AN EXAMINATION OF TEACHER-CONDUCTED
TRIAL-BASED FUNCTIONAL ANALYSIS
IN JUVENILE JUSTICE CLASSROOMS

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D. TICHELLE BRUNTMYER
Dr. Timothy J. Lewis, Dissertation Supervisor
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The undersigned, appointed by the dean of the Graduate School, have examined the
dissertation entitled

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Presented by D. Tichelle Bruntyer, a candidate for the degree of Doctor of Philosophy
and hereby certify that, in their opinion, it is worthy of acceptance.

Dr. Timothy J. Lewis

Dr. Janine Stichter

Dr. Erica Lembke

Dr. Cathy Thomas

Dr. Charles Borduin
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Do nothing out of selfish ambition or vain conceit.

Rather, in humility, value others above yourselves, not looking to your own interests but each of you to the interests of the others.

Philippians 2:3-4
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An Examination of Teacher-conducted Trial-based Functional Analysis in Juvenile Justice Classrooms

D. Tichelle Bruntmyer

Dr. Timothy J. Lewis, Dissertation Supervisor

ABSTRACT

This study evaluated the use of a teacher-conducted trial-based functional analysis (TBFA) in a long-term correctional school. Two juvenile justice teachers implemented the TBFA procedure during regular classroom activities for three youth who displayed chronic challenging behavior. Results of the TBFA aligned with outcomes from researcher-conducted functional behavior assessment for all three participants. An antecedent-based intervention derived from the TBFA outcome was implemented for one youth and proved effective in increasing on-task behavior in the classroom. Social validity of the procedure was also investigated. Findings suggest that TBFA has the potential to be an effective method to determine behavioral function of students with chronic challenging behavior and developing effective intervention, and, with modifications, is appropriate for use in juvenile justice classrooms. Implications for future research are discussed.
Chapter I

Introduction and Literature Review

Introduction

Of the approximate 87 million children under the age of twenty-one living in the United States, roughly 2.5 million are expected to enter the juvenile justice system before year’s end (Flores, Russell, Latessa, & Travis, 2005) for one of two reasons: commission of a status offense or, more seriously, a delinquent act (Del Carmen & Trulson, 2006; Rutherford, Bullis, Anderson, & Griller-Clark, 2002). Status offenses, which are infractions related to the age of the offender, include such behaviors as truancy, underage alcohol consumption, curfew violations, and incorrigibility. In contrast, delinquent acts, such as assault, rape, arson, armed robbery, or homicide, would be considered criminal if the individual were an adult. The most recent data from the Office of Juvenile Justice and Delinquency Programs indicates just over 54,000 of these youth progressed beyond arrest to disciplinary residential placement in 2013: diversion programs (1%), detention facilities (33%), and long-term correctional facilities (66%). Not surprisingly, the majority of dispositions to long-term secure care (95%) were for the commission of delinquent acts (Sickmund et al., 2015).

Most youth enter the justice system with a host of intense educational, mental health, medical, and social deficits (Leone & Cutting, 2004) that are related to several risk factors (Leone, Meisel & Drakeford, 2002). For example, many youth in long-term secure care come from single-parent homes, and over half of these children have at least one family member who is also incarcerated (Snyder, 2004). Additionally, these children have an increased likelihood for exposure to or for being a victim of physical or sexual
abuse, neglect, or violence (Gagnon & Barber, 2010; Shelton, 2006). They often enter the justice system with a host of mental health issues that include aggression, irritability, impulsivity, and diagnoses of conduct disorder, oppositional defiant disorder, attention deficit hyperactivity disorder, anxiety, and/or depression (Gagnon & Barber, 2010; Snyder, 2004). These children also have histories of externalizing behaviors that lead to high rates of suspension, expulsion, and chronic attendance issues in school (Malmgren & Meisel, 2002; Shelton, 2006). These absences from school worsen the effects of existing educational disabilities that are common among incarcerated youth (Gagnon & Barber, 2010) and contribute to significant deficits in reading, math, and written and oral language across the juvenile justice population (Foley, 2001; Nelson, Leone & Rutherford, 2000). Consequently, many students enter correctional schools with few to no earned high school credits and academic performance levels between the fifth and ninth grades, which is, on average, two years below their non-incarcerated peers (Foley, 2001; Gagnon & Barber, 2010; Nelson, Leone & Rutherford, 2000).

Although punishment, not education, has been the priority in juvenile justice settings (Foley & Gao, 2002), incarceration has also been the least effective treatment for the antisocial behavior it sets out to correct (Lane & Burchard, 1983; Nelson, 2000; Walker, Colvin, & Ramsey, 1995). Incarcerated students are likely to have issues complying with the rules and regulations of the juvenile justice system in general (Leone & Cutting, 2004), because the incredibly structured and restrictive correctional environment was in stark contrast to that from which the majority of youth come. As a result, the exhibition of maladaptive behavior is expected. Because school-based forms of suspension and expulsion have not been possible in juvenile corrections settings, secure
confinement has been a typical reaction to chronic behavior issues; however, secure confinement has not been without its shortcomings. First, secure confinement limits a youth’s access to a variety of correctional programming, including academics (Morris & Thompson, 2008). Second, it runs the risk of reinforcing escape maintained behavior (Nelson, 2000). Third, secure confinement is experienced by students with special needs more than any other subgroup in the facility which contributes to their academic deficits by removing them from the instructional environment (Leone, Meisel & Drakeford, 2002), and fourth, it is at odds with the disciplinary procedures and safeguards outlined for students with disabilities in federal law leading to a lack of compliance with the Individuals with Disabilities Education Act (IDEA; Sheldon-Sherman, 2013).

