BIP on file, or identify the written behavioral objectives from the student's IEP.

Umbreit et al. (2007) have come up with a systematic method to guide FBAs and design function-based interventions, and a few researchers have used the procedures to guide FBAs resulting in effective interventions (Lane, Barton-Arwood et al., 2007; Lane, Rogers et al., 2007; Lane, Weisenbach et al., 2006; Liaupsin, Umbreit, Ferro, Urso, & Upreti, 2006; Nahgahgwon et al., 2010; Stahr, Cushing, Lane, & Fox, 2006; Turton et al., 2007; 2011; Underwood, Umbreit, & Liaupsin, 2009; Wood, Umbreit, Liaupsin, & Gresham, 2007). The method includes a visual organizer (called a function matrix) to help practitioners determine function of behavior. The function matrix has one column with a list of the three functions that maintain behavior (i.e., attention, escape, and sensory), and two columns practitioners can use to determine if interview and observational data indicate the student is avoiding something (negative reinforcement) or accessing something (positive reinforcement). Next, practitioners use the matrix to determine whether the student is gaining or escaping attention, tangibles/activities, sensory consequences, or whether multiple functions are maintaining the target behavior.

After the practitioner writes the function statement, the "Function-Based Intervention Decision Model" is employed to decide which of three evidence-based intervention procedures (Sugai et al., 2000) should be selected for the BIP. The three procedures include: "teach the replacement behavior, improve the environment, and adjust the contingencies" (p. 96-97). Turton and colleagues (2011) used the function matrix and the decision model in collaboration with teachers and students to construct systematic, function-based interventions for three students with EBD. The interventions supported increased on-task behavior that was generalized to a nonintervention classroom, and the teacher-participants continued to implement the treatment for at least 3 weeks after the intervention ended. Considering the outcomes of recent investigations, the systematic method described by Umbreit et al. (2007) may provide a model of the standardization needed for the FBA/BIP process.

Function-Based Intervention Planning

The Behavior Intervention Plan (BIP)

An IEP team should use the information gained from the FBA to develop a detailed action plan, called a Behavior Intervention Plan (BIP), for managing a student's behavior. Rather than focus on the child as the difficulty, BIPs should propose changes for social and environmental variables (including adult behavior), emphasizing the research-based conclusion that modifying learning conditions can result in improvements in behavior (McLaren & Nelson, 2009). Per federal law, school personnel are required to address severe behavioral issues using interventions that have been widely researched in classroom settings (Couvillon et al., 2009). Instead of relying on traditional punishment to stop behaviors from occurring, ethical principles and empirical support dictate that

positive strategies to enable students to build useful skill sets (through systematic application of reinforcement) must be incorporated into BIPs. Teaching students to interact prosocially with peers will provide long-term benefits for the students, while punishing students for peer altercations may reduce the problem behavior but will not teach them what to do instead (Gable et al., 2005).

Replacement Behaviors

Effective interventions are founded on an appreciation of the conditions that motivate and maintain problem behavior built on empirical findings gained by functional assessment and analysis (Hanley et al., 2003; Umbreit et al., 2007). Personnel involved in the FBA process identify an alternative (replacement) behavior that accomplishes the same function but is acceptable across social environments, including school (Carr & Durand, 1985). For example, it is desirable and important for students to solicit their teachers' attention if they do not understand an assignment; however, the use of expletives to gain attention is not acceptable in most schools. Therefore teaching a replacement behavior such as socially acceptable requests for help that include raising hand, waiting for teacher to call on student, and asking a question politely, will support the student to obtain the same consequences (access teacher attention) as the target behavior (Umbreit et al., 2007). Effective BIPs contain recommendations to: defuse and rid the student's environment of antecedents that occasion problem behaviors, address the factors that sustain problem behavior (function), identify a replacement behavior that accomplishes the same function but is acceptable across social environments, including school (Carr & Durand, 1985), and manage consequences in the social context and physical environment that occasion the likelihood of appropriate behavior and reduce

problem behavior (Ingram et al., 2005). Additionally, BIPs may contain recommendations to address performance and skill deficits, and recommendations for strategies to teach the student appropriate skills or replacement behaviors (Cale, Carr, Blakely-Smith, & Owen-DeSchryver, 2009). Furthermore, plans that provide for direct teacher support (e.g., modeling, maintenance, and feedback) may improve intervention outcomes (Lane, Pierson, Robertson, & Little, 2004).

Function-based Verses Non-function-based Intervention Plans

Interventions should be based on the function of behavior, not founded on the topography of the behavior (Scott et al., 2009). If escape is the function of the target behavior, an intervention strategy such as sending the student to the office, for example, will reinforce the problem behavior and exacerbate the student's situation (Scott & Kamps, 2007). However, if a student earns visitation time with a well-liked principal for increasing the amount of time spent on task during math class, sending the student to the office also can be reinforcing, but in this case reinforcing the desired behavior rather than the undesired behavior. The results of several studies have been interpreted to conclude that function-based interventions led to more successful outcomes when compared to nonfunction-based interventions.

Newcomer and Lewis (2004) designed function-based and non-function based interventions for a nine-year-old (Matthew) who was diagnosed with other health impairments (OHI) and received special education services, and two 11-year-old students (Jerod and Emma) who were not eligible for special education services. All three students exhibited behavior problems in general education settings that impeded their learning and the learning of other students in the classroom, resulted in numerous office referrals, and

put them at risk for academic failure. Non-function-based interventions focused on the topography of the behavior, and corresponded with typical systems and conditions of the school and classroom. Function-based intervention plans were developed to change environmental factors that occasioned problem behavior, increase the availability of reinforcement for appropriate alternative behaviors, and decrease the possibility that a maintaining reinforcer (as identified by the FBA) followed the problem behavior.

The function of Matthew's verbal aggression was to escape/avoid peers so his function-based intervention plan included avoiding grouping Matthew with peers he disliked, teaching Matthew a replacement skill that provided an appropriate means of escape from peers, one-on-one instruction on how to make "I" statements to ask to be assigned to a different group or area when unhappy with group membership, precorrection to use "I" statements when needed, lessons on how to respond to teasing and perceived challenges from peers, and group social skill lessons on self-management and self-advocacy (taught to class but tailored to meet Matthew's skill deficits to promote generalization of the individualized lessons). Matthew's non-function-based intervention plan included using a reinforcement system compatible with a school-wide reinforcement system, reviewing the expectation to work and play cooperatively with peers, and a dependent group-contingency reinforcement system in which tokens earned by Matthew resulted in a "Fun Friday" for the whole class.

Because the function of Jerod's off-task behavior was to escape/avoid activities, his function-based intervention plan included working with a peer tutor to access help and check work (thereby providing a brief break from task demands) when presented with difficult work, and a structured system of self-monitoring and contingent

reinforcement. Jerod's non-function-based intervention plan included a cue-and-prompt (pre-determined prompts) strategy to address off-task behavior, and close teacher proximity.

Emma's problem behavior, including breaking rules, and arguing with teachers in an aggressive and volatile manner was maintained by adult attention. Her function-based intervention focused on teaching and supporting her to attain adult attention in appropriate manner and included individually taught (by an adult) social skills lessons with role-playing and practice on how to appropriately obtain adult attention, accept no, and request help; lessons on "teacher pleaser" positive attention-seeking behaviors; and self-monitoring combined with self-evaluation and self-recruitment of teacher praise. Emma's non-function-based intervention included reviewing lessons on respectful behaviors from the school-wide behavior model, increased contingent teacher praise, and cooperative learning strategies such as rewarding group behavior based on performance of members and teaching students to give each other praise. A multiple baseline across participants displayed a significant decreasing trend in problem behavior during the function-based interventions for all three students, with clear level changes over the baselines and the non-function-based interventions (Newcomer & Lewis, 2004).

Ingram et al. (2005) compared function-based and non-function-based plans to decrease the problem behaviors of two sixth-grade male students who were not receiving special education services. The function-based interventions for their escape-maintained behaviors focused on methods to defuse setting events, neutralize antecedents, decrease the power of problem behavior by teaching replacement behaviors, and giving access to maintaining consequences for desirable behavior while denying access to maintaining

consequences for problem behavior. The non-function-based interventions focused on maintaining consequences not specified by the hypothesis statement, and included strategies that did not defuse setting events or neutralize antecedents.

The function-based interventions included checking on the boys' biological well-being at the beginning of the day. The teacher checked on Carter to discern if he was tired at the beginning of class (as a setting event modification he would have been given breaks from class tasks every 10 min if he self-identified his tiredness). Bryce was asked if he had taken his medication; he was given breaks from tasks every 10 min if he had not taken his medication, and medication was kept at school in case Bryce forgot to take it at home.

A self-management plan was implemented that allowed Carter and Bryce to self-assess and record their on-task behavior on a 5 minute schedule and request teacher evaluation of ratings. Additional components of the intervention included: precorrection for appropriate behavior; redirection and prompting to use replacement behavior; and what could be earned for desirable behavior. If they were on-task for most of the interval for six out of eight intervals, the boys earned the choice to remove problems from assignments or access to 5 min of computer time (for Carter), or free time with a peer (for Bryce).

Additional individualized components of Carter's escape-based intervention included breaks when tired, tutoring for difficult math work, instruction on how to ask for teacher help, and reminders to redo old assignments while waiting for teacher help as a means of remaining on-task during an interval. Bryce's plan included written directions for work, teaching him to ask for help when unsure of directions, offering help for one

problem, allowing two breaks during class (one break he remained seated and one break he could leave the room to get water), and allowing 2-minute breaks after two intervals of appropriate behavior.

The non-function-based intervention did not include breaks for Carter when he self-identified he was tired, and the teacher ignored his off-task behaviors. Strategies in his non-function-based plan included precorrection and prompting appropriate behavior, reminders that he could earn time with a peer for appropriate behavior, reminders to raise hand if he needed help with difficult work, praise for hand raising, and contingent praise and time to visit with peers for meeting self-management expectations.

Bryce's non-function-based intervention included asking Bryce if he had taken his medication at beginning of class, precorrecting and prompting appropriate behavior, reminding Bryce of what he could earn (schoolwide token) for desirable behavior, reminders to raise hand if he needed help with difficult work, teacher ignored the problem behavior if Bryce was not looking at teacher and not completing problems, and giving Bryce a token that could be exchanged for tangible reinforcers for meeting self-management expectations. Ingram and colleagues (2005) used single-case ABCBC designs to compare the results, and conclude the use of function-based intervention plans led to a greater reduction in problem behaviors when compared to the results of the non-function-based interventions.

Payne and colleagues (2007) compared the efficiency of function-based interventions to non-function-based interventions for four students with special needs who had received many office referrals. In this extension of research by Newcomer and Lewis (2004) and Ingram et al. (2005), they verified the function of the problem behavior

using experimental analysis procedures to develop consequence-based intervention plans that were functional and non-functional, and used a counterbalanced design to control for intervention effects. A brief FA was conducted to verify the functions. Typical classroom strategies were used as the non-function-based interventions for all four of the students.

Julie, an 11-year-old third grader, had a learning disability (LD) in math and reading, and received most of her instruction in a special education resource classroom. Amy, a 10-year-old girl repeating third grade, had a LD in reading, received her reading instruction in a special education resource classroom, and received the rest of her instruction in a general education third-grade classroom. Julie and Amy engaged in a frequent amount of off-task and noncompliant behavior. Their problem behaviors were described as talking with a peer (most frequently each other) rather than paying attention to teacher instruction and academic tasks. Although no replacement behavior was identified, Julie's and Amy's desired behavior was described as paying attention to academic tasks during certain times without interacting with each other.

Because attention from a specific peer was the assessed function of the problem behavior, the function-based intervention involved reinforcement of on-task behavior in the form of breaks in which they could interact with each other contingent upon paying attention to the teacher during instruction and academic tasks. The non-function-based intervention included the delivery of verbal reprimands and prompts when the girls engaged in off-task behavior.

The third participant with attention-maintained behavior, was Brian, a nine-year-old third grader who completed grade-level academic work. He spent time in the general education setting during physical education class and lunch, and the rest of the day he

received his instruction in the special education resource classroom. Brian's problem behavior was described as inappropriately responding to teacher demands, including improper verbal or facial responses and noncompliance. The intervention team wanted Brian to increase his ability to follow teacher directions with socially acceptable facial expressions and body language.

His attention-based intervention included teacher praise for appropriate behavior and frequent verbal encouragement from his teacher given on an average of once every 2 min during class. The teacher provided prompts and gave immediate attention when Brian was engaged in on-task behavior. His non-function-based intervention included the teacher using planned ignoring (i.e., extinction) to respond to his problem behavior.

The fourth participant, Barry, was an 11-year-old fifth grader, had a mild intellectual disability, read at a first-grade level, and completed second-grade math. The amount of time he spent in the general education setting was not mentioned by the authors. Barry's off-task escape-maintained behavior was described as (a) doing nothing for more than 3 s but interacting with teachers or peers rather than paying attention to academic instruction or tasks; (b) staring in a direction away from tasks or teacher instruction for more than 3 s; or (c) playing with non-academic objects or academic materials in an off-task manner (e.g., doodling or pencil tapping).

Barry's escape-based intervention included breaks from task demands when he earned "B Passes" for completing small (i.e., 10-min) assignments. The passes were printed on magnets given to Barry while he worked on academic assignments and were controlled by the teacher at the magnetic white board. He chose when to spend his earned B Passes; however, in order to spend one pass he was required to possess at least two

passes. Barry's non-function-based intervention included more frequent teacher attention in the form of verbal prompts and reprimands, and he was not allowed to take breaks from tasks even when he engaged in the desired behavior. A multielement single-case design was used to analyze results, particularly the obvious reductions in problem behavior for all four students when the function-based interventions were implemented and clear increases in problem behavior when the non-function-based interventions were implemented (Payne et al., 2007).

Hawkins and Axelrod (2008) compared the effectiveness of interventions for escape-maintained behavior to the effectiveness of interventions based on non-function-based contingencies for the off-task behavior of four boys with EBD who received services in a residential treatment program. The boys' ages ranged from 11 to 16 years, and the range of categories of their disabilities included attention deficit with hyperactivity ADHD, oppositional defiant disorder (ODD), and learning disability (LD) in reading. When the FBA information was analyzed, Hawkins and Axelrod concluded escape from homework demands maintained the problem behavior.

An alternating treatment with baseline design was used to confirm that the contingent break alone (negative reinforcement) function-based intervention led to the greatest increase in on-task behavior for three of the boys when compared to the results of the contingent break with access to preferred activities (negative and positive reinforcement), and contingent access to edibles (positive reinforcement) non-function-based intervention. Interestingly, James' on-task behavior decreased during the edibles condition as compared to baseline. Hawkins and Axlerod (2008) used James' reaction to the edibles condition to highlight the importance of verifying hypotheses and developing

interventions based on function. If the contingencies maintaining James' problem behavior had not been assessed, the IEP team may have developed an intervention that included the use of edibles, which would have increased the rate of his problem behavior.

McIntosh, Campbell, Carter, and Dickey, (2009) found that an intervention in which students were given routine opportunities for attention and feedback (Check-In/Check-Out intervention; Crone, Horner, & Hawken, 2003) led to a significant decrease in problem behavior of students with attention-maintained problem behavior, while the problem behavior of students with escape-maintained behavior increased during the implementation of the intervention. The participants were 34 general education students whose ages ranged from 6 to 11 years, who needed more support than the universal behavior support program their school provided. During the Check-In/Check-Out intervention increased adult attention was provided throughout the day in the form of morning check-in meetings for encouragement and precorrection, teachers providing feedback and ratings of behavior at the beginning and end of each period, end-of-day debriefings with a mentor, and notes sent home to summarize student behavior progress for parents. Additionally, students used earned points to purchase social privileges or small tangible items. McIntosh and colleagues (2009) theorized the problem behavior increased for students with escape-maintained behavior because the Check In/Check Out intervention did not address the need for escape from aversive task demands.

Filter and Horner (2009) compared the use of function-based verses non-function-based academic interventions to decrease the problem behaviors of two fourth-grade students who had a history of problem behavior during work times in the classroom. The first participant, Brett, had a learning disability and was receiving special education

services in speech, reading, writing, and math. The second participant, Dylan, had no identified academic disabilities and was performing at grade level in all academic areas. Dylan began taking Concerta (a time released medication for attention deficit/hyperactivity disorder) during the study which did not result in reduced problem behavior.

The FBA revealed that reading tasks at least four grade levels above Brett's instructional level triggered problem behaviors maintained by escape from complicated tasks. His function-based reading intervention included the teacher ignoring all problem behaviors, and two antecedent manipulations developed to reduce the aversiveness of the task. Grade-level reading material and multiple-choice comprehension questions were presented on audio tape so that Brett could listen to the tape and circle the correct answers on his answer sheet.

Dylan's FBA revealed his problem behavior was maintained by escape from difficult tasks when escape was provided in the form of instructional support (rather than task removal). Dylan's function-based intervention consisted of contingent access to a mastery-level task, and functional communication training (FCT); all problem behaviors were ignored. Dylan used a small box with a red picture on it on his desk to signal when he wanted 20 s of instructional help on one math item. Instructional help included feedback on the accuracy of his answer, and/or explaining a problem-solving strategy. If Dylan finished the math assignment he earned access to a mastery-level math assignment. When results were compared using a single-case reversal design, Filter and Horner (2009) concluded the function-based intervention led to greater reductions of problem behavior than the non-function-based interventions.

Teachers who identified student-participants as at risk for being identified with emotional disturbance (ED) changed their minds and decided special education was no longer needed after problem behavior was reduced with the implementation of a function-based intervention (Mustian, 2010). The function-based intervention for two 11-year-old students who were typically developing and engaged in escape-maintained behavior, included the use of a MotivAiders© electronic device that had a vibrating signal at set intervals to prompt one part of the self-management intervention. Students recorded their behavior in 2-min intervals on a chart and at the end of 5 intervals reinforced their behavior by self-initiating a 2-min break if earned. When the participants engaged in off-task behavior the teacher put the behavior on extinction and redirected on-task behavior by pointing to their self-management charts without verbal prompts (Mustian, 2010).

During the non-function-based intervention the teacher provided verbal encouragement (attention) prior to lessons, and gave instruction for on-task behavior expectations to the entire class. Access to breaks was blocked by redirecting student to task or subsequent task (Mustian, 2010). Greater increases in on-task replacement behavior of the two students (who were African American) resulted with the use of the function-based intervention compared to outcomes of the non-function-based intervention. Mustian (2010) recommended function-based assessments and interventions as technology to help reduce disproportionality in both special education (i.e., students who are African American are over-represented in the EBD category; Skiba, Poloni-Staudinger, Simmons, Feggins-Azziz, & Chung, 2005) and disciplinary actions (Gregory, Skiba, & Noguera, 2010).

Researchers have verified conclusively that function-based interventions are necessary for evincing compelling change in maladaptive behavior (Hawkins & Axelrod, 2008; Ingram et al., 2005; McIntosh et al., 2009; Newcomer & Lewis, 2004; Payne et al., 2007). Given this level of science, the question arises as to which interventions are used for which functions of behavior. Since the function of pain attenuation is considered in each FBA but beyond the scope of school-based practitioners for intervention, research for only the other three categories will be reviewed. The broad functions include access (to attention or tangibles; i.e., positive reinforcement), escape (i.e., negative reinforcement), and sensory (i.e., automatic reinforcement) as maintaining consequences (Iwata, Dorsey et al., 1982/1994; Northup et al., 1991). Since a particular behavior may serve multiple functions (Borerro & Vollmer, 2006; Kamps et al., 2006; Lane, Barton-Arwood et al., 2007; Lane et al., 2009), interventions for multiply-maintained behavior will be considered also.

Interventions by Function of Behavior

Attention-Based Interventions

Attention, in the form of eye contact, verbal comments, physical contact, and so forth, is a commonly occurring response to problem behavior in most school settings (Grow, Carr, & LeBlanc, 2009). Types of attention are important to consider and evaluate when planning interventions. For example, Piazza, Fisher et al. (1997) found contingent tickles led to decreases in a student's problem behavior, whereas contingent praise did not. Reprimands and unrelated comments served as rewards for one individual, and a hands-down physical procedure functioned as punishment for another (Kodak, Northup, & Kelly, 2007). When participants did not respond to an adult-attention-based

intervention, FBA results alerted Campbell and Anderson (2008) that peer attention rather than adult attention maintained participants' behavior. Adding peer-attention components to the intervention resulted in improved behavior for the participants.

Many situations in school environments impose restrictions on interpersonal interactions (e.g., waiting for a turn to talk, being quiet during work time), and this restraint on social attention can momentarily increase the value of attention as a reinforcer for problem behavior, acting as an establishing operation (Grow et al., 2009). When Love, Carr, and LeBlanc (2009) found that 88% of difficult behavior of 32 participants with autism spectrum disorders (ASD) was maintained by attention, they concluded that attention may be scarce in the social environments of children with ASD, and students with ASD should be taught socially appropriate responses to access attention.

Indeed, effective interventions to address problematic attention-based behavior, all involve manipulating when students are receiving reinforcement in the form of attention. Examples of attention-based interventions that have empirical support, include consequence-based procedures such as extinction (EXT) during which target behavior is ignored, noncontingent reinforcement (NCR); differential reinforcement [specifically differential reinforcement of alternative behavior (DRA)] and functional communication training (FCT)], antecedent-based procedures such as classwide peer tutoring (CWPT; Greenwood, Delquadri, & Hall, 1989), and restructuring classroom routines (Grow et al., 2009). Even though practitioners frequently design interventions for attention-maintained behaviors that begin with the withholding of attention that has been positively reinforcing (i.e., EXT; Iwata, Pace, Cowdery, & Miltenberger, 1994; Skinner, 1948),

supplementing EXT with alternative behavior-contingent strategies may be needed to achieve optimal results in behavior change (Fisher, DeLeon, Rodriguez-Catter, & Keeney, 2004; Kozlowski, Wood, Gilligan, & Luiselli, 2009).

EXT attention. EXT of attention-maintained problem behaviors occurs when attention is withheld when problem behaviors occur for the purpose of decreasing the behavior (Iwata, Pace, Cowdery et al., 1994). Planned ignoring, an EXT procedure if the function of the behavior is attention, is most effective when the behaviors for which attention will be withheld are carefully selected, and when attention for appropriate behaviors is provided simultaneously (Nelson & Rutherford, 1983). Planned ignoring has been used successfully as a component of interventions for attention-maintained behavior (i.e., differential reinforcement of alternative behavior)**.**

Noncontingent attention. Noncontingent attention (NCA) occurs when attention is delivered regardless of what behavior is occurring (Vollmer, Iwata, Zarcone, Smith, & Mazaleski, 1993). NCA has been used along with EXT to decrease problem behavior of individuals of various ages who have intellectual disability, autism, or are typically developing (Asmus et al., 2004; Carter & Horner, 2007; Fisher et al., 2004; Lang, et al., 2008, 2010; Lang, O'Reilly, 2009; Rasmussen & O'Neill, 2006). NCA in the form of presession attention as a motivating operation (MO) helped a typically developing student in high school (Patterson, 2009), students with autism (O'Reilly, Edrisinha, Sigafoos, Lancioni, & Andrews, 2006; O'Reilly, Edrisinha, Sigafoos, Lancioni, Cannella et al., 2007; O'Reilly, Edrisinha, Sigafoos, Lancioni, Machalicek et al., 2007), and a typically developing 6-year-old when combined in a function-based treatment package with First Step to Success (Carter & Horner, 2007). Additionally, a NCA treatment

combined with the use of a fixed-interval schedule of delivery of tangibles was used to decrease interruption behavior of a 16-year-old girl with multiple disabilities. When a timer and informative statement were added to signal the upcoming delivery of attention, the behavior was decreased further (Gouboth, Wilder, & Booher, 2007).

Differential reinforcement. DRA, which involves EXT by withholding attention for the problem behavior, while providing contingent attention for an appropriate alternative behavior (Volmer & Iwata 1992) has been used to support behavior improvement for students with a wide range of intellectual abilities and disabilities (Asmus et al., 2004; Carter & Horner, 2007, 2009; Kozlowski et al., 2009; Lane, Weisenbach, Little, Phillips, & Wehby, 2006; Lane, Weisenbach, Phillips, & Wehby, 2007; Legray, Dufrene, Sterling-Turner, Olmi, & Bellone, 2010; Lo & Cartledge, 2006; Mace, McComas, Mauro, Progar, & Taylor, 2010; Roane & Kelly, 2008; Romaniuk et al., 2002; Shumate & Wills, 2010; Skinner et al., 2009; Trussell, Lewis, & Stichter, 2008). During DRA, problem behaviors may be ignored (Gouboth et al., 2007), although needed redirection may be provided briefly while providing as minimal attention as possible (Lane, Weisenbach et al., 2006). Preteaching procedures were used to teach the skills needed to perform the replacement behavior prior to implementing the DRA (Lane, Weisenbach et al., 2006); and used with a signal to teach discrimination between upcoming delivery (or no delivery) of contingent attention (Legray et al., 2010). Wood, Ferro, Umbreit, and Liaupsin, (2011) improved several classroom variables (i.e., provided visual organizers of steps of class activities, warnings before transitions, increased contingent praise) to supplement their use of DRA.

Successful reduction of problem behavior was achieved using a DRA intervention without EXT when Athens and Vollmer (2010) used a combination of more immediate, longer duration, and higher quality of attention (30 s of social praise, high fives, and pats on the back) relative to the attention that historically maintained problem behavior. Remarkably, after a first experiment demonstrated that the use of DRA resulted in increased resistance of problem behavior to EXT, Mace and colleagues (2010) found that implementing FCT in an environment in which attention had not reinforced problem behavior, prevented the strengthening of problem behavior during EXT (that can occur as a side effect with the use of DRA; Mace et a., 2009) and increased appropriate communication.

Other forms of differential reinforcement have been used to treat attention-maintained behavior as well. Friman (1990) defines differential reinforcement of incompatible behavior (DRI) as delivering reinforcement (attention in the following studies) for behavior that is physically incompatible with the problem behavior while withholding reinforcement for the problem behavior. Lo and Cartledge (2006) combined DRI with DRA and self-monitoring (a procedure which involved students recording their own behavior at predetermined intervals of time), as did Holifield, Goodman, Hazelkorn, and Heflin (2010) with positive results.

Differential reinforcement of low rates of behavior (DRL) occurs when attention is delivered for problem behavior if it occurs less than or equal to a specified criterion (Deitz, 1977). Shaw and Simms (2009) used a DRL intervention (problem behavior was reinforced with attention if the behavior occurred less than or equal to 18 times during the

each school day), combined with a positive punishment procedure (tokens were given for every two occurrences of problem behavior) to reduce the problem behavior.

Differential reinforcement for other behavior (DRO) has been used to decrease attention-maintained behavior by delivering attention at specific times if the problem behavior does not occur (Northup et al., 1995; Thompson, Iwata, Hanley, Dozier, & Samaha, 2003; Vollmer et al., 1993). DRO has been used in combination with positive scanning (i.e., the teacher wrote one positive behavior the student displayed on a note card that was shown to the student and sent home to parents) and self-monitoring (Lane, Smither, Huseman, Guffey, & Fox, 2007). When Legray and colleagues (2010) compared the use of DRO and DRA with colored cards for signals for attention delivery, they found both procedures led to reductions of inappropriate vocalizations, but the use of DRA with signals resulted in greater reductions of problem behavior for two typically developing children.

Functional Communication Training. FCT incorporates DRA by reinforcing demonstration of a functionally equivalent alternative in place of maladaptive behavior. Specifically for attention-based behavior, students are taught and reinforced for appropriately soliciting attention, while attention is withheld for problem behavior (Carr & Durand, 1985). FCT has been used to produce successful outcomes for individuals with a wide range of intelligence quotients (IQ), disabilities, and expressive and receptive language delays (Harding et al., 2009; Najdowski, Wallace, Ellsworth, MacAleese, & Cleveland, 2008; Shumate & Wills, 2010; Thompson, Fisher, Piazza, & Kuhn, 1998). When FCT alone did not lead to improved behavior, Hanley, Piazza, Fisher, and Maglieri (2005), added punishment, which led to decreased problem behavior levels near

zero. The positive punishment, a procedure in which a stimulus is added to reduce behavior (Hansford et al., 2010) was provided in the form of placing one participant's hands by his side, and placing the other student's hands by her side while covering her eyes with the therapist's hands. Importantly, after implementation of the intervention, both participants indicated they preferred the punishment procedure when they were given a choice of FCT with or without punishment.

Self-operated auditory prompts (SOAPs). SOAPs have been used to modify antecedent conditions to occasion appropriate behavior by transferring stimulus control from the discriminative-producing event to an alternative stimulus (an audio player) to increase appropriate behavior (Alberto, Taber, & Fredrick, 1999; Cihak, Alberto, & Fredrick, 2007; Hughes, 2003; Hughes, Alberto, and Fredrick, 2006; Taber, Seltzer, Heflin, & Alberto, 1999). Socially fashionable technologies (such as the MP3® player in 2007) are worn by individuals who hear recorded prompts and praise for performing the desired alternative behavior. Prompts that stated the individual's name and provided praise such as "Great job, I like the way you're working" or "Nice work, keep it up," were provided every 2 min during a 20-min session to successfully decrease attention-maintained problem behavior and increase on-task behavior in a community-based job setting (Hughes et al., 2006).

Social skills. Social skills programs such as Student Achievement Model (Criste and Neal-White, 2005), skill-streaming (McGinnis & Goldstein, 1997), the ACCEPTS program (Walker et al., 1983), and Boys Town (Dowd, Tobias, Connolly, Criste, & Nelson, 1993), use direct instruction, reinforcement, modeling, and practice to teach students how to develop and maintain positive social relationships. Criste and Neal-

White, (2005) recommend that in addition to the school environment, social skills should be taught, modeled, practiced, and reinforced in the student's non-school environments (e.g. home and community) where socially appropriate behaviors will be naturally reinforced (e.g. attention in the form of a smile and eye contact from a fellow bus passenger). In particular, interventions that combine the teaching of social skills with increased teacher attention and opportunities to participate have successfully reduced attention-maintained behaviors in students with emotional behavior disorders (Campbell & Anderson, 2008, 2011; Carter & Horner, 2007, 2009; Newcomer & Lewis, 2004; Trussell et al., 2008).

Package programs. The Behavior Education Program (BEP), also known as Check-in/check-out (CICO; Hawken & Horner, 2003) is a secondary-tier intervention that is geared toward preventing severe behavior and includes increased adult attention, feedback, conditioned reinforcement of acceptable behaviors, and token economy. CICO is cost effective, can be implemented for several students at once, and has been found to be especially effective for students with average or above intelligence whose behavior is maintained by attention (Campbell & Anderson, 2008, 2011; Fairbanks, Sugai, Guardino, & Lathrop, 2007; Hawken, O'Neill, & MacLeod, 2011; McIntosh et al., 2009; Mong, Johnson, & Mong, 2011; Swoszowski, Jolivette, Fredrick, & Heflin, in review; Todd, Campbell, Meyer, & Horner, 2008). During CICO, an adult coordinator gives attention during a morning check-in meeting while making sure students have needed supplies and a daily progress report (DPR), a point sheet that lists behavioral expectations. More attention is provided as teachers give feedback on student behavior. Praise and points are earned if students display appropriate behaviors. During check out, the DPR points are

tallied, praise is delivered along with a small item such as a sticker or snack to reward performance and the student receives a copy of the DPR to bring home for the parent to sign (Hawken et al., 2011).

In recent investigations, when participants did not respond to CICO, additional attention-based components led to a significant reduction in problem behaviors for students whose behavior was attention-maintained (Campbell & Anderson, 2008; Fairbanks et al., 2007). After FBA results indicated problem behavior was maintained by peer attention, Campbell and Anderson (2008) added a DRA component so that participants could sit near favorite peers if they earned enough points, or were assigned seats away from peers if the criterion was not earned. Fairbanks and colleagues (2007) augmented CICO with contingent attention (i.e., recess with peers, lunch with teacher, take a friend to counselor's office to play), precorrection reminders (of expectations, choices and reinforcement), had students put their heads down on their desks if they did not comply with directions after a warning, and social skills instruction.

Another Tier-2 intervention, First Step to Success (Walker et al., 1997) was modified with attention-based variations which led to a reduction in problem behavior for typically developing students whose problem behaviors were maintained by attention (Carter & Horner, 2007; 2009). First Step is geared toward kindergarteners to second graders at risk for developing antisocial behavior, and includes Contingencies for Learning Academic and Social Skills (CLASS), a component during which teachers use green and red cards, combined with a point system to teach and reinforce the difference between appropriate and inappropriate behavior. Attention-based supports such as the whole class earned points for ignoring distractions (not giving attention for problem

behaviors), the teacher increased attention for appropriate behavior and withheld attention for inappropriate behavior (DRA), and the student –participant earned points or a note that could be awarded to a fellow classmate, were added to First Step by Carter and Horner (2007) as well as additional variations such as the teacher wrote a note to parents, teacher checked in with the student in the morning to chat about student's well-being, precorrection for behavior expectations before transitions, and time-out when problem behavior escalated. In the 2009 investigation, Carter and Horner added consistent responses to noncompliant behavior (warning, calming routine, choice between 2-min time-out and compliance), and increased adult and peer attention for appropriate behavior to another student .

Praise. Praise, or verbal compliments, is most effective when it is delivered contingent upon the occurrence of the behavior and when it specifically describes the behavior (Alberto & Troutman, 2009; Hawkins & Heflin, 2011). Providing behavior-specific praise requires minimal planning, is cost effective and has been used as reinforcement to successfully decrease attention-maintained behaviors during DRA procedures (Athens & Vollmer, 2010; Carter & Horner, 2007; Dufrene, Doggett, & Henington, 2007; Kozlowski et al., 2009), self-operated prompts (Hughes et al., 2006), and CICO (Campbell & Anderson, 2008, 2011; Fairbanks et al., 2007).

Time-out. Seclusionary time-out for attention-maintained behavior entails taking an individual out of an environment in which attention for the problem behavior is provided, and then confining the individual to an environment devoid of attention to diminish the occurrence of problem behavior (Donaldson & Vollmer, 2011). Time-out has been used to implement the EXT component in differential reinforcement procedures

(Dufrene et al., 2007; Fairbanks et al., 2007) and when attention-maintained problem behavior escalates (Carter & Horner, 2007). Faribanks et al. (2007) effectively used a non-seclusionary time-out procedure that entailed removing the student from the group activity by having the student put her head down on her desk if she did not comply with directions after a warning.

Common characteristics of effective attention-based interventions include: (a) providing enough attention before problem behavior occurs so that students do not need to engage in the problem behavior access attention, (b) instruction of (and attention for) social and/or communication skills so that students can access attention using appropriate behaviors, and (c) withholding attention (i.e., reprimands, proximity, public confrontations, peer laughter) when problem behavior occurs.

Tangible-Based Interventions

Tangible-maintained behaviors (Day, Rea, Schussler, Larsen, & Johnson, 1988) occur so an individual can obtain positive reinforcement in the form of access to a tangible item or a desired activity (Alberto & Troutman, 2009). The function of the behavior is often termed "access" as it is understood that what is accessed is a tangible item, event, or specific activity (Alberto & Troutman, 2009). Northup and colleagues (1991) in an FA and treatment investigation, found that the tangibles that maintained an individual's aggressive behavior also reinforced a socially acceptable replacement behavior. Contingently delivered tangibles for her signing "please" led to significant decreases of aggressive and self-injurious behavior to near zero levels and increases in her appropriate behavior from 0% in baseline to 50% during the contingency conditions. In investigation that demonstrated that access to activities served to reinforce problem

behavior, Wilder, Chen, Atwell, Pritchard, and Weinstein (2006) found that one preschooler exhibited tantrums when preferred activities were terminated.

Sometimes behavior is maintained by access to items/activities because the items/activities are used to access sensory reinforcement (Fisher, Lindauer, Alterson, & Thompson, 1998). After conducting an FBA for elopement that produced undifferentiated results, Falcomata, Roane, Feeney, and Stephenson (2010) conducted a second FBA that included stereotypic door play, and found that elopement and door play formed a link (Michael, 2000) for a child with autism who engaged in elopement because it resulted in access to sensory-reinforced door play. This study along with those of other investigators (Rooker, Iwata, Harper, Fahmie, & Camp, 2011; Shirley, Iwata, & Kahng, 1999; Vollmer, Marcus, LeBlanc, 1994) can be interpreted to highlight the importance of taking special care when conducting and interpreting results of behavior when tangibles are included in assessments.

Including tangibles during functional assessments may occasion new behaviors, increase the frequency of previously existing behaviors (Rooker et al., 2011), or compete with automatic reinforcement (McCord & Neef, 2005), which could lead to an incorrect conclusion that tangibles maintain behavior. Several categories of students served through special education engage in behaviors that are sensitive to tangibles and involve excessive management of tangibles but may be maintained functions other than tangible. For example, Ruta, Mugno, D'Arrigo, Vitiello, and Mazzone (2010) found children with Asperger's syndrome presented significantly higher frequencies for saving/hoarding, repeating, and ordering tangibles than children in the general population, but empirical assessments were not conducted to discern the purpose for the behaviors. More research

is needed to determine the extent to which disability contributes to behavior (Matson et al., 2011).

For students who engage in problem behaviors because they do not have the communication skills to express that they want access to tangibles or activities, Alberto and Troutman (2009) recommend the use of FCT to teach appropriate communication behavior. Other procedures that have been successfully used to decrease problem behaviors that serve to gain access to tangibles or activities include NCR, contingent reinforcement, differential reinforcement, response interruption or blocking, altering level of activity difficulty, and methods of saying "no."

Noncontingent access to tangibles. NCR can be used to weaken the connection between problem behavior and tangible reinforcement when access to activities and/or tangibles is provided during specific times, regardless of whether the problem behavior is occurring or not, thereby reducing the drive to use problem behavior to gain access to tangibles (Tucker, Sigafoos, & Bushell, 1998). NCR using tangibles as reinforcement has been used along with various combinations of procedures to decrease tangible-based problem behavior. Problem behavior was reduced when Lang, O'Reilly and colleagues (2009), and Lang et al. (2010) used NCR in conjunction with EXT. For example, while a student was provided with continuous access to watching a DVD, the teacher only delivered tangibles and praise if problem behavior did not occur (Lang et al., 2010).