Although no clear prevalence rates for students with special needs in juvenile justice settings exist (Rutherford, Bullis, Anderson & Griller-Clark, 2002), it has been reported that the special education population is three to five times higher than that found in traditional public schools (Gagnon, Barber, Van Leon & Leone, 2005; Kvarfordt, Purcell & Shannon, 2005). It is estimated that an average of 40% (Foley, 2001; Rutherford, Bullis, Anderson & Griller-Clark, 2002) to as many as 90% (Morris & Thompson, 2008; Zhang, Hsu, Katsiyannis, Barrett, & Ju, 2011) of incarcerated youth are eligible to receive special education services. Among students with known special education diagnoses, approximately 48% have gained eligibility under the label of "Emotional Disturbance" (Quinn, Rutherford, Leone, Osher & Poirier, 2005; Morris & Thompson, 2008; Sheldon-Sherman, 2013) and nearly 39% are considered eligible under the label of "Specific Learning Disability" (Morris & Thompson, 2008). Since so many youth have come to correctional facilities with special education diagnoses and the
remainder are arguably at-risk, it has been important to note that the provisions in IDEA can be applied and are required to be extended to incarcerated youth who attend correctional schools (Gagnon, Barber, Van Loan, & Leone, 2009; Katsiyannis & Murry, 2000; Robinson & Rapport, 1999; Nelson, Leone, & Rutherford, 2000; Morris & Thompson, 2008; Sheldon-Sherman, 2013). The recommended use of a functional behavior assessment (FBA) for students whose behavior results in a change of placement (e.g., repeated or prolonged placement in secure confinement) is seen as one avenue for compliance with IDEA's mandate for use of evidence-based practices in correctional settings (Nelson, 2000) and would conceivably address challenging classroom behavior and academic deficits related to decreased exposure to instruction resulting from exclusionary behavior management practices.

Functional assessment methods, such as FBA, have the capacity to provide correctional educators with effective interventions and strategies to improve both academic and behavioral outcomes for all children remanded to their facility irrespective of disability status. According to Gable, Park, and Scott (2014), the usefulness of an FBA is predicated on the following: 1) behavior is purposeful and served a function, 2) behavior is contextually linked and situation specific, and 3) the assessment of behavioral function facilitates the design of effective interventions. The context of juvenile justice classrooms has been of particular concern when looking to extend functional assessment practices to this setting. To begin with, service delivery in correctional settings can be negatively impacted by the constraints of physical space, insufficient funding, frequent sudden changes in daily schedules, inadequate instructional time, and reliance on the use of independent “worksheet packets” as the primary method of instructional delivery.
As for correctional staff, not only has there been a lack of certified special education teachers in correctional schools (Morris & Thompson, 2008; Sheldon-Sherman, 2013), juvenile justice schools are reported to have under qualified or underpaid teachers who do not have access to adequate professional development opportunities to help meet the diverse and pervasive needs of their students (Leone & Cutting, 2004). By in large, juvenile justice personnel have not been familiar with requirements for general education service provision, nor have they possessed adequate knowledge of the specific special education requirements mandated for a significant portion of their population (Robinson & Rapport, 1999). In fact, in a survey conducted by Kvarfordt, Purcell, and Shannon (2005), 62% of juvenile justice teachers reported having received no training whatsoever regarding students with disabilities. Clearly, a better approach to correctional education as well as improved support and training for teachers and staff is needed.

For students who present chronic behavior challenges that adversely affect their educational performance, school personnel would do well not only to attend to the form of a child’s behavior, but also have the skill set necessary to determine its function in a given environment and intervene accordingly (Lane, Umbreit, and Beebe-Frankenberger, 1999). The remainder of this chapter will discuss both experimental and non-experimental methods of functional assessment of behavior, as well as the importance of context in accurately determining behavioral function. It will also discuss an adaptation to experimental functional assessment and lay the foundation for its extension to perhaps the most challenging school setting and demographic of youth – those in the juvenile justice system.
Review of the Literature

Centuries of scientific research have yielded a model of inquiry that has been applied to a variety of fields, including the social sciences. One such field, Applied Behavior Analysis (ABA), the extension of behavior learning theory to applied settings, has a history of utilizing scientific inquiry and experimentation to understand behavior better through description and prediction of the variables that control behavior. Central to ABA has been the notion of behavioral function. The function of a behavior is considered the purpose it serves in a given environment, and this purpose can be discovered through careful analysis of the environmental consequences that immediately follow a behavior (Umbreit et al., 2007). In the premier issue of the Journal of Applied Behavior Analysis, Baer, Wolf, and Risley (1968) advocated for the use of ABA in improving behaviors that relate to areas such as crime, mental illness, and education. In addition, applied research should be technological, systematic, effective, and reserved exclusively for the manipulation of socially significant behaviors. Since their admonition, social scientists and educational researchers have strived to adhere to the restrictions of empirical study when dealing with deviant human behavior. Currently, this process of utilizing behavior analytic principles in applied settings to determine behavioral function takes on many forms, which are known collectively as functional assessment.

Functional assessment: Experimental method. Functional assessment encompasses a variety of methods to include indirect, non-experimental, and experimental assessments that can be used to determine environmental variables that evoke and maintain challenging behavior (Anderson, Rodriguez, & Campbell, 2015; Fox
The most rigorous of these methods is known as a functional analysis (FA). Over thirty years of research has firmly established the effectiveness of FA outcomes in providing definitive information that results in effectual treatment of problem behavior, establishing it as the “gold standard” of functional assessment (Beavers, Iwata, & Lerman, 2013; Fox & Davis, 2005; Kunnavatana, Bloom, Samaha, & Dayton, 2013).