Gouboth and colleagues (2007) used an NCR treatment combined with the use of a fixed-interval schedule of delivery of tangibles to decrease the aggressive behavior of a 19-year-old student with multiple disabilities. When a timer and informative statement were added to signal the upcoming delivery of tangibles, the behavior was decreased

further. Hagopian, Bruzek, Bowman, and Jennett, (2007) used NCR of preferred tangibles and activities without interruption, access to tangibles for appropriate mands, and no differential consequences for target behavior to decrease problem behavior for two students. The students successfully maintained behavior improvements in natural settings (where interruption occurs) after a two-component multiple-schedule arrangement was used to gradually increase the amount of time in which ongoing activities were interrupted (Hagopian et al., 2007).

Presession NCR. NCR in the form of presession access to tangibles was used to successfully decrease behavior as part of a combination package of DRA with a fixed-ratio (FR) 1 schedule and FCT (Hausman, Kahng, Farrell, & Mongeon, 2009). Presession NCR has also been found to work as a MO (Rispoli et al., 2011), and more specifically, as an abolishing operation (AO) on stimulus control of behavior (Edrisinha, O'Reilly, Sigafoos, Lancioni, & Choi, 2011). When Edrisinha and colleagues (2011) combined the presession with discrimination training and EXT, the intervention resulted in decreased levels of problem behavior.

Contingent Reinforcement. Contingent reinforcement occurs when practitioners provide tangibles only when a student engages in a requested behavior, thereby constructing a clear link between the use of the desired behavior and the tangible reinforcement (Alberto & Troutman, 2009). Wilder, Allison, Nicholson, Abellon, and Saulnier, (2010) found that contingent tangible delivery was successful, particularly when dense schedules of values were used with no consequences for problem behavior, to support a student with autism to increase his compliance behavior. The second student, who was typically developing, improved his behavior when response cost was added to

the intervention. Indeed, differential reinforcement interventions involve the contingent delivery of reinforcers and have been found to be effective when used to decrease tangible-maintained behaviors (Athens & Vollmer, 2010; Borrero & Vollmer, 2006; Carr & Durand, 1985; Grey, Healy, Leader, & Hayes, 2009; Hammond, Iwata, Fritz, & Dempsey, 2011).

Differential reinforcement. DRA, one type of differential reinforcement which involves EXT by withholding access to tangibles/activities for the problem behavior, while providing contingent access for an appropriate alternative behavior (Vollmer & Iwata, 1992) has been used to support behavior improvement for students with tangible-maintained behavior (Borrero & Vollmer, 2006; Day et al., 1988; Grey et al., 2009; Mace et al., 2010; Mace, Pratt, Prager, & Pritchard, 2011; Wilder, Harris, Reagan, & Racey, 2007). Successful reduction of problem behavior was achieved using a DRA intervention without EXT when Athens and Vollmer (2010) contingently delivered higher-quality toys in a more immediate fashion, and for a longer duration (relative to the tangible reinforcement that historically maintained problem behavior).

DRO entails delivery of tangibles at specific times if the problem behavior does not occur (Thompson et al., 2003). Hammond and colleagues (2011) used a fixed momentary (FM) schedule DRO with a signal for upcoming tangibles. However, the results indicated that the signal component, in which the researcher showed the tangible reinforcer to students 3 s prior to the end of the DRO interval, helped to decrease problem behavior for two of the students, but increased the problem behavior of the other two. When Legray and colleagues (2010) compared the use of DRO and DRA, they found both procedures led to reductions of inappropriate vocalizations maintained by tangibles,

but the use of DRA resulted in greater reductions for a 4-year-old participant who was typically developing.

Functional Communication Training. FCT incorporates DRA by providing tangibles for the demonstration of a functionally-equivalent alternative instead of maladaptive behavior. Specifically for tangible-based behavior, students are taught and reinforced for appropriately soliciting tangibles, while tangibles are withheld for problem behavior (Carr & Durand, 1985). FCT interventions have been used to support the replacement of problem behavior with an appropriate communication technique to gain access to desired tangibles resulting in significant decreases in tangible-maintained problem behavior (Falcomata et al., 2010; Harding et al., 2009; Hausman et al., 2009; Najdowski et al., 2008; Ringdahl et al., 2009; Winborn-Kemmerer, Ringdahl, Wacker, & Kitsukawa, 2009).

After an FCT with blocking for EXT treatment led to decreased problem behavior and increased communication responses, tangible delivery for the mand was thinned using a card to signal the difference between tangible delivery and EXT as they were alternated during a graduated multiple-schedule (Najdowski et al., 2008). In another FCT investigation, problem behavior was eliminated during the first session of the training, in which response-cost was used to facilitate EXT (Winborn-Kemmerer et al., 2009).

Response interruption or blocking. Response interruption or blocking is a punishment method used to physically interrupt or block problem behavior from continuing (Hagopian & Toole, 2009). Response blocking has been used as an EXT procedure (Falcomata et al., 2010; Nadjowski et al., 2008) to supplement other tangible-based behavior-contingent strategies to achieve optimal results in behavior change. An

intervention that combines blocking with a redirection component, Response Interruption/Response Redirection (RIRD), has been used to decrease tangible-maintained behaviors such as self-stimulation and non-functional vocalizations (Ahrens, Lerman, Kodak, Wordsell, & Keegan, 2011).

Methods of saying "no." When a student asks for a tangible/activity that cannot be provided without delay or a tangible/activity that is inappropriate or not available, researchers have shown that certain methods of saying "no" can support students to accept "no" appropriately and prevent the escalation of problem behavior (Mace et al., 2011); support individuals to engage in appropriate behavior while waiting longer for access (Grey et al., 2009; Hagopian, Wilson, & Wilder, 2001), and improve a child's behavior when terminating a preferred activity (Wilder et al., 2006). Mace and colleagues (2011) found two interventions were effective to teach a student to accept "no" and wait for access appropriately. During the first intervention the student was denied access to playing on the computer but provided with an option to engage in an alternative preferred activity (i.e., playing football). In the second, DRA intervention, the student was given 5-min access to the computer if he completed a nonpreferred task (Mace et al., 2011).

Grey and colleagues (2009) used DRA along with a digital timer as a predictive stimulus to increase waiting behavior for a student with Cerebral Palsy and intellectual disability. Wilder and colleagues used DRO plus EXT, with a colored posterboard to signal intervention was taking place, and a sequential hierarchy of verbal, gestural, and physical prompts to help two children complete tasks and decrease tantrum behavior.

Altering level of activity difficulty. Adjusting the difficulty of activities to match students' abilities can effect positive behavior change (Ringdahl et al., 2009). During an

investigation in which FCT with response cost was used, Ringdahl, and colleagues (2009) found that the use of communication responses (mands) that were identified as high proficiency for students and required less invasive prompting (i.e., physical guidance or modeling), led to greater decreases in tangible-maintained problem behavior when compared to mands that were identified as low proficiency and necessitated relatively more prompts. In another investigation, a DRA intervention in which access to challenging academic tasks (that matched the student's instructional level) were provided contingent on accuracy and completion of assignments, led to large increase in on-task behavior (Umbreit, Lane, & Dejud, 2004).

Teaching students appropriate behaviors to obtain access to preferred items/activities decreases their reliance on tangible-maintained problem behavior. Students who engage in tangible-maintained problem behavior clearly benefit from the regulation of access to tangibles/activities to support the use appropriate behavior.

Escape-Based Interventions

Individuals use escape-maintained behavior to prevent or stop a non-preferred or an aversive event (i.e., the behavior is negatively reinforced; Butler & Luiselli, 2007). Love and colleagues (2009) found that escape was the second most prevalent function of problem behavior, and 16 of 32 children with autism spectrum disorders in the study exhibited problem behaviors maintained by escape. There are two subcategories of escape: escape from social attention (Taylor & Carr, 1992) and escape from tasks (Iwata, Pace, Dorsey et al., 1994).

Escape from social attention. Attention provokes students who are socially avoidant, and while they typically complete assignments without protest, the presence of

a specific adult or attention that occurs during everyday instruction (e.g., proximity, speaking directions and reprimands, group interaction) can be aversive to them. Taylor and Carr (1992) recommended nonsocial reinforcement in the form of contingent breaks from social events and contingent access to sensory reinforcement, and they hypothesized computer-based instruction may be beneficial for students who are socially avoidant. Indeed, function-based interventions that provided breaks from social attention have led to successful results for individuals who engaged in problem behavior maintained by escape from social attention (e.g., Hagopian et al., 2001; Lane, Rogers et al., 2007; Maag, Wolchik, Rutherford, & Parks, 1986; Newcomer & Lewis, 2004).

Escape from task demands. Problem behavior that is maintained by escape from tasks can evolve as students become exhausted by large amounts of demands to process new and/or challenging information in academic environments (McIntosh, Horner, Chard, Dickey, & Braun, 2008). Problem behavior may provide an escape from academic demands that can become aversive to students with disabilities (Geiger, Carr, & LeBlanc, 2010) who have experienced repeated failure with academic tasks (Bambara & Kern, 2005).

Results of a multivariate analysis of variance indicated that in a sample of 47 fourth through sixth grade students, those whose problem behavior was hypothesized to be maintained by escape from academic tasks had lower levels and growth rates in oral reading fluency than students with other hypothesized functions (McIntosh, Horner et al., 2008). Additionally, the results of a longitudinal analysis were used to determine the gap in reading fluency increased for at least 3 years during the investigation, and were the basis of McIntosh, Horner and colleagues' (2008) conclusion that low academic skills

may occasion the development of escape-maintained behaviors. Students who lack academic skills get caught in a cycle of failure which can result in the use of escape behavior as repeated failure during academic tasks becomes increasingly aversive.

Students may engage in inappropriate behaviors as a means to avoid failure (e.g. an outburst halts the read-aloud activity, or results in the student leaving the room with an office referral). While students avoid the learning activity, they miss instruction and fall further behind their classmates in terms of skill level, which sets them up for their next failure. On a hopeful note, McIntosh, Horner and colleagues (2008) theorized adding academic supports to function-based interventions may help break the failure cycle. An improvement in students' academic skills can make tasks less aversive and lead to more success, which may in turn decrease the need for escape behaviors and result in increased access to learning (Geiger et al., 2010; McIntosh, Horner et al., 2008).

Interventions that involve the manipulation of antecedent task characteristics to make demands less aversive have led to successful results in treating escape behaviors (Butler & Luiselli, 2007). Matching tasks to student's abilities (Filter & Horner, 2009), allowing extra time to complete tasks (Trussell et al., 2008), providing students with choice (Ramsey, 2010; Romaniuk et al., 2002), self-monitoring (Briere & Simonsen, 2011), and the use of self-operated auditory prompts (SOAP; Alberto et al., 1999) are examples of antecedent interventions that have supported students to decrease escape-based problem behavior. Along with antecedent methods, strategies that involve careful manipulation of breaks (escape) have been included in effective interventions for escape-maintained behaviors such as escape EXT (Ingvarsson, Hanley, & Welter, 2009), and differential reinforcement (Lalli et al., 1999). The six types of empirically–based

interventions recommended by Geiger and colleagues (2010) in their treatment-selection model for severe escape-maintained behavior include: extinction, noncontingent escape, differential reinforcement, demand fading, curricular and instructional revision, and activity choice.

EXT escape. During EXT, escape is not allowed when students engage in problem behavior, thereby eliminating the contingency between problem behavior and the negatively reinforcing consequence (Ingvarsson et al., 2009; Iwata, Pace, Kalsher, Cowdery, & Cataldo, 1990). Physical assistance (Iwata et al., 1990) and hand-over-hand guided compliance until tasks are completed are means that have been used successfully to support students to complete tasks while preventing problem behavior from being reinforced by breaks (Dufrene et al., 2007; Kodak, Miltenberger, & Romaniuk, 2003). If a student-participant did not engage in a task upon researcher request, Kodak and colleagues (2003) used a three-prompt sequence (vocal, model, and physical prompt), and if the student got out of his chair during a session, the researchers physically assisted him back to his chair to withhold escape. Geiger and colleagues (2010) cautioned that the physical assistance used to prevent students from escaping task demands may act as punishment, and may result in response bursts and relatively slower decreases in problem behavior (than interventions without physical assistance).

Noncontingent reinforcement. Noncontingent escape (NCE) is a procedure in which escape that maintains the problem behavior is provided on a time-based schedule, regardless of the type of occurring behavior (Vollmer, Marcus, & Ringdahl, 1995) and has been used successfully to decrease escape-maintained behavior (Geiger et al., 2010; Ingvarsson et al., 2009; Waller, & Higbee, 2010; Wilder, Normand, & Atwell, 2005).

Butler and Luiselli (2007) used NCE to modify an academic task by scheduling and fading 20-s non-contingent breaks from demands every 10 s. NCE procedures with a fixed-time schedule that were gradually thinned led to decreased problem behavior for two preschoolers with autism (Kodak et al., 2003), and two teenagers in a self-contained classroom for EBD and LD (Waller & Higbee, 2010).

Differential reinforcement. Differential negative reinforcement of alternative behavior (DNRA), is an intervention in which escape that maintains the problem behavior is provided contingent on an alternative response and (Ingvarsson et al., 2009; Marcus & Vollmer, 1995), and has been used successfully to decrease escape-maintained behavior (Arvans & LeBlanc, 2009; Borrero & Vollmer, 2006; Dufrene et al., 2007; Hawkins & Axelrod, 2008; Lane, Rogers et al., 2007). In DNRA, every occurrence of compliance resulted in a 30-s break, while access to breaks from instructional demands was withheld when problem behavior occurred (Borrero & Vollmer, 2006). To implement DNRA and prevent a student from taking breaks after engaging in problem behavior, hand-over-hand guided compliance was used until the student completed the task, then immediately the student was given a new instruction (Dufrene et al., 2007).

To increase participation for a student who had behavior maintained by escape from social attention Lane, Rogers et al. (2007) used a DNRA along with goal setting with a graduated criterion design (Hartmann & Hall, 1976), prompts to participate, extra time to answer questions, and earned breaks from participation (while the student remained seated with the rest of the class). If the student was not participating, the teacher would ask questions to the student directly, thus implementing the EXT by not allowing the student to escape participation (Lane, Rogers et al., 2007). When standard

medical and psychological treatment did not lead to decreases in migraine reports for an adolescent, Arvans and LeBlanc (2009) used a token economy to implement DNRA with escape EXT, which led to decreases of migraine reports and increases in school attendance. Interestingly, after a first experiment demonstrated that the use of DNRA resulted in increased resistance of problem behavior to EXT, Mace and colleagues (2010) found that implementing FCT in an environment without a history of escape for problem behavior prevented the strengthening of problem behavior during EXT (that can occur as a side effect with the use of DRA; Mace et al., 2009) and increased appropriate communication.

Differential negative reinforcement for other behavior (DNRO) has been used to successfully reduce escape-maintained behavior by providing breaks when a student does not engage in problem behavior for a certain amount of time (Vollmer & Iwata, 1992; Vollmer et al., 1995). DNRO was used with a fixed-time schedule that was gradually thinned, by Kodak and colleagues (2003) to support two preschoolers with autism to increase compliance and decrease problem behavior. When given a task, if the child did not engage in problem behavior in the 10 s interval, a 10-s break was given. If the child engaged in problem behavior within the interval, the clock was reset and the break was given after 10 s without any problem behavior. Intervals increased if the rate of the problem behavior was equal to or less than the student's criterion level, from 10 s, to 20 s, to 30 s, to 1 min, to 1.5 min, and concluded at 2 min (Kodak et al., 2003).

Functional Communication Training. FCT incorporates DNRA by reinforcing demonstration of a functionally-equivalent alternative instead of maladaptive behavior (Carr & Durand, 1985). Specifically for escape-based behavior, students are taught and

reinforced for appropriately soliciting escape, while escape is withheld for problem behavior (Geiger et al., 2010). FCT has been used successfully to increase appropriate communication behavior and decrease escape-maintained problem behaviors (Athens & Vollmer, 2010; Filter & Horner, 2009; Harding et al., 2009; Langdon, Carr, & Owen-DeSchryver, 2008; Mace et al., 2010; Peck Peterson et al., 2005).

Demand fading. Practitioners have used demand (instructional) fading (Pace, Ivancic, & Jefferson, 1994) to reduce escape-maintained problem behavior by first discontinuing demands, arranging environmental variables to reduce the chance that problem behavior will occur, and then slowly and progressively presenting demands (Geiger et al., 2010). Demand fading has been used to successfully treat escape-behavior in combination with NCE (Butler & Luiselli, 2007), and DNRA (Najdowski, Wallace, Doney, & Ghezzi, 2003). For example, Ringdahl and colleagues (2002) used demand fading with DNRA to decrease the aggressive and self-injurious behavior of a child with autism. During the first three sessions no directions were given. During the fourth session, a single task demand was given every 15 min, however the rate of task demands progressively increased, as one demand was added every 15 min subsequent to every 45 min session with no problem behavior.

Curricular and instructional revision. Geiger and colleagues (2010) stressed that students should not be taught endure inadequate learning environments, rather the curriculum should be modified to ensure instruction and materials are meaningful, are matched to student's skill level (Center, Deitz, & Kaufman, 1982), and are necessary for use in the student's environment. Teachers should use empirically based teaching methods and teach necessary prerequisite skills to ensure students learn foundation skills

needed to perform more difficult tasks (Geiger et al., 2010). For example, decreases in escape-maintained behavior occurred when Trussell et al. (2008) modified classroom procedures so that teachers increased the amount of time they provided instruction to the students, teachers checked for student understanding more often, and students had to have 95% or more mastery on tasks that were assigned as independent work to prevent frustration. Results of a function-based intervention using language-matched instructional priming (in the students' primary language) on the content, directions, and vocabulary provided students who were English Language Learners with the basic skills they needed to make future reading activities more accessible and comfortable (Preciado, Horner, & Baker, 2009).

Instructional supports can be embedded within the learning routine to make the curriculum more accessible for students, thus decreasing the drive to escape (Geiger et al., 2010). Ingram et al. (2005) provided breaks when tired, tutoring, instruction on how to ask for teacher help, redirection and prompting to use replacement behavior, reminders to redo old assignments while waiting for teacher help to remain on-task, reminders of what could be earned for desirable behavior, and contingent removal of math problems or access to 5 min computer for a student to support him to increase his on-task behavior. Filter and Horner (2009) modified the curriculum by providing reading material and multiple-choice comprehension questions on audio tape so a one student could listen to tape and circle the correct answers on his answer sheet. A second student was provided with contingent access to a mastery-level task to increase on-task behavior. Lane, Rogers et al. (2007) implemented an intervention that included prompts to participate, extra time

to answer questions, and earned breaks from participation for a student whose problem behavior was maintained by escape from social attention.

Activity choice. Students may be provided with escape from the aversive characteristics of a learning task when they are given choices regarding the characteristics of how, when, where, and with whom leaning activities occur (Geiger et al., 2010). Another benefit of activity choice is that independence is fostered when students make decisions and exert control over curriculum variables that affect how their learning will transpire (Jolivette, Wehby, Canale, & Massey, 2001). Choice intervention can include inviting students to communicate their choice (e.g. materials, order of task completion, who will be in their learning group) during certain times of the day and subsequently supporting them to execute their choice, or providing them with access to their choices (Ramsey, Jolivette, Patterson, & Kennedy, 2010). Choice of task order (Trussell et al., 2008), choice of learning tasks from an array of four to six tasks and the choice to change tasks if students requested (Romaniuk et al., 2002), and choice between completing work and taking a break (Peck Peterson et al., 2005) have all successfully supported students to decrease their escape-maintained behavior.

Self-monitoring. Self-monitoring has been used in combination with other procedures to decrease escape-maintained behaviors (Ingram et al., 2005; Mustian, 2010; Newcomer & Lewis, 2004). Briere and Simonsen (2011) used a vibrating timer worn on the belt of an adolescent to prompt him to self-monitor every 5 min using a sheet on which he rated his on-task behavior (incompatible with off-task) or requesting a break behavior (replacement behavior). Mustian (2010) used a MotivAiders© electronic device that had a vibrating signal set at 2-min intervals to prompt students to record their

behavior on a chart. At the end of five intervals, students reinforced their behavior by self-initiating a 2- min break if earned. EXT was implemented as the teacher redirected on-task behavior by pointing to their self-management charts without verbal prompts.

Self-operated auditory prompts. SOAPs have been used to modify antecedent conditions to occasion appropriate behavior by transferring stimulus control from the discriminative-producing event to an alternative stimulus (an audio player) to increase appropriate behavior (Alberto et al., 1999; Cihak et al., 2007; Hughes, 2003; Hughes et al., 2006; Taber et al., 1999). Socially fashionable technologies (such as the MP3® player in 2007) are worn by individuals who hear recorded prompts to perform the desired alternative behavior for attaining escape. Reminders to individuals that they would earn breaks for completion of work, led to increases in work-engagement behavior in a community-based job setting (Cihak et al., 2007; Hughes et al., 2006).

Food and leisure items. Researchers have indicated some students with escape-maintained behavior choose food when given a choice between breaks from tasks and food items (DeLeon, Neidert, Anders, & Rodriguez-Catter, 2001; Kodak, Lerman, Volkert, & Trosclair, 2007; Lalli et al., 1999).Task demands may be made less aversive and escape from tasks may be made less reinforcing when preferred items are given during task demands, thereby acting as an abolishing operation (Gardner, Wacker, & Boelter, 2009; Ingvarsson, Kahng, & Hausman, 2008; Lalli et al., 1999; Lomas, Fisher, & Kelley, 2010; Piazza, Fisher et al., 1997). Ingvarsson and colleagues (2009) found that CR and NCR with edibles resulted in significantly decreased levels of escape-maintained problem behavior.

Cihak and colleagues (2007) found that a DRA intervention using food items led to a successful reduction in escape-maintained problem behavior, although it was not as effective as the SOAPS function-based intervention using breaks for reinforcement. In the DRA intervention an FI 30-s/LH 1 schedule as used, in which participants had to engage in on-task behavior more immediately to earn reinforcers (compared to an interval schedule in which a student can postpone on-task behavior and still be reinforced). The participants had to engage in on-task behavior within 1 s at the end of every 30-s interval to receive a token (that could be exchanged for food) paired with verbal praise and a statement describing the alternative behavior, otherwise no consequences were earned and the interval was started over (Cihak et al., 2007). Kodak, Lerman and colleagues (2007) recommend providing a choice between food and breaks as reinforcement, and assessment of the variables that affect quality of breaks when students' preferences for food compete with breaks.

Leisure items also have been used to augment interventions for escape-maintained behavior. Carter (2010) found that providing high-preference food or leisure items contingent on compliance in the absence of extinction was more effective than breaks to support a student to reduce destructive behavior maintained by escape from self-care tasks. Noncontingent access to a video during feeding sessions led to decreased self-injurious behavior that was maintained by escape from food presentation and an increase in bite acceptance (Wilder et al., 2005). When breaks and access to toys were provided as reinforcement during a DRA/FCT intervention escape-maintained problem behavior decreased (Athens & Vollmer, 2010).

Time-out. Time-out (TO) entails taking an individual out of an environment in which reinforcement for the problem behavior is provided, and then confining the individual to a non-reinforcing environment to diminish the occurrence of problem behavior (Donaldson & Vollmer, 2011). Using TO may increase escape-maintained behavior because when students are removed from task demands (e.g., TO, restraint) because they are reinforced for engaging in problem behavior with a break from tasks (Nelson & Rutherford, 1983; Plummer, Baer, & LeBlanc, 1977; Solnick, Rincover, & Peterson, 1977). However, Everett and colleagues (2007) found that a TO intervention, during which children were ignored until they met the expectations required to leave time-out (i.e., 3- to 5-s period of quiet time in TO with and without escape extinction was effective in increasing compliance above baseline levels.

Manipulating antecedent-demand conditions so that students are more content engaging in tasks, and managing the establishing operations (Michael, 1993) of the target behavior have led to successful outcomes for students with escape-maintained problem behavior (Butler & Luiselli, 2007).

Sensory-Based Interventions

Automatically reinforced (sensory-reinforced) behavior is a class of behaviors maintained by non-social reinforcement, which are consequences generated by a particular behavior (e.g., biting one's hand causes sensation, scratching one's hand momentarily decreases itching; Vaughan & Michael, 1982). When adequate reinforcement is not accessible from others or the environment, children will reinforce themselves (O'Neill et al., 1997). The two classes of sensory reinforcement are sensory positive reinforcement and sensory negative reinforcement.

Sensory positive reinforcement. Sensory positive reinforcement (often termed self-stimulatory behavior or stimming) happens when a behavior causes nonsocial stimulation and resulting in an increase of the frequency of the behavior (Miltenberger, 2005). Behavior maintained by sensory-positive reinforcement serves to access internal stimulation such as tactile stimulation (e.g., foot tapping, nail biting) or external stimulation (e.g., watching a door swing back and forth; Miltenberger, 2005).

Sensory negative reinforcement. Sensory negative reinforcement happens when a certain behavior is used to terminate aversive stimulation, resulting in an increase in the frequency of that behavior (Wilder & Carr, 1998). Behavior maintained by sensory-negative reinforcement may emanate from medical problems (e.g., ear infection, headache) and serves to dampen or cease internal stimulation such as pain, autonomic arousal, and negative emotions; or it may serve to remove external stimulation such as loud noise, noxious odors, or scratchy fabric (Miltenberger, 2005). Extinction is not achievable for problem behaviors maintained by sensory-negative reinforcement; however, differential reinforcement interventions and procedures to manage antecedents are recommended (Miltenberger, 2005). Students may be taught to communicate that they are in discomfort (Vollmer, 1994) or to use behaviors that diminish pain such as taking medication or applying cream (Volmer & Iwata, 1992).

Because it is usually difficult to access the contingency of reinforcement that maintains sensory maintained behavior, it is challenging to manage (Athens, Vollmer, Sloman, & Pipkin, 2008; Groskreutz, Groskreutz, & Higbee, 2011; Vollmer, 1994). However, alternative reinforcement (that competes with the form of sensory stimulation the child gains through problem behavior) can be provided using NCR (Long, Hagopian,

DeLeon, Marhefka, & Resau, 2005), differential reinforcement procedures (Vollmer & Iwata, 1992), and antecedent interventions (Iwata, Vollmer, Zarcone, & Rogers, 1993). Additionally, sensory-maintained behavior can be reduced by enriching students' environments with stimulating and preferred activities and persons (Bambara & Kern, 2005; Horner, 1980). Vollmer et al. (1994) recommended sensory EXT, differential reinforcement, manipulations of EOs, and punishment as effective procedures to decrease sensory-maintained behavior.

Sensory EXT. Sensory EXT (Rincover, 1978) occurs when the sensory consequences produced (e.g., auditory, visual, or proprioceptive sensory stimulation) are dampened or diminished by interfering with or removing consequences (Rincover, Cook, Peoples, & Packard, 1979). For example, a student who engaged in banging his head against objects stopped engaging in that behavior when the tactile consequences were dampened by putting a padded helmet on his head (Kuhn & Triggs, 2009). As part of the EXT process, a student did not gain access to straightening behavior if he engaged in destructive behavior (Kuhn, Hardesty, & Sweeney, 2009).

Noncontingent reinforcement. Noncontingent sensory reinforcement (NCR) is a procedure in which sensory reinforcement that maintains the problem behavior or competing stimuli/items are provided on a time-based schedule, regardless of the type of occurring behavior (Long et al., 2005) and has been used to successfully to decrease sensory-maintained behavior (Chung & Cannella-Malone, 2010). NCR using matched stimuli (Higbee, Chang, & Endicott, 2005; Sidener, Carr, & Firth, 2005), competing stimuli (Long et al., 2005; Lyons, Rue, Luiselli, DiGennaro, & Roscoe, 2007), competing items (Ahearn, Clark, DeBar, & Florentino, 2005; Falcomata, Roane, Hovanetz,

Kettering, & Keeney, 2004; Mueller & Kafka, 2006), alternative stimuli and competing items (Ing, Roane, & Veenstra, 2011), competing activities (Ladd, Luiselli, & Baker, 2009; Lane, Thompson, Reske, Gable, & Barton-Arwood , 2006), and attention (Athens et al., 2008) has led to decreases in problem behavior . For example Long et al. (2005) used NCR of competing stimuli to reduce self-injurious and aggressive behavior of individuals during staff-assisted hygiene routines.

Presession NCR. NCR in the form of presession access to reinforcement can work as an AO on stimulus control of behavior (Edrisinha et al., 2011) and has been used to decrease sensory-maintained problem behavior when access to sensory reinforcement is provided. An intervention which included presession exercise has led to successfully decrease behavior as part of a combination package with verbal and physical prompting, and contingent praise contingent on appropriate engagement with exercise equipment and items (Morrison, Roscoe, & Atwell, 2011). Chung and Cannella-Malone, (2010) found that presession stereotypy NCR (with no social consequences) worked as an abolishing operation for two participants, and as an establishing operation for the other two participants. They found different conditions acted as AOs for four students whose problem behavior was maintained by sensory reinforcement. When presession access to the particular condition acting as an AO for each individual was provided (i.e., antecedent walking for one student, stereotypy for another) problem behavior decreased and appropriate behavior increased (Chung & Cannella-Malone, 2010).

Differential reinforcement. Differential reinforcement procedures for sensory-maintained behaviors involve dampening the sensory reinforcement that maintains the problem behavior (EXT) while using sensory reinforcement and/or reinforcement that

competes with the sensory reinforcement that maintains that problem behavior to reinforce a socially acceptable alternative behavior (Vollmer & Iwata, 1992). Commonly implemented in combination with EXT, differential positive reinforcement (DRA), is an intervention in which the sensory stimulation that maintains the problem behavior or competing stimulation is provided contingent on an alternative response (Vollmer & Iwata, 1992), and has been used successfully to decrease sensory positive -maintained behavior (Ahearn, Clark, MacDonald, & Chung, 2007; Lang, Didden et al., 2009). Lang, Didden et al. (2009) implemented a DRA intervention in which they used bandages to cover areas where a student picked his skin (to block visual and tactile stimulation) and then provided preferred food if the student left the bandages on the wounds.

DRO occurs when the sensory reinforcement that maintains (or competes with) the problem behavior is provided for behavior other than the problem behavior (Cowdery, Iwata, & Pace, 1990). Tiger, Fisher, & Bouxsein (2009) implemented a DRO intervention in which the participant earned tokens for progressively increasing the amount of time he did not engage in skin-picking, in conjunction with self-awareness training in which he sat in front of a mirror and was prompted to recognize when he picked his skin, and eventually learned to implement the intervention independently. Taylor, Hoch, and Weissman, (2005) used matched preferred stimuli (toys that produced auditory stimulation), and Roane, Falcomata, and Fisher, (2007) used an alternative preferred stimulus (a radio) to reinforce the non-occurrence of vocal stereotypy in DRO interventions.

Functional Communication Training. FCT incorporates DRA by reinforcing demonstration of a functionally-equivalent alternative instead of maladaptive behavior

(Carr & Durand, 1985). Specifically for sensory-based behavior, students may be taught and reinforced for appropriately requesting access to sensory reinforcement, or asking for relief from sensory reinforcement, while the sensory reinforcement that maintains the problem behavior is dampened when problem behavior occurs (Carr & Durand, 1985). FCT has been used successfully to increase appropriate communication behavior and decrease sensory-maintained problem behaviors (Esch, Carr, & Grow, 2009; Falcomata et al., 2010).

Kuhn and colleagues (2009) executed a FCT intervention that included blocking of repetitive straightening and extinction of destructive behavior that led to decreases in excessive straightening and destructive behaviors. Esch et al. (2009) used stimulus–stimulus pairing (SSP) procedure, in which speech stimuli were reinforcers that increased the responses that produced the speech (Sundberg, Michael, Partington, & Sundberg, 1996) along with programmed reinforcement which entailed the experimenter delivering a preferred item (edibles or toys) within 5 s of a desired vocalization to increase desired vocal responses.

Competing items. Interventions that use competing items that match and/or interfere with automatic reinforcement have led to successful decreases in problem behavior (Ahearn et al., 2005; Groskreutz et al., 2011; Taylor et al., 2005; Higbee et al., 2005). Results of a competing items assessment can be used to determine if the maintaining effects of an activity or tangible item rival with the sensory reinforcement that maintains problem behavior (Piazza, Adelinis, Hanley, Goh, & Delia, 2000). Access to the competing item or activity can be provided on a schedule or access can be provided contingent upon behavior (Hansford et al., 2010).

Hagopian and Toole (2009) found an intervention using redirection (without blocking), that entailed showing the student the competing stimuli and telling her that it was available, led to significant decreases in body tensing and aggression. Interestingly, Ahearn and colleagues (2005) found that providing continuous access to competing items that matched the sensory consequences for the problem behavior (i.e., video for Cris, therapy ball for Tim) was effective but not as effective as unmatched items (i.e., books for Cris, blocks for Tim) in reducing stereotypy and increasing appropriate activity engagement .

Motivating operations. The manipulation of MOs by sensory competition, which occurs when the environment is enriched using competing types of stimulation, can be an effective treatment for sensory-maintained behavior (Vollmer, 1994; Wilder & Carr, 1998). An establishing operation (EO) occurs when a reinforcing episode serves to evoke behavior by altering the reinforcing stimulus (Michael, 1982). Deprivation works as an EO to increase the power of sensory stimulation to reinforce behavior (Wilder & Carr, 1998). AO occur when a reinforcing episode serves to decrease behavior by altering the reinforcing stimulus (Rapp, 2007). For example satiation works as an AO to decrease the power of sensory stimulation to reinforce behavior. Rapp (2007) found that noncontingent delivery of auditory stimulation (noise from toy cars) served as an AO for one participant's stereotypy and reprimands worked as an EO for the other participant's vocal stereotypy.

Stimulus control. When a particular antecedent stimulus occurs right before a behavior, subsequent purposeful relationship termed "stimulus control" develops in which that antecedent stimulus evokes the behavior (Alberto & Troutman, 2009). Visual

colored cue cards used to signal when appropriate or not to engage in stereotypy have been used to establish stimulus control over stereotypy (Brusa & Richman, 2008; Conroy, Asmus, Sellers, & Ladwig, 2005; O'Connor, Prieto, Hoffmann, DeQuinzio, & Taylor, 2011; Rapp, Patel, Ghezzi, O'Flaherty, & Titterington, 2009).

Brusa and Richman (2008) taught a student that the green discriminative stimulus card (SD) was linked with free access to stereotypy and RIRD was used to teach the student that the red card signaled he should not engage in string play. Conroy et al. (2005) allowed free access to engage in stereotypy while the access card was apparent; however, they pointed to the no access card and verbally reminded the student that it was not acceptable for him to engage in stereotypy while that particular card was present. In the O'Connor et al. (2011) investigation, stimulus control over stereotypy generalized to a participant's classroom and to a community setting public library, supporting the participant to function with appropriate behavior in the community.

Punishment. Punishment occurs when a consequence is delivered after a behavior occurs, thereby reducing the chance the behavior will occur in the future (Alberto & Troutman, 2009). Vollmer (1994) cautioned that ethical and legal principles should be considered, and that punishment should be used only if other reinforcement procedures are likely to be ineffective to change the behavior or will take so long to effect change that the individual may be harmed. Response blocking and response cost are examples of punishment procedures that have been used in conjunction with other procedures to successfully decrease sensory-maintained behavior (e.g., Ahearn et al., 2007; Falcomata et al., 2004).

Response interruption or blocking. Response interruption or blocking is a punishment method used to physically interrupt or block problem behavior from continuing (Hagopian & Toole, 2009). Response blocking has improved the potency of reinforcement procedures (Ahrens et al. 2011; Vollmer et al., 1994) and has been used in conjunction with other procedures to reduce sensory-maintained behaviors (Brusa & Richman, 2008; Falcomata et al., 2010; Mueller & Kafka, 2006). For example, Falcomata et al. (2010) found that adding response blocking to a FCT intervention led to decreases of elopement to near-zero rates.

Response Interruption/Response Redirection. An intervention that combines blocking with a redirection component, RIRD, has been used to decrease sensory-maintained behaviors such as self-stimulation and non-functional vocalizations (Ahearn et al., 2007; Ahrens et al., 2011; Cassella, Sidener, Sidener, & Progar, 2011; Chung & Cannella-Malone, 2010; Liu-Gitz & Banda, 2010; Miguel, Clark, Tereshko, & Ahearn, 2009; Schumacher & Rapp, 2011). For example Ahearn et al., (2007) used questions that required vocal responses to interrupt vocal stereotypy and redirect responding.

Response cost. Response cost entails removing reinforcement (whether or not it maintained the behavior) as a consequence for a behavior (Burchard & Barrera, 1972). Response cost used in conjunction with NCR decreased sensory-maintained problem behaviors (Athens et al., 2008). For example, Falcomata et al. (2004) found that removing access to a radio for 5 s contingent on inappropriate vocalizations led to greater reductions in stereotypy than NCR alone.

Non-function-based sensory interventions. Notably, recent investigations have revealed sensory-based interventions are the choice of many schools to support students

with ASD (Hess, Morrier, Heflin, & Ivey, 2008) even though many of the sensory-based interventions used in schools are not empirically validated (Heflin & Alaimo, 2007). While individuals with ASD often have sensory processing difficulties (Van Rie, 2010) sensory-based interventions may be successful for some, but not all individuals with ASD (Van Rie & Heflin, 2009). Empirical findings indicate functions of problem behavior vary for individuals with ASD. Individuals with ASD may engage in problem behaviors that are maintained by attention (Athens & Vollmer, 2010), tangibles (Ahrens et al., 2011), escape (Butler & Luiselli, 2007), and sensory reinforcement (Ahrens et al., 2011), highlighting the necessity of using data derived from FBAs to accurately identify the function that maintains each individual's behavior before prescribing interventions.

Behavior Maintained by Multiple Functions

Multiple functions of problem behavior are identified in approximately 15% of functional analyses (Hanley et al., 2003). When Matson et al. (2011) reviewed 173 studies that used functional assessment to identify functions of behavior, they found that attention linked with either escape or tangible were the most frequent co-occurring maintaining functions, and that tangible and escape functions also may co-occur frequently.

However, Beavers and Iwata (2011) found that 77 out of 88 cases that indicated multiple functions served problem behavior, actually assessed more than one type of problem behavior at the same time (e.g., self-injury and aggression assessed together rather than self-injury assessed alone). Beavers and Iwata (2011) hypothesized that results of those FAs (that indicate multiple functions serve the problem behavior of two or more topographies) are ambiguous because each topography of behavior may or may

not be maintained by a distinct function. FA results that indicate tangibles serve to maintain behavior may be suspect as well, particularly if they include highly preferred tangibles (Beavers & Iwata, 2011) because tangibles may occasion new behaviors and increase the frequency of previously existing behaviors (Rooker et al., 2011), or compete with automatic reinforcement (McCord & Neef, 2005), which could lead to an incorrect conclusion that tangibles maintain behavior.

On the other hand, function-based strategies can be used to reduce problem behaviors that cross more than one function of behavior. Because the specific establishing operation must be considered during the implementation of the distinct intervention for each reinforcer, practitioners may experience challenges when implementing interventions of multiply controlled behavior (Borrero & Vollmer, 2006). Procedures that help reduce problem behavior maintained by one function may increase the problem behaviors maintained by a different function (Beavers & Iwata, 2011; Smith, Iwata, Vollmer, & Zarcone, 1993). For example, the physical attention provided in an intervention using hand-over-hand guidance to withhold access to breaks for a student whose behavior is maintained by attention and escape, may increase the problem behavior. Furthermore, results of investigations by Smith and colleagues (1993), and Bachmeyer and colleagues (2009) revealed that problem behavior maintained by both attention and escape decreased only when procedures tailored to both functions were implemented, which led Bachmeyer et al. (2009) to conclude that extinction techniques affect different behavioral changes when behaviors are maintained by more than one function, and need to include procedures geared toward each maintaining function.

Attention and escape maintained behavior. Interventions that have led to significant reductions in problem behavior maintained by attention and escape involve careful manipulation of the delivery of attention and escape so that the procedures that focus on the attention function are planned with consideration of the effects of the escape function and vice versa, so as not increase the problem behavior while addressing both functions (Carter & Horner, 2009). For example, Bachmeyer et al. (2009) used a combined EXT technique (i.e., escape and attention EXT) that led to decreased problem behavior. Procedures that increase students' comfort while engaging in tasks by providing curricular supports, and embedding attention and breaks during academic routines have been used to decrease behavior maintained by attention and escape (Fairbanks et al., 2007). Specific attention and escape-maintained interventions include reinforcement strategies such as NCR (Gale, Eikesesth, Rudrud, 2011), DRA (Kamps et al., 2006), FCT (Dolezal and Kurtz, 2010), curricular modifications (Lane, Barton-Arwood et al., 2007), self-monitoring strategies (Briere, & Simonsen, 2011), social skills training (Turton, Umbreit, Liaupsin, & Bartley, 2007), choice (Turton, Umbreit, & Mathur, 2011), CICO with escape-based supports (Fairbanks et al., 2007), and praise (Turton et al., 2011).

NCR. NCR is a procedure in which attention and/or escape that maintains the problem behavior is provided on a time-based schedule, regardless of the type of occurring behavior (Vollmer, Marcus, & Ringdahl, 1995) and has been used successfully to decrease attention and escape-maintained behavior (Gale et al., 2011). Humenik, Curran, Luiselli, and Child (2008) used an intervention in which a choice of foods was

continuously presented with no demands while the child had continuous access to preferred stimuli, to decrease self-injurious behavior during feeding time.

Differential reinforcement. Differential reinforcement procedures have been used to withhold attention and escape that maintains problem behavior (EXT) while using attention and/or escape (Kamps et al., 2006; Neidert, Iwata, & Dozier, 2005; Turton et al., 2007, 2011; Wright-Gallo, Higbee, Reagon, & Davey, 2006) and/or reinforcement that competes with the attention/escape (Carter & Horner, 2009; Kamps et al., 2006) to reinforce a socially acceptable alternative behavior. Skinner et al. (2009) used a DRO intervention (i.e., play breaks in back of classroom for no occurrences of target behaviors within a specified time), and function-based fixed-time reinforcement (i.e., teacher/peer attention and breaks on a 3-min schedule) to decrease disruptive and aggressive behavior.

Kamps et al. (2006) implemented a DRA-based intervention with curricular supports that addressed both the attention and escape functions that served aggressive and noncompliant behavior. The intervention included increased levels of teacher attention (praise), points and lottery tickets for desirable behavior, while attention was withheld for inappropriate behavior (EXT), in conjunction with curricular supports and "help tickets" as a means to request academic help from the teacher or peers and provide a little escape from the task, and increased social reinforcement (attention) for finished assignments.

Curricular and instructional revision. The curriculum can be modified to ensure instruction and materials are meaningful, are matched to student's skill level (Center et al., 1982), and are necessary for use in the student's environment (Geiger et al., 2010). The use of empirically based teaching methods and teaching necessary prerequisite skills to ensure students learn foundation skills needed to perform more

difficult tasks can decrease the aversiveness of tasks (Geiger et al., 2010). Increased support for task demands (Kamps et al., 2006; Lane, Barton-Arwood et al., 2007; Turton et al., 2007; 2011), modifying the difficulty level of tasks (Carter & Horner, 2009; Fairbanks et al., 2007; Turton et al., 2007), and modifying the duration or amount of work (Fairbanks et al., 2007) are curriculum supports that have been used to decrease attention and escape-maintained behavior.

Additionally, Turton et al., (2007) provided a student with time for planning her day during homeroom, increased challenging work and modified assignments so that the student could participate in whole-class lessons. Kamps et al. (2006) directed the teacher to model three responses at the beginning of tasks to reduce difficulty. Lane, Weisenbach et al., (2006) provided examples at the top of assignments and checklists of task steps.

Self-monitoring. Self-monitoring, a procedure which involves students recording their own behavior at predetermined intervals of time (Holifield et al., 2010) has been used in combination with other procedures to reduce behavior maintained by attention and escape (Briere, & Simonsen, 2011; Kamps et al., 2006; Lane, Barton-Arwood et al., 2007; Turton et al., 2007). Along with DRA and curricular supports, a student self-recorded her responses during group choral responding (Kamps et al., 2006). Lane, Barton-Arwood et al. (2007) used a self-monitoring and curricular modification intervention to decrease off-task and disruptive behaviors. The self-monitoring component included a timer that was set to ring every 15 min, at which time John self-monitored his work and the teacher provided immediate feedback, and a sticker or stamp contingent on quality of work behavior. At the end of the work section John shared his reading log comments or answers with a study buddy. The curricular modifications

included a sign with reminders for how to wait for questions to be answered, chunking, reading log journal with Know What Learn (KWL) charts, and challenge questions.

Attention and tangibles. Interventions that have led to significant reductions in problem behavior maintained by attention and tangibles involve careful manipulation of the delivery of attention and tangibles so that procedures that focus on the attention function consider the effects of the tangible function and vice versa, so as not increase the problem behavior while addressing both functions. Harding et al. (2009) designed a FCT intervention during which the child was given a choice to pick preferred toys every 5 min. Students were given praise and an additional preferred toy for 20 to 30 s if they said "more," or touched a microswitch. Disruptive behavior was ignored and destructive behavior was blocked in a neutral manner (i.e., no reprimands or talking) and the toys were taken away until the child behaved appropriately. At that point, reminders were given on how to communicate appropriately to access attention and/or toys. Mann and Mueller (2009) also used a FCT intervention and found that when appropriate communication produced attention that led to a preferred activity, the participant's attention and tangible-maintained aggression decreased to near-zero levels. Hagopian, Kuhn, Long, and Rush (2005) implemented a FCT intervention in which a participant was provided with noncontingent and continuous access to preferred stimuli (i.e., music and a game boy) to help him to tolerate the delay between his appropriate communication response and reinforcement during schedule thinning.

Escape and tangibles. Interventions that have led to significant reductions in problem behavior maintained by escape and tangibles involve careful manipulation of the delivery of escape and tangibles so that procedures that focus on the escape function

consider the effects of the tangible function and vice versa, so as not increase the problem behavior while addressing both functions. Separate treatments were implemented for escape from attention and tangible-maintained behavior using a multiple baseline design across conditions design (Hagopian et al., 2001). The FCT intervention with NCR of toys and books for 30 s on a fixed-time 3-min schedule, reinforced the student to request breaks from attention in one condition and access to tangibles in the other condition, while a delay-to-reinforcement fading technique supporting him to engage in appropriate behavior while waiting longer for access to tangibles (Hagopian et al., 2001). Gale et al., (2011) used a NCR with no demands (continuo escape) intervention in which a spoon was removed and meals ended noncontingently, while videos were played occasionally throughout the sessions (tangible reinforcement).

Attention, escape, and sensory. Interventions that have led to significant reductions in problem behavior maintained by attention, escape and sensory reinforcement involve careful manipulation of the delivery of attention, breaks and sensory reinforcement so that the procedures that focus on one function are planned with consideration of the effects of the of the other two functions, so as not increase the problem behavior while addressing each of the maintaining functions. Kamps et al. (2006) implemented an individualized DRA and DRO- based intervention with curricular supports that addressed the attention, escape, and sensory functions of the off-task and self-stimulation behaviors of a student at risk for EBD. The intervention included increased levels of teacher attention (praise), points and lottery tickets for desirable behavior, while attention was withheld for inappropriate behavior (EXT), in conjunction with a DRO self-monitoring strategy which entailed the student recording on-task and

off-task behavior at 1-2 min intervals (after a preset number of intervals of on-task behavior, increases in on-task behavior and decreases in disruptive behaviors were reinforced). The self-management strategy supported a behavior incompatible with the stimulatory and off-task behaviors (Kamps et al., 2006).

Banda, McAfee, and Hart, (2009) used a DRA intervention in which the student (who wore a helmet that prevented injury, which also blocked sensory reinforcement) was given positive attention every 10 s when he refrained from using SIB, and praise when he completed tasks. SIB was blocked along with the teaching assistant telling him to stop his problem behavior. When the student exhibited SIB the teaching assistant repositioned away from the student, did not communicate with him for 10 s, and then prompted him to complete tasks (Banda et al., 2009).

Attention, escape, and tangibles. Interventions that have led to significant reductions in problem behavior maintained by attention, escape and tangibles involve careful manipulation of the delivery of attention, breaks, and tangibles so that the procedures that focus on one function are planned with consideration of the effects of the of the other two functions, so as not increase the problem behavior while addressing each of the maintaining functions. Borrero and Vollmer (2006) implemented an intervention that provided separate interventions for each reinforcer that led to decreases in destructive and aggressive behavior that was maintained by attention, escape, and tangibles. They used a multiple baseline design to implement NCA for attention, and separate DRA procedures for escape and tangible functions, and the parameters of each intervention (i.e., delays and response requirement) were thinned.

Attention, tangibles, and sensory. Interventions that have led to significant reductions in problem behavior maintained by attention, tangibles and sensory reinforcement involve careful manipulation of the delivery of attention, tangibles and sensory reinforcement so that the procedures that focus on one function are planned with consideration of the effects of the of the other two functions, so as not increase the problem behavior while addressing each of the maintain functions. Lane et al., (2009) implemented an intervention in which the student was given a special chair to impede movement, and colored cups were used to communicate whether or not he needed help, to decrease off-task and physically aggressive behaviors maintained by attention, tangibles, and sensory reinforcement. Reinforcement delivery increased from once a week (before the start of the intervention) to several times a day and included a choice for 2 min access to Koosh ball, break, or a ticket that could be turned in to access a visit with the principal. The teacher provided the student with only one verbal prompt when he was off-task, then modeled the appropriate behavior or completion of the task, and finally provided guidelines if needed while ensuring the student remained in the room and could not escape the task (Lane et al., 2009).

Translating Research on Function-Based Interventions into Practice

Researchers have documented the superiority of function-based interventions and the challenge is to translate this knowledge to applied practice (Fox & Davis, 2005; Turton et al, 2011). Central in effective intervention design, is recognizing that the identified function is providing reinforcement and using that awareness to drive the development of the intervention plan (Delfs & Campbell, 2010; McIntosh, Brown et al., 2008). Critical to the BIP is the modification of antecedents to reduce the likelihood that

the problem behavior will occur (Stichter, Lewis, Johnson, & Trussell, 2004). Once the behavior improves, students' responses need to be shaped so that they spend the majority of time engaged in instruction and acquiring skills useful for post-school life. BIPS need to plan for generalization and fading of external supports.

Monitoring BIPs

To make sure the BIP is implemented correctly, a plan that lists the exact components of the function-based intervention need to be included in the BIP to allow for monitoring of the consistency and accuracy of implementation (Etscheidt, 2006; Umbreit et al., 2007; Van Acker et al., 2005). An example of a plan to monitor the implementation of the BIP is documentation of the specific components of the intervention plan with the inclusion of the individual personnel who will be responsible for implementing each component. Van Acker and colleagues recommended that a description of the criteria to be used to determine if the plan should be discontinued due to lack of effectiveness should be included in the BIP. A plan to monitor the BIP should include: how the implementation and/or success of the intervention plans will be evaluated, who will be responsible for the assorted components of plan implementation, how the maintenance of any behavior change accomplished will be assessed, and how the generalization of the behavior change across behaviors, people, or settings will be evaluated. Additionally, BIPs should identify necessary teacher/staff supports, resources, and training needed to fix problem contexts and ensure maintenance of improved behavior (Carr et al., 2002; Knoster, Villa, & Thousand, 2000).

Concerns with Applied Practice

Although the crucial need for and benefit of function-based interventions have been substantiated, researchers have found that most BIPs are not founded on the results of FBAs (Blood & Neel 2007), and incorporate strategies that do not address the assessed function of the problem behavior (**Scott, McIntyre et al., 2005;** Van Acker et al., 2005). When the interventions developed for BIPs are not based on the assessed function of the problem behavior, the problem behavior may be strengthened by means of positive or negative reinforcement, and the contingencies maintaining the problem behavior may not address appropriate replacement behaviors (Vollmer & Northup, 1996). For example, a BIP that recommends time out as the intervention and sitting quietly in one's chair as the replacement behavior (for a student whose problem behavior of throwing chairs is maintained by escape), may inadvertently reinforce the problem behavior by providing the student with access for escape (time out) and leave the student without the skills to request a break appropriately.

When Scott, McIntyre and colleagues (2005) conducted a descriptive analysis of the perceptions of 13 school-based FBA teams in Illinois, a mere **23% of IEP teams reported they** selected interventions based on the assessed function of the behavior. Responses that choices were not clearly connected to function (e.g., teach students there are consequences for behavior) were given by 46% of the teams, and 31% chose interventions that excluded the student (e.g., removal from class as a consequence). When asked how they learned about the interventions, 69% of the teams selected from a general list of strategies, and 31% reported they had past experience with those interventions

because they were commonly used in their school (e.g., they had experienced success when they used the interventions with other students).

As part of a state-wide study in Wisconsin, Van Acker and colleagues (2005) examined the technical sufficiency of 71 FBA/BIPs that were provided by public school IEP teams. They found critical deficiencies in most of the FBAs and also discovered that a significant number of the BIPs lacked interventions and strategies that addressed the function of the behavior identified in the FBA, leading to poorly developed and unsuccessful BIPs. Over half of the BIPs used positive behavioral supports to support appropriate behavior; however 46% of the BIPs planned to address the target behavior using only aversive approaches. Only 35% of the BIPs contained interventions that were founded on the assessed function of the behavior.

Blood and Neel (2007) discovered 42 out of 43 files did not address the function of problem behavior when they examined the randomly selected files of 43 students in self-contained classrooms for students with EBD and behavioral challenges in a Washington school district. Only 14 out of the 43 files contained FBAs, and only 1 out of 14 FBAs included a hypothesis of function and replacement behavior. None of the behavior plans contained evidence that the IEP teams had used the results of an FBA to develop interventions.

None of the behavior plans were designed to address the individual needs of students and did not contain contingency equations or individualized antecedent conditions. Instead, 78.6% of the files that contained FBAs, and 78.3% of the files that did not contain FBAs, included a general list of positive and negative consequences that could apply to any problem behavior. The typical generalized list contained a range of

methods for responding to problem behavior in a less restrictive manner (e.g., verbal prompts) to more intense strategies (e.g., expulsion). A personal component (e.g., description of preferred consequences for appropriate behavior) was added to a general list in 21.4% of the files that contained FBAs, and 21.7% of the files that did not contain FBAs. When teachers of the district were interviewed they reported that they created their behavior interventions in their classrooms rather than using the information contained in the students' FBAs and BIPs.

Partly as a result of BIPs lacking a connection to the function of the problem behavior, many schools are called to court in due process hearings to investigate the inaccurate use of FBAs and BIPs (Couvillon et al., 2009; Van Acker et al., 2005). Invalid assessments and ineffective intervention plans have been the result of schools conducting practices not founded on evidenced-based findings and procedures that have been inaccurately labeled as FBA (Scott et al., 2008; Sasso et al., 2001). Consequently, authorities have expressed misgivings concerning schools' implementation of the FBA/BIP process (Quinn et al., 2001; Scott & Kamps, 2007). More research is needed to understand the gap between FBAs and the implementation of BIPs (Couvillon et al., 2009; Van Acker et al., 2005).

CONCLUSION

Researchers in the field of EBD have called for the standardization of FBA procedures and the use of experimental analysis to identify function of behaviors (Kamps et al., 2006). It is crucial that function-based behavior intervention planning is applied in a sound manner to provide students with interventions that will support them to spend more time engaged in instruction and acquiring skills that are useful for post-school life

(Hammond & Hall, 2011; Scott & Caron, 2005). Moreover, interventions designed without regard to the function maintaining behavior may be counter-therapeutic, reinforce problem behavior, and waste opportunity for life-changing progress (Sasso et al., 2001).

There are questions about the shortcomings of the FBA/BIP process and abilities of teachers to conduct FBAs and design BIPs in a reliable manner without specialist support (Fox & Davis, 2005). Although researchers confirm the effectiveness of function-based interventions, the FBA/BIP process is complicated and requires specialized training that incorporates practice and feedback (Codding, Livanis, Pace, & Vaca, 2008; Van Acker et al., 2005). Methods and/or systems of support that can improve the efficiency of the FBA/BIP process for practitioners need to be investigated (Ingram et al., 2005; McIntosh, Brown et al., 2008; Scott, Liaupsin et al., 2005). Despite policy that recommends FBAs be used to drive behavior intervention planning, there are still questions about whether practitioners are linking FBAs to intervention plans (Blood & Neel, 2007; Van Acker et al., 2005). More research is needed to shed light how on the FBA/BIP process is carried out in schools, and how well practitioners link behavioral function to intervention to inform best practice guidelines (Sasso et al., 2001; Van Acker et al., 2005).

References

Ahearn W. H., Clark, K. M., DeBar, R., & Florentino, C. (2005). On the role of preference in response competition. *Journal of Applied Behavior Analysis*, *38*, 247–250.

Ahearn, W. H., Clark, K. M, MacDonald, R. P., & Chung, B. I. (2007). Assessing and treating vocal stereotypy in children with autism. *Journal of Applied Behavior Analysis*, *40*, 263-275.

Ahrens, E. N., Lerman, D. C., Kodak, T., Worsdell, A. S., & Keegan, C. (2011). Further evaluation of response interruption and redirection as treatment for stereotypy. *Journal of Applied Behavior Analysis*, *44*, 95-108.

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

Alberto, P., & Troutman, A. C. (2009). *Applied behavior analysis for teachers* (8th ed.). Upper Saddle, NJ: Prentice-Hall.

Algozzine, K., Christian, C., Marr, M. B., McClanahan, T., & White, R. (2008). Demography of Problem Behavior in Elementary Schools. *Exceptionality*, *16*, 93–104.

Alter, P. J., Conroy, M. A., Mancil, G. R., & Haydon, T. (2008). A comparison of functional behavior assessment methodologies with young children: Descriptive methods and functional analysis. *Journal of Behavioral Education*, *17*, 200-219.

Anderson, C. M., English, C. L., & Hedrick, T. M. (2006). Use of the structured descriptive assessment with typically developing children. *Behavior Modification*, *30*, 352-378.

Anderson, C.M., Freeman, K. A., & Scotti, J. R. (1999). Evaluation of the generalizability (reliability and validity) of analog functional assessment methodology. *Behavior Therapy, 30,* 31–50.

Arvans, R. K., & LeBlanc, L. A. (2009). Functional assessment and treatment of migraine reports and school absences in an adolescent with Asperger's disorder. *Education and Treatment of Children*, *32*, 151-166.

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

Athens, E. S., & Vollmer, T. R. (2010). An investigation of differential reinforcement of alternative behavior without extinction. *Journal of Applied Behavior Analysis*, *43*, 569-589.

Athens, E. S., Vollmer, T. R., Sloman, K. N., & Pipkin, C. S. (2008). An analysis of vocal stereotypy and therapist fading. *Journal of Applied Behavior Analysis*, *41*, 291-297.

Bachmeyer, M. H., Piazza, C. C., Fredrick, L. D., Reed, G. D., Rivas, K. D., & Kadey, H. J. (2009). Functional analysis and treatment of multiply controlled behavior. *Journal of Applied Behavior Analysis*, *42*, 641-658.

Bambara, L. M., & Kern, L. (2005). *Individualized supports for students with problem behaviors: Designing positive behavior plans*. New York: The Guilford Press.

Banda, D. R., McAfee, J. K., & Hart, S. L. (2009). Decreasing self-injurious behavior in a student with autism and Tourette syndrome through positive attention and extinction. *Child and Family Behavior Therapy*, *31*, 144-156.

Barton-Arwood, S. M., Wehby, J. H., Gunter, P. L., & Lane, K. (2003). Functional behavior rating scales: Interrater reliability with students with emotional or behavioral disorders. *Behavioral Disorders*, *28*, 386–400.

Beavers, G. A., & Iwata, B. A. (2011). Prevalence of multiply controlled problem behavior. *Journal of Applied Behavior Analysis*, *44*, 593-597.

Bijou, S., Peterson, R., & Ault, M. (1968). A method to integrate descriptive and experimental field studies at the level of data and empirical concepts. *Journal of Applied Behavior Analysis*, *1*, 175-191.

Billingsley, B. (2004). Promoting teacher quality and retention in special education. *Journal of Learning Disabilities*, *37*, 370-376.

Blood, E., & Neel, R. S. (2007). From FBA to implementation: A look at what is actually being delivered. *Education and Treatment of Children*, *30*, 67-80.

Borrero, C. W., & Vollmer, T. R. (2006). Experimental analysis and treatment of multiply controlled problem behavior: A systematic replication and extension. *Journal of Applied Behavior Analysis*, *39*, 375-379.

Briere, D. E., & Simonsen, B. (2011). Self-monitoring interventions for at-risk middle school students: The importance of considering function. *Behavioral Disorders*, *36*, 129-140.

Brusa, E., & Richman, D. (2008). Developing stimulus control for occurrences of stereotypy exhibited by a child with autism. *International Journal of Behavioral Consultation and Therapy*, *4*, 264-269.

Burchard, J. D., & Barrera, F. (1972). An analysis of timeout and response cost in a programmed environment. *Journal of Applied Behavior Analysis*, *5*, 271-282.

Butler, L. R., & Luiselli, J. R. (2007). Escape-maintained problem behavior in a child with autism: Antecedent functional analysis and intervention evaluation of noncontingent escape and instructional fading. *Journal of Positive Behavior Interventions, 9*, 195-202.

Cale, S. I., Carr, E. G., Blakely-Smith, A., & Owen-DeSchryver, J. S. (2009). Context-based assessment and intervention for problem behavior in children with autism spectrum disorder. *Behavior Modification*, *33*, 707-742.

Campbell, A., & Anderson, C. (2008). Enhancing effects of check-in/check-out with function-based support. *Behavioral Disorders*, *33*, 233-245.

Campbell, A., & Anderson, C. M. (2011). Check-in/check-out: A systematic evaluation and component analysis. *Journal of Applied Behavior Analysis*, *44*, 315-326.

Carr, E. G., Dunlap, G., Horner, R. H., Koegel, R. L., Turnbull, A., Sailor, W., …Fox, L. (2002). Positive behavior support: Evolution of an applied science. *Journal of Positive Behavior Interventions*, *4*, 4-16.

Carr, E. G., & Durand, V. M. (1985). Reducing behavior problems through functional communication training. *Journal of Applied Behavior Analysis, 18,* 111-126.

Carter, S. L. (2010). A comparison of various forms of reinforcement with and without extinction as treatment for escape-maintained problem behavior. *Journal of Applied Behavior Analysis*, *43*, 543-546.

Carter, D. R., & Horner, R. H. (2007). Adding functional behavioral assessment to first step to success: A case study. *Journal of Positive Behavior Interventions*, *9*, 229-238.

Carter, D. R., & Horner, R. H. (2009). Adding function-based behavioral support to First Step to Success: Integrating individualized and manualized practices. *Journal of Positive Behavior Interventions*, *11*, 22-34.

Cassella, M. D., Sidener, T. M, Sidener, D. W, & Progar, P. R. (2011). Response interruption and redirection for vocal stereotypy in children with autism: A systematic replication. *Journal of Applied Behavior Analysis*, *44*, 169-173.

Center, D., Deitz, S. M., & Kaufman, M. (1982). Student ability, task difficulty, and inappropriate classroom behavior. *Behavior Modification*, *6*, 355-374.

Christle, C., Nelson, C. M., & Jolivette, K. (2004). School characteristics related to the use of suspension. *Education and Treatment of Children, 27,* 509–526.

Chung, Y., & Cannella-Malone, H. I. (2010). The effects of presession manipulations on automatically maintained challenging behavior and task responding. *Behavior Modification*, *34*, 479–502.

Cihak, D., Alberto, P. A., & Fredrick, L. D. (2007). Use of brief functional analysis and intervention evaluation in public settings. *Journal of Positive Behavior Interventions*, *9*, 80-93.

Codding, R. S., Livanis, A., Pace, G. M., & Vaca, L. (2008). Using performance feedback to improve treatment integrity of classwide behavior plans; an investigation of observer reactivity. *Journal of Applied Behavior Analysis*, *41*, 417-422.

Conroy, M., Asmus, L., Sellers, L., & Ladwig, C. (2005). The use of an antecedent-based intervention to decrease stereotypic behavior in a general education classroom: A case study. *Focus on Autism and Other Developmental Disabilities*, *20*, 223-230.

Conroy, M. A., & Davis, C. A. (2000). Early elementary-aged children with challenging behaviors: Legal and educational issues related to IDEA and assessment. *Preventing School Failure*, *44*, 163-168.

Conroy, M. A., & Stichter, J. P. (2003). The application of antecedents in the functional assessment process, *The Journal of Special Education*, *37*, 15-25.

Couvillon, M. A., Bullock, L. M., & Gable, R. A. (2009). Tracking behavior assessment methodology and support strategies: A national survey of how schools utilize functional behavioral assessments and behavior intervention plans. *Emotional and Behavioural Difficulties*, *14*, 215-228.

Cowdery, G. E., Iwata, B. A., & Pace, G. M. (1990). Effects and side effects of DRO as treatment for self-injurious behavior. *Journal of Applied Behavior Analysis*, *23*, 497-506.

Criste, A., & Neal-White, J. (2005). *Student Achievement Model: Training and reference manual*. Atlanta, GA: Georgia Psychoeducational Network.

Crone, D. A., & Horner, R. H. (2003). *Building positive behavior support systems in schools: Functional behavioral assessment.* New York: Guilford Press.

Crone, D. A., Horner, R. H., & Hawken, L. S. (2003). *Responding to problem behavior in schools: The Behavior Education Program*. New York: Guilford.

Cunningham, E. M., & O'Neill, R. E. (2007). Agreement of functional behavior assessment and analysis methods for students with EBD, *Behavior Disorders*, *32*, 211-221.

Day, R. M., Rea, J. A., Schussler, N. G., Larsen, S. A., & Johnson, W. L. (1988). A functionally based approach to the treatment of self-injurious behavior. *Behavior Modification*, *12*, 565-589.

Deitz, S. M. (1977). Ana analysis of programming DRL schedule in educational settings. *Behavioral Research and Therapy*, *15*, 103-111.

DeLeon, I. G., Neidert, P. L., Anders, B. M., & Rodriguez-Catter, V. (2001). Choices between positive and negative reinforcement during treatment for escape-maintained behavior. *Journal of Applied Behavior Analysis*, *34*, 521–525.

Delfs, C. H., & Campbell, J. M., (2010). A quantitative synthesis of developmental disability research: The impact of functional assessment methodology on treatment effectiveness. *Behavior Analyst Today*, *11*, 4-19.

Dolezal, D. N., & Kurtz, P. (2010). Evaluation of combined-antecedent variables on functional analysis results and treatment of problem behavior in a school setting. *Journal of Applied Behavior Analysis*, *43*, 309-314.

Donaldson, J. M., & Vollmer, T. R. (2011). An evaluation and comparison of timeout procedures with and without release contingencies. *Journal of Applied Behavior Analysis*, *44*, 693-705

Dowd, T., Tobias, L., Connolly, T., Criste, A., & Nelson, C. (1993). *Specialized classroom management: A Boys Town approach.* Boys Town, NE: Boys Town Press.

Dufrene, B. A., Doggett, R. A., & Henington, C. (2007). Functional assessment and intervention for disruptive classroom behaviors in preschool and head start classrooms. *Journal of Behavioral Education*, *16*, 368–388.

Dunlap, G., Carr, E. G., Horner, R. H., Koegel, R., Sailor, W., Clarke, S., …Fox, L. (2010). A descriptive multi-year examination of positive behavior support. *Behavioral Disorders*, *35*, 259-279.

Dunlap, G., Kern, L., dePerczel, M., Clarke, S., Wilson, D., Childs, K. E., …Falk, G. D. (1993). Functional analysis of classroom variables for students with emotional and behavioral disorders. *Behavioral Disorders*, *18*, 275-291.

Durand V.M, & Crimmins D. (1992). *Motivation assessment scale*. Topeka, KS: Monaco & Associates.

Edrisinha, C., O'Reilly, M., Sigafoos, J., Lancioni, G., & Choi, H. Y. (2011). Influence of motivating operations and discriminative stimuli on challenging behavior maintained by positive reinforcement. *Research in Developmental Disabilities*, *32*, 836-845.

English, C. L., & Anderson, C. M. (2006). Evaluation of the treatment utility of the analog functional analysis and the structured descriptive assessment. *Journal of Positive Behavior Interventions, 8,* 212-229.

Esch, B. E., Carr, J. E., & Grow, L. L. (2009). Evaluation of an enhanced stimulus-stimulus pairing procedure to increase early vocalizations of children with autism. *Journal of Applied Behavior Analysis*, *42*, 225-241.

Etscheidt, S. (2006). Behavioral intervention plans: Pedagogical and legal analysis of issues. *Behavioral Disorders*, *31*, 223-243.

Everett, G. E., Olmi, D. J., Edwards, R. P., Tingstrom, D. H., Sterling-Turner, H. E, & Christ, T. J. (2007). An empirical investigation of time-out with and without escape extinction to treat escape-maintained noncompliance. *Behavior Modification*, *31*, 412-434

Fairbanks S., Sugai, G., Guardino, D., & Lathrop, M. (2007). Response to intervention: An evaluation of a classroom system of behavior support for second grade students. *Exceptional Children*, *73*, 288–310.

Falcomata, T. S., Roane, H. S., Feeney, B. J., & Stephenson, K. M. (2010). Assessment and treatment of elopement maintained by access to stereotypy. *Journal of Applied Behavior Analysis*, *43*, 513-517.

Falcomata, T. S., Roane, H. S., Hovanetz, A. N., Kettering, T. L., & Keeney, K. M. (2004). An evaluation of response cost in the treatment of inappropriate vocalizations maintained by automatic reinforcement. *Journal of Applied Behavior Analysis*, *37*, 83-87.

Filter, K. J., & Horner, R. H. (2009). Function-based academic interventions for problem behavior. *Education and Treatment of Children*, *32*, 1-19.

Fisher, W. W., DeLeon, I. G., Rodriguez-Catter, V., & Keeney, K. M. (2004). Enhancing the effects of extinction on attention-maintained behavior through noncontingent

delivery of attention or stimuli identified via a competing stimulus assessment. Journal of Applied Behavior Analysis, 37, 171-184.

Fisher, W. W, Lindauer, S. E, Alterson, C. J., & Thompson, R. H. (1998). Assessment and treatment of destructive behavior maintained by stereotypic object manipulation. Journal of Applied Behavior Analysis, 31, 513–527.

Fox, J., & Davis, C. (2005). Functional behavior assessment in schools: Current research findings and future directions. *Journal of Behavioral Education, 14,* 1-4.

Friman, P. C. (1990). Nonaversive treatment of high-rate disruption: child and provider effects. *Exceptional Children*, *57*, 64-69.

Gable, R. A., Quinn, M. M., Rutherford, R. B., Howell, K. W., Hoffman, C. C., & Butler, C. J. (2005). *Functional behavior assessment, behavior intervention plans, and positive intervention and supports: An essential part of effective schoolwide discipline in Virginia*. Retrieved from http://www.doe.virginia.gov/support/student_conduct/monograph.pdf

Gage, N. A., & Lewis, T. J., (2010). Structural analysis in the classroom. *Beyond Behavior*, *19*, 3-11.

Gale, C. M., Eikesesth, S., & Rudrud, E. (2011). Functional assessment and behavioural intervention for eating difficulties in children with autism: A study conducted in the natural environment using parents and ABA tutors as therapists. *Journal of Autism Developmental Disorders*, *41*, 1283-1396.

Gardner, A. W., Wacker, D. P., & Boelter, E. W. (2009). An evaluation of the interaction between quality of attention and negative reinforcement with children who

display escape-maintained problem behavior. *Journal of Applied Behavior Analysis*, *42*, 343–348.

Geiger, K. B., Carr, J. E., & LeBlanc, L. A. (2010). Function-based treatments for escape-maintained problem behavior: A treatment-selection model for practicing behavior analysts. *Behavior Analysis in Practice*, *3*, 22-32.

Gouboth, D., Wilder, D. A., & Booher, J. (2007). The effects of signaling stimulus presentation during noncontingent reinforcement. *Journal of Applied Behavior Analysis*, *40*, 725-730.

Gregory, A., Skiba, R. J., & Noguera, P. A. (2010). The achievement gap and the discipline gap: Two sides of the same coin? *Educational Researcher*, *39*, 59-68.

Grey I., Healy O., Leader, G., & Hayes, D., (2009). Using a Time Timer™ to increase appropriate waiting behavior in a child with developmental disabilities. *Research in Developmental Disabilities*, *30*, 359–366.

Greenwood, C. R., Delquadri, J., & Hall, R. V. (1989). Longitudinal effects of classwide peer tutoring. *Journal of Educational Psychology*, *81*, 371–383.

Groskreutz, M. P., Groskreutz, N. C., & Higbee, T. S. (2011). Response competition and stimulus preference in the treatment of automatically reinforced behavior. *Journal of Applied Behavior Analysis*, *44*, 211-215.

Grow, L. L., Carr, J. E., & LeBlanc, L. A. (2009). Treatments for attention-maintained problem behavior: Empirical support and clinical recommendations. *Journal of Evidence-Based Practices for Schools*, *10*, 70-92.

Hagan-Burke, S., Burke, M. D., & Sugai, G. (2007). Using structural analysis and academic-based intervention for a student at Risk of EBD. *Behavioral Disorders*, *32*, 175-191.

Hagopian, L. P., Bruzek, J. L., Bowman, L. G., & Jennett, H. K. (2007). Assessment and treatment of problem behavior occasioned by interruption of free-operant behavior. *Journal of Applied Behavior Analysis*, 40, 89-103.

Hagopian, L. P., Kuhn, S. A. C., Long, E. S., & Rush, K. S. (2005). Schedule thinning following communication training: Using competing stimuli to enhance tolerance to decrements in reinforcer density. *Journal of Applied Behavior Analysis*, *38*, 177-193.

Hagopian, L. P., & Toole, L. M. (2009). Effects of response blocking and competing stimuli on stereotypic behavior. *Behavioral Interventions*, *24*, 117-125.

Hagopian, L. P., Wilson, D. M., & Wilder, D. A. (2001). Assessment and treatment of problem behavior maintained by escape from attention and access to tangible items. *Journal of Applied Behavior Analysis*, *34*, 229-232.

Hammond, J. L., & Hall, S. S. (2011). Functional analysis and treatment of aggressive behavior following resection of a craniopharyngioma. *Developmental Medicine and Child Neurology*, *53*, 369-74.

Hammond, J. L., Iwata, B. A., Fritz, J. N., & Dempsey, C. M. (2011). Evaluation of fixed momentary DRO schedules under signaled and unsignaled arrangements. *Journal of Applied Behavior Analysis*, *44*, 69-81.

Hanley, G. P., Iwata, B. A., & McCord, B. (2003). Functional analysis of problem behavior: A review. *Journal of Applied Behavior Analysis*, *36*, 147-186.

Hanley, G. P., Piazza, C. C., Fisher, W. W. & Maglieri, K. A., (2005). On the effectiveness of and preference for punishment and extinction components of function-based interventions. *Journal of Applied Behavior Analysis*, *38*, 51-65.

Hansford, A., Zilber, I., LaRue, R. H., & Weiss, M. J. (2010). Practical issues in effective behavioral intervention development. *Behavior Analyst Today*, *11*, 59-76.

Harding, J. W., Wacker, D. P., Berg, W. K., Winborn-Kemmerer, L., Lee, J. F., & Ibrahimovic, M. (2009). Analysis of multiple manding topographies during Functional Communication Training. *Education and Treatment of Children*, *32*, 21-36.

Hartmann, D. P., & Hall, R. V. (1976). The changing criterion design. *Journal of Applied Behavior Analysis*, 4, 527–532.

Hausman, N., Kahng, S. W., Farrell, E., & Mongeon, C. (2009). Idiosyncratic functions: Severe problem behavior maintained by access to ritualistic behaviors. *Education and Treatment of Children*, *32*, 77-87.

Hawken, L., & Horner, R. (2003). Evaluation of a targeted group intervention within a school-wide system of behavior support. *Journal of Behavioral Education*, *12*, 225-240.

Hawken, L. S., O'Neill, R. E., & MacLeod, K. S. (2011). An investigation of the impact of function of problem behavior on effectiveness of the behavior education program (BEP). *Education and Treatment of Children*, *34*, 551-574.

Hawkins, S. M., & Heflin, L. J. (2011). Increasing secondary teachers' behavior-specific praise using a video self-modeling performance feedback intervention. *Journal of Positive Behavior Interventions*, *13*, 97-108.