During a functional analysis, variables are systematically manipulated in an effort to determine a functional relation between those variables and a behavior. Because strict scientific methods require experimental control, functional analysis typically has taken place in a clinical setting in which confounding variables can be minimized. During test conditions, both antecedents and consequences that resemble those found in the natural environment are introduced and withdrawn and continuously measured to determine the individual effects of each antecedent and consequence on the behavior of concern. Functional analyses typically consist of four test conditions (attention, tangibles, escape, alone) and one control condition (play). The duration of each condition has typically been 10 to 20-minutes in length, and randomly repeated three to five times over several days (Carr & Durand, 1985).

During the attention condition, the child is given access to preferred items and activities, but does not receive attention from the clinician conducting the trial unless the target behavior is emitted. When the target behavior has occurred, the clinician records the behavior, provides attention to the child for a brief period of time, and withdraws attention until the target behavior is emitted again. If the function of a child’s behavior is to gain attention, an increase in challenging behavior will be indicated by the data.
If the function of a child’s behavior is to gain access to a preferred activity or item, an increase in behavior will be noted during the tangible condition. In this condition, the child has the continual attention of the clinician, but is denied access to preferred objects and activities until the target behavior occurs. Upon the occurrence of the target behavior, brief access to the preferred item or activity is permitted and the behavior is recorded. After a short period of time, the item or activity is removed and the testing condition continues.

The third test condition assessed the function of behavior of escape from an aversive task or demand. During the escape condition, the clinician prompts the child to engage in an aversive task until the target behavior is emitted. When the problem behavior occurs, the task is removed, the behavior is noted, and after a short break, the task is reinstated. If the function of a child’s behavior is to escape a demand, the data indicated an increase in behavior during this condition.

During the final test condition, the alone condition, the setting is devoid of any stimulation, including attention, activities, or objects, and no consequences are provided for the occurrence of the target behavior. If the function of the behavior is self-stimulation, the data will indicate an increase in the behavior during this condition.

Lastly, the play condition serves the purpose of comparative control. During this condition, the child has continual access to attention, preferred activities and objects, and no consequences are given for engaging in the target behavior. The occurrence of challenging behavior is expected to be low to nonexistent during this condition.

When the data from each condition is graphed, the function of the child’s behavior should be evident through visual analysis. When the data indicate that a change
in the dependent variable (i.e., the individual’s behavior) was reliably influenced by a change in one (or more) of the independent variables (i.e., test condition stimuli), it can be said that a functional relation between those variables exists and a behavioral function is established (Cooper, Heron, & Heward, 2007). Figure 1 is an example of graphed functional analysis data that indicate attention as the function of behavior.

Figure 1

*Example of functional analysis graphed data*

Through repeated replication, functional analysis has been demonstrated to be effective in dealing with a wide variety of challenging behaviors (e.g., EBD, Bessette & Wills, 2007; ADHD, Boyjian et al., 2001; at-risk, Dufrene et al., 2007; language disorder, Durand & Carr, 1992; LD, Filter & Horner, 2009;). Despite its accuracy, shortcomings have been reported with clinical functional analysis as it relates to applied settings. These concerns include: 1) the time and training needed to conduct analogue analyses, making it less feasible in applied settings, 2) the continual schedule of reinforcement
during an analogue analysis that might not be present in the natural environment, and 3) all variables that might contribute to behavior in the natural environment may not be present in the analogue setting, thereby calling the validity of the findings into question (Schmidt, Drasgow, Halle, Martin, & Bliss, 2014). Such concerns have led to the use of less rigorous functional assessment methods in applied settings, such as the school environment.

**Functional assessment: Indirect and non-experimental methods.** The 1997 reauthorization of the primary federal education law that mandates special education, IDEA, brought with it a directive for the use of functional assessments for children with disabilities whose challenging behavior threatened to place them in more restrictive settings or were subjected to disciplinary procedures that may not take manifestations of the children’s disability into account (Anderson, Rodriguez, & Campbell, 2015; Fox & Davis, 2005). The result was a school-based form of functional assessment that relies primarily on indirect assessments of behavior via teacher checklists and interviews, as well as non-experimental assessment through direct anecdotal observations in the classroom. Although both indirect and non-experimental methods can be conducted alone to hypothesize behavioral function, they are frequently used in tandem in the school setting. This process is commonly referred to as *functional behavioral assessment* (FBA).

Though the field of education has yet to determine definitive guidelines for conducting a school-based FBA, the generally accepted practice includes both indirect and non-experimental descriptive assessments that combine to describe the interaction between behavior and environment (Bessette & Wills, 2007; Gable, Park, & Scott, 2014;
Gage, Lewis, & Stichter, 2012; Scott, Meers, & Nelson, 2000). Cooper, Heron, and Heward (2007) described functional behavior assessment as a four-step process that includes 1) gathering information through indirect and descriptive assessments, 2) forming a functional hypothesis based on analysis of the indirect and descriptive assessments, 3) testing the hypothesis through a functional analysis, and 4) developing a function-based intervention derived from the outcomes of the functional analysis. Indirect assessments have generally taken the form of structured teacher, parent, and/or student interviews, teacher-completed rating scales, and teacher or parent-completed behavioral checklists. The descriptive assessments have involved direct observations of student behavior in settings of concern. Interviews, rating scales, and checklists have provided behavior specialists with valuable information regarding problem behavior and settings in which these behaviors are most likely to occur. This information is used to develop operational definitions of target behaviors and a prioritized list of settings in which to observe the student. Using anecdotal observation, or ABC recording (Bijou, Peterson & Ault, 1968), behavior specialists then conduct direct observations of the student in settings of concern within the school. Information is gathered on antecedents to behavior (A), the topography of student behavior (B), and environmental consequences to behavior (C). This information is then analyzed to identify patterns in antecedents and consequences of behavior and a functional hypothesis of behavior is developed. Lastly, and different than the process proposed by Cooper, Howard, and Heward (2007), school-based personnel have often forgone an experimental functional analysis and simply tested the hypothesis via a function-based intervention. If progress-monitoring data indicate the function-based intervention is having the desired effect on the target behavior, it is
assumed the function was correctly identified. If data indicate the intervention is not having the desired effect on the target behavior, the FBA data is reviewed and the hypothesis revised, or another FBA is conducted and a new hypothesis and corresponding intervention are formulated. Figure 2 has provided a summary of the typical school-based FBA process.