Hawkins, R. O., & Axelrod, M. I. (2008). Increasing the on-task homework behavior of youth with behavior disorders using functional behavioral assessment. *Behavior Modification*, *32*, 840-859.

Heflin, L. J., & Alaimo, D. F. (2007). *Students with autism spectrum disorders: Effective instructional practices.* Upper Saddle River, NJ: Pearson Merrill Prentice Hall.

Hershfeldt, P. A., Pell, K. L., Sechrest, R., Rosenberg, M. S., Bradshaw, C. P., & Leaf, P. J. (2009). Double-Check: A model for cultural responsiveness applied to classroom behavior. *TEACHING Exceptional Children Plus*, *6*(2), Internet site: http:// escholarship.bc.edu /education / tecplus/vol6/iss2/art52

Hershfeldt, P. A., Rosenberg, M. S., & Bradshaw, C. P. (2010). Function-based thinking: A systematic way of thinking about function and its role in changing student behavior problems. *Beyond Behavior*, *19*, 12-21.

Herzinger, C. V., & Campbell, J. M., (2007). Functional assessment methodologies: A quantitative synthesis. *Journal of Autism and Developmental Disabilities*, *37*, 1430-1445.

Hess, K. L., Morrier, M. J., Heflin, L. J., & Ivey, M. L. (2008). Autism treatment survey: Services received by children with autism spectrum disorders in public school classrooms. *Journal of Autism and Developmental Disorders, 38,* 961-971.

Higbee, T. S., Chang, S., & Endicott, K. (2005). Non-contingent access to preferred sensory stimuli as a treatment for automatically reinforced stereotypy. *Behavioral Interventions*, *20*, 177–184.

Holifield, C., Goodman, J., Hazelkorn, M., & Heflin, L. J. (2010). Using self-monitoring to increase attending to task and academic accuracy in children with autism. *Focus on Autism and Other Developmental Disabilities*, *25*, 230-238.

Horner, R. D. (1980). The effects of an environmental "enrichment" program on the behavior of institutionalized profoundly retarded children. *Journal of Applied Behavior Analysis, 13,* 473-491.

Horner, R. H., Vaughn, B. J., Day, H. M., & Ard, W. R. (1996). The relationship between setting events and problem behavior: Expanding our understanding of behavioral support. In L. Koegel, R. L. Koegel, & G. Dunlap (Eds.), *Positive behavioral support: Including people with difficult behavior in the community* (pp. 381–402). Baltimore: Brookes.

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

Hughes, M. A., Alberto, P. A., & Fredrick, L. L. (2006). Self-operated auditory prompting systems as a function-based intervention in public community settings. *Journal of Positive Behavior Interventions*, *8*, 230-243.

Humenik, A. L., Curran, J., Luiselli, J. K., & Child, S. N. (2008). Intervention for self-injury in a child with autism: Effects of choice and continuous access to preferred stimuli. *Behavioral Development Bulletin*, *3*, 17-22.

Individuals With Disabilities Education Act Amendments of 1997, Pub. L. No. 105-117.

Individuals With Disabilities Education Act of 2004, 20 U.S.C. §1401–82 (2004).

Individuals With Disabilities Education Act regulations, 34 C.F.R. §§ 300.1 *et seq.* (2008).

Ing, A. D., Roane, H. S., & Veenstra, R. A. (2011). Functional analysis and treatment of coprophagia. *Journal of Applied Behavior Analysis*, *44*, 151-155.

Ingram, K., Lewis-Palmer, X, & Sugai, G. (2005). Function-based intervention planning: Comparing the effectiveness of FBA indicated and contra-indicated intervention plans. *Journal of Positive Behavior Interventions*, 7, 224-236.

Ingvarsson, E. T., Hanley, G. P., & Welter, K. M. (2009). Treatment of escape-maintained behavior with positive reinforcement: The role of reinforcement contingency and density. *Education and Treatment of Children*, *32*, 371-401.

Ingvarsson, E. T., Kahng, S., & Hausman, N. (2008). Some effects of noncontingent positive reinforcement on multiply controlled problem behavior and compliance in a demand context. *Journal of Applied Behavior Analysis*. *41*, 435-440.

Iwata B. A, & DeLeon I. G. (1995). *The functional analysis screening tool (FAST).* Unpublished manuscript, University of Florida.

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

Iwata, B. A., Pace, G. M., Cowdery, G. E., & Miltenberger, R. G. (1994). What makes extinction work: An analysis of procedural form and function. *Journal of Applied Behavior Analysis*, *27*, 131-144.

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

Iwata, B. A., Pace, G. M., Kalsher, M. J., Cowdery, G. E., & Cataldo, M. F. (1990). Experimental analysis and extinction of self-injurious escape behavior. *Journal of Applied Behavior Analysis*, *23*, 11-27.

Iwata, B. A., Vollmer, T. R., Zarcone, J. R., & Rodgers, T. A. (1993). Treatment classification and selection based on behavioral function. In R. Van Houten, & S. Axelrod (Eds.), *Behavior analysis and treatment* (pp. 101–125). New York: Plenum.

Iwata, B. A., Wallace, M. D., Kahng, S. W., Lindberg, J. S., Roscoe, E. M., Conners, J.,…Worsdell, A. S. (2000). Skill acquisition in the implementation of functional analysis methodology. *Journal of Applied Behavior Analysis, 33,* 181–194.

Jolivette, K., Scott, T. M., & Nelson, C. M. (2000). *The link between functional behavior assessments (FBAs) and behavioral intervention plans (BIPs).* (Report No. E592, EDO 001). Reston, VA: ERIC Clearinghouse on Disabilities and Gifted Education. (ERIC Document Reproduction Service No. ED438662)

Jolivette, K., Wehby, J. H., Canale, J., & Massey, N. G. (2001). Effects of choice-making opportunities on the behavior of students with emotional and behavioral disorders. *Behavioral Disorders*, *26*, 131-145.

Kamps, D., Wendland, M., & Culpepper, M. (2006). Active teacher participation in functional behavior assessment for students with emotional and behavioral

disorders risks in general education classrooms. *Behavioral Disorders*, *31*, 128-146.

Knoster, T. P., Villa, R. A., & Thousand, J. S. (2000). A framework for thinking about systems change. In R. A. Villa & J.S. Thousand (Eds.), *Restructuring for caring and effective education* (pp. 93-128). Baltimore: Paul H. Brookes.

Kodak, T., Lerman, D. C., Volkert, V. M., & Trosclair, N. (2007). Further examination of factors that influence preference for positive versus negative reinforcement. *Journal of Applied Behavior Analysis*, *40*, 25-44.

Kodak, T., Miltenberger, R. G., & Romaniuk, C. (2003). The effects of differential negative reinforcement of other behavior and noncontingent escape on compliance. *Journal of Applied Behavior Analysis*, *36*, 379–382.

Kodak, T., Northup, J., & Kelly, M. E. (2007). An evaluation of the types of attention that maintain problem behavior. *Journal of Applied Behavior Analysis*, *40*, 167-171.

Kozlowski, A., Wood, L., Gilligan, K., & Luiselli (2009). Effects of nonverbal social disapproval on attention-maintained spitting and disruptive vocalizing in a child with autism. *Clinical Case Studies*, *8*, 309-316.

Kuhn, D. E., Hardesty, S. L., & Sweeney, N. M. (2009). Assessment and treatment of excessive straightening and destructive behavior in an adolescent diagnosed with autism. *Journal of Applied Behavior Analysis*, *42*, 355-360.

Kuhn, S. A. C., & Triggs, M. (2009). Analysis of social variables when an initial functional analysis indicates automatic reinforcement as the maintaining variable for self-injurious behavior. *Journal of Applied Behavior Analysis*, *42*, 679-683.

Ladd, M. V., Luiselli, J. K., & Baker, L. (2009). Continuous access to competing stimulation as intervention for self-injurious skin picking in a child with autism. *Child and Family Behavior Therapy*, *31*, 54–60.

Lalli, J. S., Vollmer, T. R., Progar, P. R., Wright, C., Borrero, J., Daniel, D.,…May, W. (1999). Competition between positive and negative reinforcement in the treatment of escape behavior. *Journal of Applied Behavior Analysis*, *32*, 285–296.

Lane, K. L., Barton-Arwood, S. M., Spencer, J. L., & Kalberg, J. R. (2007). Teaching elementary school educators to design, implement, and evaluate functional assessment-based interventions: Successes and challenges. *Preventing School Failure*, *51*, 35-46.

Lane, K. L., Eisner, S. L., Kretzer, J. M., Bruhn, A. L., Crnobori, M. E., Funke, L. M., … Casey, A. (2009). Outcomes of functional assessment-based interventions for students with and at risk for emotional and behavioral disorders in a job-share setting. *Education and Treatment of Children*, *32*, 573-604.

Lane, K. L., Pierson, M. R., Robertson, E. J., & Little, A. (2004). Teachers' views of prereferral interventions: Perceptions of and recommendations for implementation support. *Education and Treatment of Children*, *27*, 420-439.

Lane, K. L., Rogers, L. A., Parks, R. J., Weisenbach, J. L., Mau, A. C., Merwin, M. T., & Bergman, W. A. (2007). Function-based interventions for students nonresponsive to primary and secondary prevention efforts: Illustrations at the elementary and middle school levels. *Journal of Emotional and Behavioral Disorders*, *15*, 169-183.

Lane, K. L., Smither, R., Huseman, R., Guffey, J., & Fox, J. (2007). A function-based intervention to decrease disruptive behavior and increase academic engagement. *Journal of Early and Intensive Behavioral Intervention*, *4*, 348-364.

Lane, K. L., Thompson, A., Reske, C. L., Gable, L. M., & Barton-Arwood, S. (2006). Reducing skin-picking via competing activities. *Journal of Applied Behavior Analysis*, *39*, 459–462.

Lane, K. L. Weisenbach, J. L., Little, M. A., Phillips, A., & Wehby, J. (2006). Illustrations of function-based interventions implemented by general education Teachers: Building capacity at the school site. *Education and Treatment of Children*, *29*, 549-571.

Lane, K. L., Weisenbach, J. L., Phillips, A., & Wehby, J. (2007). Designing, implementing, and evaluating function-based interventions using a systematic approach. *Behavioral Disorders*, 32, 122-139.

Lang, R., Davis, T., O'Reilly, M., Machalicek, W., Rispoli, M., Sigafoos, J., … & Regester, A., (2010). Functional analysis and treatment of elopement across two school settings. *Journal of Applied Behavior Analysis*, *43*, 113-118.

Lang, R., Didden, R., Sigafoos, J., Rispoli, M., Regester, A., & Lancioni, G. E. (2009). Treatment of chronic skin-picking in an adolescent with Asperger syndrome and borderline intellectual disability. *Clinical Case Studies*, *8*, 317–325.

Lang, R., O'Reilly, M., Lancioni, G., Rispoli, M., Machalicek, W., Chan, J. M.,…Franco, J. (2009). Discrepancy in functional analysis results across two settings: Implications for intervention design. *Journal of Applied Behavior Analysis*, *42*, 393–397.

Lang, R., O'Reilly, M., Machalicek, W., Lancioni, G., Rispoli, M., & Chan, J. M. (2008). A preliminary comparison of functional analysis results when conducted in contrived versus natural settings. *Journal of Applied Behavior Analysis*, *41*, 441–445.

Langdon, N. A., Carr, E. G., & Owen-DeSchryver, J. S. (2008). Functional analysis of precursors for serious problem behavior and related intervention. *Behavior Modification*, *32*, 804-827.

LaRue, R. H., Lenard, K., Weiss, M. J., Bamond, M., Palmieri, M., & Kelley, M. E. (2010). Comparison of traditional and trial-based methodologies for conducting functional analyses. *Research in Developmental Disabilities*, *31*, 480–487.

Legray, M. W., Dufrene, B. A., Sterling-Turner, H., Olmi, D. J., & Bellone, K. (2010). A comparison of function-based differential reinforcement interventions for children engaging in disruptive classroom behavior. *Journal of Behavioral Education*, *19*, 185-204.

Lewis, C. W., Butler, B. R., Bonner, F. A., & Joubert, M. (2010). African American male discipline patterns and school district responses resulting impact on academic achievement: Implications on academic achievement for urban educators and policy makers. *Journal of African American Males in Education*, *1*, 1-25.

Lewis, T. J., Scott, T., & Sugai, G. (1994). The problem behavior questionnaire: A teacher based instrument to develop functional hypotheses of problem behavior in general education classrooms. *Diagnostique*, *19*, 103-115.

Liaupsin, C. J., Ferro, J. B., Umbreit, J., Urso, A., & Upreti, G. (2006). Improving academic engagement through systematic, function-based intervention. *Education and Treatment of Children*, *29*, 573-591.

Liu-Gitz, L., & Banda, D. R., (2010). A replication of the RIRD strategy to decrease vocal stereotypy in a student with autism. *Behavioral Interventions*, *25*, 77-87.

Lo, Y., & Cartledge, G. (2006). FBA and BIP: Increasing the behavior adjustment of African American boys in schools. *Behavioral Disorders*, *31*, 147–161.

Lomas, J. E., Fisher, W. W., & Kelley, M. E. (2010). The effects of variable-time delivery of food items and praise on problem behavior reinforced by escape. *Journal of Applied Behavior Analysis*, *43*, 425-435.

Long, E. S., Hagopian, L. P., DeLeon, I. G., Marhefka, J. M., & Resau, D. (2005). Competing stimuli in the treatment of multiply controlled problem behavior during hygiene routines. *Research in developmental disabilities*, *26*, 57-69.

Love, J. R., Carr, J. E., & LeBlanc, L. A. (2009) Functional assessment of problem behavior in children with autism spectrum disorders: A summary of 32 outpatient cases. *Journal of Autism and Developmental Disorders*, *39*, 363-372.

Lyons, E. A., Rue, H. C., Luiselli, J. K., & DiGennaro, F. D. (2007). Brief functional analysis and supplemental feeding for postmeal rumination in children with developmental disabilities. *Journal of Applied Behavior Analysis*, *40*, 743–747.

Maag, J. W., Wolchik, S. A., Rutherford, J. B., Jr., & Parks, B. T. (1986). Response covariation on self-stimulation behaviors during sensory extinction procedures. *Journal of Autism and Developmental Disorders*, *16*, 145-154.

Mace, F. C., McComas, J. J., Mauro, B. C., Progar, P. R., & Taylor, B. (2010). Differential reinforcement of alternative behavior increases resistance to extinction: Clinical demonstration, animal modeling, and clinical test of one solution. *Journal of the Experimental Analysis of Behavior*, *93*, 349-367.

Mace, F. C., McComas, J. J., Mauro, B. C., Progar, P. R., Taylor, B., Ervin, R., & Zangrillo, A. N. (2009). The persistence-strengthening effects of DRA: An illustration of bidirectional translational research. *The Behavior Analyst*, *32*, 293–300.

Mace, F. C., Pratt, J. L., Prager, K. L., & Pritchard, D. (2011). An evaluation of three methods of saying "no" to avoid an escalating response class hierarchy. *Journal of Applied Behavior Analysis*, *44*, 83-94.

Mann, A. J., & Mueller, M. M. (2009). False positive functional analysis results as a contributor of treatment failure during functional communication training. *Education and Treatment of Children*, *32*, 121-149.

Marcus, B. A., & Vollmer, T. R. (1995). Effects of differential negative reinforcement on disruption and compliance. *Journal of Applied Behavior Analysis*, *28*, 229–230.

Martinez, S. (2009). A system gone berserk: How are zero-tolerance policies really affecting schools? *Preventing School Failure*. *53*, 153-158.

Matson, J. L., Sipes, M., Horovitz, M., Worley, J. A., Shoemaker, M. E., & Kozlowski, A. M. (2011). Behaviors and corresponding functions addressed via functional assessment. *Research in Developmental Disabilities*, *32*, 625-629.

McCord, B. E., & Neef, N. A. (2005). Leisure items as controls in the attention condition of functional analyses. *Journal of Applied Behavior Analysis*, *38*, 417-426.

McGinnis, E., & Goldstein, A. P. (1997). *Skillstreaming the elementary school child: New strategies and perspectives for teaching prosocial skills.* Chicago, IL: Research Press.

McIntosh, K., Borgmeier, C., Horner, R. H., Anderson, C. M., Rodriguez, B. J., & Tobin, T. J. (2008). Technical adequacy of the Functional Assessment Checklist: Teachers and Staff (FACTS) FBA interview measure. *Journal of Positive Behavior Interventions*, *10*, 33-45.

McIntosh, K., Brown, J. A., & Borgmeier, C. J. (2008). Validity of functional behavior assessment within a response to intervention framework: Evidence, recommended practice, and future directions. *Assessment for Effective Intervention*, *34*, 6-14.

McIntosh, K. K., Campbell, A. L., Carter, D. R., & Dickey, C. R. (2009). Differential effects of a tier two behavior intervention based on function of problem behavior. *Journal of Positive Behavior Interventions*, *11*, 82-93.

McIntosh, K., Horner, R. H., Chard, D. J., Dickey, C. R., & Braun, D. H. (2008). Reading skills and function of problem behavior in typical school settings. *Journal of Special Education*, *42*, 131–147.

McLaren, E. M., & Nelson, M. C. (2009).Using functional behavior assessment to develop behavior interventions for students in Head Start. *Journal of Positive Behavior Interventions*, *11*, 3-21.

Menzies, H. M., & Lane, K. L. (2011). Using self-regulation strategies and functional assessment-based interventions to provide academic and behavioral support to students at risk within three-tiered models of prevention. *Preventing School Failure*, *55*, 181-191.

Michael, J. (1982). Distinguishing between discriminative and motivational functions of stimuli. *Journal of the Experimental Analysis of Behavior*, *37*, 149–155.

Michael, J. (1993). Establishing operations. *The Behavior Analyst*, *76*, 191-206.

Michael, J. (2000). Implications and refinements for the establishing operation concept. *Journal of Applied Behavior Analysis*, *33*, 401-410.

Miltenberger, R. G. (2005). The role of automatic negative reinforcement in clinical problems. *International Journal of Behavioral Consultation and Therapy*, *1*, 1-11.

Miguel, C. F., Clark, K., Tereshko, L., & Ahearn, W. H. (2009). The effects of response interruption and redirection and sertraline on vocal stereotypy. *Journal of Applied Behavior Analysis*, *42*, 883-888.

Mitchell, B. S., Stormont, M., & Gage, N. A. (2011). Tier two interventions implemented within the context of a tiered prevention framework. *Behavioral Disorders*, 36, 241-261.

Mong, M., Johnson, K. N., & Mong, K. (2011). Effects of Check in/Check Out on behavior and mathematics with elementary students. *Behavioral Disorders*, *36*, 225-240.

Moore, D. W., Anderson, A., & Kumar, K. (2005). Instructional adaptation in the management of escape-maintained behavior in a classroom. *Journal of Positive Behavior Interventions*, *7*, 216-223.

Moreno, G., & Bullock, L. M. (2011). Principles of positive behavior supports: Using the FBA as a problem-solving approach to address challenging behaviors beyond special populations. *Emotional and Behavioural Difficulties*, *16*, 117-127.

Morrison, H., Roscoe, E. M., & Atwell, A. (2011). An evaluation of antecedent exercise on behavior maintained by automatic reinforcement using a three-component multiple schedule. *Journal of Applied Behavior Analysis*, *44*, 523-541.

Mueller, M. M., & Kafka, C. (2006). Assessment and treatment of object mouthing in a public school classroom. *Behavioral Interventions*, *21*, 137-154.

Murdock, S. G., O'Neill, R. E., & Cunningham, E. (2005). A comparison of results and acceptability of functional behavioral assessment procedures with a group of middle school students with emotional/behavioral disorders (E/BD). *Journal of Behavioral Education*, *14*, 5-18.

Mustian, A. L. (2010). *The comparative effects of function-based versus nonfunction-based interventions on the social behavior of African American students*. Available from ProQuest Dissertations and Theses database. (UMI No. 3422674)

Najdowski, A. C., Wallace, M. D., Doney, J. K., & Ghezzi, P. M. (2003). Parental assessment and treatment of food selectivity in natural settings. *Journal of Applied Behavior Analysis*, *36*, 383-386.

Najdowski, A. C., Wallace, M. D., Ellsworth, C. L., MacAleese, A. N., & Cleveland, J. M. (2008). Functional analyses and treatment of precursor behavior. *Journal of Applied Behavior Analysis*, *41*, 97-105.

Nahgahgwon, K. N., Umbreit, J., Liaupsin, C. J, & Turton, A. M. (2010). Function-based planning for young children at risk for emotional and behavioral disorders. *Education and Treatment of Children*, *33*, 537-559.

Ndoro, V. W., Hanley, G. P., Tiger, J. H., & Heal, N. A. (2006). A descriptive assessment of instruction-based interactions in the preschool classroom. *Journal of Applied Behavior Analysis*, *39*, 79–90.

Neef, N. A., & Peterson, S. M. (2007). Functional behavior assessment. In J. O. Cooper, T. E. Heron, & W. L. Heward (Eds.), *Applied behavior analysis* (2nd ed., pp. 500-524). Upper Saddle River, NJ: Pearson Education.

Neidert, P. L., Iwata, B. A., & Dozier, C. L. (2005). Treatment of multiply controlled problem behavior with procedural variations of differential reinforcement. *Exceptionality*, *13*, 45-53.

Nelson, C. M., & Rutherford, R. B. (1983). Timeout revisited: Guidelines for its use in special education. *Exceptional Education Quarterly*, *3*, 56-67.

Newcomer, L. L., & Lewis, T. J. (2004). Functional behavioral assessment: An investigation of assessment reliability and effectiveness of function-based interventions. *Journal of Emotional and Behavioral Disorders*, *12*, 168-181.

Northup, J., Broussard, C., Jones, K., George, T., Vollmer, T. R., & Herring, M. (1995). The differential effects of teacher and peer attention on the disruptive classroom behavior of three children with a diagnosis of attention deficit hyperactivity disorder. *Journal of Applied Behavior Analysis*, *28*, 227–228.

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

O'Connor, A. S., Prieto, J., Hoffmann, B., DeQuinzio, J. A., & Taylor, B. A. (2011). A stimulus control procedure to decrease motor and vocal stereotypy. *Behavioral Interventions*, *26*, 231-242.

O'Neill, R. E., Horner, R. H., Albin, R. W., Sprague, J. R., Storey, K., & Newton, J. S. (1997). *Functional assessment and program development for problem behavior: A practical handbook* (2nd ed.). Pacific Grove, CA: Brooks/Cole.

O'Reilly, M. F., Edrisinha, C., Sigafoos, J., Lancioni, G., & Andrews, A. (2006). Isolating the evocative and abative effects of an establishing operation on challenging behavior. *Behavioral Interventions*, *21*, 195–204.

O'Reilly, M. F., Edrisinha, C., Sigafoos, J., Lancioni, G., Cannella, H., & Machalicek, W., & Langthorne, P. (2007). Manipulating the evocative and abative effects of an establishing operation: Influences on challenging behavior during classroom instruction. *Behavioral Interventions*, *22*, 137–145.

O'Reilly, M. F., Edrisinha, C., Sigafoos, J., Lancioni, G., Machalicek, W., & Antonucci, M. (2007). The effects of presession attention on subsequent attention-extinction and alone conditions. *Journal of Applied Behavior Analysis*, *40*, 731–735.

Pace, G. M., Ivancic, M. T., & Jefferson, G. (1994). Stimulus fading as treatment for obscenity in a brain-injured adult. *Journal of Applied Behavior Analysis*, 27, 301–305.

Paclawskyj, T. R., Matson, J. L., Rush, K. S., Smalls, Y., & Vollmer, T. R. (2000). Questions About Behavioral Function (QABF): A behavioral checklist for functional assessment of aberrant behavior. *Research in Developmental Disabilities*, 21, 223-229.

Park, K. L., & Scott, T. M. (2009). Antecedent-based interventions for young children at risk for emotional and behavioral disorders. *Behavioral Disorders*, *34*, 196-211.

Patterson, S. T. (2009). The effects of teacher-student small talk on out-of-seat behavior. *Education and Treatment of Children*, *32*, 167-174.

Payne, L.D., Scott, T.M., & Conroy, M. (2007). A school-based examination of the efficacy of function-based intervention. *Behavioral Disorders*, *32*, 158-174.

Peck Peterson, S.M., Caniglia, C., Royster, A.J., Macfarlane, E., Plowman, K., Baird, S.J., & Wu, N. (2005). Blending functional communication training and choice making to improve task engagement and decrease problem behaviour. *Educational Psychology*, *25*, 257-274.

Peck, J., Sasso, G. M., & Jolivette, K. (1997). Use of structural analysis hypothesis testing model to improve social interactions via peer-mediated interventions. *Focus on Autism and Other Developmental Disabilities*, *12*, 219-230.

Piazza, C. C., Adelinis, J. D., Hanley, G. P., Goh, H., & Delia, M. D. (2000). An evaluation of the effects of matched stimuli on behaviors maintained by automatic reinforcement. *Journal of Applied Behavior Analysis*, *33*, 13-27.

Piazza, C. C., Fisher, W. W., Hanley, G. P., Remick, M. L., Contrucci, S. A., & Aitken, T. (1997). The use of positive and negative reinforcement in the treatment of escape-maintained problem behavior. *Journal of Applied Behavior Analysis*, *30*, 279–298.

Piazza, C. C., Hanley, G. P., Bowman, L. G., Ruyter, J. M., Lindauer, S. E., & Saiontz, D. M. (1997). Functional analysis and treatment of elopement. *Journal of Applied Behavior Analysis*, *30*, 653–672.

Plummer, S., Baer, D. M., & LeBlanc, J. M. (1977). Functional considerations in the use of time out and an effective alternative. *Journal of Applied Behavior Analysis*, *10*, 689-705.

Preciado, J. A., Horner, R. H., & Baker, S. K. (2009). Using a function-based approach to decrease problem behaviors and increase academic engagement for Latino English language learners. *The Journal of Special Education***,** *42*, 227-240.

Quinn, M. M., Gable, R. A., Fox, J., Rutherford, R. B., Jr., Van Acker, R., & Conroy, M. (2001). Putting quality functional assessment into practice in schools: A research agenda on behalf of E/BD students. *Education and Treatment of Children*, *24*, 261–275.

Ramsey, M. L. (2010). *Using function-based choice-making interventions to increase task completion and accuracy and to reduce problem behaviors for students with E/BD*. (Educational Psychology and Special Education Dissertations). Retrieved from http://digitalarchive.gsu.edu/epse_diss/69

Ramsey, M. L., Jolivette, K., Patterson, D. P., & Kennedy, C. (2010). Using choice to increase time on-task, task-completion, and accuracy for students with emotional/behavior disorders in a residential facility. *Education and Treatment of Children, 33*, 1-21.

Rapp, J. T. (2007). Further evaluation of methods to identify matched stimulation. *Journal of Applied Behavior Analysis*, *40*, 73-88.

Rapp, J. T., Patel, M. R., Ghezzi, P. M., O' Flaherty, C. H., & Titterington, C. J. (2009). Establishing stimulus control of vocal stereotypy displayed by young children with autism. *Behavioral Interventions*, *24*, 85–105.

Rasmussen, K., & O'Neill, R. E. (2006). The effects of fixed-time reinforcement schedules on problem behavior of children with emotional and behavioral disorders in a day-treatment classroom setting. *Journal of Applied Behavior Analysis*, *39*, 453-457.

Reinke, W. M., Lewis-Palmer, T., & Merrell, K. (2008). The classroom check-up: A classwide teacher consultation model for increasing praise and decreasing disruptive behavior. *School Psychology Review*, *37*, 315-332.

Rincover, A. (1978). Sensory extinction: A procedure for eliminating self-stimulatory behavior in psychotic children. *Journal of Abnormal Child Psychology*, *6*, 299-310.

Rincover, A., Cook, R., Peoples, A., & Packard, D. (1979). Sensory extinction and sensory reinforcement principles for programming multiple adaptive behavior change. *Journal of Applied Behavior Analysis*, *12*, 221-233.

Ringdahl, J. E., Falcomata, T. S., Christensen, T. J., Bass-Ringdahl, S. M., Lentz, A., Dutt, A., & Schuh-Claus, J. (2009). Evaluation of a pre-treatment assessment to select mand topographies for functional communication training. *Research In Developmental Disabilities*, *30*, 330-341.

Ringdahl, J. E., Kitsukawa, K., Andelman, M. S., Call, N., Winborn, L., Barretto, A., & Reed, G. (2002). Differential reinforcement with and without instructional fading. *Journal of Applied Behavior Analysis*, *35,* 291-294.

Rispoli, M., O'Reilly, M., Lang, R., Machalicek, W., Davis, T., Lancioni, G., & Sigafoos, J. (2011). Effects of motivating operations on problem and academic behavior in classrooms. *Journal of Applied Behavior Analysis*, *44*, 187-192.

Roane, H. S., Falcomata, T. S., & Fisher, W. W. (2007). Applying the behavioral economics principal of unit price to DRO schedule thinning. *Journal of Applied Behavior Analysis*, *40*, 529-534.

Roane, H. S., & Kelley, M. E. (2008). Decreasing problem behavior associated with a walking program for an individual with developmental and physical disabilities. *Journal of Applied Behavior Analysis*, *41*, 423-428.

Romaniuk, C., Miltenberger, R., Conyers, C., Jenner, N., Jurgens, M., & Ringenberg, C. (2002). The influence of activity choice on problem behaviors maintained by escape versus attention. *Journal of Applied Behavior Analysis*, *35*, 349-362.

Rooker, G. W., Iwata, B. A., Harper, J. M., Fahmie, T. A., & Camp, E. M. (2011). False-positive tangible outcomes of functional analyses. *Journal of Applied Behavior Analysis*, *44*, 737-745.

Ruta, L., Mugno, D., D'Arrigo, V. G., Vitiello, B., & Mazzone L. (2010). Obsessive-compulsive traits in children and adolescents with Asperger syndrome. *European Child Adolescent Psychiatry*, *19*, 17–24.

Sasso, G. M., Conroy, M. A., Peck-Stichter, J., & Fox, J. J. (2001). Slowing down the bandwagon: The misapplication of functional assessment for students with emotional or behavioral disorders. *Behavioral Disorders*, *26*, 282-296.

Schumacher, B. I., & Rapp, J. T. (2011). Evaluation of the immediate and subsequent effects of response interruption and redirection on vocal stereotypy. *Journal of Applied Behavior Analysis*, *44*, 681-685.

Scott, T. M., Anderson, C., Mancil, R., & Alter, P. (2009). Function-based supports for individual students in school settings. In W. Sailor, G. Dunlop, G. Sugai, & R.

Horner (Eds.), *Handbook of positive behavior support* (pp. 421-441). New York: Springer.

Scott, T. M., Anderson, C. M., & Spaulding, S. A. (2008). Strategies for developing and carrying out functional assessment and behavior intervention planning. *Preventing School Failure*, *52*, 39-49.

Scott, T.M., Bucalos, A., Liaupsin, C.J., Nelson, C.M., Jolivette, K., & DeShea, L. (2004). Using functional behavior assessment in general education settings: Making a case for effectiveness and efficiency. *Behavioral Disorders*, *29*, 189-201.

Scott, T. M., & Caron, D. B. (2005). Conceptualizing functional behavior assessment as prevention practice within positive behavior support systems. *Preventing School Failure*, *50*, 13-20.

Scott, T. M., & Kamps**,** D. M. (2007). The future of functional behavioral assessment in school settings**.** *Behavioral Disorders*, *32*, 146–157.

Scott, T. M., Liaupsin, C., Nelson, C. M., & McIntyre, J. (2005). Team-based functional behavior assessment as a proactive public school process: A descriptive analysis of current barriers. *Journal of Behavioral Education*, *14*, 57-71.

Scott, T. M., McIntyre, J., Liaupsin, C., Nelson, C. M., Conroy, M., & Payne, L. D. (2005). An examination of the relation between functional behavior assessment and selected intervention strategies with school-based teams. *Journal of Positive Behavior Interventions, 7*, 205-215.

Shaw, R., & Simms, T. (2009). Reducing attention-maintained behavior through the use of positive punishment, differential reinforcement of low rates, and response marking. *Behavioral Interventions*, *24*, 249–263.

Shirley, M. J., Iwata, B. A., & Kahng, S. (1999). False-positive maintenance of self-injurious behavior by access to tangible reinforcers. *Journal of Applied Behavior Analysis*. *32*, 201–204.

Shores, R. E., & Wehby, J. H. (1999). Analyzing the classroom social behavior of students with EBD. *Behavioral Disorders*, *7*, 194–199.

Shumate, E. D., & Wills, H. P. (2010). Classroom-based functional analysis and intervention for disruptive and off-task behaviors. *Education and Treatment of Children*, *33*, 23-48.

Sidener, T. M., Carr, J. E., & Firth, A. M. (2005). Superimposition and withholding of edible consequences as treatment for automatically reinforced stereotypy. *Journal of Applied Behavior Analysis*, *38*, 121-124.

Simonsen, B., Jeffrey-Pearsall, J., Sugai, G., & McCurdy, B. (2011). Alternative setting-wide positive behavior support. *Behavior Disorders*, *36*, 213-224.

Skiba, R. J. (2002). Special education and school discipline: A precarious balance. *Behavioral Disorders*, *27*, 81–97.

Skiba, R. J., Horner, R. H., Chung, C. G., Rausch, M. K., May, S. L., & Tobin, T. (2011). Race is not neutral: A national investigation of African American and Latino disproportionality in school discipline. *School Psychology Review*, *40*, 85-107.

Skiba, R. J., Poloni-Staudinger, L., Gallini, S., Simmons, A. B., & Feggins-Azziz, R. (2006). Disparate access: The disproportionality of African American students

with disabilities across educational environments. *Exceptional Children*, *72*, 411-424.

Skinner, B. F. (1948). "Superstition" in the pigeon. *Journal of Experimental Psychology*, *38*, 168-172.

Skinner, J. N., Veerkamp, M. B., Kamps, D. M., & Andra, P. R. (2009). Teacher and peer participation in functional analysis and intervention for a first grade student with attention deficit hyperactivity disorder. *Education and Treatment of Children*, *32*, 243-266.

Smith, R. G., Iwata, B. A., Vollmer, T. R., & Zarcone, J. R. (1993). Experimental analysis and treatment of multiply controlled self-injury. *Journal of Applied Behavior Analysis*, *26*, 183–196.

Solnick, M. D., & Ardoin, S. P. (2010). A quantitative review of functional analysis procedures in public school settings. *Education and Treatment of Children*, *33*, 153-175.

Solnick, J. V., Rincover, A., & Peterson, C. R. (1977). Some determinants of the reinforcing and punishing effects of time out. *Journal of Applied Behavior Analysis*, *10*, 415-424.

Stage, S. A., Jackson, H. G., Moscovitz, K., Erickson, M. J., Thurman, S. O., Jessee, W., & Olson, E. M. (2006). Using multimethod-multisource functional behavioral assessment for students with behavioral disabilities. *School Psychology Review*, *35*, 451-471.

Stahr, B., Cushing, D., Lane, K., & Fox, J. (2006). Efficacy of a function-based intervention in decreasing off-task behavior exhibited by a student with ADHD. *Journal of Positive Behavior Interventions*, *8*, 201-211.

Steege, M. W., & Watson, T. S. (2009) *Conducting school-based functional behavioral assessments: A practitioner's guide* (2nd ed.). NY: The Guilford Press.

Stichter, J. P., & Conroy, M. A. (2005). Using structural analysis in natural settings: A responsive functional assessment strategy. *Journal of Behavioral Education*, *14*, 19-34.

Stichter, J., Lewis, T., Johnson, N., & Trussell, R. (2004). Toward a structural assessment: Analyzing the merits of an assessment tool for a student with EBD. *Assessment for Effective intervention, 30*, 25-40.

Stichter, J. E., Randolph, J. K., Kay, D., & Gage, N. (2009). The use of structural analysis to develop antecedent-based interventions for students with autism. *Journal of Autism and Developmental Disabilities*, *39*, 883-896.

Stichter, J. P., Sasso, G. M., & Jolivette, K. (2004). Structural analysis and intervention in a school setting: Effects on problem behavior for a student with an emotional/behavioral disorder. *Journal of Positive Behavior Interventions*, *6*, 166-177.

Sugai, G., & Horner, R. H. (2002) Behavior function: Staying close to what we know. *Positive Behavioral Interventions and Support Newsletter*. Retrieved from http://www.pbis.org/pbis_newsletter/volume_1/issue1.aspx

Sugai, G., Horner, R. H., Dunlap, G. Hieneman, M., Lewis, T. J., Nelson, C. M.,… Wilcox, B. (2000). Applying positive behavioral support and functional

behavioral assessment in schools. *Journal of Positive Behavioral Interventions*, *2*, 131-143.

Sundberg, M. L., Michael, J., Partington, J. W., & Sundberg, C. A. (1996). The role of automatic reinforcement in early language acquisition. The analysis of verbal behavior, 13, 21–37.

Swoszowski, N.C., Jolivette, K., Fredrick, L., & Heflin, J. (in review). Function-based responses to check in/check out for students with emotional and behavior disorders in a residential facility. *Behavioral Disorders*.

Symons, F., McDonald, L., & Wehby, J. (1998). Functional assessment and teacher collected data. *Education and Treatment of Children*, *21*, 135-159.

Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). New York: Harper Collins.

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

Tarbox, R. S., Wallace, M. D., & Williams, L. (2003). Assessment and treatment of elopement: A replication and extension. *Journal of Applied Behavior Analysis*, *36,* 239–244.

Tarbox, J., Wilke, A. E., Najdowski, A. C., Findel-Pyles, R. S., Balasanyan, S., Caveney, A. C., … Tia, B. (2009). Comparing indirect, descriptive, and experimental functional assessments of challenging behavior in children with autism. *Journal of Developmental and Physical Disabilities*, *21*, 493–514.

Tawny, J. W., & Gast, D. L. (1984). *Single subject research in special education*. Columbus, OH: Merrill.

Taylor, J. C., & Carr, E. G. (1992). Severe behavior problems related to social interactions. I: Attention seeking and social avoidance. *Behavior Modification*, *16*, 305–335.

Taylor, B. A., Hoch, H., & Weissman, M. (2005). The analysis and treatment of vocal stereotypy in a child with autism. *Behavioral Interventions*, *20*, 239-253.

Thompson, R. H., Fisher, W. W., Piazza, C. C., & Kuhn, D. E. (1998). The evaluation and treatment of aggression maintained by attention and automatic reinforcement. *Journal of Applied Behavior Analysis*, *31*, 103–116.