Figure 2

School-based functional behavior assessment process

Teacher, parent, and/or student completes interviews, rating scales, and checklists

Operational definitions of behavior developed from indirect measures & direct observation settings determined

Direct observations of student behavior conducted in settings of concern

Functional hypothesis of behavior developed based on analysis of observation data

Function-based intervention derived from hypothesis

Hypothesis confirmed through effectiveness of intervention

**Functional assessment: School-based applications.** In 2015, Anderson, Rodriguez, and Campbell published a review of existing literature regarding school-based applications of functional assessment methods. A total of 233 articles met the researchers’ inclusion criteria, which involved a total of 640 participants. The majority of participants had a diagnosis of autism spectrum disorder (ASD) or intellectual disability (ID) (63.3%), with the remainder having a psychiatric or educational diagnosis of emotional or behavioral disorder (18.5%), an educational diagnosis of learning disability (1.9%) or other health impairment (1.4%), or no diagnosis of any kind (14.7%).
The problem behaviors under study in this review included topographies such as stereotypy, inappropriate verbalizations, self-injurious behavior, and elopement for students with ASD or ID, and out of seat, verbal aggression, off-task, and defiant behavior for all other participants. Over half of the publications under review reported using more than one method of functional assessment; 80% combined indirect and non-experimental observation assessments, 40.1% combined indirect assessment with a functional analysis, and 25.9% reported using a non-experimental observation assessment with a functional analysis. With regard to the individuals who conducted the FBA in these publications, researchers selected the method of assessment, the number of observations or sessions, and analyzed the data in 100% of the cases. Teachers, or others in the school, collected data in 24.7% of the studies using ABC recording, and 45.5% of the studies utilizing scatterplots. Lastly, researchers were reported to have collected data in 100% of the studies using experimental methodology. In short, the majority of functional assessment studies to date have employed a combination of the least rigorous methods (i.e., indirect and non-experimental assessment) administered by non-school-based individuals to students whose behavior is certainly worthy of intervention, but who are less prevalent in classroom settings than students with diagnoses of emotional or behavioral disorder, learning disability, attention-deficit-hyperactivity disorder, or students at risk for these classifications.

An important finding from the Anderson, Rodriguez, and Campbell (2015) review was that as the experimental rigor of the functional assessment method increased, the number of non-ASD or ID participants decreased. In other words, it would appear the most effective methods of behavior assessment that produce the most effective
Interventions are only being implemented by researchers and not routinely utilized with students who engage in high-frequency, low-intensity behaviors (e.g., students at-risk for school failure and delinquency, and/or students with or at-risk for emotional or behavioral disorders). In fact, it has been reported that school-based personnel rely heavily on indirect measures of behavior assessment (i.e., rating scales and interviews) as opposed to the more accurate methods of direct observation or experimental analysis to manage behavior in schools (Blood & Neel, 2007). That being said, research has demonstrated the plausibility of school-based personnel to identify behavioral function accurately in traditional school settings using basic FBA procedures that include both indirect and direct observation methods.

In 2014, Loman and Horner conducted a study to determine whether typical school personnel (e.g., counselors, principals) could be taught to conduct technically adequate functional behavior assessments after attending four one-hour training sessions in basic FBA procedures. Ten participants were trained to use the FACTS interview, conduct ABC observations of student behavior, and formulate a hypothesis statement based on the collective data. Researchers then conducted experimental functional analyses to confirm or disconfirm those hypotheses. Results of this study indicated an 80% correspondence between FACTS and ABC observation hypotheses, and a 100% correspondence between the overall FBA hypotheses and results from the functional analyses. These findings demonstrated the feasibility of typical school-based personnel to conduct functional behavior assessments in traditional schools, but might not hold true for correctional settings. It is important to note that Loman and Horner (2014) recommended this approach be used in situations where the challenging behavior was 1)
occurring in no more than two settings throughout the day and 2) not posing a physical threat to the target student or others in the classroom. Additionally, previous research has suggested the accuracy of FBA in traditional school settings is likely when personnel with behavioral expertise were involved in the assessment process (e.g., Scott et al., 2004) or when appropriate guidance and professional development were provided (Borgmeier, Loman, Hara, & Rodriguez, 2015; Cunningham & O’Neil, 2007; Lane, Weisenbach, Phillips, & Wehby, 2007); however, the juvenile corrections environment is considered unique. At least four important factors have been noted earlier in this chapter that should be considered in regard to the extension of FBA in correctional schools: 1) the behavior of incarcerated youth is more frequent and intense than that displayed by typical school children, 2) correctional schools have a lack of special education teachers who might have the behavioral expertise needed to conduct an accurate FBA, 3) inadequate opportunities exist in juvenile justice settings for the professional development needed to train facility personnel in FBA procedures, and 4) juvenile justice settings have a lack of additional available personnel to conduct the direct classroom observations that have been shown to align closely with functional analyses of behavior. It has been demonstrated that traditional school personnel and, reasonably, correctional school personnel can be trained to identify behavioral function accurately; however, traditional schools have had a greater likelihood than correctional schools to have staff available to conduct direct observations of classroom behavior. In order to fit the context, correctional schools have needed a functional assessment method that can be conducted solely by the classroom teacher.
**Functional assessment: Environmental considerations.** Behavior learning theory has posited that all behavior is functionally related to the environment in which it occurs and that environmental antecedents signal the availability of reinforcement contingent on a particular behavior, which is based on an individual’s learning history in a particular setting. As a result, variables that resemble antecedents to behavior are introduced in analogue functional analyses; however, the analogue nature of these variables has called the contextual validity of the findings into question (Lang et al., 2009). One logical solution, an experimental functional analysis conducted in the classroom, has posed other problems. As previously stated, school-based functional analyses have not been carried out by classroom teachers, but by researchers who are not part of a student’s typical school environment. Despite their best intentions, researchers might serve as a confounding variable in their own analysis; therefore, their suggested interventions might not adequately address behavior in a context in which the researchers are no longer present.

Although the next logical step would be for teachers or school personnel to conduct the functional analysis in their own classrooms, these individuals are not likely to have had the strong behavioral background and training necessary to plan and carry out such a rigorous procedure (Scott, Alter, & McQuillan, 2010). This disadvantage has remained true despite their need to understand these procedures due to IDEA behavior assessment mandates (Cipiani, 2002). Although some researchers believe teachers need external support from researchers to conduct effective and accurate functional assessments (Gable et al., 2014), the important role environmental variables play in the accuracy of outcomes and effectiveness of related interventions has called for a rigorous
procedure that can be implemented without the oversight of outsiders. One possibility, a recent adaptation to experimental functional assessment, is known as a *trial-based functional analysis*.

**Functional assessment: Trial-based functional analysis.** Despite serving as the “gold standard”, functional analyses are not frequently used in schools due to concerns regarding 1) lack of teacher training, 2) the perception of excessive time consumption for conducting functional analysis, and 3) doubts of whether teachers can be taught to implement the procedure with fidelity (Bessette & Wills, 2007; Kunnatavana, Bloom, Samaha, & Dayton, 2013). Over the years, adaptations to the traditional analogue functional analysis procedure have been made to increase its fit in applied settings, such as residential treatment facilities and schools. The two most notable are considered to be the brief functional analysis and trial-based functional analysis. According to Bloom, Iwata, Fritz, and Carreau (2011), brief functional analysis is conducted by the teacher in the classroom setting, though not embedded during normal classroom activities. Brief functional analysis could consist of the same test conditions as an analogue analysis (i.e., attention, escape, alone, and control), but students are exposed to only one or two brief 5-minute sessions, as opposed to repeated sessions of much greater length that are common in a traditional analogue FA procedure. No additional equipment other than a system for collecting data, is required for a brief FA, and the teacher or consultant is allowed to conduct the procedure in just a few minutes a day. While this adaptation is seen as a step in the right direction, it does not completely address contextual validity issues, because trials are not embedded in normal classroom activities; however, another option is known to exist.
**Trial-based functional analysis.** Trial-based functional analysis (TBFA) was developed as an alternative approach to traditional analogue procedures and designed for use by teachers in the classroom setting and within normal classroom activities (Kunnavatana, Bloom, Samaha, & Dayton, 2013). TBFA has been appealing for use in applied settings because it requires less training, less time to carry out, and fewer resources than previously mentioned experimental methods; however, it still permits assessment of behavioral function to be carried out in systematically rigorous ways that allow for the determination of behavioral function and development of effective interventions (Schmidt, Drasgow, Halle, Martin & Bliss, 2013).

A trial-based functional analysis retains the same basic components as a traditional analogue procedure, with several notable adaptations. First, each trial is divided into test and control segments that are typically one to two minutes in length. Motivating operations (e.g., the presence of task demands, attention, etc.) are kept present during the test segment and absent during the control segment, eliminating the need for a generic control condition. Second, trials are embedded in normal classroom activities; they do not take place in clinical settings as in a traditional analogue procedure or in another part of the classroom while instruction continues with the other students as in a brief functional analysis. Last, behavioral responding is compared across test and control segments for each condition to identify the function of behavior, as opposed to across conditions in analogue or brief functional analysis methods (Bloom, Lambert, Dayton, & Samaha, 2013; Schmidt, Drasgow, Halle, Martin, & Bliss, 2014). Because TBFA is conducted under the same conditions as when the problem behavior occurs (i.e., in the natural environment, during regularly scheduled classroom activities, and administered
by the classroom teacher), the likelihood for an accurate function of behavior and ecological validity is increased (Schmidt, Drasgow, Halle, Martin, & Bliss, 2014).

**TBFA Research to Date.** Sigafoos and Saggers (1995) conducted the first trial-based functional analysis (TBFA) study with the purpose of evaluating the use of a discrete-trial approach for the functional analysis of aggressive behavior in two boys with Autism Spectrum Disorder (ASD). The procedure took place in the boys' regular classroom within a school for students with ASD and was conducted by their regular classroom teacher. Twenty 2-minute trials consisting of 1-minute test and 1-minute control segments were conducted across attention, tangible, and demand conditions for each student. Four trials per condition per student took place each day and were distributed throughout the regular classroom activities. Results of the TBFA showed that aggression was maintained by attention for one student and accessibility of tangibles for the other.