Thompson, R. H., Iwata, B. A., Hanley, G. P., Dozier, C. L., & Samaha, A. L. (2003). The effects of extinction, noncontingent reinforcement and differential reinforcement of other behavior as control procedures. *Journal of Applied Behavior Analysis*, *36*, 221–238.

Tiger, J. H., Fisher, W. W., & Bouxsein, K. J. (2009). Therapist- and self-monitored DRO contingencies as a treatment for the self-injurious skin-picking of a young man with Asperger syndrome. *Journal of Applied Behavior Analysis*, *42*, 315–319.

Tiger, J. H., Fisher, W. W., Toussaint, K. A., & Kodak, T. (2009). Progressing from initially ambiguous functional analyses: Three case examples. *Research in Developmental Disabilities: A Multidisciplinary Journal*, *3*, 910-926.

Tobin T. J., Lewis-Palmer, T., & Sugai, G. (2001). School-wide and individualized effective behavior support: An explanation and an example. *The Behavior Analyst Today*, *3*, 51–75

Tobin, T. J., & Sugai, G. (2005). Preventing problem behaviors: Primary, secondary, and tertiary level prevention interventions for young children. *Journal of Early Intensive Behavior Intervention, 2*, 115-124.

Tobin, T. J., & Vincent, C. G. (2011). Strategies for preventing disproportionate exclusions of African American students. *Preventing School Failure*, *55*, 192-201.

Todd, A., Campbell, A., Meyer, G., & Horner, R. (2008). Evaluation of a targeted group intervention in elementary students: The check-in/check-out program. *Journal of Positive Behavior Interventions*, *10*, 46–55.

Touchette, P. E., MacDonald, R. F., & Langer, S. N. (1985). A scatter plot for identifying stimulus control of problem behavior. *Journal of Applied Behavior Analysis*, *18*, 343-351.

Trussell, R. P., Lewis, T. J., & Stichter, J. P. (2008). The Impact of targeted classroom interventions and function-based behavior interventions on problem behaviors of students with emotional/behavioral disorders. *Behavioral Disorders*, *33*, 153-166.

Tucker, M., Sigafoos, J., & Bushell, H. (1998). Use of noncontingent reinforcement in the treatment of challenging behavior: A review and clinical guide. *Behavior Modification*, *22*, 529–547.

Turnbull, A., Edmonson, H., Griggs, P., Wickham, D., Sailor, W., Freeman, R., … Jared, W. (2002). A blueprint for schoolwide positive behavior support: Implementation of three components. *Exceptional Children*, *68*, 377-402.

Turton, A. M., Umbreit, J., Liaupsin, C. J., & Bartley, J. (2007). *Behavioral Disorders*, *33*, 23-32.Turton, A. M., Umbreit, J., & Mathur, S. R. (2011). Systematic function-based intervention for adolescents with emotional behavior disorders in an alternative setting: Broadening the context. *Behavioral Disorders*, *36*, 117-128.

Umbreit, J., Ferro, J., Liaupsin, C., & Lane, K. L. (2007). *Functional behavioral assessment and function-based intervention: An effective, practical approach*. Upper Saddle River, NJ: Prentice-Hall.

Umbreit, J., Lane, K. L., & Dejud, C. (2004). Improving classroom behavior by modifying task difficulty: Effects of increasing the difficulty of too-easy tasks. *Journal of Positive Behavior Interventions*, *6*, 13-20.

Underwood, M. A., Umbreit, J., & Liaupsin, C. J. (2009). Efficacy of a systematic process for designing function-based interventions for adults in a community setting. *Education and Training in Developmental Disabilities*, *44*, 25–38.

Vaughan, M. E., & Michael, J. (1982). Automatic reinforcement: An important but ignored concept. *Behaviorism*, *10*, 217-227.

Van Acker, R., Boreson, L., Gable, R. A., & Potterton, T. (2005). Are we on the right course? Lessons learned about current FBA/BIP practices in schools. *Journal of Behavioral Education, 14,* 35–56.

Van Rie, Ginny L., “Using Sensory Interventions to Promote Skill Acquisition for Students with autism Spectrum disorders” (2010). Educational Psychology and

Special Education Dissertations. Paper 71. http://digitalarchive.gsu.edu/epse_diss/71

Van Rie, G. L., & Heflin, L. J. (2009). The effect of sensory activities on correct responding for children with autism spectrum disorders. *Research in Autism Spectrum Disorders*, *3*, 783-796.

Vollmer, T. R. (1994). The concept of automatic reinforcement: Implications for behavioral research in developmental disabilities. *Research in Developmental Disabilities*, *15*, 187-207.

Vollmer, T. R., & Iwata, B. A. (1992). Differential reinforcement as a treatment for behavior disorders: Procedural and functional variations. *Research in Developmental Disabilities*, *13*, 393-417.

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

Vollmer, T. R., Marcus, B. A., & LeBlanc, L. (1994). Treatment of self-injury and hand-mouthing following inconclusive functional analyses. *Journal of Applied Behavior Analysis*, *27*, 331–344.

Vollmer, T. R., Marcus, B. A., & Ringdahl, J. E. (1995). Noncontingent escape as a treatment for self-injurious behavior maintained by negative reinforcement. *Journal of Applied Behavior Analysis*, *28*, 15-26.

Vollmer, T. R., & Northup, J. (1996). Some implications of functional analysis for school psychology. *School Psychology Quarterly, 11,* 76-92.

Wacker, D. P., Berg, W. K., Harding, J. W., & Cooper-Brown, L. J. (2011). Functional and structural approaches to behavioral assessment of problem behavior. In W. W. Fisher, C. C. Piazza, & H. S. Roane (Eds.), *Handbook of applied behavior analysis* (pp. 165-181). New York, NY: Guilford Press.

Wacker D. P., Harding J. W., Berg W. K., Lee J. F., Schieltz K. M., Padilla Y. C., … Shahan T. A. (2011). An evaluation of persistence of treatment effects during long-term treatment of destructive behavior. *Journal of the Experimental Analysis of Behavior*, *96*, 261-282.

Wacker, D., & Steege, M. (1993). Providing outclinic services: Evaluating treatment and social validity. In J. Reichle & D. Wacker (Eds.), *Behavior analysis and treatment* (pp.297-319). New York: Plenum.

Wallace, J. M., Goodkind, S., Wallace, C. M., & Bachman, J. G. (2008). Racial, ethnic, and gender differences in school discipline among U.S. high school students: 1991-2005. *Negro Educational Review*, *59*, 47–62.

Waller, R. D., & Higbee, T. S. (2010). The effects of fixed-time escape on inappropriate classroom behavior. *Journal of Applied Behavior Analysis*, *43*, 149-153.

Walker, H. M., McConnell, S. R., Holmes, D., Todis, B., Walker, J., & Golden, N. (1983). *The Walker social skills curriculum: The ACCEPTS (A curriculum for children's effective peer and teacher skills) program.* Austin, TX: Pro-Ed.

Walker, H. M., Stiller, B., Golly, A., Kavanagh, K., Severson, H. H., & Feil, E. G. (1997). *First Step to Success: Helping children overcome antisocial behavior. Implementation guide*. Longmont, CO: Sopris West.

Waller, R. D., & Higbee, T. S. (2010) The effects of fixed-time escape on inappropriate classroom behavior. *Journal of Applied Behavior Analysis*, *43*, 149-153.

Weber, K. P., Killu, K., Derby, K. M., & Barretto, A. (2005). The status of functional behavioral assessment (FBA): Adherence to standard practice in FBA methodology. *Psychology in the Schools*, *42*, 737-744.

Wilder, D. A., Allison, J., Nicholson, K., Abellon, O. E., & Saulnier, R. (2010). Effects of rationales to increase compliance among preschoolers. *Journal of Applied Behavior Analysis*, *43*, 601-613.

Wilder, D. A., & Carr, J. E. (1998). Recent advances in the modification of establishing operations to reduce aberrant behavior. *Behavioral Interventions*, *13*, 43-59.

Wilder, D. A., Chen, L., Atwell, J., Pritchard, J., & Weinstein, P. (2006). Brief functional analysis and treatment of tantrums associated with transitions in preschool children. *Journal of Applied Behavior Analysis*, *39*, 103-107.

Wilder, D. A., Harris, C., Reagan, R., & Racey, A. (2007). Functional analysis and treatment of noncompliance by preschool children. *Journal of Applied Behavior Analysis*, *40*, 173-177.

Wilder, D. A, Normand, M., & Atwell, J. (2005). Noncontingent reinforcement as treatment for food refusal and associated self-injury. *Journal of Applied Behavior Analysis*, *38*, 549–553.

Winborn-Kemmerer, L., Ringdahl, J. E., Wacker, D. P., & Kitsukawa, K. (2009). A demonstration of individual preference for novel mands during functional communication training. *Journal of Applied Behavior Analysis*, *42*, 185-189.

Wong, H. K., & Wong, R. T., (2001). *How to be an effective teacher: The first days of school.* Mountain View, CA: Harry K. Wong.

Wood, B. K., Ferro, J. B., Umbreit, J., & Liaupsin, C. J. (2011). Addressing the challenging behavior of young children through systematic function-based intervention. *Topics in Early Childhood Special Education*, *30*, 221-232.

Wood, K., Umbreit, J., Liaupsin, C., & Gresham, F. (2007). A treatment integrity analysis of function-based interventions. *Education and Treatment of Children*, *30*, 105-120.

Wright-Gallo, G. L., Higbee, T. S, Reagon, K. A., & Davey, B. J. (2006). Classroom-based functional analysis and intervention for students with emotional/behavioral disorders. *Education and Treatment of Children*, *29*, 421-436.

Yell, M. L., & Shriner, J. G. (1998). The Discipline of students with disabilities: Requirements of the IDEA amendments of 1997. *Education and Treatment of Children*, *21*, 246–257.

Zarcone, J. R., Iwata, B. A., Vollmer, T. R., Jagtiani, S., Smith, R. G., & Mazaleski, J. L. (1993). Extinction of self-injurious escape behavior with and without instructional fading. *Journal of Applied Behavior Analysis, 26,* 353–360.

Zirkle, P. A. (2009). What does the law say? *Teaching Exceptional Children*, *41*, 73-75.

Zirkle, P. A. (2011). State special education laws for functional behavior support assessment and behavior intervention plans. *Behavioral Disorders*, *36*, 262-278.

CHAPTER 2

TECHNICAL AND APPLIED FEATURES OF FUNCTIONAL BEHAVIORAL ASSESSMENTS AND BEHAVIORAL INTERVENTION PLANS

All students, including those with emotional and behavioral disorders (EBD), engage in specific behaviors to get what they want and avoid what they do not want. Unlike students without disabilities, however, students with EBD have histories of using behaviors that are inappropriate for school settings. Some students exhibit challenging behaviors to avoid or escape educational tasks to escape the discomfort and humiliation associated with repeated failure and rejection (Shores & Wehby, 1999). Other students display inappropriate behavior to get attention from peers and adults in the school environment, while still others engage in undesirable behavior to achieve desired sensory stimulation.

Professionals recognize the need to know the function of the behavior to develop effective interventions (Ingram, Lewis-Palmer, & Sugai, 2005; Newcomer & Lewis, 2004; Scott, Anderson, & Spaulding, 2008). When conducted correctly, functional behavior assessments (FBAs) allow personnel to intervene with problem behavior using function-based interventions (McLaren & Nelson, 2009; Tobin & Vincent, 2011). Additionally, FBAs can help address disproportionality as educators examine the context of challenging behavior during the FBA process, and subsequently can adjust environmental variables that contribute to misbehavior before making unnecessary referrals to special education (Lo & Cartledge, 2006; Moreno & Bullock, 2011; Mustian, 2010).

There is no officially recognized or standard legal definition of the procedures or processes that produce a FBA (Sasso, Conroy, Peck-Stichter, & Fox, 2001; Scott, Meers, & Nelson, 2000; Scott & Kamps, 2007; Sugai, Lewis-Palmer, & Hagan-Burke, 1999–2000). Lawfully, only 17 states specify definitions of FBAs/or BIPs, vital components (of FBAs and BIPS) are seldom identified and are not defined, and FBAs and BIPs are not mandatory when behavior obstructs learning (Zirkle, 2011).

Miltenberger (2011) described the FBA as a document used by school professionals to establish which antecedents and consequences are consistently related to the occurrence of the target behavior by systematically describing the events preceding and following behavior. An IEP team uses the information gained from the FBA to develop a detailed action plan (i.e., Behavior Intervention Plan or BIP) for managing a student's behavior. BIPs may provide recommendations to address performance and skill deficits by: modifying the physical environment and social context to prevent the problem behavior from occurring, suggesting consequences to reinforce desirable behavior, proposing the use of extinction to prevent reinforcing inappropriate behavior, and recommending strategies to teach the student appropriate skills or replacement behaviors.

Researchers have demonstrated that interventions based on function are effective for helping students with EBD improve their behavior (Conroy, Dunlap, Clarke, & Alter, 2005; Kern, Hilt, & Gresham, 2004; Umbreit, Ferro, Liaupsin, & Lane, 2007). Turton, Umbreit, Liaupsin, and Bartley (2007) used a function-based intervention to teach an appropriate replacement behavior to a 16-year-old female student with behavior problems who used profanity to gain attention from adults. The function-based intervention

supported the replacement of profanity with an appropriate communication technique to gain staff attention. A function-based intervention also decreased the interruption behavior of a 7-year-old student with ADHD, who used the behavior to gain attention from his teacher and escape class assignments. The intervention package included self-monitoring and curricular modification components that allowed the student to gain teacher praise and attention, and resulted in the student's improved classroom performance (Lane, Barton-Arwood, Spencer, & Kalberg, 2007).

Interventions based on function have been effective in increasing appropriate behavior for students with autism spectrum disorders (Banda, McAfee, & Hart, 2009; Kuhn, Hardesty, & Sweeney, 2009; Langdon, Carr, & Owen-DeSchryver, 2008). For example, Butler and Luiselli (2007) used a combination of noncontingent escape and instructional fading to reduce the escaped-based self-injurious behavior, physical aggression, and tantrum behavior of a 13-year-old girl who had autism, which resulted in increased frequency of instruction.

Function-based interventions can be useful in general education classrooms to help students without disabilities who need support with behavioral issues. Function-based interventions were shown to have greater effects on the reduction of problem behaviors across general education students who were at risk for failure (Ingram et al., 2005; Newcomer & Lewis, 2004) and students with special needs (Payne, Scott, & Conroy, 2007) than interventions not based on function. A function-based intervention improved on-task behavior and decreased disruptive behaviors in general education elementary students at risk for developing EBD (Kamps, Wendland, & Culpepper, 2006). A general education teacher used a function-based intervention to reduce a student's out-

of-seat behavior (Patterson, 2009) and functional assessment-based interventions were effective for decreasing inappropriate behavior in Head Start classrooms (McLaren & Nelson, 2009). A function-based intervention, including implementation of language-matched instructional priming, supported four students who were Latino English-language learners improve behavior and reading abilities (Preciado, Horner, & Baker, 2009).

Despite the fact that researchers have shown that effective interventions are based on function (Scott et al., 2008), some investigators have found that many students with EBD do not have FBAs in their files (Blood & Neel, 2007), and most BIPs prescribe interventions that are unrelated to the function of students' problem behavior as assessed in their FBAs. Scott, Liaupsin, Nelson, and MacIntyre (2005) found that only 23% of IEP teams participating in their study reported that they selected interventions based on the assessed function of the behavior. Van Acker, Boreson, Gable, and Potterton (2005) discovered that only 35% of the BIPs they reviewed reflected information related to the function of the behavior to support the student to engage in an appropriate alternative behavior. In an investigation by Blood and Neel (2007), only one BIP out of 43 contained a hypothesis statement derived from the FBA and a corresponding replacement behavior. During the examination of the other 42 student files, Blood and Neel (2007) could not find evidence that the information collected during the FBA process was used to analyze the function of the problem behavior or select the replacement behaviors.

Given the empirical validation of function-based interventions, an updated examination needs to occur to determine whether technology and procedures have advanced, or the lack of reliance on the outcomes of FBAs has continued. Additionally,

the overall technical adequacy of FBAs and BIPs needs to be scrutinized. Scott and Kamps (2007) stressed the necessity that future researchers provide data-based investigations of FBA procedures within school settings that link FBA assessment to intervention**.** Blood and Neel (2007) suggested future investigators carefully examine specific components of FBAs and BIPs, and analyze how effective educational teams use the components. Weber, Killu, Derby, and Barretto (2005) and Fox and Davis (2005) appealed to researchers to examine the technical accuracy of the components of FBAs.

In addition to examining the current status of how FBAs are conducted and BIPs are developed, investigators need to examine the similarities and differences between function-based strategies that are specified in BIPs. Scott, Liaupsin et al. (2005) found that IEP teams frequently selected interventions from a standard list provided by their school district or chose from among those that were customarily used in their schools; unfortunately, most of these interventions were punitive in nature and unrelated to behavioral function. Function-based interventions will appear radically different from interventions which are punitive and may even vary differentially by function. An understanding of the function of problem behavior results in differentiated interventions for effectively addressing target behavior (Scott et al., 2008). For example, interventions for attention-based behaviors often include methods that support students in gaining access to social attention through appropriate means while withholding attention for problem behaviors. In contrast, interventions for escape-based functions may facilitate student willingness to exert effort during learning activities, while sensory-based interventions support students in meeting their stimulation needs appropriately.

Replacement behaviors prescribed in attention-based interventions often provide students with skills to access peer and adult attention using socially desirable means. Investigators have successfully taught students to access social attention by recruiting teacher praise (Sutherland, Wehby, & Copeland, 2000) and increasing opportunities to respond (Sutherland, Wehby, &Yoder, 2002). Effective interventions have included teaching replacement behaviors using social skills training programs, and providing academic and/or self-management strategies (Stahr, Cushing, Lane, & Fox, 2006), and helping students gain attention through socially acceptable methods. Social skills programs such as skill-streaming (McGinnis & Goldstein, 1997), the ACCEPTS program (Walker et al., 1983), and Boys Town (Dowd, Tobias, Connolly, Criste, & Nelson, 1993), use direct instruction, reinforcement, modeling, and practice components to teach students how to develop and maintain positive social relationships (Kavale, Mathur, & Mostert, 2004). In particular, interventions that combine the teaching of social skills with increased teacher attention and opportunities to participate have successfully reduced problem behaviors in students with EBD (Newcomer & Lewis, 2004; Trussell, Lewis, & Stichter, 2008).

Other strategies for attention-based behavior include using precorrection (Crosby, Jolivette, & Patterson, 2006), teaching students self-management techniques (Lane, Smither, Huseman, Guffey, & Fox, 2007), explicitly teaching clearly stated class rules and expectations (Hester, Hendrickson, & Gable, 2009), and providing academic support. These strategies empower students to earn attention for academic productivity and achievement (Trussell et al., 2008). Precorrection can be used to set students up to achieve and earn positive attention by proactively addressing behaviors and academic

responses (Crosby et al., 2006). Self-management strategies support students to learn self-control techniques (Stahr et al., 2006), which will help them focus on meeting academic and behavior goals. The difference between acceptable and nonacceptable behaviors is conveyed when teachers systematically withhold attention to prevent reinforcement of problem behaviors during planned ignoring (Hester et al., 2009).

In contrast to the interventions for attention-based behaviors, interventions for escape-based behaviors tend to focus on the establishing operations (Michael, 1993) of the target behavior and rely on manipulating antecedent-demand conditions so that the student is more comfortable engaging in the activity (Butler & Luiselli, 2007). Noncontingent reinforcement (NCR) may increase the comfort of learning situations by changing the establishing operation for escape by providing the reinforcement independent of the problem behavior (Carr et al., 2000; Wilder, Normand, Atwell, & Vollmer, 2005). Modifying demand conditions by reducing time required for task demands (Kamps et al., 2006), decreasing difficulty of task demands or adding instructional support (Filter & Horner, 2009; Kamps et al., 2006; Lane, Barton-Arwood et al., 2007; Lane, Smither et al., 2007; Preciado et al., 2009), adding novel tasks to a repertoire of learned tasks (McComas, Hoch, Paone, & El-Roy, 2000), providing students with choices on lesson elements or how to complete tasks (McComas et al., 2000; Romaniuk et al., 2002; Trussell et al., 2008), using instructional fading (removal of task demands followed by a gradual increase of the presentation of task demands task requests (Butler & Luiselli, 2007; Zarcone et al., 1993), and using a fixed-time schedule to offer noncontingent breaks from demands (Butler & Luiselli, 2007; Kodak, Miltenberger, & Romaniuk, 2003) can make learning activities less aversive for students.

Interventions for escape-based behaviors sometimes involve eliminating the contingency between the problem behavior and the negatively reinforcing consequence by preventing escape or by not giving breaks from demands when students exhibit problem behavior (i.e., escape extinction; Ingram et al., 2005; Iwata, Pace, Cowdery, & Miltenberger, 1994; Lane et al., 2009) and often are implemented in conjunction with differential reinforcement of alternative behavior (DRA; Carr, Newsom, & Binkoff, 1980; Ingvarsson, Hanley, & Welter, 2009; Reed, Ringdahl, Wacker, Barretto, & Andelman, 2005). Replacement behaviors prescribed in escape-based interventions often provide students with appropriate tools to make their environment more comfortable or to gain escape in a socially-acceptable manner (e. g., request help; request to change seating location or cooperative group; Lane et al., 2009; Mildon, Moore, & Dixon, 2004; Preciado et al., 2009).

The most common programs for addressing sensory-based behaviors rely on identifying the sensory stimulation being sought by the student (Guess & Carr, 1991) or identifying what the sensory-based behaviors are communicating about the context (Vollmer, 1984). Examples of sensory-based interventions include NCR (Carr, Dozier, & Patel, 2002) and providing context-based supports and modifications (Cale, Carr, Blakeley-Smith, & Owen-DeSchryver, 2009). Strategies that help students cope with overwhelming stimulation include cognitive calming methods and self-regulation (Murray, Baker, Murray-Slutsky, & Parris, 2009). Extinction of sensory-based behaviors typically involves response blocking (Rincover, Cook, Peoples, & Packard, 1979).

A synthesis of evidenced-based interventions matched to function of behavior could help simplify the process of developing intervention plans while providing

effective and non-punitive options to manage problem behavior. Skinner, Veerkamp, Kamps, and Andra (2009) suggested future researchers give teachers an assortment of appropriate function-based interventions so that they can select preferred interventions (after results of a functional analysis have been carefully reviewed to make sure there is a connection to function)**,** theorizing that giving teachers choice of interventions may positively influence their fidelity of implementation.

The purpose of this study was to investigate the technical and applied features of a randomly-selected sample of FBA/BIPs from the Georgia Network of Educational and Therapeutic Services (GNETS). GNETS was selected because FBAs and BIPs must be conducted for all of their students prior to or upon entry to their programs. The methods used for determining function of behavior (e.g., indirect data collection, direct observation, experimental analysis, antecedent manipulation) were identified. The results of FBAs were reviewed as well the subsequent BIPs to discern if they addressed the function of the target behavior. Statistical analyses were used for a more rigorous examination of the FBA/BIP process, and to gauge whether current practices have evolved since the Van Acker et al. (2005) and Blood and Neel (2007) investigations.

While investigating the components of the BIPs, a collection of the various recommended function-based interventions was compiled. Behavioral interventions were examined to generate a collection of strategies used for each of four general functions: (a) attention-based (social reinforcement), (b) escape-based (negative reinforcement), (c) sensory-based (automatic reinforcement), and (d) tangible-based (social reinforcement). The interventions were compared and contrasted by identify function-specific strategies as well as those which appeared across two or three functions. Subsequently, a

prototypical plan was developed for each function, along with the strategies used most commonly to augment. statistical analyses for more rigorous examination

The following research questions guided the study; each relied on data found in the files of randomly sampled students in GNETS programs:

1. Which components described as critical in research literature for conducting FBAs and BIPs are present and which are absent?
2. What percentage of BIPs addresses the function of the behavior specified in the FBA?
3. What are the most commonly used methods for identifying and verifying function?
4. Which interventions are used specifically for each of the four targeted functions of behavior and which appear across functions?
5. What is the probability that a given behavioral function can predict which intervention (s) might be chosen?
6. How do the BIP component variables, demographic variables, behavioral function variables, and behavioral intervention variables relate to each other statistically?
7. What do GNETS directors perceive as the importance and utility of FBAs and function-based BIPS?

METHOD

Participants

Student files from the Georgia Network of Educational and Therapeutic Services (GNETS) programs were examined for this investigation. GNETS are unique to Georgia

and provide comprehensive support services to students with disabilities, ages 3-21 years. GNETS consists of 24 regional programs that augment the local school systems' continuum of services. Students, who might otherwise require residential or other more restrictive placements as a result of the severity of one or more of the characteristics of emotional and behavioral disorders (EBD) and more recently, autism spectrum disorders (ASD), are served by GNETS. Local school systems refer students to receive GNETS program services through the IEP process.

Consideration for service provision in GNETS for a child with EBD or ASD must be founded on documentation of the severity of the intensity, frequency, and duration of behavioral challenges. Previous extension of less restrictive services, and data which indicate such services have not enabled the child to benefit educationally, must be included in the documentation.

GNET classes are in session for a minimum of 180 days each fiscal year and may proceed up to 200 days. Eight students is the suggested maximum class size for preschool, elementary, and middle school classes. Ten students is the suggested maximum class size for high school classes. There is at least one paraprofessional in most GNETS classrooms to provide academic and behavioral support. The academic curriculum for all children is the Georgia general education curriculum as articulated through the Georgia Performance Standards. Of the 24 GNETS programs that were invited to participate, directors of 11 GNETS programs in the state volunteered to provide student files for the study.

Random Selection. All students in Georgia are identified by an individual Georgia Testing Identification number (GTID). A random number generator was used to

identify students whose FBAs and BIPs were selected for review, based on the last digit of their GTID. Selection occurred via phone and required that the program representative have a list, by GTID, of all students being served in the program at the time of the December 2009 FTE Count. The researcher asked the GNETS representative to go down the list and highlight students whose GTIDs ended with the same numbers that appeared on a list created by a random number generating program, until the total number of students for the program was selected.

Student Characteristics. Information for a total of 135 students, in grades 1 through 12, with single and multiple-function FBAs and BIPs were obtained. One file was excluded because it did not contain a BIP, resulting in a sample of 134 student files. Given that there are about 5,000 students in the GNETS programs, 2.7% of the population was sampled. The sample was representative of the population across the state in that four of the schools were located in an urban setting and the other seven programs were rural. Information from approximately 20% of each participating program's student population was gathered.

The ages of the students varied, most of the students were male. About half of the students were white, and the rest of the sample included students who were African-American, Hispanic, Multiracial-heritage, and Asian. Almost 75% of the students were eligible for free or reduced. Lunch eligibility information was not available for 20% of the students because the food providers controlled access to lunch eligibility data and did not give representatives that information. English was the primary language for all but one student, who was identified as an English as a second language learner. Total number of months of enrollment in GNETS programs varied greatly across students. Most of the

students were eligible for special education services under the category of severe emotional and behavioral disorders (SEBD). A summary of participant characteristics is provided in Table 1.

Table 1

Summary of Participant Characteristics

Characteristics				
		Mean	SD	Range
Age		14 years	3.4 years	6-21 years
Months in GNETS		34 months	27 months	1-144 months
IQ		81	19.65	33-138
Ethnicity		*N*	%	
	White	73	54.5	
	African-American	53	39.6	
	Hispanic	2	1.5%	
	Multiracial	2	1.5	
	Asian	1	.07	
	Unknown	3	2.2	
Lunch Eligibility	Full price	14	10.4	
	Reduced lunch	14	10.4	
	Free lunch	80	59.7	
	Not reported	26	19.4	
DSM Diagnoses	*n* with at least one diagnosis	%	Range of diagnoses	
	105	78%	1 – 8	
Medications	*n* taking at least one medication	%	Range of medications	
	74	55	1 – 12	
Special Education Eligibility		*n*	%	
	Autism	18	13.3	
	Emotional/Behavioral Disorder	114	85.2	
	Hearing Impairment	1	0.7	
	Mild Intellectual Disability	9	6.7	
	Moderate Intellectual Disability	1	0.7	
	Other Health Impairment	12	9.6	
	Occupational Therapy	4	3.0	
	Severe Developmental Delay	3	2.2	
	Specific Learning Disability	6	4.4	
	Speech and Language Impairment	28	20.7	
	Visual Impairment	1	0.7	

Note: $N = 134$

To gain additional understanding of the nature of the students' emotional and physical states, diagnoses and medication information were recorded. Diagnoses based on the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., Text Revision; American Psychiatric Association, 2000) were reported in over 75% of the files, with attention deficit/hyperactivity being the most common. Table 2 contains a summary and frequency of participant diagnoses.

Table 2

Reported Frequency and Percentage of Students with Diagnoses

Diagnosis	*N*	%	Diagnosis	*N*	%
adjustment disorder	1	0.7	mild intellectual disability	1	0.7
anxiety disorder	7	5.2	mild mental retardation	4	3.0
Asperger's disorder	7	5.2	mood disorder	1	0.7
asthma	2	1.5	*neurological impairment	1	0.7
attention deficit/hyperactivity disorder	77	57.1	obsessive-compulsive disorder	4	3.0
autistic disorder	8	5.9	oppositional defiant disorder	30	22.2
bipolar disorder	38	28.1	personality disorder (borderline & narcissistic)	1	0.7
borderline intellectual functioning	2	1.5	pervasive developmental disorder – not otherwise specified	10	7.4
bronchial pulmonary disease	1	0.7	phonological disorder	1	0.7
cerebral palsy	1	0.7	physical abuse of a child	2	1.5
chromosomal abnormality	1	0.7	posttraumatic stress disorder	13	9.6
chronic vocal tic disorder	1	0.7	*Prader-Willi syndrome	1	0.7
conduct disorder	2	1.5	psychotic disorder	6	4.4
diabetes	1	0.7	reactive airway disease	1	0.7
disruptive behavior disorder	1	0.7	reactive attachment disorder	7	5.2
Down's syndrome	1	0.7	reading disorder	1	0.7
dysthymic disorder	1	0.7	schizoaffective disorder	1	0.7
enuresis	1	0.7	*seizure disorder	4	3.0
grand mal seizure	1	0.7	selective mutism	1	0.7
impulse control disorder	4	3.0	sensorineural hearing loss	1	0.7
insomnia psycho-physiologic	1	0.7	sexual abuse of a child	6	4.4
intermittent explosive disorder	8	5.9	substance abuse	1	0.7
learning disorder	4	3.0	tic disorder	1	0.7
major depressive disorder	13	9.6	Tourette's disorder	2	1.5

Note: $N = 134$

Over half of the students were taking a large variety (i.e., > 56) of prescription medications for mental and physical conditions. Medicine to treat ADHD was the most frequently reported medication (i.e., Concerta/Ritalin, Adderall, Focalin, Vyvanse, and Strattera). The second most commonly prescribed medications were antidepressants, followed by antipsychotic drugs licensed to treat schizophrenia and bipolar disorder. One antipsychotic prescription (Risperidone) also was reported for treating irritability associated with autism. Benzodiazepines, neuroleptics, sedatives, and medicine for diabetes, seizures, and allergies were among the medications identified. The various medications reported in student files are provided in Table 3.

Table 3

Reported Frequency and Percentage of Medications Prescribed to Students in Sample

Medication	*N*	%	Medication	*N*	%
Abilify	2	1.5	Melatonin	2	1.5
Adderall, dextroamphetamine	14	10.4	Metformin	2	1.5
Advair	1	0.7	Niravam	1	0.7
albuterol	1	0.7	Paxil, paroxetine	1	0.7
Catapres, clonidine	11	8.1	Pimozide, orap	1	1.5
Celexa	2	1.5	Prandin	1	0.7
Cogentin, benztropine	4	3.0	Prozac, fluoxetine	3	2.2
Depakote, Depakene, divalproex	4	3.0	Pulmicort	1	0.7
Desmopressin	2	1.5	Risperdal, risperidone	26	19.3
Diastat, diazepam	1	0.7	Ritalin, Concerta, Methylin	35	25.9
Dicyclomine	1	0.7	Seroquel	15	11.1
Effexor	1	0.7	Singulair	2	1.5
enalapril	1	0.7	Strattera	3	2.2
Focalin	6	4.4	Tegretol, carbamazepine	2	1.5
Geodon	5	3.7	Tenex, guanfacine	7	5.2
glimepiride	1	0.7	Thorazine, chlorpromazine	1	0.7
imipramine	1	0.7	Topomax	1	0.7
Invega	2	1.5	Tranxene	1	0.7
Klonopin, clonazepam	1	0.7	Trazodone	4	3.0
Lamictal	2	1.5	Trileptal	2	1.5
Lantus	1	0.7	Vistaril, hydroxyzine	3	2.2
levetiracetam, Keppra	3	2.2	Vyvanse	5	3.7
levothyroxine, Synthroid	1	0.7	Wellbutrin	4	3.0
Lexapro	3	2.2	Xopenex	1	0.7
Lithium	7	5.2	Zantac, ranitidine	2	1.5
Loratadine, Claritin	1	0.7	Zoloft, sertraline	5	3.7

Lovastatin	1	0.7	Zyprexa	3	2.2
Luvox	1	0.7			

Note: Of the 134 students in the sample, medications were reported in 74 (54.8%) student files.

Independent Variables

Demographic information. Demographic information (e.g., age, gender, IQ, ethnicity, zip code) was collected on the student participants in order to provide a complete description of the sample population and to investigate relations between demographic variables, FBA/BIP components, functions of behavior, and specific interventions. Because some GNETS schools use a daily behavior plan in addition to the BIP, "daily behavior plan" was included as an item on the form developed to collect demographic information data. A data collection form was devised to collect demographic information on the student participants and their schools. The demographic information collection form is provided in Appendix A.

The form was field tested by a representative in the Cobb-Douglas GNETS program, who found that the length of time it took to collect demographic information for students was related to the length of time the student had been in the program longer (i.e., 10 min for 18 month tenure, 24 min for 52 months, and 40 min for 80 months). To preserve anonymity, a representative from each program completed demographic information forms for the selected students. Another employee of the program randomly selected 27% of the participants' files and completed his/her own copies of the demographic forms. The researcher compared the forms to determine reliability of the demographic information for each program. Reliability was calculated by dividing the number of agreements by the number of agreements and disagreements and multiplying

by 100%. The mean agreement score for the *Demographic Data Collection Forms* was 97.59 % (range = 85- 100%).

Checklist and data collection form items. Independent variables included items from a yes/no checklist [a modified version of the Van Acker et al. (2005) checklist] because the items were used to ascertain the presence or absence of dependent variables (the critical components of BIPs). The Van Acker et al. (2005) rating checklist is based on a comprehensive review of research literature on best practices when developing FBAs and BIPs. Van Acker et al. sent the operational definitions and rating checklist to seven experts in the field of Applied Behavior Analysis/Functional Assessment of Behavior for their review, remarks, and critique. Subsequent changes were made based on expert feedback.

The ensuing rating checklist was used to investigate the principal components of FBAs/BIPs in a previous study (Van Acker et al., 2005), including (a) the identification and operational definition of the target behavior(s), (b) the identification of the hypothesized function(s) of the behavior, (c) data collection procedures, (d) verification of the hypothesized function of the behavior, (e) relation of the FBA to the BIP, (f) employment of positive behavioral supports, and (g) implementation and monitoring of the effectiveness of the BIP.

A modified *Critical Component Checklist and Data Collection Form* was used in this study. The Van Acker et al. (2005) checklist was modified by changing the Likert-type format to a yes/no checklist and open-ended question format. Additionally, a few items were eliminated and replaced with new items to gather more detailed information about assessments and interventions. The checklist used contained: (a) a yes/no version

of the checklist to record each component or variable as present or absent (1= present = yes, 0 = absent = no), and (b) open-ended items to allow the researcher to record descriptive data (e.g., target behavior, assessments used, number of assessment methods used, strategies used). The *Critical Component Checklist and Data Collection Form* is provided in Appendix B.

General functions of behavior. Independent variables included the four general functions of behavior that were examined to identify function-specific strategies as well as those that appeared across two, three, or four functions. The functions of behavior were recorded on the *Critical Component Checklist and Data Collection Form*, which is provided in Appendix B and are categorized as follows:

(a) attention-based (social reinforcement). Behavior motivated by attention is commonly the result of students wanting peers and adults to like them, to give them attention, and to appreciate them and their efforts (Grow, Carr, & LeBlanc, 2009). Examples may include: poking a peer, making a bizarre noise, talking out of turn, cursing, yelling at a teacher or peer, having a tantrum, and ignoring an adult request.

(b) escape-based (negative reinforcement). Behavior motivated by escape is commonly the result of a student's need either to avoid or escape an uncomfortable task or situation (Butler & Luiselli, 2007). Examples can include: acting out to avoid reading in front of peers, skipping class or school to avoid unpleasant tasks or situations, having a tantrum in order to be removed from class, hiding in the bathroom to avoid a chaotic lunchroom, and arguing with a teacher to escape working on a difficult math assignment.

(c) sensory-based (automatic reinforcement). Sensory-based behaviors are behaviors that are followed by reinforcement not maintained by a purposeful act of

another person and social environment (Vollmer, 1994). Sensory-based behaviors meet a sensory need for the student exhibiting the behavior and often happen during stressful or boring circumstances. Examples of sensory stimulation include: hair twirling, foot tapping, rhythmic rocking, scratching, waving hands in front of eyes, mouthing or biting hands, rubbing nose or ears, masturbating, and poking eyes.

(d) tangible-based (social reinforcement). Behavior motivated by tangibles is commonly the result of students wanting to gain access to tangible items or desired activities (Northrup et al., 1995). Examples include: pushing others to gain access to a candy bar, screaming until a television show is turned on, and threatening others to gain access to computer time.

Dependent Variables

Necessary components of the FBA and BIP. The critical components of the FBA and BIP were examined to verify their inclusion or absence in the FBAs and BIPs, and included: (a) the identification and operational definition of the target behavior(s), (b) the identification of the hypothesized function of the behavior, (c) data collection procedures, (d) verification of the hypothesized function, (e) relation of the BIP to the FBA, (f) use of positive behavioral supports, and (g) monitoring of implementation and success of the BIP.