In their discussion of the findings, Sigafoos and Saggers (1995) mentioned that while traditional analogue functional analysis is extremely prescriptive and effective in development of behavioral interventions, it is also labor and time intensive and may not be a feasible alternative in applied settings. Additionally, the researchers asserted that the clinical nature of analogue procedures might compromise the ecological validity of the findings and that functional analysis in natural settings may ameliorate the issue. In the end, Sigafoos and Saggers listed a few advantages for the use of trial-based functional analysis in applied settings to include: 1) the minimal time and labor required by the discrete-trial approach, 2) the brief nature of the process minimizes the children’s exposure to contingencies that might inadvertently strengthen inappropriate behaviors,
and 3) trial-based functional analysis is easier to incorporate into the natural classroom routine and with normal classroom staff, thereby increasing the ecological validity of the assessment.

In 1996, Sigafoos and Meikle conducted a study using TBFA to inform functional communication training (FCT) with 2 boys with ASD. The researchers utilized TBFA to determine the function of aggression, disruption, self-injurious behavior, and stereotypy as a basis for developing effective functional communication training programs for each participant. Just as in the original study, twenty trials of two-minute duration were conducted across attention, escape, and sensory conditions. The classroom teacher ran each condition four times per day for five days in the student’s classroom. Once the behavioral function was determined, five to ten baseline trials for attention and tangible conditions took place in the same manner as the TBFA. Results of the study indicated the challenging behavior of each student occurred consistently during baseline, substantiating the finding of the TBFA. Additionally, problem behavior decreased and appropriate communication increased for both participants. In their discussion of the findings, Sigafoos and Meikel noted that the results were promising from an applied perspective because the research was conducted in the classroom by the teacher and yielded effective function-based interventions. Even though fairly sophisticated interventions may be warranted for some students, results of the study suggest it may be possible for teachers to determine function accurately and develop and successfully implement function-based interventions in the classroom.

Very few studies of trial-based functional analysis have taken place since Sigafoos' initial work with Saggers and Meikel; those that have been conducted were
carried out in special schools or residential settings with individuals who have diagnoses of autism or developmental disabilities. Just a few years after the initial work, Tucker, Sigafoos, and Bushell (1998) set out to determine if conditions associated with low rates of challenging behavior could be determined using TBFA and used to develop effective interventions to address screaming, property destruction, and aggression in two teenage youth with intellectual disabilities. Components of this study were more indicative of a traditional analogue functional analysis in that researchers conducted over 100 trials per student as opposed to the classroom teacher. Trials were broken down and grouped into 15-20 minute sessions with 2-minute breaks between each trial. In keeping with TBFA methodology, each trial was two minutes in length, consisting of a 1-minute test and 1-minute control segment across attention, alone, tangible, escape, and social avoidance conditions and administered in the regular classroom. Findings from the TBFA identified multiple functions to the problem behavior of each participant. As a result, researchers chose to develop interventions based on conditions in which the problem behavior was least likely to occur. The function-based interventions developed from this information proved effective for both participants and led researchers to purport that conditions associated with low rates of behavior may prove useful in developing effective interventions for high rates of challenging behavior.

In 2010, LaRue et al. compared analogue to trial-based functional analysis in three boys (ages 4, 8, and 9) and two men (ages 20 and 29) who collectively engaged in a wide variety of challenging behavior (e.g., aggression, self-injurious behavior, disruption, spitting, inappropriate vocalizations, and hand stereotypy). Analogue functional analyses were conducted outside the classroom in a controlled setting and consisted of 10-minute
evaluations of social attention, tangible, demand, ignore, and toy play/control conditions. Trial-based functional analyses were conducted in the natural classroom or vocational setting. Social attention, tangible, and demand conditions were 1-2 minutes in length and consisted of two phases: 1) the presence of the motivating operation and 2) the absence of the motivating operation. Each phase was one minute in length unless the target behavior occurred during the phase in which the motivating operation was present. Results of this study demonstrated exact correspondence across models in four of the five participants with partial correspondence for the fifth participant. Additionally, data showed that the trial-based model required 85% less time than the traditional functional analysis procedure. Researchers reported four strengths of their study: 1) a strong correspondence between trial-based and traditional functional analysis procedures was found, 2) considerable time was saved in using trial-based FA, 3) students were allowed to remain in the classroom, addressing the concern regarding artificial findings of the traditional FA model, and 4) data collection was reported to be less intensive, which may be significant in settings where resources are scarce or training is less robust.

Bloom, Iwata, Fritz, Roscoe, and Carreau (2011) conducted a similar study for 10 participants in schools for children with developmental disabilities. Traditional FAs were conducted in a separate room and consisted of 10-minute sessions across attention, demand, tangible, ignore/alone, and play conditions. Trial-based FAs were conducted in the classroom and consisted of 2-minute trials (1-minute test segment, 1-minute control segment) across attention, tangible, demand, and ignore conditions. Both analysis models were conducted by graduate students and results showed exact correspondence for six of the ten participants. Researchers offered several explanations for the non-
correspondence of the remaining participants to include: 1) the brief nature of the trial-based functional analysis conditions limited the student’s exposure to the contingency and, therefore, it did not serve as an effective establishing operation to behavior, 2) the brief nature of the trial did not allow detection of the behavioral function, and 3) the behavior was under stimulus control (i.e., the presence of a classroom teacher who utilized differential reinforcement of zero rates of behavior) during the trial-based functional analysis.