Behavioral interventions. Behavioral interventions for four general functions were compared and contrasted to identify function-specific strategies as well as those which appeared across two or three functions. During analysis, the strategies recommended for use with the student on the BIP were listed on the *Critical Component Checklist and Data Collection Form,* and entered as data into SPSS. Once all of the

FBAs and BIPs were examined, an exhaustive list of all strategies by function was created. The researcher then computed a frequency of the number of times each strategy is listed/described in the BIPs per specific function (see Table 4 for a list of the strategies).

Table 4

Frequency of Interventions Prescribed in BIPs Across Functions of Behavior

Intervention	Attention (n = 22)	Escape (n = 40)	Sensory (n = 1)	Tangible (n = 2)
address distractions	2	3	0	0
adjust the contingencies	22	40	1	2
allow breaks	12	20	1	2
behavior contract	3	2	0	0
break down tasks	4	17	0	1
build communication competencies	9	21	1	1
calming strategies	5	10	0	0
check in/out with teacher	0	1	0	0
choice	8	12	1	1
clearly define rules & consequences	6	13	0	1
curricular and instructional revision	6	22	1	1
differential reinforcement	3	5	0	0
encouragement	2	9	0	0
extra time to complete tasks	1	10	0	0
functional communication training	0	1	1	0
good news notes or calls home	5	4	0	1
help others, do jobs in class	3	5	1	1
improve environment	10	19	1	0
in-school suspension	10	12	0	1
keep personal space/boundaries	0	2	1	0

Life Space Crisis Intervention	1	7	0	0
MindSet	2	0	0	0
noncontingent reinforcement (NCR)	0	1	0	0
out-of-school suspension	10	13	0	0
package programs	1	3	0	0
parent call/contact	15	21	0	1
peer help	0	4	0	0
physical restraint	10	11	0	0
planned ignoring	8	14	1	2
private conference	10	14	0	1
proximity	3	9	1	0
redirection	8	22	1	1
reinforce appropriate behavior	22	39	1	2
reminders	4	19	0	0
response cost	18	26	1	1
role play	5	7	0	0
seating	2	8	0	0
self-monitoring	1	11	0	0
sensory diet	1	0	0	0
sensory supports	3	2	1	0
social skills training	6	15	0	0
social stories	0	3	0	0
teach alternative behaviors	12	31	1	1
time-out	13	19	0	1
transition supports	0	5	1	0
verbal warning	5	11	0	1
visual aids	3	13	1	1

Note: Of the 134 student files in the sample, 65 (48.51%) contained hypothesized functions in the FBAs/BIPS.

Data Collection Procedures

Program directors were given the choice to photocopy, redact identifying information, and mail copies of the FBAs and BIPs to the researcher to allow for collection of data. An alternate choice given to the directors was for the researcher to visit

the program and collect data onsite. Nine of the GNETS directors chose to have a representative of their staff collect data, whereas the directors of two programs chose to have the researcher gather data from files on location. Identifying information was removed by GNETS personnel prior to examination for the two programs that chose to have the researcher on site.

Each director of the nine GNETS programs that mailed data designated a program representative (staff member who is familiar with the files) to review the randomly selected student participants' school records to (a) complete the demographic data collection form, (b) make photo copies of the FBAs and BIPs (and daily behavior plan if one is used), and (c) use a black ink marker to hide the identity of the students in all documents by marking through students' and parents' last names. The completed demographic data collection forms (including the redundant forms for assessing reliability) along with the copies of the FBAs and BIPS (and daily behavior plan if available) were mailed to the researcher. Pre-paid flat rate envelopes were provided by the researcher. Two directors who preferred an onsite visit were accommodated.

The designated program representatives were provided with a $10.00 gift card to either Walmart or Starbucks per file as compensation for completing demographic data collection forms and making copies of the FBAs, BIPs, and daily behavior plan if available. All documentation was stored in a locked cabinet in the researcher's home. The key to the cabinet was kept in a secure location known only to the researcher. Data were stored on a password- and firewall-protected computer.

Data Analysis

Coding categorical variables. The categorical, nondichotomous, nominal variables (i.e., ethnicity, GNETS programs, lunch eligibility) were coded so that they could be incorporated into a regression model. For example, lunch eligibility: free lunch eligibility, reduced lunch eligibility, and not eligible are categorical data, and were converted to two indicator or dummy variables so that each level is defined by combining the two dummy variables. Coding is needed to perform a regression because regression usually involves ordinal level data with approximately equal differences between ordinal categories (Chattefuee & Hadi, 2006). The dummy variables were put into the logistic regression as two predictors. Each dummy variable was compared to the reference level (free lunch eligibility), which was coded as "0" for both dummy variables. In this study free lunch eligibility was considered as the reference level by the coding.

The two dummy variables were given either the value zero or one for the first two categorical values (reduced lunch eligibility, not eligible). They were coded 1, 0, 0 which reduces to dummy variables X (3) = 1, X (.2) = 0. Figure 1 shows an example of how the nominal variables were coded.

Dummy variables are coded as (j+1) when there are j+1 categories resulting in j dummy variables (Kleinbaum, Kupper, Nizam, & Muller, 2007). Reduced lunch eligibility was coded "0 1" and not eligible was coded "1 0," and both indicator variables (codes) were zero for the third category (0 0). This final code (0 0) was given to the reference cell (free lunch eligibility) whose intercept is the model's intercept. The code had the same number of digits as the degrees of freedom (the number of categories minus 1; Kleinbaum et al., 2007). The model for the full dummy variable scheme for primary

language was: Yi = a +B1 * Xi + B2 * ESOL i + B3 * unknown i. The intercept term represents the intercept for free lunch eligibility (the omitted category.) The slope coefficient for the dummy variable represents the change in the intercept for the category coded 1 (reduced lunch eligibility). Using dummy variables demonstrated whether or not the coefficient was different from the reference category (free lunch eligibility), not whether it was different from 0 (Chattefuee & Hadi, 2006). For example, if a = 45, and B1 = -35, the coefficient for reduced lunch may not be significantly different from 0, while free lunch is significantly different from 0.

The demographic information form included quantitative and qualitative types of data (x variables) that were represented by: continuous data (age, IQ score, # months in GNETS, grade, use of medication, number of diagnoses); categorical data (ethnicity, lunch eligibility); and binary data (yes/no: behavior function, special education eligibility, medication, gender, primary language). The continuous data were entered as numerals into SPSS. Categorical data were coded and entered as dummy variables into SPSS. Binary data were coded (e.g., 1 = yes or 0 = no, 1= female or 0 = male) and entered into SPSS.

Critical components and addressing function. To answer the first and second research questions (i.e., Which components described as critical in research literature for conducting FBAs and BIPs are present and which are absent?; What percentage of BIPs address the function of the behavior specified in the FBA?), binary data (yes/no) were collected from the *Critical Component Checklist and Data Collection Form*. The responses were coded (1= yes or 0= no) and entered into Statistical Package for the

Social Sciences, 19th edition (SPSS) software. Frequency analyses were conducted to calculate the frequency and percentage of BIPs that contained the critical components.

Identifying and verifying function. To answer the third research question (i.e., What are the most commonly used methods for identifying and verifying function?), data were measured via two categorical approaches to calculate general types and then more specific types of assessment used. During the first approach, the general types of methods used to identify or verify functions (e.g., direct, indirect, functional analysis) were coded (1 = indirect data collection, 2 = observational data collection, 3 = both direct and indirect, and 4 = antecedent manipulation) entered into SPSS as categorical data (y variables), and then descriptive data analyses were run to provide frequencies and percentages. During the second approach, individual variable columns were created in SPSS for the more specific types of assessments (e.g., A-B-C format, structured interviews, PBQ) and data were coded as 1 = yes and 0 = no. Descriptive data analyses were conducted using SPSS to provide frequency and percentage counts of the specific types of assessments.

Intervention by function. To answer the fourth research question (i.e., Which interventions are used specifically for each function of behavior and which appear across functions?), cross tabulation tests and frequency analyses were conducted. Because each student may have one or more target behaviors with corresponding functions, an SPSS column variable was created for each of the four main functions (attention-based, escape-based, sensory-based, tangible-based), and each intervention to ensure exactness. Single functions of behavior were entered into SPSS as the x (independent) dichotomous variables, and were coded as 1= yes (if FBA/BIP indicated that particular function

maintained the target behavior) and 0 = no (if FBA/BIP indicated that particular function did not maintain the target behavior). Behavioral interventions were recorded as dichotomous data, entered into SPSS as the y (dependent) variables, and coded as 1= intervention prescribed and 0 = intervention not prescribed.

There were over 100 different interventions listed in the BIPs, along with several combinations of various interventions. To pare down the number of intervention variables used for the final analysis, first interventions were grouped into categories (e.g., several types of reinforcement delivery methods were grouped and entered into SPSS under the "reinforce appropriate behavior" category, several types of environmental modifications and supports were grouped under the "improve environment" category). Next, cross tabulation tests and frequency analyses were conducted to figure out which interventions were used per behavior function, which interventions were used across functions, and which interventions were most frequently used. Subsequently, a summary of the strategies most commonly prescribed was developed for each function.

Function predicting intervention. To answer the fifth question, a group design, specifically binary logistic regression, was used to compute the probability that a given behavioral function can predict which intervention(s) might be chosen. Logistic regression is an appropriate model to use when the variables of a study are discrete (not continuous,) the independent variables are categorical (attention-based, escape-based, sensory-based, tangible-based), the outcome dependent variables are dichotomous, and the dependent variables are anticipated to be nonlinear with one or more of the independent variables (Pedhazur, 1997).

Prior to running the binary logistic regressions, the relations between behavior functions and interventions were analyzed using 192 cross-tabulation and chi-square tests for independence (computed for a 2 x 2 table) for each possible relation between the four main behavioral functions and the 48 interventions, and were considered significant if $p < 0.05$. Nineteen significant relations were found across 18 intervention variables. As a result, 19 binary logistic models were used. Type I or family-wise error was minimized because each function was entered as a single, independent predictor variable. Interventions were the outcome variables.

Stable evaluations can be made from logistic regression analyses that are conducted with a sample size that includes 10-15 cases for each predictor variable (Peduzzi, Concato, Holford, Feinstein, 1995; Peduzzi, Concato, Kemper, Holford, Feinstein, 1996). However, Harrell (2001) recommended that there should be at least 20 cases for each predictor variable. Long (1997) recommended that researchers secure at least a 100 cases for a logistic regression analysis. All regressions in this study were conducted with 5 or fewer predictors, thereby ensuring there were more than 20 observations per predictor variable.

Statistical relationships. To answer the sixth research question (i.e., How do the BIP component variables, demographic variables, behavioral function variables, and behavioral intervention variables relate to each other statistically?), there was a sizable number of potential explanatory variables and no fundamental theory which could guide the model selection. Therefore, stepwise regressions were run as diagnostic tests to the insignificant demographic variables and identify the variables that should be incorporated in the multinomial logit regression models. The categorical predictor variables were

entered into the stepwise models as factors, which were used to form the cross classifications.

The logistic regression model has been expanded and applied to studies in which the dependent variable is of more than two types: multinomial or polytomous (Tabachnick & Fidell, 1996). In this situation a multinomial logistic regression considers a response variable that contains more than two categorical outcomes (Chattefuee & Hadi, 2006; Long, 1997). In the multinomial logit model all the logits are estimated at the same time. The log of the odds of *A* versus *B* is the dependent variable. The β coefficients have a subscript A/B to show they are from the logit A versus B. The odds of A versus B change by a factor of exp ($\beta_{1, A/B}$), for every unit increase in x. B versus C can be computed using the same procedure. $N_{\beta} + N_{C}$ observations will be chosen to estimate the binary logit.

The dependent variable (behavioral function) had j nominal outcomes, so the categories were numbered 1 - j, and not in any particular order (Long, 1997). The resulting logit can be interpreted as the logit for a binary response in which 1- j are one category, and the residual categories from (j + 1) to ***k*** is the second category. The probability of being in a lower numbered category will increase with the increase in the number of a response variable with a positive β, all other variables remaining the same. The method of maximum likelihood is used to estimate the model parameters (Chattefuee & Hadi, 2006). SPSS was used to fit the model parameters and run the nominal logit regression.

When the resulting significance levels of the stepwise regressions and multinomial regressions indicated no multinomial regression models were more effective

at predicting the relations than the null models (see Figure 1 for an example of a nonsignificant multinomial regression model), cross-tabulation and chi-square tests for independence (computed for a 2 x 2 table) for each possible relation between the BIP component variables, demographic variables, behavioral function variables, and behavioral intervention variables demographic variables, FBA/BIP components, and the 48 interventions, and were considered significant if $p < 0.05$. Chi-square tests of independence were conducted to evaluate if relations were significant.

	Model Fitting Criteria	Likelihood Ratio Tests		
Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	107.526			
Final	101.733	5.792	5	.327

Figure 1. Model fitting SPSS information output from a multinomial regression. The model is not significant ($p = 0.327 > 0.05$), and therefore not more effective than the null model. The outcome variable, escape, was coded 1 = *yes* and 0 = *no*. The predictor variables included age (numerical), gender (coded 1 = *female* and 0 = *male*), EBD (coded 1 = *yes* and 0 = *no*), SLI (coded 1 = *yes* and 0 = *no*), and autism (coded 1 = *yes* and 0 = *no*). The chi-square statistic is the calculated difference between the -2 log-likelihoods of the null and final models. *df* = degrees of freedom of the chi-square distribution used to test the chi-square statistic and is equal to the number of predictors in the model. Sig. = the significance level.

Specific combinations of the demographic continuous, categorical, and binary data (x predictor variables) were run through the SPSS program with the function binary data (x or y, predictor or outcome variables), the BIP component checklist binary data (y outcome variables), and/or the binary intervention data (y outcome variables). Examples of questions that were analyzed included:

(a) How does the age variable affect the function of behavior variable?

(b) Are the age variable, the gender variable, and the function of behavior related?

(c) How does the eligibility variable affect the function variable?

(d) Are the gender variable, the function variable, and the intervention variable related?

(e) How does the reduced lunch variable affect any of the other variables?

Reliability

Coding reliability. At least 35% of the *Critical Component Checklist and Data Collection Forms* were completed by a second person to document reliability of collection. The researcher trained the second observer by using FBAs and BIPs as they were received; the documents were analyzed until 90% accuracy was achieved. The training consisted of the researcher and second observer discussing examples and nonexamples of the components in the checklist. The FBAs and BIPs that were used for training purposes were not included in the 35% necessary to calculate recording reliability. Reliability was calculated by dividing the number of agreements by the number of agreements and disagreements and multiplying by 100%. The mean agreement score for the *Critical Component Checklist and Data Collection Forms* was 98.6 %, (range = 85- 100%).

Procedural reliability. To ensure reliability of data entry, approximately 30% of the FBAs/BIPs were examined independently by the second observer. Because information from student files were entered into SPSS as numbered cases from 1 to134, a random number generator was used to provide a list of 40 numbers, which ranged from 1 and 134, and which corresponded to each SPSS case number. Next, the second observer examined the randomly chosen case numbers by comparing the case in the SPSS data

columns to hard copies of the case files. An agreement was scored when the two researchers noted the same data across all 231 columns of demographics, FBA, BIP, and strategies variables. Reliability was calculated by dividing the number of agreements by the number of agreements and disagreements and multiplying by 100%. Mean agreement between data entered by the researcher and the data checked by the second observer was 99% (range 97.4% - 100%).

RESULTS

Critical Components

Overall, the components described as critical in research literature for conducting FBAs and developing BIPs were absent from most of the student files in this investigation. A summary of the percentage of critical components found in the FBAs and BIPs is depicted in Table 5.

Table 5

Frequency and Percentage of FBAs/BIPs Containing Critical Components

	Frequency	Percent
Identification and operational definition of target behavior (s)		
Each target behavior was operationally defined	21	15.7%
Each behavior was assessed separately	11	8.2%
Data collection procedures		
One or more data collection methods used to identify the function	44	32.8%
Investigation of context variables that influence the target behavior		
Determines whether context variables serve as an antecedent or consequence	38	28.4%
Relationship between the target behavior and student's environment	37	27.6%
Patterns are identified from the information collected	25	18.7 %
More general context variables identified	27	20.1%
Identification of hypothesized function (s) of the behavior		
Patterns are summarized into written statements	11	8.1%
There is a hypothesis related to the function of the behavior	84	62.7%
Verification of the hypothesized function of the behavior		
Context variables manipulated	0	0
Functional analysis conducted	0	0
Relation of the FBA to the BIP		
BIP is related to the BIP	32	23.9%
Replacement behavior serves the same function	9	6.7%

Circumstances when replacement behavior should occur identified	7	5.2%
Modifications address context of the behavior	51	38.1%
Use of positive behavior supports		
At least one or more positive behavioral supports	134	100.0%
Primary positive behavioral supports	121	90.3%
Secondary positive behavioral supports	75	56.0%
Tertiary positive behavioral supports	129	96.3%
Strategies included for managing consequences so that reinforcement is maximized for positive behavior and minimized for problem behavior	15	11.2%
Implementation and monitoring of the effectiveness of the BIP		
The BIP is clear and specific (who needs to do what, when)	3	2.2%
The BIP includes an adequate plan for monitoring and evaluation	2	1.5%
The BIP includes an inadequate plan for monitoring and evaluation	73	54.0%
Necessary teacher/staff supports are identified	4	3.0%
Objective information is collected to assess effectiveness of the BIP	6	4.5%

Note: N =134 student files

Identification, operational definition, and assessment of target behavior(s).

Frequency analyses for 134 FBAs/BIPs indicated each target behavior was operationally defined and assessed separately in very few of the files. A small number of the FBAs/BIPs provided an indication (results reported, hard copies of assessments, or checking off a box on a FBA or BIP form denoting the method was used) that one or more data collection methods were used to identify the hypothesized function of the behavior.

Investigation of context variables that influence the target behavior.

Information that determined whether context variables served as antecedents or consequences was present in only some of the FBAs/BIPs. Additionally, the relationship between the target behavior and factors in the student's environment, including: peers, teachers, context, course subject, tasks involved, time of day, location, medical issues, and any other potentially relevant stimuli rarely was acknowledged in of the files. In a small number of the files, patterns were identified describing events in which the target behavior (s) were most likely and least likely (e.g., when, where, with whom) to occur.

More general context variables were identified (e.g., curriculum, activity patterns) that may be influencing the student's behavior in very few of the files.

Identification of hypothesized function(s) of the behavior. Patterns were summarized into clear and accurate (based on data) written statements in hardly any of the files. Slightly over half of the FBAs/BIPs contained a hypothesis related to the function of the behavior.

Verification of the hypothesized function of the behavior. No files in this investigation contained indications that context variables had been manipulated to verify function hypothesis. More specifically, there were no reports of the use of functional analyses, structural assessments, or any other type of procedure that manipulated variables to measure their influence on the target behavior.

Relation of the FBA to the BIP. Approximately a quarter of the BIPs in the sample, were related to the FBAs, contained intervention strategies that were clearly linked to the functional assessment information, and prescribed consequences that had a direct connection to the function of the inappropriate target behavior.

Replacement behavior that serves the same function as the problem behavior (or results in the same outcomes for the student) that would allow the student to cope more effectively with circumstances was identified in a scarce number of the files. The circumstances when replacement behavior should occur (e.g., when Jessica encounters transitions, when Andy feels frustrated) were identified rarely. The context of the behavior (e.g., need for modification, curricula, peers or teacher behavior) was addressed, and/or suggestions of modifications that should be made to the environment that may

prevent problem behavior and/or lead to increases in alternative appropriate behaviors were provided in very few files.

Use of positive behavior supports. Positive behavioral supports (Turnball et al., 2000) were prescribed in all of the BIPs. Primary supports such as evidenced-based teaching methods, school-wide ecological arrangement, direct instruction of social skills, precorrection procedures, proximity control, and school-wide reinforcement arrangements (Turnball et al., 2002) were included in the majority of the FBAs/BIPs. Secondary supports including social skills training and groups, role playing, empirically validated intervention programs, self-monitoring, and tutoring (Mitchell, Stormont, & Gage, 2011; Simonsen, Jeffrey-Pearsall, Sugai, & McCurdy, 2011; Turnball et al., 2002) were listed in slightly over half of the files. Almost all of the FBAs/BIPs included tertiary supports such as modifications of the environment, increased support from school psychologists and counselors, planned ignoring of inappropriate behavior, contingency management, time-out, and medication (Simonsen et al., 2011; Turnball et al., 2002). However, in this investigation only a few of the BIPs included strategies for managing consequences so that reinforcement is maximized for positive behavior and minimized for problem behavior.

Implementation and monitoring of the effectiveness of the BIP. A small number of the BIPs, included clear and specific plans (indicated who needs to do what and when) to monitor the effectiveness of the BIP; and an even smaller number of the BIPs contained a complete plan for monitoring and evaluation that included details about what type of data would be collected, who would collect data, the integrity of implementation, effectiveness, maintenance, generalization, and communication with

others. Necessary teacher/staff supports, resources, and training needed to fix problem contexts and ensure maintenance of improved behavior were identified hardly ever. An indication that objective information was collected to assess effectiveness of the BIP scarcely was found in the files.

Most Commonly Used Assessment Methods

Overall the most common specific methods used to identify the hypothesized function of problem behavior were school forms, interviews, the Problem Behavior Questionnaire, the Functional Analysis Screening Tool (FAST), and the A-B-C format. Indirect assessments (IA) alone were used most frequently followed by the use of both direct assessments (DA) and IA, and DA alone.

Direct assessment methods. Rarely DA methods were conducted across settings and activities, and by more than one person in of the student files. The A-B-C format, interval or time sampling, curricular or ecological assessments were indicated in a small number of BIPs. The other DAs included a Data Collection and Tracking System (DCATS) used for one FBA, and in a few of the files a box labeled “observation” was checked off (however, no results or hard copies of the direct assessments were included in those files). A list of the frequency and percent of the reported use of the different DAs is depicted in Table 6.

Indirect assessment methods. The most commonly used IA method, interviews, were completed by more than one person, and across settings and activities in only some files. A list of the frequency of who completed the interviews is depicted in Table 6. Along with the PBQ and the FAST (the third and fourth most commonly used methods for identifying function), the FBA Profiler, and the Motivational Assessment Scale

Table 6

Summary of the Type of Data Collection Methods Used

Percent of FBAs employing certain data collection methods used to identify/verify the function of behavior	
Data collection method	Frequency and Percent of FBAs employing method
Direct assessment alone	8; 6.0%
Indirect assessment alone	22; 16.4%
Both direct and indirect used	13; 9.7%
Direct data collection	
A-B-C format	8; 6.0%
Scatter plot	0.0
Interval or time sampling	2; 1.4%
Other	8; 6.0%
Across settings and activities	10; 7.5%
By more than one person	1; 0.7%
Other assessments (curricular, ecological, etc.) conducted to determine broader variables affecting student behavior.	1; 0.7%
Indirect data collection	
Interviews total	14; 10.4%
Interview with parents only	1; 0.7%
Interview with student only	1; 0.7%
Interview with teacher(s) only	6; 4.5%
Interviews with paraprofessional	0.0
Interviews with parent & teacher(s)	2; 1.5%
Interview with student & teacher(s)	1; 0.7%
Interview with parent, student, & teacher	2; 1.5%
Across settings and activities	7; 5.2%
Total by more than one person	9; 6.7%
Indirect data collection tools used:	
Functional Assessment Interview (FAI)	0.0
Motivational Assessment Scale (MAS)	4; 3.0%
Functional Analysis Screening Tool (FAST)	9; 6.7%
Functional Assessment Checklist for Teachers and Staff (FACTS)	0.0
Problem Behavior Questionnaire (PBQ)	10; 7.5%
Functional Assessment Informant Record-Teacher (FAIR-T)	0.0
The Profiler	6; 4.5%
Other (unspecified rating scales)	8; 6.0%
Verification of function of behavior:	
Context variables manipulated	0.0
Functional analysis	0.0
Most commonly used methods for identifying function of behavior:	
1. School/county assessment form	40; 29.9%
2. Interviews	14; 10.4%
3. Problem Behavior Questionnaire (PBQ)	10; 7.5%
4. Functional Analysis Screening Tool (FAST)	9; 6.7%
5. A-B-C format	8; 6.0%

Note: The numbers show the FBA contained these data collection procedure regardless of how many times the particular procedure was used (e.g., one versus four A-B-C assessments) in a given FBA. No files in this investigation contained indications that context variables had been manipulated to verify function hypothesis. N =134 student files.

were employed. In some of the files, forms with boxes labeled rating scales, interviews, or questionnaires were checked off under a section labeled "FBA" to indicate the source used for assessment (however, no results or hard copies of the IAs were included in those files). (See Table 6)

School FBA form. The most frequently used specific method to identify the hypothesized function of problem behavior, the school (or county) assessment form, ranged from a sparse two-sentence section on a form labeled "FBA," to a three-page document which included pointed questions. In some of the school forms information was gathered about antecedents: "time of day, location, with whom, what activities, when asked to do or stop something, when is this behavior most likely to occur, when is the least likely to occur;" consequences: "what might student attain as a result of this behavior, what might the student avoid as a result of this behavior, how do you and other students respond to this behavior, describe student's positive behaviors and consequences for them;" and medical history. Most of the school environmental forms provided no indication of the source (DA or IA) of information. If the source was provided, it was recorded and entered as data for the frequency analysis.

Interventions Used Specifically for Functions of Behavior

All of the BIPs that contained hypothesized functions prescribed interventions that involved adjustments of contingencies. Several other interventions appeared across behavior functions, including curricular and instructional management, teach alternative behaviors, build communication competencies, and improve environment.

Attention-based interventions. Of the BIPs that contained identified functions, all of the BIPs that were developed for students whose behavior was maintained by

attention prescribed interventions involving the adjustment of contingencies and reinforcement of appropriate behavior. Other commonly prescribed interventions included response cost, parent contact, time-out, allow breaks, and teach alternative behaviors. A summary of the frequency counts of the interventions recommended for problem behaviors maintained by the single function, attention, is depicted in Table 7. A more detailed list of attention-based interventions recommended in the BIPs is depicted in Table 8.

Table 7

Frequency of Interventions Prescribed in BIPs per Attention Function of Behavior

Intervention	Attention (n = 22)
adjust the contingencies	22
reinforce appropriate behavior	22
response cost	18
parent call/contact	15
time-out	13
allow breaks	12
teach alternative behaviors	12
improve environment	10
in-school suspension	10
out-of-school suspension	10
physical restraint	10
private conference	10
build communication competencies	9
choice	8
planned ignoring	8
redirection	8
clearly define rules & consequences	6

curricular and instructional revision	6
social skills training	6
calming strategies	5
good news notes or calls home	5
role play	5
verbal warning	5
break down tasks	4
reminders	4
behavior contract	3
differential reinforcement	3
help others, do jobs in class	3
proximity	3
sensory supports	3
visual aids	3
address distractions	2
detention	2
encouragement	2
MindSet	2
seating	2
blocking	1
extra time to complete tasks	1
Life Space Crisis Intervention	1
package programs	1
self-monitoring	1
sensory diet	1
check in/out with teacher	0
functional communication training	0
keep personal space/boundaries	0
noncontingent reinforcement (NCR)	0
peer help	0
social stories	0
transition supports	0

Note: Of the 134 student files in the sample, 22 (16.4%) files contained interventions for target behaviors maintained by attention reinforcement.

Table 8

Strategies Found in GNETS BIPs for Attention-based Behavior.

Interventions Recommended in BIPs
Address Distractions: headphones to reduce distractions
Adjust the Contingencies: praise; planned ignoring of behavior; time-out; isolation form others; loss of points on contract, loss of special passes; loss of points from token economy; loss of daily class rewards; reinforce other peers when they ignore student's attempts to get attention during class; reinforce with a positive consequence, positive points when student gets teacher's attention appropriately; give attention through the corrective teaching only once he is getting teachers' attention appropriately; reinforce with points each time that student can remain on-task for 5 minutes; reinforce student with points when you observe him engaging on a positive peer interaction; find appropriate ways to let student be on-stage and gain positive peer attention; teach peers to ignore student's provocations and mimicking; proceed through escalating consequences quickly and use more silence as de-escalation tool to minimize attention; limit attention to victimization comments and redirect focus on his behavior; verbal praise; tangible rewards; fifteen minutes of earned free time; loss of privileges; complete assignments during high interest activity; tangible rewards: sticker chart, bonus bucks, candy; specific praise; individual time with the teacher; positive notes home; bonus points; time away from group; rewards for positive behaviors; point system to earn points for class breaks and school store; away from group at lunch; random reinforcement (sticker charts), special privileges, computer time; treats; provide positive adult attention periodically when student is doing well; fun Friday; opportunity to casually talk to adults about personal issues; level/classroom management system; token economy; ignore attention seeking behaviors; remove other students from the area; isolated lunch; delay of activities; seclusion; gain/lose classroom money; student needs a reward system that will interest her, such as a vending machine; allow student to sit near adult or preferred peer; avoid physical contact with the student; loss of privileges should be discussed with student prior to the loss as an incentive to refrain from verbal and physical aggression; loss of computer time
Allow Breaks: allow student to journal in a "feelings" notebook; cool off outside of the classroom; on difficult tasks, break down assignments into smaller chunks and/or provide frequent breaks; quiet area (drawing permissible); give a few minutes to regroup; movement breaks; provide a quiet place outside of classroom when student needs a cool down; time for self away from stressor; allow time-out if student becomes upset; teach student to ask adult and go to a safe place if student needs time to regain control
Behavior Contract: given a student contract
Break Down Tasks: on difficult tasks, break down assignments into smaller chunks and/or provide frequent breaks; work provided in small increments, frequent breaks; modify length of assignment to alleviate frustration
Build Communication Competencies: teacher directed peer-to-peer interactions; pre-teach the appropriate manner in which to express his feelings and what he needs; pre-teach appropriate and inappropriate manners in which to get attention; discuss alternate ways to communicate; interact in small groups; imbedded instruction of social skills; do not force student to talk, or talk too much about what's wrong too quickly
Calming Strategies: deep breaths; counting and breathing strategies, stress ball; use a pre-taught strategy to regain control (i.e., take a breath, count to ten, etc.)
Choice: provide choices for tasks; when possible give student two choices; offer student choice of two clearly defined options
Clearly Define Rules and Consequences: clear and concise expectations; present clearly defined classroom rules and consequences
Curricular and Instructional Revision: modified curriculum; opportunity to take unfinished

work home for homework; provide multi-sensory cues and supports; frequently check for understanding; evaluate the appropriateness of the task to determine if the task is too easy; evaluate the appropriateness of the task to determine if the task is too hard

Differential Reinforcement

Encouragement

Extra time to Complete Tasks: allow extra time to process information; do not force student to talk, or talk too much about what's wrong too quickly; provide extended time for assignments or tests (30 minutes); allow time for resolution

Good News Notes or Calls Home: positive notes home

Help Others: classroom job, assist teacher

Improve Environment: specific quiet area; structured setting; clear and concise expectations; create positive environment; provide safe areas to regain control; review posted social skills; classroom management system; present clearly defined classroom rules and consequences

In-School Suspension

Life Space Crisis Intervention (Wood & Long, 1991).

MindSet: crisis intervention based on the Prevention and Management of Aggressive Behavior (PMAB®) Program

Out-of-School Suspension: no pattern; can't be OSS for same reason each time

Package Programs: Student achievement model (SAM; Criste & Neal-White, 2005).

Parent Call/Contact: daily written contact with parent; implement home-school communication report

Peer Help: utilize peer assistance

Physical Restraint: physical restraint (when hurting self, others, or harm is imminent)

Private Conference: individual conferencing; private conference when necessary; speak with another staff member; individual time with the teacher; conference with principal or other administrator; resolution report to process behavior choices; conference with the teacher to discuss appropriate replacement behaviors for the inappropriate behavior; correct inappropriate behavior one on one; conference privately with the student at another time if problems persist

Redirection: verbally redirect; limit attention to victimization comments and redirect focus on his behavior; avoid power struggle when conflict occurs

Reinforce Appropriate Behavior: praise; student will be recognized during an award ceremony as Student of the Month; student will earn the privilege given for being the student of the month; reinforce with a positive consequence, positive points when student gets teacher's attention appropriately; give attention through corrective teaching only once he is getting teachers' attention appropriately; reinforce with points each time that student can remain on-task for 5 minutes; reinforce student with points when you observe him engaging on a positive peer interaction; verbal praise; tangible rewards; fifteen minutes of earned free time; positive phone call/note; tangible rewards: sticker chart, bonus bucks, candy; specific praise; individual time with the teacher; positive notes home; bonus points; rewards for positive behaviors; random reinforcement (sticker charts); fun Friday; opportunity to casually talk to adults about personal issues; consumable reinforcement; student needs a reward system that will interest her, such as a vending machine; allow student to sit near adult or preferred peer

Reminders: remind her of when her scheduled break is; remind daily of rules; remind the student that this behavior is not appropriate and that he can try other methods of getting out frustration; remind student to use words; remind student of expectations; review posted social skills; reminder of consequences or privileges that might be lost

Role Play: practice positive self-talk

Seating: change seating arrangement; sit student in the back near the paraprofessional's desk to increase supervision and provide proximity control; sit student away from other peers who frequently provoke or go off task; allow student to sit near adult or preferred peer

Self-Monitoring
Sensory Diet: sensory diet to manage his activity level, therapy chair
Sensory Supports: spitting, movement breaks; stress ball
Social Skills Training: social skill activities and anger management activities: explicit social skills instruction; review posted social skills; imbedded instruction of social skills
Teach Alternative Behaviors: skill training, model specific behaviors; setting expectations lessons on how to ask for help; setting expectations lessons on frustration/anger control strategies; once student gets teacher's attention appropriately, go over and complete a prompted teaching skill interaction; at least once a week use settings expectations lessons to help practice a neutral times situation where it is hard for him to get the teachers' attention appropriately; lessons to help student learn to elicit positive attention from adults (show his work, talk about accomplishments); settings expectations lessons to help reinforce how to remain on-task with his work despite distractions; expected behavior monitoring; overcorrection and positive practice; pre-teach the appropriate manner in which to express his feelings and what he needs; pre-teach appropriate and inappropriate manners in which to get attention; teaching interactions (includes description of inappropriate behavior, description of desired behavior, opportunity to practice appropriate behavior and point penalties); teach student to ask adult and go to a safe place if student needs time to regain control
Time-out: isolation from others; remove student from his peers when possible if he begins acting out; time away from group; remain in an alternative location; time-out in the classroom; time-out in STOP (silent time-out place)
Transition Supports: visual and sound prompts for transitions; bonus points during transitions; a visual timer to prepare for transition
Verbal Warning: loss of privileges should be discussed with student prior to the loss as an incentive to refrain from verbal and physical aggression
Visual Aids: visual prompts to begin a task; if student does not get attention appropriately give a visual prompt (hand raise, finger to lips) and wait for student to self-correct; a visual timer to prepare for transition; non-verbal signals; behavioral cues: If student begins using inappropriate language, the agreed upon cue of pointing to the head (for thinking about his actions) should be used to assist him in getting to his cooling place or the counselor

Notes: Table includes interventions recommended in FBAs and BIPs of students with attention-maintained behavior.

Escape-based interventions. Interventions involving the adjustment of contingencies were prescribed in all of those files the BIPs that were developed for students whose behavior was maintained by escape. The most commonly prescribed interventions for escape-maintained behavior include reinforce appropriate behavior, teach alternative behavior, response cost, curricular and instructional revision, and redirection. A summary of frequency counts of the interventions recommended for problem behaviors maintained by the single function, escape, is depicted in Table 9. A

more detailed list of escape-based interventions recommended in the BIPs is depicted in Table 10.

Table 9

Frequency of Interventions Prescribed in BIPs per Escape Function of Behavior

Intervention	Escape (n = 40)
adjust the contingencies	40
reinforce appropriate behavior	39
teach alternative behaviors	31
response cost	26
curricular and instructional revision	22
redirection	22
build communication competencies	21
parent call/contact	21
allow breaks	20
improve environment	19
time-out	19
break down tasks	17
social skills training	15
planned ignoring	14
private conference	14
clearly define rules & consequences	13
out-of-school suspension	13
reminders	13
visual aids	13
choice	12
in-school suspension	12
physical restraint	11
self-monitoring	11
verbal warning	11
calming strategies	10

extra time to complete tasks	10
encouragement	9
proximity	9
seating	8
Life Space Crisis Intervention	7
role play	7
detention	5
differential reinforcement	5
help others, do jobs in class	5
transition supports	5
good news notes or calls home	4
peer help	4
address distractions	3
package programs	3
social stories	3
behavior contract	2
blocking	2
keep personal space/boundaries	2
sensory supports	2
check in/out with teacher	1
functional communication training	1
noncontingent reinforcement (NCR)	1
MindSet	0
sensory diet	0

Note: Of the 134 student files in the sample, 40 (29.9%) files contained interventions for target behaviors maintained by escape (negative) reinforcement.

Table 10

Strategies Found in GNETS BIPs for Escape-based Behavior.

Interventions Recommended in BIPs
Address Distractions: student will be seated away from potential distractions when necessary
Adjust the Contingencies: reward student each time he uses the alternative behavior; student will earn tickets each time he uses the replacement behavior and can use the tickets to purchase privileges; student will lose tickets when he engages in hitting or striking behavior; earn learning points, praise; award schedule in which student receives points every 15 minutes that

he stays in demarcated area; positive praise, point menu, positive points, preferred time; reinforce compliance with positive praise and privileges; learning points, loss of privileges; loss of points for token economy reward system; loss of recess, computer privileges, and free time; earn positive points for each 30 minutes she can go without losing self-control; praise for approximations; move to more intermittent levels of reinforcement; classroom incentive system; earn positive points every 30 minutes he is able to maintain self-control if he drops to the foundation level; provide tangible reinforcement; reward effort or participation rather than outcome; frequent praise/parent contact; positive reinforcement of alternate behaviors; provide with positive feedback, which will indicate that he is successful, important, respected; praise for doing the right thing and staying on task; peer restriction; student will be given high fives and verbal praise from the teacher as he successfully follows his picture card schedule and completes each assignment; reward and reinforce positive behaviors with "soar bucks"; reward positive behaviors with an earned classroom structured activity; withhold attention for inappropriate non-aggressive behaviors by ignoring, but utilizing proximity control; social reinforcement (smiles, nods, pat on the back, etc.) increased attention from valued adult, frequent contact from valued adults; activity reinforcement (computer time, game time, outside time, etc.); loss of rewards/privileges such as play time, computer time, or lunch with the class; earn reinforcing activities (pair non-preferred activity item with secondary preferred item/activity); use a point system (choice/reinforcer board); earned time to spend with a preferred friend or time on the computer; isolated lunch; increase the use of positive verbal praise for transition paired with an edible reinforcement; isolation in the class/ISS; drop a level; individual behavior chart with built-in rewards and privileges; loss of recess, specials, assemblies, etc.; office referral; homework; delay of activities; send home; provide opportunities for student to gain positive attention from others; planned sustained silence will be used; removal from class or removal of audience, if necessary

Allow Breaks: student will have the option of taking a short time out (5 minutes) after being told 'no'; allow a cool down period; student will be given space and time to comply; allow her to leave once it is her scheduled break time; frequent breaks; use cool down area; provide student with a safe, quiet place to go when upset; allow time-out; provide a place for privacy where she can go to regain control; allow student to go to guidance counselor

Behavior Contract

Build Communication Competencies: modeling of appropriate social language and respectful behavior skills towards others; needs to be taught through social skills the appropriate way to interact with others; promote positive social connections; teach a variety of ways to solve problems in conflict situations (e.g., withdrawing, reasoning, apologizing, compromising); student will read social stories to better acquire an awareness of how others need and want to be treated; model appropriate interactive behaviors using role play activities in social skills; teach positive words and phrases as a substitute for inappropriate comments; teach student to identify feelings and signs that are present when he becomes upset; modeling of appropriate communication skills and offering alternate ways to express his feelings; use conflict resolutions/mediation; teach communication skills; write down what her perception of the problem is and appropriate strategies for solving; interact in small groups; pre-teach personal interaction skills; modeling of appropriate ways to communicate

Calming Strategies: breathing exercise; student will use relaxation strategies (self talk, breathing, counting, stress ball, etc.) to deal with his frustration and manage his stress in classroom situations; prompted teaching alternative skills interactions when student becomes frustrated or begins to lose self-control (Is there something you need to help you calm down now?); teach student calming down steps to assist him, practice these steps, and remind him to use them when needed; offer student calming strategies and time away to regroup to process his feelings; provide calming place (stress-free zone)

Check In/Out with Teacher: student will check in to school and check out of school by making contact with his case manager

Choice: student will be given two alternative options when being told no so that he will still have some control over his choices; provide choices for tasks; student will have choice times:

computer, art, playground, snack, etc. as he follow his schedule through the day; choice/reinforcer board; have choice or enrichment activities readily available when others are finishing their work; provide an array of reinforcement options (choices); choice of activities, or to work with others or alone; provide limited choices; student selection of reinforcement activities; if there are several things to do, give her a choice of what she would like to do first; if behavior continues to escalate, offer options to provide student with the opportunity to return to baseline phase; visual schedule and allow choices in the schedule

Clearly Define Rules and Consequences: review expectations daily; make expectations clear and concise and be sure student knows what they are; secure individual attention and make expectations clear and concise; clearly define rewards and consequences; review expected behaviors before activity; clarify expected behavior; have student repeat directions; pre-teach rules and expectations

Curricular and Instructional Revision: provide 1:1 assistance to complete the task; alternate easy and difficult tasks; ensure that learning tasks provide moderate challenge but that ample support is available; avoid tasks which are clearly beyond capabilities; student will be given assignments that are of short duration and that match his ability level; he will use manipulatives as much as possible to keep his interests; instructions will be brief and to the point; one-on-one instruction will be provided; modifications of learning activities/tasks; changes in the manner of presenting instruction/feedback; direct instruction will be provided for each subject; standing beside his desk to work if he needs movement; frequently check for understanding; provide multi-sensory cues and supports; use physical prompts; have choice or enrichment activities readily available when others are finishing their work; reduced writing set requirements to reduce frustration; teacher will check and see if student needs academic assistance; make sure calculator is available for math assignments and assistance is provided for long written assignments; give student only the number of tasks that can be tolerated in one sitting; tasks only on his ability level

Differential Reinforcement: provide differentiated reinforcement for successive approximations of target behaviors and for transition from a preferred to a non-preferred (i.e., provide Doritos as a reinforcer for leaving the computer)

Encouragement: provide gentle prodding and encouragement; encourage for doing right thing; student will be encouraged to ask for help as needed

Extra time to Complete Tasks: additional time will be allowed to complete assignments when necessary; allow extra time to process information; provide (wait-out) opportunities for student to request assistance; provide adequate wait time; provide extended time for assignments or tests (15 minutes)

Functional Communication Training

Good News Notes or Calls Home

Help Others: teacher helper job; allow student to become helper in class; assist teacher

In-School Suspension (ISS)

Keep Personal Space/Boundaries: student will be physically redirected from others if he is in their personal space and will not leave on his own accord

Life Space Crisis Intervention (Wood & Long, 1991).

MindSet :crisis intervention based on the Prevention and Management of Aggressive Behavior (PMAB®) Program

Out-of-School Suspension (OSS): no pattern, can't be for same reason each time

Package Programs: Student achievement model (SAM; Criste & Neal-White, 2005).

Parent Call/Contact: notes and email sent home, phone call, note to parent; teacher and parent will communicate through point sheet and calls to monitor student's behavior; use of student agenda to communicate with parents

Peer Help: use a slightly more capable peer as a learning buddy when possible to scaffold student's learning; student will be provided with one-to-one assistance or peer partner if

needed; utilize peer assistance

Physical Restraint

Private Conference: feedback in a 1:1 contrasting her maturity with adults and the inconsistency in her interactions with peers; refer to administrator; teacher/student counseling; speak with student one on one outside of classroom; conference with student to discuss coping strategies; debrief and point behavior chart; conference privately with the student at another time if problems persist

Proximity: physical proximity to the classroom door when it appears student is angry or upset; close proximity during assignments; increase adult proximity; withhold attention for inappropriate non-aggressive behaviors by ignoring, but utilizing proximity control

Redirection: student will be redirected if he looks as though he is beginning the striking behavior; verbal redirection to begin task; validate her feelings and remind her of when her scheduled break is; redirect with verbal prompts; student will be verbally redirected and desired behavior will be explained; student will be redirected with a low key, non-verbal cue in an effort to end the behavior; will be redirected verbally and the desired behavior will be explained; redirect behaviors through praise of successive approximations and physical guidance (hand over hand, physical redirection); redirection without confrontations; establish eye contact before directing; avoid a power struggle when a conflict occurs and allow time for resolution

Reinforce Appropriate Behavior: reward student each time he uses the alternative behavior; student will earn tickets each time he uses the replacement behavior and can use the tickets to purchase privileges; praise; award schedule in which student receives points every 15 minutes that he stays in demarcated area; positive praise; point menu; positive points; preferred time; reinforce compliance with positive praise and privileges; earn positive points for each 30 minutes she can go without losing self-control; praise for approximations; classroom incentive system; earn positive points every 30 minutes he is able to maintain self-control if he drops to the foundation level; provide tangible reinforcement; reward effort or participation rather than outcome; frequent praise/parent contact; positive reinforcement of alternate behaviors; provide with positive feedback, which will indicate that he is successful, important, respected; praise for doing the right thing and staying on task; student will be given high fives and verbal praise from the teacher as he successfully follows his picture card schedule and completes each assignment; reward and reinforce positive behaviors with “soar bucks”; reward positive behaviors with an earned classroom structured activity; social reinforcement (smiles, nods, pat on the back, etc.) increased attention from valued adult, frequent contact from valued adults; activity reinforcement (computer time, game time, outside time, etc.); earned time to spend with a preferred friend or time on the computer; use positive tangible reinforcements; use tangible reinforcements; tangible rewards (candy, pencils, paper, clothes, bowling ring pass, etc.); activity reinforcer such as creative writing; choice of activities, or to work with others or alone; provide opportunities to engage in creative, artistic, or other activities; reinforce student for attending to task based on the length of time he can be successful; gradually increase the length of time for reinforcement as the student demonstrates success; student will earn points on the daily point sheets, as well as work himself up the class level system; coloring pictures; teacher helper job; lots of smiles; ROTC program; positive feedback when student completes assignment; visit with favorite staff with positive referral; time to engage in appropriate preferred activities; activity reinforcement (computer time, extra science, reading time, etc.); point store, free time; earned time to listen to music and/or spend time with a preferred friend; provide immediate feedback; appropriate behavior praised and time will be provided for student to engage in appropriate preferred activities

Reminders: student will be reminded that when he is not getting something he wants, he may still have the opportunity to have it later on; setting expectations prompt at the onset of disruptive/provocative peer behavior to remind her that she can earn points for ignoring negative behavior; use indirect prompts to remind student of her responsibility in asking for a self-control strategy (“is there something that you could do to calm down in this situation?”); review of cognitive strategies to use when ignoring peer behavior; teacher will remind student

of the choice times and privileges he will lose if he does not follow his schedule; remind student that he can be successful in school; verbal reminders/reprimand; three strike rule-reminder of behavior

Response Cost: student will lose tickets when he engages in hitting or striking behavior; learning points, loss of privileges; loss of points for token economy reward system; loss of recess, computer privileges, and free time; loss of preferred activities for a short period of time (lunch in cafeteria, media center); denial of daily activities/removal of privileges; loss of something desirable; loss of rewards/privileges such as play time, computer time, or lunch with the class; token will be removed from the student if the behavior persists after a verbal warning

Role Play: model appropriate interactive behaviors using role play activities in social skills

Seating: choice of seating when possible to maximize student's ability to escape without using inappropriate behaviors; assign specific work area; assign to alternative area for work/study; student will ask to sit away from the group for five to ten minutes to calm down

Self-Monitoring: will self-evaluate his ability to use self-control on the schedule dictated by his level status; use of behavior checklist to self-monitor behavior (with teacher's assistance)

Sensory Supports

Social Skills Training: social skill activities and anger management activities; modeling of appropriate social language and respectful behavior skills towards others; needs to be taught through social skills the appropriate way to interact with others; model appropriate interactive behaviors using role play activities in social skills

Social Stories: student will read social stories to better acquire an awareness of how others need and want to be treated

Teach Alternative Behaviors: introduce breathing exercise to student and help him use it when he is not stressed; reteach appropriate behavior/responses; teacher will teach coping strategies and responsibilities; setting expectations lessons at least once a week to practice how to use self-control in situations where student has been provoked to fight in the past; setting expectations at least once a week practice how to handle situations where student might yell; setting expectations lesson at least once a week to practice strategies for ignoring provocations or distractions; teach replacement skill; train with multiple staff; train in multiple locations (classroom, hallway, cafeteria, gym, and transition classroom when earned); settings expectations lessons on how to ask for help; settings expectations lessons on frustration/anger control strategies; prompted teaching alternative skills interactions when student becomes frustrated or begins to lose self-control (Is there something you need to help you calm down now?); positive practice; teach student how to avoid becoming involved in conflict situations (e.g., move away from situation, change his behavior); teach positive words and phrases as a substitute for inappropriate comments; teach student to identify feelings and signs that are present when he becomes upset; teach student calming down steps to assist him, practice these steps, and remind him to use them when needed; teach problem-solving skills; teach aggression replacement training; pre-teach personal interaction skills; pre-teach self-control skills; teach student to identify triggers that upset him and feelings that are present when he becomes upset; modeling of appropriate ways to communicate and alternate ways to process his frustration; anger management classes

Time-out: isolation; time-out used in the following ways to reduce or eliminate behaviors: contingent observation (student is removed from the setting, but can still observe instruction); time-out is not appropriate to address these behaviors (ignore refusal/avoidance behaviors); planned sustained silence will be used; student will be informed of how long his time-out is to last; removal from class or removal of audience, if necessary

Transition Supports: use a timer at choice times to give other students a turn; provide ample warning prior to transition from one activity to the other (use a timer); increase the use of positive verbal praise for transition paired with an edible reinforcement; provide specific markets to indicate transitions (warnings, timers)

Verbal Warning: provide ample warning prior to transition from one activity to the other (use a timer); structured warning system

Visual Aids: use of tape to mark out designated area; written directions instead of verbal when appropriate; picture card schedule to see what task is next; use digital timer for visual cue for three to five minutes for a scheduled break when identification of emotions and requests have been made appropriately; use visual cues; provide visual supports, remain consistent to visual structure; use of assignment sheet/agenda; visual schedule and allow choices in the schedule; give nonverbal cues to discontinue behavior

Notes: Table includes interventions recommended in FBAs and BIPs of students with escape-maintained behavior.

Sensory-based interventions. A summary of interventions prescribed for the one student whose target behavior was maintained by sensory reinforcement (single function), with frequency counts is depicted in Table 11. A more detailed list of interventions recommended in the BIP for sensory-based behaviors is depicted in Table 12.

Table 11

Frequency of Interventions Prescribed in BIPs per Sensory Function of Behavior

Intervention	Sensory (n = 1)
adjust the contingencies	1
allow breaks	1
blocking	1
build communication competencies	1
choice	1
curricular and instructional revision	1
functional communication training	1
help others, do jobs in class	1
improve environment	1
keep personal space/boundaries	1
planned ignoring	1
proximity	1

redirection	1
reinforce appropriate behavior	1
response cost	1
sensory supports	1
teach alternative behaviors	1
transition supports	1
visual aids	1
address distractions	0
behavior contract	0
break down tasks	0
calming strategies	0
check in/out with teacher	0
clearly define rules & consequences	0
detention	0
differential reinforcement	0
encouragement	0
extra time to complete tasks	0
good news notes or calls home	0
in-school suspension	0
Life Space Crisis Intervention	0
MindSet	0
noncontingent reinforcement (NCR)	0
out-of-school suspension	0
package programs	0
parent call/contact	0
peer help	0
physical restraint	0
private conference	0
reminders	0
role play	0
seating	0
self-monitoring	0
sensory diet	0
social skills training	0
social stories	0
time-out	0

verbal warning	0

Note: Of the 134 student files in the sample, 1 (0.75%) file contained interventions for target behaviors maintained by sensory reinforcement.

Table 12

Strategies Found in GNETS BIP for Sensory-based Behavior.

Interventions Recommended in BIPs
Adjust the Contingencies: extremely high rates of verbal praise for working and being quiet; take him for a walk outside the classroom; offer headphones with music or other auditory stimulation; praise; provide access to window to put his head out to yell
Allow Breaks: take him for a walk outside the classroom
Build Communication Competencies
Choice: bathroom breaks, access to the window to open it, put his head out and scream
Functional Communication Training: provide student with close and constant access to a picture symbol indicating the need to go to the window and put his head out to yell; provide with close and constant access to a picture symbol indicating the need to go to the window to spit
Help Others: keep him engaged in a variety of gross motor vocational tasks, school chores that are most effective are having him pick things up, shredding, emptying the shredder, carrying large objects, wiping tables
In-School Suspension (ISS)
Keep Personal Space/Boundaries:
Out of School Suspension
Planned ignoring: ignore inappropriate behavior whenever possible
Redirection: when passing a water fountain, staff will give redirection (swallow) before he has an opportunity to spit
Reinforce Appropriate Behavior: extremely high rates of verbal praise for working and being quiet; take him for a walk outside the classroom; offer headphones with music or other auditory stimulation; praise; provide access to window to put his head out to yell; offer extremely high rates of positive praise when he engages in appropriate hygiene behavior such as blowing his nose in a tissue
Response Cost
Sensory Diet: engage in a variety of sensory activities such as blowing up balloons or large inflatable objects or bubbles
Sensory Supports: provide student with close and constant access to a picture symbol indicating the need to go to the window and put his head out to yell, other appropriate locations should be developed for cold or stormy weather; engage in a variety of sensory activities such as blowing up balloons or large inflatable objects or bubbles; use headphones that provide noise feedback; headphones with white noise or songs/noises that reflect his noise patterns; maintain a low vocal tone when talking to student; keep him engaged in a variety of gross motor vocational tasks, school chores that are most effective are having him pick things up, shredding, emptying the shredder, carrying large objects, wiping tables; vary classroom tasks to provide challenging material that his multi-sensory in nature and requires kinetic manipulation (cutting and pasting along with cognitive skills); take him for a walk outside the classroom; offer headphones or other auditory stimulation; teach him to use lip balm on his lips
Social Skills Training: social skill activities and anger management activities;

Teach Alternative Behaviors: teach him how to use lip balm on his lips
Transition Supports: verbal; visual (pictures, writing, lights); sound (timer, bell, music, clapping)
Visual Aids: visual cues and gestural cues

Notes: Table includes interventions recommended in FBA and BIP of student with sensory-maintained behavior.

Tangible-based interventions. Of the BIPs that contained identified functions, all of the BIPs that were developed for students whose behaviors were maintained by access to tangibles prescribed interventions involving the adjustment of contingencies, allow breaks, planned ignoring, and reinforce appropriate behavior. A summary of frequency counts of the interventions recommended for problem behaviors maintained by the single function, tangible, is depicted in Table 13. A more detailed list of tangible-based interventions recommended in the BIPs is depicted in Table 14.

Table 13

Frequency of Interventions Prescribed in BIPs per Tangible Function of Behavior

Intervention	Tangible (n = 2)
adjust the contingencies	2
allow breaks	2
planned ignoring	2
reinforce appropriate behavior	2
break down tasks	1
build communication competencies	1
choice	1
clearly define rules & consequences	1
curricular and instructional revision	1
detention	1

good news notes or calls home	1
help others, do jobs in class	1
in-school suspension	1
parent call/contact	1
private conference	1
redirection	1
response cost	1
teach alternative behaviors	1
time-out	1
verbal warning	1
visual aids	1
address distractions	0
behavior contract	0
blocking	0
calming strategies	0
check in/out with teacher	0
differential reinforcement	0
encouragement	0
extra time to complete tasks	0
functional communication training	0
improve environment	0
keep personal space/boundaries	0
Life Space Crisis Intervention	0
MindSet	0
noncontingent reinforcement (NCR)	0
out-of-school suspension	0
package programs	0
peer help	0
physical restraint	0
proximity	0
reminders	0
role play	0
seating	0
self-monitoring	0
sensory diet	0
sensory supports	0

social skills training	0
social stories	0
transition supports	0

Note: Of the 134 student files in the sample, 2 (1.5%) files contained interventions for target behaviors maintained by tangible reinforcement.

Table 14

Strategies Found in GNETS BIPs for Tangible-based Behavior.

Interventions Recommended in BIPs
Adjust the Contingencies: student may visit with familiar and appropriate school personnel when needed; praise; reading time; assist teacher with their duties if possible; lunch detention; praise; positive attention; lost activity
Allow Breaks: cool off time; allow time-out if student becomes upset
Break Down Tasks: break up lengths of assignment to shorter segments
Build Communication Competencies
Calming Strategies
Choice: offer student choice of two clearly defined options
Clearly Define Rules and Consequences: present clearly defined classroom roles and consequences
Differential Reinforcement
Encouragement
Good News Notes or Calls Home
Help Others: assist teacher with their duties if possible
In-School Suspension (ISS)
Life Space Crisis Intervention (Wood & Long, 1991).
Out-of-School Suspension (OSS)
Package Programs: Student achievement model (SAM; Criste & Neal-White, 2005).
Parent Call/Contact: implement home-school communication report
Physical Restraint
Private Conference: correct inappropriate behavior one on one
Proximity
Redirection
Reinforce Appropriate Behavior: student may visit with familiar and appropriate school personnel when needed; praise; reading time; assist teacher with their duties if possible; tangible reinforcers
Reminders
Response Cost
Seating: seating arrangement
Social Skills Training: social skill activities and anger management activities
Teach Alternative Behaviors
Time-out
Verbal Warning

Visual Aids

Notes: Table includes interventions recommended in FBAs and BIPs of students with tangible-maintained behavior.

Relation between behavior function and intervention. Results of 192 chi-square tests of independence, revealed 19 significant relations between specific functions of behavior and interventions. There was a significant relationship between attention and two interventions: response cost and teach alternative behavior. There was a significant relationship between the escape function of behavior and 10 interventions: break down tasks, curricular and instructional revision, extra time to complete tasks, Life Space Crisis Intervention (LSCI), peer help, planned ignoring, redirection, self-monitoring, social skills training, and social stories.

There was a significant relationship between the sensory function of behavior and six interventions: blocking, functional communication training (FCT; Carr & Durrand, 1985), keep personal space/boundaries, proximity, sensory supports, and transition supports. There was a significant relationship between the tangible function of behavior and one intervention, planned ignoring. The absence or presence of significance of relation between prescribed interventions and functions of behavior is depicted in Table 15.

Likelihood that intervention is related to function of behavior. Nineteen binary logistic regressions, each with one set of predictors, were fitted to the data to test the research hypothesis regarding the likelihood that an intervention was related to the hypothesized function of problem behavior.

A predictive relationship was not found in the first model between attention and response cost ($p > .05$). According to the second model, the log of odds of teach

Table 15

Absence or Presence of Significance of Relation between Prescribed Interventions and Functions of Behavior

Intervention	Attention χ^2 (1, n = 22)	Escape χ^2 (1, n = 40)	Sensory χ^2 (1, n = 1)	Tangible χ^2 (1, n = 2)
Blocking	$p > .05$	$p > .05$	**$\chi^2 = 18.83, p = .000$**	$p > .05$
break down tasks	$p > .05$	**$\chi^2 = 9.31, p = .002$**	$p > .05$	$p > .05$
curricular and instructional revision	$p > .05$	**$\chi^2 = 5.81, p = .016$**	$p > .05$	$p > .05$
extra time to complete tasks	$p > .05$	**$\chi^2 = 6.76, p = .009$**	$p > .05$	$p > .05$
functional communication training	$p > .05$	$p > .05$	**$\chi^2 = 58.50, p = .000$**	$p > .05$
keep personal space/boundaries	$p > .05$	$p > .05$	**$\chi^2 = 22.79, p = .000$**	$p > .05$
Life Space Crisis Intervention	$p > .05$	**$\chi^2 = 4.79, p = .029$**	$p > .05$	$p > .05$
peer help[p	$p > .05$	**$\chi^2 = 4.95, p = .026$**	$p > .05$	$p > .05$
planned ignoring	$p > .05$	**$\chi^2 = 6.81, p = .009$**	$p > .05$	**$\chi^2 = 5.24, p = .022$**
Proximity	$p > .05$	$p > .05$	**$\chi^2 = 4.40, p = .036$**	$p > .05$
Redirection	$p > .05$	**$\chi^2 = 3.95, p = .047$**	$p > .05$	$p > .05$
response cost	**$\chi^2 = 3.89, p = .049$**	$p > .05$	$p > .05$	$p > .05$
self-monitoring	$p > .05$	**$\chi^2 = 10.03, p = .002$**	$p > .05$	$p > .05$
sensory supports	$p > .05$	$p > .05$	**$\chi^2 = 13.87, p = .000$**	$p > .05$
social skills training	$p > .05$	**$\chi^2 = 3.94, p = .047$**	$p > .05$	$p > .05$
Social Stories™	$p > .05$	**$\chi^2 = 6.00, p = .014$**	$p > .05$	$p > .05$
teach alternative behaviors	**$\chi^2 = 4.11, p = .043$**	$p > .05$	$p > .05$	$p > .05$
transition supports	$p > .05$	$p > .05$	**$\chi^2 = 13.87, p = .000$**	$p > .05$

Note: A chi-square test of independence (computed for a 2 x 2 table) was performed to examine the relation between the behavior functions and prescribed interventions. Levels of significance were reported if relation between those variables was significant $p < .05$. N = 134 student files.

alternative behavior was negatively related to attention ($p < .05$). In other words, if a student's problem behavior was attention-based, it was less likely that teach alternative behavior would be recommended in the BIP. In fact, the odds of teach alternative

behavior not being recommended for a student with attention-based behavior were 3.08 (= $e^{-.97}$) times greater than if that student's behavior was not attention-based.

According to the third model, the log of odds of break down tasks was positively related to escape ($p < .05$). In other words, if a student's problem behavior was escape-based, it was more likely that break down tasks would be recommended in the BIP. In fact, the odds of break down tasks being recommended in the BIP of a student with escape-based behavior were 3.70 (= $e^{1.3}$) times greater than if that student's behavior was not escape-based.

According to the fourth model, the log of odds of curricular and instructional revision was positively related to escape ($p < .05$). In other words, if a student's problem behavior was escape-based, it was more likely that curricular and instructional revision would be recommended in the BIP. In fact, the odds of curricular and instructional revision being recommended in the BIP of a student with escape-based behavior were 2.59 (= $e^{.95}$) times greater than if that student's behavior was not escape-based.

According to the fifth model, the log of odds of extra time to complete tasks was positively related to escape ($p < .05$). In other words, if a student's problem behavior was escape-based, it was more likely that extra time to complete tasks would be recommended in the BIP. In fact, the odds of extra time to complete tasks being recommended in the BIP of a student with escape-based behavior were 4.00 (= $e^{1.39}$) times greater than if that student's behavior was not escape-based.

According to the sixth model, the log of odds of LSCI was positively related to escape ($p < .05$). In other words, if a student's problem behavior was escape-based, it was more likely that LSCI would be recommended in the BIP. In fact, the odds of LSCI being

recommended in the BIP of a student with escape-based behavior were 3.92 (= $e^{1.37}$) times greater than if that student's behavior was not escape-based.

A predictive relationship was not found in the seventh model between escape and peer help ($p > .05$). A predictive relationship was not found in the eighth model between escape and planned ignoring ($p > .05$).

According to the ninth model, the log of odds of redirection was positively related to escape ($p < .05$). In other words, if a student's problem behavior was escape-based, it was more likely that redirection would be recommended in the BIP. In fact, the odds of redirection being recommended in the BIP of a student with escape-based behavior were 2.18 (= $e^{.78}$) times greater than if that student's behavior was not escape-based.

According to the tenth model, the log of odds of self-monitoring was positively related to escape ($p < .05$). In other words, if a student's problem behavior was escape-based, it was more likely that self-monitoring would be recommended in the BIP. In fact, the odds of self-monitoring being recommended in the BIP of a student with escape-based behavior were 5.54 (= $e^{1.71}$) times greater than if that student's behavior was not escape-based.

A predictive relationship was not found in the eleventh model between escape and social skills training ($p = .05$). A predictive relationship was not found in the twelfth model between escape and social stories ($p > .05$).

There were no predictive relationships found in models 13-18, between sensory and the following interventions: blocking, FCT, keep personal space/boundaries, proximity, sensory supports, and transition supports ($p > .05$). A predictive relationship was not found in the nineteenth model between tangible and planned ignoring ($p > .05$).

A summary of logistic regression analyses for behavior function variables predicting intervention is depicted in Table 16.

Table 16

Summary of Logistic Regression Analyses for Behavior Function and Recommended Interventions

Variables	*B*	*SE B*	Wald's χ^2	*df*	*P*	e^B (odds ratio)
Attention						
1. Response cost	1.13	.591	3.63	1	.057	3.08
2. Teach alternative behavior	-.97	.490	3.93	1	**.047**	.38
Escape						
3. Break down tasks	1.31	.44	8.78	1	**.003**	3.70
4. Curricular and instructional revision	.95	.40	5.67	1	**.017**	2.59
5. Extra time to complete tasks	1.39	.56	6.12	1	**.013**	4.00
6. Life Space Crisis Intervention	1.37	.66	4.28	1	**.039**	3.92
7. Peer help	2.15	1.14	3.57	1	.059	8.56
8. Planned ignoring	.51	.42	1.47	1	.225	1.67
9. Redirection	.78	.40	3.89	1	**.049**	2.18
10. Self-monitoring	1.71	.58	8.64	1	**.003**	5.54
11. Social skills training	.84	.43	3.84	1	.050	2.32
12. Social stories	18.69	4550.96	.00	1	.997	1.31
Sensory						
13. Blocking	24.31	40192.97	.00	1	1.000	3.62
14. Functional communication training	25.96	40192.97	.00	1	.999	1.87
15. Keep personal space/boundaries	25.54	40192.97	.00	1	1.000	4.56
16. Proximity	22.72	40192.97	.00	1	1.000	7.39
17. Sensory supports	23.96	40192.97	.00	1	1.000	2.54
18. Transition supports	23.96	40192.97	.00	1	1.000	2.54
Tangible						
19. Planned ignoring	22.21	28420.72	.00	1	.999	4.43

Note: The research hypothesis posed to the data was the likelihood that an intervention is related to hypothesized function of problem behavior. Predictor variables (attention, escape, sensory, tangible) coded as 1 for *yes* and 0 for *no*. Intervention outcome variables coded as 1 for *yes* and 0 for *no*. $p < .05$. *B* = the values (in log-odds units) for predicting the dependent variable from the independent variable for the logistic regression equation. *SE B* = the standard errors associated for the coefficients. A Wald test was used to test the statistical significance of each coefficient (b) in the model. *df* = degrees of freedom. *p* = significance. e^B (odds ratio) = exponentiated B is the odds ratios for the predictor variables. *N* = 118 student files.

Relation of FBA/BIP components to specific program. Chi-square tests of independence indicated significant relations between specific GNETS program and presence of most of the FBA/BIP critical components, and specific GNETS program and

some of the prescribed interventions. A summary of the significant results of the chi-square tests of independence is provided in Table 17.

Table 17

Statistically Significant Relations between GNETS Programs and BIP Components, and GNETS Programs and Prescribed Interventions

BIP Components	Results	Prescribed Interventions	Results
Each behavior operationally defined	$\chi^2 = 24.74$, $p = .006$	Address distractions	$\chi^2 = 19.09$, $p = .039$
Each behavior assessed separately	$\chi^2 = 41.08$, $p = .000$	Allow breaks	$\chi^2 = 20.13$, $p = .028$
Used assessment or not	$\chi^2 = 57.24$, $p = .000$	Break down tasks	$\chi^2 = 42.50$, $p = .000$
How many methods used to collect data	$\chi^2 = 48.60$, $p = .030$	Build communication competencies	$\chi^2 = 39.33$, $p = .000$
Determines whether context variables are antecedents or consequences	$\chi^2 = 47.85$, $p = .000$	Choice	$\chi^2 = 21.10$, $p = .020$
Relationship between problem behavior and context variables is determined	$\chi^2 = 44.49$, $p = .000$	Clearly define rules and consequences	$\chi^2 = 36.73$, $p = .000$
Patterns of context variables identified	$\chi^2 = 47.21$, $p = .000$	Curricular and instructional revision	$\chi^2 = 53.45$, $p = .000$
More general context variables identified	$\chi^2 = 27.36$, $p = .002$	Differential reinforcement	$\chi^2 = 23.03$, $p = .011$
Patterns identified for function of behavior	$\chi^2 = 23.32$, $p = .010$	Extra time to complete tasks	$\chi^2 = 63.14$, $p = .000$
There is a function hypothesis	$\chi^2 = 46.74$, $p = .000$	Good news notes or calls home	$\chi^2 = 23.94$, $p = .008$
Valid verses invalid functions	$\chi^2 = 131.64$, $p = .000$	Improve environment	$\chi^2 = 27.89$, $p = .002$
BIP related to FBA	$\chi^2 = 38.48$, $p = .000$	Parent call, contact	$\chi^2 = 32.84$, $p = .000$
Replacement behavior serves the same function	$\chi^2 = 25.05$, $p = .005$	Physical restraint	$\chi^2 = 35.57$, $p = .000$
Modifications for context variables	$\chi^2 = 39.29$, $p = .000$	Planned ignoring	$\chi^2 = 31.13$, $p = .001$
BIP clear who needs to do what, when to monitor	$\chi^2 = 31.20$, $p = .001$	Proximity	$\chi^2 = 26.31$, $p = .003$
There is a plan but inadequate	$\chi^2 = 65.76$, $p = .000$	Redirection	$\chi^2 = 34.84$, $p = .000$
Strategies managed so that reinf. maximized for appropriate bx and minimized for problem bx	$\chi^2 = 28.55$, $p = .001$	Reminders	$\chi^2 = 31.16$, $p = .001$
		Response cost	$\chi^2 = 32.78$, $p = .000$
		Role play	$\chi^2 = 41.43$, $p = .000$
		Seating	$\chi^2 = 19.10$, $p = .039$
		Self-monitoring	$\chi^2 = 24.66$, $p = .006$
		Sensory support	$\chi^2 = 25.29$, $p = .005$
		Social skills	$\chi^2 = 30.30$, $p = .001$
		Verbal warning	$\chi^2 = 44.84$, $p = .000$
		Visual aids	$\chi^2 = 22.89$, $p = .011$

Note: A chi-square test of independence (computed for a 2 x 2 table) was performed to examine the relation between the specific GNETS programs and BIP components, and specific GNETS programs and prescribed interventions. Levels of significance were

reported if relation between those variables was significant $p < .05$. $df = 10$. $N = 134$ student files.

The Wald chi-square tests revealed the overall model fit and individual regression coefficients of the multinomial logistic regressions could not predict relations more effectively than the null models. No significant relations were found in the results of the relation of the demographic variables, behavioral function variables, and behavioral intervention variables to each other.

Social Validity

GNETS directors from participating programs were asked to complete a brief questionnaire concerning their opinions of the study. The questionnaire consisted of a seven-item survey soliciting responses on a 4-point Likert scale to assess their satisfaction with the study as well as to gauge their value of FBAs and a prototypical plan developed for each function. The directors circled a number (1-4) to choose their response to each question with 1indicating "strongly disagree" and 4 indicating "strongly agree." Approximately half of the questions were worded negatively to promote thoughtful responses, and then reverse scored. A 4-point Likert scale was chosen to encourage respondents to commit to agreeing or disagreeing to some magnitude

A percentage was computed for each question equaling the number of directors who circled a specific rating, divided by the total number of directors, and then multiplied by 100%. The questionnaires were mailed to directors with self-addressed envelopes. The questionnaires were anonymous (i.e. the directors' names and program identification were absent from the forms), and the responses were used to answer the seventh research question (i.e., What do GNETS directors perceive as the importance and utility of FBAs

and function-specific BIPs?). The Social Validity Questionnaire is provided in Appendix C.

The social validity form was completed by 9 out of 11 directors of the participating GNETS programs. After the surveys were mailed along with self-addressed envelopes, nine directors mailed the surveys to the researcher. Subsequently the researcher sent an email to all the directors with a reminder about the surveys, and an offer to mail another survey with prepaid postage if needed. Several directors emailed back that they had already mailed the survey to the researcher, and no one asked for another survey.

Overall, social validity scores indicate that the directors agreed that the quality of FBAs affects the quality of services provided to students with EBD, and that feedback on the way the BIPs are written is useful. More specifically, all the directors agreed that the quality of FBAs affects the quality of services provided to students with EBD. Most directors agreed that teachers and other school personnel could improve the way they write BIPs if someone else reads and provides them with feedback on the quality of the BIPs.

Most directors disagreed that FBAs can be completed adequately by a team discussing the student's behavior; direct observation of behavior in context rarely adds useful information. All the directors agreed that the extent to which the IEP team uses the FBA to inform their development of the BIP affects the effectiveness of the BIP. Most directors agreed that providing a prototypical plan for each behavioral function, along with a list of function-based strategies to choose from, would help improve the quality of BIPs.

Not all directors agreed the purpose of the FBA is to improve services and interventions by helping personnel comprehend the relationship between the target behavior and the environment. None of the directors agreed that participating in this research study was a waste of time for themselves and their staff. The results of the Social Validity Questionnaire are provided in Table 18.

Table 18

Responses for Director Social Validity Survey Likert-scale Questions

	1 Strongly Disagree	2 Disagree	3 Agree	4 Strongly Agree
1. I believe the quality of functional behavioral assessments (FBAs) affects the quality of services provided to students with emotional and behavioral disorders.	0	0	5	4
2. Teachers and other school personnel could improve the way they write BIPs if someone else reads and provides them with feedback on the quality of the BIPs.	0	1	4	4
3. FBAs can be completed adequately by a team discussing the student's behavior; direct observation of behavior in context rarely adds useful information.	6	2	0	1
4. The extent to which the IEP team uses the FBA to inform their development of the BIP affects the effectiveness of the BIP.	0	0	4	5
*5. Providing a prototypical plan for each behavioral function, along with a list of function-based strategies to choose from, would help improve the quality of BIPs.	0	1	6	1
6. The purpose of the FBA is to improve services and interventions by helping personnel comprehend the relationship between the target behavior and the environment.	0	2	3	4
7. Participating in this research study was a waste of time for me and my staff.	5	4	0	0

Note: *One participant did not respond to question # 5.

DISCUSSION

This study was designed to measure the technical and applied features of a randomly-selected sample of FBAs/BIPs from GNETS. In addition, the statistical relations between the BIP variables, behavioral function variables, and demographic variables were calculated. The data of this study showed that components described as critical in research literature for conducting FBAs and developing BIPs were absent from a significant number of the student files, and presence of some of the components were significantly related to specific GNETS programs. Close inspection of the information in the BIPs revealed practitioners may lack knowledge regarding FBAs and behavior function. Furthermore, results of the statistical analyses indicated few of the prescribed interventions were likely to be related to function. These data replicate and extend the findings of previous studies that indicated most BIPs are not founded on the results of FBAs (Blood & Neel 2007), and incorporate strategies that do not address the assessed function of the problem behavior (Scott, McIntyre et al., 2005; Van Acker et al., 2005).

Similar to the findings of the Van Acker et al. (2005) study, most of the FBA/BIPs in this investigation lacked an operational definition, and the target behaviors were not assessed separately. Interestingly, several practitioners wrote a behavior objective in the place designated for target behavior which may have been an indication that the practitioners did not understand the meaning of that term (target behavior).

Disturbingly, in 67.2% of the FBAs/BIPs provided, there was no indication (results reported, hard copies of assessments, or checking off a box on a FBA or BIP form denoting the method was used) that one or more data collection methods were used to identify the hypothesized function of the behavior. O'Neill and colleagues (1997)

stressed the importance of using data-based assessments during the FBA process; and recommended the data collected should be compared and analyzed to create testable hypotheses or summary statements regarding the function of the behavior to describe the relationships among setting events, antecedents, behavior, and consequences. However, patterns were summarized into clear and accurate (based on data) written statements in only 8.1% of the files in this investigation, and only 62.2% of the FBAs/BIPs contained a hypothesis related to the function of the behavior.

Several of the statements written in the sections of BIP forms reserved for behavioral function indicated practitioners misunderstood the meaning of behavioral function. For example, in some of BIPs statements such as "cognitive functioning is within the low average range with relative strengths in categorical reasoning," and "student struggles to handle changes appropriately due to his disability," was written under the space for "Functional Behavioral Assessment and Identified Function of the Target Behavior."