In 2012, Lambert, Bloom, and Irwin evaluated whether functional communication training based on trial-based functional analysis would reduce problem behavior and increase appropriate communication skills in three pre-school children with developmental disability. Both the trial-based functional analysis and functional communication training took place in the student’s regular early childhood classrooms. A graduate student in special education served as the therapist and conducted ten 2-minute trials (1-minute test segment and 1-minute control segment) across each condition (attention, escape, tangible, and ignore). The intervention consisted of extinction of problem behavior and trial-based differential reinforcement of appropriate communication skills. Results of the study reported that inappropriate behaviors of aggression and tantruming decreased and appropriate communication increased across all participants. The researchers pointed out that the graduate student who administered the functional analysis had taken a course in applied behavior analysis, which might have increased her proficiency with the process, an important factor to consider regarding generalizability to teachers without such training or in other settings.
Rispoli, Davis, Goodwynn, and Camargo (2012) also compared traditional and trial-based functional analysis, but in a traditional public school setting. Participants were a 5-year-old girl with a diagnosis of autism who engaged in aggressive behavior, and a 15-year-old boy with a diagnosis of intellectual disability who engaged in inappropriate vocalizations. This study took place in three phases: 1) descriptive analysis, 2) traditional analogue functional analysis, and 3) trial-based functional analysis. Descriptive assessments were conducted by doctoral students for each participant to determine target behaviors and consisted of a 7-hour observation for each student and were used to inform functional analysis procedures. During phase 2, an analogue FA was conducted consisting of four 5-minute sessions across all conditions (i.e., attention, tangible, escape, play) for each participant. Sessions took place in a partitioned area of the classroom for the girl, in a conference room for the boy, and no more than four sessions were conducted in one day. The trial-based functional analyses in Phase 3 were conducted in the regular classroom by teachers and consisted of 20 2-minute trials across all conditions (i.e., attention, escape, tangible). No more than five trials were conducted per condition in a given day, resulting in a maximum of 15 discrete trials per day. Results for the analogue functional analyses were inconclusive, but trial-based functional analyses detected a behavioral function for both participants. Researchers credited the conflicting results across models to the absence of naturally occurring establishing operations in the analogue settings. The presence and absence of establishing operations could also account for the reported congruence between descriptive assessment and trial-based analysis findings, both of which were conducted in the same settings.
Bloom, Lambert, Dayton, and Samaha (2013) examined the efficacy of function-based interventions derived from teacher-conducted trial-based functional analysis on the reduction of problem behavior in three pre-school students in a special education classroom who were diagnosed with ASD or developmental delay and exhibited a variety of problem behaviors including aggression, property destruction, tantrums, and mouthing. Trial-based functional analysis procedures were conducted by the regular classroom teacher and consisted of ten 2-minute trials (1-minute test and 1-minute control segments) across all conditions (attention, demand, tangible, and ignore.) A 10-second partial interval data collection procedure was used to collect percentage of intervals of target behaviors during baseline and intervention stages of the study. During baseline, data was collected in 5-minute sessions in which performance of the target behavior or use of an alternative response card resulted in 30-second access to reinforcers for two of the participants. Mouthing was the target behavior for the third participant. During the 5-minute baseline data collection sessions, no programmed response for the target behavior was found. Instead, all preferred items were available for the student resulting in non-contingent reinforcement for the behavior. Data collection procedures were identical during the intervention phase, except that target behavior was put on extinction and alternative behaviors were differentially reinforced. Non-contingent reinforcement was continued for the third student except that a competing and preferred item (bottle of water) was present throughout the sessions. Bloom, Lambert, Dayton, and Samaha concluded that the function-based interventions resulted in a decrease of problem behavior and an increase in replacement behaviors across all students in this study.
In 2013, Kodak, Fisher, Payden, and Dickes used trial-based functional analysis to develop interventions for aggression, inappropriate vocalizations, and inappropriate hand-to-body contact of five students with autism enrolled in a university-based early childhood program or elementary school setting. The purpose of this study was to evaluate a TBFA procedure that utilized 30-second test and control segments as opposed to the typical 1-minute segment length, required only one person to implement and collect data, and was conducted in the classroom setting by routine staff that typically worked with the participants. Twenty trials across attention, escape, and tangible (when indicated by parent or teacher) consisting of ten 30-second test segments and ten 30-second control segments for all conditions were conducted by classroom teachers in the natural classroom environment. The TBFA was successful in identifying behavioral function for each participant and extended the literature by further demonstrating the feasibility of TBFA in the regular classroom by routine staff.

Most recently, Schmidt, Drasgow, Halle, Martin, and Bliss (2014) utilized TBFA with three students with autism and severe intellectual disabilities. Participants were enrolled in a residential treatment facility for students with autism, intellectual disabilities, and challenging behavior and engaged in high rates of food stealing, aggression, disruption, self-injury, and inappropriate language. The purpose of the study was to determine if a functional communication training program based on results of a TBFA would enhance the communication skills of participants in the natural classroom setting. Five hours of direct observation data was collected for each participant and used to inform and develop pertinent TBFA conditions, which resulted in determination of behavioral function for all participants that led to effective FCT programming. In the
discussion of their findings, the researchers asserted that TBFA appears to be an empirically valid way to identify behavioral function in natural settings. They surmised that the clear results in their study were due to two primary factors: 1) the information gleaned from the descriptive functional assessment was useful in determining valid test conditions for the TBFA and 2) caregivers learned to conduct the TBFA readily and rapidly.

**Summary and Purpose of Study**

This chapter has addressed several issues related to the management of challenging behavior in applied settings. Attention was first drawn to the fact that not all stimuli are universally reinforcing or punishing. As a result, attention must be paid to the effects stimuli have on an individual’s behavior to reward or dissuade challenging behavior effectively. In addition, successful behavior management in the school setting, including classrooms within restrictive placements such as juvenile corrections, has required that attention is paid not only to the form of the challenging behavior, but also to the function of the behavior. Effective behavior management has also relied on efficient and effective assessment methods that are contextually relevant with regard to student need (e.g., frequency and severity of behavior) and available resources (e.g., availability of adequately trained personnel, time and funding for professional development).