In addition, the researcher had to infer the behavior function for some files by reviewing rating scale results or reading observation notes because the function was not identified on the BIP. Also, sometimes a file indicated an empirically based function for one target behavior (i.e. escape/avoid), but then indicated a non-empirically based function for another target behavior. For example, in one file the function for a target behavior was described as "student will put his head on the desk and sleep throughout the day to avoid completing assignments," while the function for the second target behavior was "student exhibits defiant behavior when he believes a person is disrespecting him."

Tiger, Fisher, Toussaint, & Kodak (2009) explained that the hypothesized function of the target behavior can be verified by manipulating the identified context variables to confirm whether or not the function of the target behavior has been correctly identified, and Van Acker et al. (2005) declared the strategies used to verify the hypothesized function should be documented in the FBA. No files in this investigation contained indications that context variables had been manipulated to verify function hypothesis. More specifically, there were no reports of the use of FAs, structural assessments, or any other type of procedure that manipulated variables to measure their influence on the target behavior.

The finding that 76.3% of the BIPs were not related to FBAs replicates the findings of other research (Blood & Neel, 2007; Van Acker et al., 2005) and is especially troubling considering numerous researchers have demonstrated that interventions based on function are effective for helping students improve their prosocial behavior while decreasing their problem behavior (Moreno & Bullock, 2011). Interventions that do not consider the function of the problem behavior can be unsuccessful and/or increase the severity of the behavior (O'Neill et al., 1997).

Upon first glance, finding PBSs were prescribed in all of the BIPs was encouraging. However, because the majority of those BIPs did not consider function when prescribing the PBSs, the effectiveness of those supports is questionable. For example, even though using time-out may increase escape-maintained behavior because when students are removed from task demands they are reinforced for engaging in problem behavior with a break from tasks (Nelson & Rutherford, 1983; Plummer, Baer,

& LeBlanc, 1977; Solnick, Rincover, & Peterson, 1977), time-out was prescribed in 47.5% of the BIPs for students with escape-based behavior.

Furthermore, although it is well established that influential antecedents and consequences should be identified and managed to improve the effectiveness of PBSs (Dunlap et al., 2010), information that determined whether context variables served as antecedents or consequences was absent from 71.9% of the FBAs/BIPs. Moreover, the fact that few of the BIPs included strategies for managing consequences so that reinforcement is maximized for positive behavior and minimized for problem behavior provides a clearer picture of the overall approach to developing the BIPs.

To ensure the BIP is implemented correctly, a plan that lists exactly what personnel need to do to monitor the consistency and accuracy with which the function-based intervention is implemented should be included in the BIP (Umbreit et al., 2007). Very few of the BIPs, included clear and specific plans, and A mere two of the BIPs included a complete plan for monitoring and evaluation that included details about what type of data would be collected, who would collect data, the integrity of implementation, effectiveness, maintenance, generalization, and communication with others.

Inadequate plans for monitoring (missing who would collect data, what type of communication to others would be involved, information of how the integrity of the implementation would be assessed, maintenance, and generalization) were included in 54.5% of BIPs, only 4.5% of the files had evidence of follow-through of the plan. One possible explanation for these results may be that daily point sheets may have been the means to collect and assess data for many of the students. Daily point sheets accumulate in number and can be space-consuming, the sheets may have been kept somewhere other

than the student's file. For example, "Data will be kept through a point system," was written in the plan for monitoring section of several BIPs. However, there were no examples of point sheets; and no specification of what behaviors, what type of data is kept in the point system, who would collect/manage the data, and when the data would be reviewed.

Upon finding that many of the files did not contain evidence of adequate plans to monitor the BIPs from student files, the researcher contacted the GNETS representatives and learned that some of the GNETS schools were monitoring the plans to some degree. In an email message one representative wrote, "Along with the BIP, teachers also use a levels/daily checks system to help monitor student progress. These include the exit criteria on the IEP/BIP goals. Students monitor their progress with a CICO system at least twice daily. This is not kept in the students' files, but in the teachers' debriefing notebooks. The data is then transferred to the students' progress monitoring reports that are sent home and to the students' home school, at the end of each nine week period."

Limitations

Nine out of 11 schools chose to mail copies of FBA/BIPs from students' files. Therefore the researcher did not have complete control over the data collection process. Ultimately the school representative regulated the file information used in this investigation. Although the researcher requested specific FBA/BIP information by phone, email, and a mailed checklist of the information needed, there is a possibility that crucial data needed for the study was not mailed. Indeed, in an email message, one representative communicated there were FBAs in her school's files, although she did not mail copies of the FBAs following repeated requests.

The most frequently used method to identify the hypothesized function of problem behavior, the school (or county) form, ranged from a sparse two-sentence section on a form labeled "FBA," to a three-page document which included pointed questions. Information was gathered about antecedents: "time of day, location, with whom, what activities, when asked to do or stop something, when is this behavior most likely to occur, when is the least likely to occur;" consequences: "what might student attain as a result of this behavior, what might the student avoid as a result of this behavior, how do you and other students respond to this behavior, describe student's positive behaviors and consequences for them;" and medical history. Unfortunately most of the school FBA forms provided no indication of the source (direct or indirect assessment) of information, which subsequently may have lessened the exactness of the data in the assessment methods calculations. If the source was provided, it was recorded and entered as data for the frequency analysis.

The imprecise descriptions in some of the BIPs made it difficult to ensure precise categorizing of the interventions. All of the BIPs that contained hypothesized functions, prescribed interventions that involved adjustments of contingencies. Interventions within this category involve the management of consequences such as reinforcement of appropriate behavior and withholding reinforcement for problem behavior (Umbreit et al., 2007), and appear appeared frequently across function categories. Because of the format in which some interventions were listed in the BIPS; (i.e., boxes checked next to "antecedents", or "positive behavior supports"); reinforcement was not necessarily linked to function and included many types of positive reinforcement (e.g., points, computer time, praise); and negative reinforcement (e.g., loss of points, loss of computer

time, time-out). Some BIPs simply listed “positive reinforcement” and the nature of the positive reinforcement (i.e., whether attention, escape, or sensory reinforcement) was rarely specified.

In addition, the exact changes or modifications to the environment were not specified in all the BIPs. For example one practitioner wrote “Make necessary adjustments in his environment to prevent students from experiencing stress, frustration, and anger.” Some BIPs used a format that listed several choices which could be marked to indicate the items would be used for the student, with no specific information about the antecedents. In those cases it was not known if interventions were function-based.

Finally, although the information in the students’ files did not indicate the FBA/BIP process was being executed in an adequate manner, each of the GNETS programs employs extensive school-wide supports. Though the supports differ from program to program, when asked what school-wide supports are used, representatives indicated that their programs employ an array of behavioral, therapeutic, and academic interventions. Some of the supports include the Student Achievement Model (SAM, Criste & O’Neal, 2005); LSCI (Long, Wood, & Fecser, 2009); MindSet Four-Step Counseling Model; Person Brain model; group and individual counseling; differentiated instruction; proactive teaching; Choose Respect, Responsibility, and Motivation; errorless learning; behavior momentum, and token economy systems. The intervention data gathered in the BIPs did not provide a complete representation of the wide-ranging supports GNETS programs provide for students.

Future Studies

Future studies are needed to explore the relation between local policy and the quality of the execution of the FBA/ BIP process. It would be helpful to learn if schools provide better quality FBAs/BIPs when given clear expectations for executing the FBA/BIP technology. A larger sample size per school would allow researchers to conduct predictive analyses and other more precise evaluations of the school relation to function-based practices.

Additionally investigations are needed to assess what efforts are being made to ensure teachers have the skills necessary to implement function-based interventions. All the BIPs in this study prescribed functions that are considered to be PBSs. However, if teachers lack the knowledge to implement interventions in a function-based manner (e.g., provide positive reinforcement based on behavioral function, refrain from using time-out for a student who has escape-maintained behavior) problem behavior may increase.

More comprehensive investigations are needed to examine the processes schools use to monitor and evaluate of the effectiveness of BIPs. As indicated by one GNETS representative, data collection may be occurring even if it is not documented in students' files. Studies could evaluate whether providing practitioners with certain supports and resources improves monitoring and evaluation practices.

Finally investigations into the specific barriers that prevent practitioners from executing the necessary procedures of an adequate FBA/BIP process could provide information that to guide future practice. Researchers have specified that FAs take a considerable amount of time to conduct (Payne et al., 2007). More data is needed on how schools allocate time and human resources to the FBA process, and why some schools

dedicate more resources towards FBAs than others, in order to conceptualize what staff supports may bridge the gap between research and practice.

CONCLUSION

Some of the data found in the BIPs suggested a lack of understanding the FBA/BIP process. Researchers have demonstrated that teachers can successfully conduct FBAs with support of researchers (Kamps et al., 2006). Van Acker and colleagues' (2005) conclusion that practitioners need systematic training with practice and feedback to develop the essential skills necessary for the FBA/BIP process were supported by the findings of this study. Because a wealth of empirical investigations have shown that using an understanding of the variables that influence behavior is the most effective way to use PBSs to improve an individual's quality of life (Dunlap et al., 2010) it is crucial that practitioners receive the training needed to make accurate decisions regarding the assessments needed to identify and verify behavioral function, and implement PBSs in a manner that is consistent FBA information.

The findings of this study provide justification for the appeal for standardization of FBA procedures and the use of experimental analysis to identify function of behavior (Kamps et al., 2006). Results demonstrated the technical adequacy of FBAs and BIPs is related to origin of school, thereby showing the importance of providing policies that provide clear guidelines for directors and principles to steer the use of FBA technology. Policies that include standardization of procedures such as the model designed by (Umbreit et al., 2007) could lead to a refinement in local schools implementation of the FBA/BIP process.

Northup and colleagues (1991) concluded that problem behaviors should not be deemed as motoric responses that can be manipulated merely to suit the practitioner's desire for compliance. Instead, the purpose or function the problem serves for individuals must be scientifically studied, and subsequent results used to inform interventions that teach and support the use of socially acceptable replacement behaviors so that individuals are no longer reliant on problem behaviors to meet their needs (Northup et al., 1991). The results of this study supply more data to support the line of research that demonstrates most BIPs incorporate strategies that do not address the assessed function of the problem behavior (Blood & Neel, 2007; Scott, McIntyre, et al., 2005; Van Acker et al., 2005) and provides clear implications for the evolution of policy regarding FBAs and BIPs.

References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text revision). Washington, DC: Author.

Baker, P., & Allen, D. (2012). Use of positive behaviour support to tackle challenging behaviour. *Learning Disability Practice*, *15*, 18-20.

Banda, D. R., McAfee, J. K., & Hart, S. L. (2009). Decreasing self-injurious behavior in a student with autism and Tourette syndrome through positive attention and extinction. *Child and Family Behavior Therapy*, *31*, 144-156.

Blood, E., & Neel, R. S. (2007). From FBA to implementation: A look at what is actually being delivered. *Education and Treatment of Children*, *30*, 67-80.

Butler, L. R., & Luiselli, J. K. (2007). Escape-maintained problem behavior in a child with autism: Antecedent functional analysis and intervention evaluation of noncontingent escape and instructional fading. *Journal of Positive Behavior Interventions*, *9*, 195-202.

Cale, S. I., Carr, E. G., Blakeley-Smith, A., & Owen-DeSchryver, J. S. (2009). Context-based assessment and intervention for problem behavior in children with autism spectrum disorder. *Behavior Modification*, *33*, 707–742.

Carr, E. G., Newsom, C. D., & Binkoff, J. A. (1980). Escape as a factor in the aggressive behavior of two retarded children. *Journal of Applied Behavior Analysis, 13,* 101-117.

Carr, J. E., Coriaty, S., Wilder, D. A., Gaunts, B. T., Dozier, C. L., Brittons, L. N., . . . Reed, C. L. (2000). A review of "noncontingent" reinforcement as treatment for

the aberrant behavior of individuals with developmental disabilities. *Research in Developmental Disabilities, 21,* 377–391.

Carr, J. E., Dozier, C. L., & Patel, M. R. (2002).Treatment of automatically reinforced object mouthing with noncontingent reinforcement and response blocking: Experimental analysis and social validation. *Research in Developmental Disabilities*, *23*, 37-44.

Carr, E. G., & Durand, V. M. (1985). Reducing behavior problems through functional communication training. *Journal of Applied Behavior Analysis, 18,* 111-126.

Chattefuee, S., & Hadi, A. S. (2006). *Regression analysis by example*. (4th ed.). Hoboken, NJ: John Wiley & Sons.

Conroy, M. A., Dunlap, G., Clarke, S., & Alter, P. J. (2005). A descriptive analysis of positive behavioral intervention research with young children with challenging behavior. *Topics in Early Childhood Special Education*, *25*, 157-166.

Criste, A., & Neal-White, J. (2005). *Student Achievement Model: Training and reference manual*. Atlanta, GA: Georgia Psychoeducational Network.

Crosby, S., Jolivette, K., & Patterson, D. (2006). Using precorrection to manage inappropriate academic and social behaviors. *Beyond Behavior*, *16*, 14-17.

Dowd, T., Tobias, L., Connolly, T., Criste, A., & Nelson, C. (1993). *Specialized classroom management: A Boys Town approach*. Boys Town, NE: Boys Town Press.

Dunlap, G., Carr, E. G., Horner, R. H., Koegel, R., Sailor, W., Clarke, S., …Fox, L. (2010). A descriptive multi-year examination of positive behavior support. *Behavioral Disorders*, *35*, 259-279.

Fox, J., & Davis, C. (2005). Functional behavior assessment in schools: Current research findings and future directions. *Journal of Behavioral Education, 14,* 1-4.

Filter, K. J., & Horner, R. H. (2009). Function-based academic interventions for problem behavior. *Education and Treatment of Children*, *32*, 1-19.

Grow, L. L., Carr, J. E., & LeBlanc, L. A. (2009). Treatments for attention-maintained problem behavior: Empirical support and clinical recommendations. *Journal of Evidence-Based Practices for Schools*, *10*, 70-92.

Guess, D., & Carr, E. (1991). Emergence and maintenance of stereotypy and self-injury. *American Journal on Mental Retardation*, *96*, 299-319.

Harrell, F. E. Jr. (2001). *Regression modeling strategies: With applications to linear models, logistic regression and survival analysis*. New York: Springer.

Hester, P. P., Hendrickson, J. M., & Gable, R. A. (2009). Forty years later: The value of praise, ignoring, and rules for preschoolers at risk for behavior disorders. *Education and Treatment of Children*, *32*, 513-535.

Ingram, K., Lewis-Palmer, X, & Sugai, G. (2005). Function-based intervention planning: Comparing the effectiveness of FBA indicated and contra-indicated intervention plans. *Journal of Positive Behavior Interventions*, *7*, 224-236.

Ingvarsson, E. T., Hanley, G. P., & Welter, K. M. (2009). Treatment of escape-maintained behavior with positive reinforcement: The role of reinforcement contingency and density. *Education and Treatment of Children*, *32*, 371-401.

Iwata, B. A., Pace, G. M., Cowdery, G. E., & Miltenberger, R. G. (1994). What makes extinction work: An analysis of procedural form and function. *Journal of Applied Behavior Analysis, 17,* 131-144.

Kamps, D., Wendland, M., & Culpepper, M. (2006). Active teacher participation in functional behavior assessment for students with emotional and behavioral disorders risks in general education classrooms. *Behavioral Disorders*, *31*, 128-146.

Kavale, K. A., Mathur, S. R., & Mostert, M. P. (2004). Social skills training and teaching social behavior to students with emotional and behavioral disorders. In R. B. Rutherford, M. M. Quinn, & S. R. Mathur (Eds.), *Handbook of research in emotional and behavioral disorders* (pp. 32-53). New York: Guilford.

Kern, L., Hilt, A. M., & Gresham, F. (2004). An evaluation of the functional behavioral assessment process used with students with or at risk for emotional and behavioral disorders. *Education and Treatment of Children*, *27*, 440-452.

Kleinbaum, D. G., Kupper, L. L., Nizam, A., & Muller, K. E. (2007). *Applied regression analysis and other multivariable methods* (4th edition). Pacific Grove, CA: Duxbury Press.

Kodak, T., Miltenberger, R. G., & Romaniuk, C. (2003). The effects of differential negative reinforcement of other behavior and noncontingent escape on compliance. *Journal of Applied Behavior Analysis, 36,* 379–382.

Kuhn, D. E., Hardesty, S. L., & Sweeney, N. M. (2009). Assessment and treatment of excessive straightening and destructive behavior in an adolescent diagnosed with autism. *Journal of Applied Behavior Analysis*, *42*, 355-360.

Lane, K. L., Barton-Arwood, S. M., Spencer, J. L., & Kalberg, J. R. (2007). Teaching elementary school educators to design, implement, and evaluate functional

assessment-based interventions: Successes and challenges. *Preventing School Failure*, *51*, 35-46.

Lane, K. L., Eisner, S. L., Kretzer, J., Bruhn, A. L., Crnobori, M., Funke, L., . . . Casey, A. (2009). Outcomes of functional assessment-based interventions for students with and at risk for emotional and behavioral disorders in a job-share setting. *Education and Treatment of Children, 32,* 573-604.

Lane, K. L., Smither, R., Huseman, R., Guffey, J., & Fox, J. (2007). A function-based intervention to decrease disruptive behavior and increase academic engagement. *Journal of Early and Intensive Behavior Intervention*, 3-4, 348-364.

Langdon, N. A., Carr, E. G., & Owen-DeSchryver, J. S. (2008). Functional analysis of precursors for serious problem behavior and related intervention. *Behavior Modification*, *32*, 804-827.

Lo, Y., & Cartledge, G. (2006). FBA and BIP: Increasing the behavior adjustment of African American boys in schools. *Behavioral Disorders*, *31*, 147–161.

Long, J. S. (1997). *Regression techniques for categorical and limited dependent variables: Advanced quantitative techniques in the social sciences*. Thousand Oaks, CA: Sage.

Long, N. J., Wood, M. M., & Fecser, F. A. (2001). *Life space crisis intervention: Talking with students in conflict*. Austin, TX: ProEd.

McComas, J., Hoch, H., Paone, D., & El-Roy, D. (2000). Escape behavior during academic tasks: A preliminary analysis of idiosyncratic establishing conditions. *Journal of Applied Behavior Analysis, 33,* 479–493.

McGinnis, E., & Goldstein, A. P. (1997). *Skillstreaming the elementary school child: New strategies and perspectives for teaching prosocial skills*. Chicago, IL: Research Press.

McLaren, E. M., & Nelson, C. M. (2009). Using functional behavior assessment to develop behavior interventions for students in Head Start. *Journal of Positive Behavior Interventions*, *11*, 3-21.

Michael, J. (1993). Establishing operations. *The Behavior Analyst, 16,* 191–206.

Mildon, R. L., Moore, D. W., & Dixon, R. S. (2004). Combining noncontingent escape and functional communication training as a treatment for negatively reinforced disruptive behavior. *Journal of Positive Behavior Interventions*, *6*, 92-102.

Miltenberger, R. G. (2011). *Behavior modification: Principles and procedures (5th ed.).* Pacific Grove, CA: Wadsworth.

Mitchell, B. S., Stormont, M., & Gage, N. A. (2011). Tier two interventions implemented within the context of a tiered prevention framework. *Behavioral Disorders*, 36, 241-261.

Moreno, G., & Bullock, L. M. (2011). Principles of positive behavior supports: Using the FBA as a problem-solving approach to address challenging behaviors beyond special populations. *Emotional and Behavioural Difficulties*, *16*, 117-127.

Murray, M., Baker, P. M., Murray-Slutsky, C., & Paris, B. (2009). Strategies for supporting the sensory-based learner. *Preventing School Failure*, *53*, 245-251.

Mustian, A. L. (2010). *The comparative effects of function-based versus nonfunction-based interventions on the social behavior of African American students*. Available from ProQuest Dissertations and Theses database. (UMI No. 3422674)

Nelson, C. M., & Rutherford, R. B. (1983). Timeout revisited: Guidelines for its use in special education. *Exceptional Education Quarterly*, *3*, 56-67.

Newcomer, L. L., & Lewis, T. J. (2004). Functional behavioral assessment: An investigation of assessment reliability and effectiveness of function-based interventions. *Journal of Emotional and Behavioral Disorders*, *12*, 168-181.

Northup, J., Broussard, C., Jones, K., George, T., Vollmer, T. R., & Herring, M. (1995). The differential effects of teacher and peer attention on the disruptive classroom behavior of three children with a diagnosis of attention deficit hyperactivity disorder. *Journal of Applied Behavior Analysis*, *28*, 227–228.

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

O'Neill, R. E., Horner, R. H., Albin, R. W., Sprague, J. R., Storey, K., & Newton, J. S. (1997). *Functional assessment and program development for problem behavior: A practical handbook* (2nd ed.). Pacific Grove, CA: Brooks/Cole.

Patterson, S. T. (2009). The effects of teacher-student small talk on out-of-seat behavior. *Education and Treatment of Children*, *32*, 167-174.

Payne, L.D., Scott, T.M., & Conroy, M. (2007). A school-based examination of the efficacy of function-based intervention. *Behavioral Disorders*, *32*, 158-174.

Pedhazur, E. J. (1997). *Multiple regression in behavioral research: Explanation and prediction* (3rd ed.). Orlando, FL: Harcourt Brace.

Peduzzi, P. N., Concato, J., Holford, T. R., Feinstein, A. R. (1995). The importance of events per independent variable in multivariable analysis, II: Accuracy and precision of regression estimates. *Journal of Clinical Epidemiology*, *48*, 1503–1510.

Peduzzi, P. N., Concato J., Kemper, E., Holford, T. R., Feinstein, A.R. (1996). A simulation study of the number of events per variable in logistic regression analysis. *Journal of Clinical Epidemiology*, *49*, 1373–1379.

Plummer, S., Baer, D. M., & LeBlanc, J. M. (1977). Functional considerations in the use of time out and an effective alternative. *Journal of Applied Behavior Analysis*, *10*, 689-705.

Preciado, J. A., Horner, R. H., & Baker, S. K. (2009). Using a function-based approach to decrease problem behaviors and increase academic engagement for Latino English language learners. *The Journal of Special Education***,** *42*, 227-240.

Reed, G. K., Ringdahl, J. E., Wacker, D. P., Barretto, A., & Andelman, M. S. (2005). The effects of fixed-time and contingent schedules of negative reinforcement on compliance and aberrant behavior. *Research in Developmental Disabilities, 26,* 281-295.

Rincover, A., Cook, R., Peoples, A., & Packard, D. (1979). Sensory extinction and sensory reinforcement principles for programming multiple adaptive behavior change. *Journal of Applied Behavior Analysis*, *12*, 221-233.

Romaniuk, C., Miltenberger, R. G., Conyers, C., Jenner, N., Jurgens, M., & Ringenberg, C. (2002). The influence of activity choice on behavior problems maintained by escape versus attention. *Journal of Applied Behavior Analysis, 35,* 349–362.

Sasso, G. M., Conroy, M. A., Peck-Stichter, J., & Fox, J. J. (2001). Slowing down the bandwagon: The misapplication of functional assessment for students with emotional or behavioral disorders. *Behavioral Disorders*, *26*, 282-296.

Scott, T. M., Anderson, C. M., & Spaulding, S. A. (2008). Strategies for developing and carrying out functional assessment and behavior intervention planning. *Preventing School Failure*, *52*, 39-49.

Scott, T. M., & Kamps, D. M. (2007). The future of functional behavioral assessment in school settings**.** *Behavioral Disorders*, *32*, 146–157.

Scott, T. M., Liaupsin, C., Nelson, C. M., & McIntyre, J. (2005). Team-based functional behavior assessment as a proactive public school process: A descriptive analysis of current barriers. *Journal of Behavioral Education*, *14*, 57-71.

Scott, T. M., McIntyre, J., Liaupsin, C., Nelson, C. M., Conroy, M., & Payne, L. D. (2005). An examination of the relation between functional behavior assessment and selected intervention strategies with school-based teams. *Journal of Positive Behavior Interventions, 7*, 205-215.

Scott, T. M., Meers, D. T., & Nelson, C. M. (2000). Toward a consensus of functional behavioral assessment for students with mild disabilities in public schools. A national survey. *Education and Treatment of Children*, *23*, 265-285.

Shores, R. E., & Wehby, J. H. (1999). Analyzing the classroom social behavior of students with EBD. *Behavioral Disorders*, *7*, 194–199.

Simonsen, B., Jeffrey-Pearsall, J., Sugai, G., & McCurdy, B. (2011). Alternative setting-wide positive behavior support. *Behavior Disorders*, *36*, 213-224.

Skinner, J. N., Veerkamp, M. B., Kamps, D. M., & Andra, P. R. (2009). Teacher and peer participation in functional analysis and intervention for a first grade student with attention deficit hyperactivity disorder. *Education and Treatment of Children*, *32*, 243-266.

Solnick, J. V., Rincover, A., & Peterson, C. R. (1977). Some determinants of the reinforcing and punishing effects of time out. *Journal of Applied Behavior Analysis*, *10*, 415-424.

Stahr, B., Cushing, D., Lane, K., & Fox, J. (2006). Efficacy of a function-based intervention in decreasing off-task Behavior exhibited by a student with ADHD. *Journal of Positive Behavior Interventions*, *8*, 201-211.

Sugai, G., Lewis-Palmer, T., & Hagan-Burke, S. (1999-2000). Overview of the functional behavioral assessment process. *Exceptionality*, *8*, 149-160.

Sutherland, K. S., Wehby, J. H., & Copeland, S. R. (2000). Effect of varying rates of behavior specific praise on the on-task behavior of students with emotional and behavioral disorders. *Journal of Emotional and Behavioral Disorders, 8,* 2-8, 26.

Sutherland, K. S., Wehby, J. H., & Yoder, P. (2002). Examination of the relationship between teacher praise and opportunities for students with EBD to respond to academic requests. *Journal of Emotional and Behavioral Disorders, 10,* 5-14

Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). New York, NY: Harper Collins.

Tiger, J. H., Fisher, W. W., Toussaint, K. A., & Kodak, T. (2009). Progressing from initially ambiguous functional analyses: Three case examples. *Research in Developmental Disabilities: A Multidisciplinary Journal*, *3*, 910-926.

Tobin, T. J., & Vincent, C. G. (2011). Strategies for preventing disproportionate exclusions of African American students. *Preventing School Failure*, *55*, 192-201.

Trussell, R. P., Lewis, T. J., & Stichter, J. P. (2008). The impact of targeted classroom interventions and function-based behavior interventions on problem behaviors of students with emotional/ behavioral disorders. *Behavioral Disorders*, *33*, 153-166.

Turnbull, A., Edmonson, H., Griggs, P., Wickham, D., Sailor, W., Freeman, R., … Jared, W. (2002). A blueprint for schoolwide positive behavior support: Implementation of three components. *Exceptional Children*, *68*, 377-402.

Turton, A. M., Umbreit, J., Liaupsin, C. J., & Bartley, J. (2007). Function-based intervention for an adolescent with emotional and behavioral disorders in Bermuda: Moving across culture. *Behavioral Disorders*, *33*, 23-32.

Umbreit, J., Ferro, J., Liaupsin, C., & Lane, K. L. (2007). *Functional behavioral assessment and function-based intervention: An effective, practical approach*. Upper Saddle River, NJ: Prentice-Hall.

Van Acker, R., Boreson, L., Gable, R. A., & Potterton, T. (2005). Are we on the right course? Lessons learned about current FBA/BIP practices in schools. *Journal of Behavioral Education, 14,* 35–56.

Vollmer, T. R. (1994). The concept of automatic reinforcement: Implications for behavioral research in developmental disabilities. *Research in Developmental Disabilities*, *15*, 187-207.

Walker, H. M., McConnell, S. R., Holmes, D., Todis, B., Walker, J., & Golden, N. (1983). *The Walker social skills curriculum: The ACCEPTS (A curriculum for children's effective peer and teacher skills) program.* Austin, TX: Pro-Ed.

Weber, K. P., Killu, K., Derby, K. M., & Barretto, A. (2005). The status of functional behavioral assessment (FBA): Adherence to standard practice in FBA methodology. *Psychology in the Schools*, *42*, 737-744. *Life space intervention. Talking with children in crisis*

Wilder, D. A., Normand, M., Atwell, J., & Vollmer, T. (2005). Noncontingent reinforcement as treatment for food refusal and associated self-injury. *Journal of Applied Behavior Analysis, 38,* 549-553.

Zarcone, J. R., Iwata, B. A., Vollmer, T. R., Jagtiani, S., Smith, R. G., & Mazaleski, J. L. (1993). Extinction of self-injurious escape behavior with and without instructional fading. *Journal of Applied Behavior Analysis, 26,* 353–360.

Zirkle, P. A. (2011). State special education laws for functional behavior support assessment and behavior intervention plans. *Behavioral Disorders*, *36*, 262-278.

APPENDIXES

APPENDIX A

Demographic Information

Student Initials:_____
Recorder: _____ Date: _____

Program _____ _____ Home Zip code: _____

Student Age: _____ Grade: _____ Gender: _____ Ethnicity: _____

Eligible for free lunch (Yes or No): _____ Reduced lunch (Yes or No) _____

Primary language spoken at home: _____

Identified as English as a Second Language Learner (Yes or No): _____

Date admitted to GNETS (circle – Initial or Current admission) : _____

Number of months in GNETS (circle – since Initial or Current admission) : _____

Special Education Eligibility/Eligibilities:

_____

_____

DSM Diagnoses (if available, please give date): (Bipolar, Depression, ADHD, etc…)

_____

_____

Current Medications and Dosage Taken at School (and/or known to be taken):

_____

_____

Standardized Testing (scores from most recent reports):

WISC **-** Date: _____ Full Score: _____ Verbal: _____ Performance: _____

KBIT **-** Date: _____ Full Score: _____ Verbal: _____ Performance: _____

Student Initials:_____
Recorder: _____ Date: _____
Program _____

EBPS – Posttest from last year or pretest from this year (circle which one):

	Standard Scores
Rater 1: Social Aggression/Conduct Disorder	_____
Social-Emotional Withdrawal/Depression	_____
Learning/Comprehension Disorder	_____
Avoidance/Unresponsiveness	_____
Aggressive/Self-Destructive	_____
(IF AVAILABLE)	
Rater 2: Social Aggression/Conduct Disorder	_____
Social-Emotional Withdrawal/Depression	_____
Learning/Comprehension Disorder	_____
Avoidance/Unresponsiveness	_____
Aggressive/Self-Destructive	_____

Language Assessment:

Name of test: _____ Score(s): _____

Other Behavioral Assessments:

Name of test: _____ Score(s): _____

Name of test: _____ Score(s): _____

Other Standardized Measures:

Name of test: _____ Score(s): _____

Name of test: _____ Score(s): _____

Name of test: _____ Score(s): _____

Name of test: _____ Score(s): _____

Annual testing (circle one): CRCT or GAA

Student Initials:_____
Recorder: _____ Date: _____
Program _____

Is the BIP in the file the one that governs daily management? YES or NO

If "NO," where is the behavior plan being used daily? _____

APPENDIX B

Critical Component Rating Checklist and Data Collection Form

Recorder: _____ Date: _____ Reliability check: Y / N
Program:
_____
Date of initial FBA report: _____ Date of initial BIP: _____
Date of most recent FBA report: _____ Date of most recent BIP: _____

Based on the most recent FBA/BIP, write Y (yes) or N (no) in blanks provided.

*** Denotes item necessary for BIP to be considered sufficient**

_____other daily behavior management plan in student's file besides BIP (e.g., adjunct to BIP, treatment plan)

(a) Identification and operational definition of the target behavior(s)
Target behavior(s)
_____
_____ Number of target behaviors
_____ *Target behavior of concern is operationally defined (ALL operationally defined if > 1). -described in clear, concrete terms that are measurable
_____ *Each target behavior is assessed individually (until the data indicate the behaviors serve the same function and could therefore be included in the same response class). + or – if 1

(b) Data collection procedures
_____*How many methods were used for identifying and verifying function?

Educational records reviewed:
_____ Medical records
_____ Discipline records
_____**Non-systematic data collection** methods used such as the use of anecdotal running accounts

Direct assessments used:
_____ A-B-C format (frequency, duration, latency)
_____# entries
_____ Scatter plot
_____Need know amount of time?
_____ Interval or Time sampling _____ length of time _____ Number
_____ Other _____
_____ Across settings and activities (e.g., multiple settings, over time)
_____ By more than one observer

_____ Other assessments (curricular, ecological, etc.) conducted to determine broader variables affecting student behavior.

Indirect assessment(s) used:
_____Structured interviews with ___parents, ___student, ____teachers, ____paraprofessionals
____others:
_____

____Across settings and activities
____ Indirect assessments by more than one observer

Tools used:
_____ Functional Assessment Interview (FAI)
_____ Motivational Assessment Scale (MAS)
_____ Functional Analysis Screening Tool (FAST)
_____ Functional Assessment Checklist for Teachers and Staff (FACTS)
_____ Problem Behavior Questionnaire (PBQ)
_____ Functional Assessment Informant Record-Teacher (FAIR-T)
_____ _____
_____ _____
_____ _____
_____ Other: _____
_____ Indirect assessment used as the sole assessment in FBA

(c) *Investigation of context variables that influence the target behavior*
_____ *Determines whether context variables serve as an antecedent or consequence
_____ *The relationships between the problem behavior and the student's environment, including: peers, teachers, context, course subject, tasks involved, time of day, location,
medical issues, and any other potentially relevant stimuli are acknowledged
_____ *Patterns are identified from the information collected that include:
- Events in which the target behavior(s) is most likely and least likely (e.g., when, where, with whom).
_____ *More general variables are identified (e.g., curriculum, activity patterns) that may be influencing the student's behavior are identified.

(d) Identification of the hypothesized function(s) of the behavior
_____ *Patterns are summarized into written statements; these statements are clear accurate (i.e., based on data).
_____ *Is there a hypothesis related to the function of the behavior?
Hypothesis:
_____

(e) Verification of the hypothesized function of the behavior

____ * Functional analysis conducted (one or more variables in students' environments thought to influence problem behavior are systematically manipulated (contrasted or withdrawn) to figure out if these variables actually impact the probability of the response to verify the function of the target behavior)

_____ Functional analysis under analog (or controlled) conditions (e.g., series of probes conducted 1:1).

_____ Functional analysis under natural conditions (e.g., manipulating actual classroom instructional variables)

_____ Enough information is supplied to determine specifically what variable(s) were manipulated and their verified influence on the target behavior.

Other_____

(f) Relation of the FBA to the BIP

_____*Is the BIP consistent with the FBA, with assessment results, and with student needs? Intervention strategies are clearly linked to the functional assessment information (hypothesis/summary statements).

Consequences relate to function (preferred or aversive consequence has a direct connection to the function of the inappropriate target behavior)

_____ preferred consequence

_____ aversive consequence

_____***Replacement behavior (s)** that serve the same function (or result in the same outcomes for the student) have been identified. Specific behaviors (skills) to be taught and/or reinforced that will achieve the same function as the problem behavior and allow the student to cope more effectively with circumstances

_____*The circumstances when replacement behavior (s) should occur are identified (e.g., when Manuel feels bored, when Jenny feels frustrated)?

_____*The BIP addresses the **context of the behavior** (e.g., need for modification, curricula, peers or teacher behavior, etc…). Modifications made to the social and physical environment that may prevent problem behavior and/or increase the likelihood of alternative appropriate behaviors.

(g) Employment of positive behavioral supports

_____**Primary PBS** prevention strategies used (using evidenced-based teaching methods, direct instruction of social skills, proximity control, classroom and schoolwide ecological arrangement, precorrection procedures, and schoolwide reinforcement systems)

_____**Secondary level PBS** interventions used (social skills training, social skills groups, role playing, tutoring, empirically validated intervention programs, and self-monitoring).

_____**Tertiary-level PBS** interventions used (increased support from school psychologists and counselors, modification of the environment, planned ignoring of problem behavior, contingency management, time-out, and medication).

_____* Strategies included for managing consequences so that reinforcement is maximized for positive behavior and minimized for problem behavior.

(h) Implementation and monitoring of the effectiveness of the BIP

_____*The BIP is **clear and specific** (e.g., who needs to do what and when)?

_____ *The BIP includes a plan for monitoring and evaluation, (including who, what data, and communication to others) for (a) integrity of the implementation; (b) effectiveness; (c) maintenance; (d) generalization

_____*Necessary teacher/staff supports are identified including consistency with building-level systems for student behavior change and support

_____*Objective information is collected to assess the effectiveness of the behavioral intervention plan/supports. This information includes:

- decreases in problem behavior;
- increases in replacement skills and/or alternative behaviors;
- achievement of broader goals; and/or,
- durability of behavior change.

_____ The BIP includes a plan for monitoring but it is inadequate.

Strategies Used: (Function= _____)

_____

_____

_____

_____

_____

_____

APPENDIX C

Social Validity Questionnaire

The purpose of this survey is to solicit your personal beliefs and perceptions; there are no correct answers. Please complete questions with only your program in mind. Please circle your response to each statement using the following scale:

4 = strongly agree
3 = agree
2 = disagree
1 = strongly disagree

1. I believe the quality of functional behavioral assessments (FBAs) affects the quality of services provided to students with emotional and behavioral disorders.

   1 2 3 4
   strongly disagree strongly agree

2. Teachers and other school personnel could improve the way they write BIPs if someone else reads and provides them with feedback on the quality of the BIPs.

   1 2 3 4
   strongly disagree strongly agree

3. FBAs can be completed adequately by a team discussing the student's behavior; direct observation of behavior in context rarely adds useful information.

   1 2 3 4
   strongly disagree strongly agree

4. The extent to which the IEP team uses the FBA to inform their development of the BIP affects the effectiveness of the BIP.

   1 2 3 4
   strongly disagree strongly agree

5. Providing a prototypical plan for each behavioral function, along with a list of function-based strategies to choose from, would help improve the quality of BIPs.

   1 2 3 4
   strongly disagree strongly agree

6. The purpose of the FBA is to improve services and interventions by helping personnel comprehend the relationship between the target behavior and the environment.

   1 2 3 4
   strongly disagree strongly agree

7. Participating in this research study was a waste of time for me and my staff.

   1 2 3 4
   strongly disagree strongly agree