Three primary ways to determine behavioral function, (a) indirect, (b) non-experimental, and (c) experimental functional assessment, have been discussed. A review of the literature indicated that experimental functional assessment, referred to as functional analysis, is considered the methodological “gold standard”. Despite its ability to determine a definitive functional relation between behavior and the variables that
occasion and maintain it, functional analysis has its shortcomings. First, it is a time consuming and laborious task that requires advanced training for proper administration. Second, and perhaps most critical for applied settings, it is an analogue procedure in which environmental stimuli are contrived in a clinical setting to mimic those that potentially influence behavior in the natural setting. These engineered scenarios call the ecological validity of the findings into question and, consequently, the appropriateness of related interventions meant to be applied in the natural setting.

The literature also suggested that less rigorous functional assessment methods of indirect and non-experimental descriptive analysis were used most often in school-based applications of functional behavior assessment, but that when used together, they have the potential to be as accurate as experimental functional analyses conducted by researchers (Lewis, Mitchell, Harvey, Green, & McKenzie, 2015; Loman & Horner, 2014). These assessment methods require less time and training to implement, had the potential to determine function accurately with appropriate levels of training and support (Borgmeier, Loman, Hara, & Rodriguez, 2015; Cunningham & O’Neil, 2007; Lane, Weisenbach, Phillips, & Wehby, 2007), and took place in the natural environment, which addresses the issue of ecological validity. It has been pointed out that there is a weak correlation between findings of indirect assessment measures (i.e., interviews and rating scales) and findings from functional analyses; however, a much higher correlation, as high as 100% agreement in Loman and Horner’s (2014) study, has been found between FBAs utilizing direct ABC observations of behavior and the results of a functional analysis. The school staff responsible for conducting the ABC observations in that study, however, had undergone four hours of training and were not the teachers of record, but
administrative or ancillary staff such as counselors or principals who could sit and observe an individual student during regular classroom activities. As stated earlier, a lack of available correctional staff might be available conduct such classroom observations, as well as a lack of time and funding to train them to carry out the procedure. Therefore, to address the environmental constraints and still ensure the accurate identification of behavioral function, a process is needed in juvenile correction settings that requires minimal training while maintaining the accuracy of direct observations of behavior that are part of functional behavior assessments and/or experimental functional analyses of behavior.

Over the years, researchers have sought new ways to combine the best of both the experimental and non-experimental methods of behavior analysis. Most recently, this attempt has taken the form of a trial-based functional analysis (TBFA). TBFA has retained the experimental rigor of an analogue functional analysis, while addressing the ecological validity of findings and intervention development through administration in the natural setting by classroom teachers. The previous review of TBFA literature reported findings for 37 participants ranging in age from pre-school through adulthood, all of whom had diagnoses of developmental delay, intellectual disability, or autism spectrum disorder. The 10 to 100 trials per participant, lasting 1-minute in one study, 4-minutes in another study, and 2-minutes in the remaining eight studies, took place in classroom settings in public schools (4 studies), special schools (5 studies), and one residential treatment facility and were administered by classroom teachers in 70% of the studies and researchers in the remaining 30%. The use of teacher-conducted trial-based functional analyses with children with more prevalent educational diagnoses who exhibit
high rates of behavior, such as children with emotional behavior disorder, as well as implementation in disciplinary alternative education settings has been conspicuously absent from the current literature base. With that in mind, the purpose of the current study was to extend the existing TBFA research to include incarcerated adolescents who exhibit chronic classroom behavior problems to extend the current TBFA literature and demonstrate its ecological validity in the juvenile justice setting. Specifically, this study was designed to answer the following research questions:

1. Do hypotheses from an expert-conducted FBA align with hypotheses from a teacher-conducted trial-based functional analysis?
2. Will hypotheses derived from trial-based functional analyses result in effective intervention in a juvenile justice setting?
3. To what degree do classroom teachers consider trial-based functional analysis socially valid and appropriate for the juvenile justice setting?
Chapter II

Method

Overview

The purpose of this study was to extend the existing trial-based functional analysis (TBFA) research to include incarcerated adolescents with severe behavior challenges, yielding another validation of the TBFA procedure and demonstrating its contextual relevance in juvenile justice classrooms. Information is provided for participants, setting, individual phases, materials, experimental design, intervention, procedural integrity, and interobserver agreement.

This study was conducted in five phases: (1) subject and teacher selection and functional behavior assessment, (2) teacher training, (3) trial-based functional analysis, (4) intervention, and (5) social validity. Phase 1 consisted of common school-based functional assessment procedures (i.e., review of student records, teacher rating scale, and direct observation) to identify relevant stimuli that might be occasioning and maintaining problem behavior in the classroom. Teacher training in trial-based functional analysis (TBFA) occurred during Phase 2, and implementation of that procedure took place in two classrooms for three students in Phase 3. During Phase 4, a reversal design was used to evaluate an intervention derived from the results of Phase 3 for one student. Phase 5 consisted of participating teachers completing a social validity survey regarding the TBFA procedure.

Participants and Setting

Participants in this study included two classroom teachers and three incarcerated youth in a long-term secure juvenile justice facility within the Texas Juvenile Justice
Department (TJJD). After consent was obtained from TJJD to carry out this project, the agency’s education superintendent recommended a specific facility in which to carry out the study. Procedures for obtaining participants are described in detail below.

**Teachers.** An email was sent to all education staff at the recommended facility, inviting them to an informational meeting regarding this project. Each phase of this study was explained in detail at the meeting and interested teachers were asked to sign consent for participation forms (see Appendix A). Teacher participants were required to meet the following criteria: 1) the individual must be a fully certified teacher in the state of Texas, 2) the individual must have taught in a TJJD school for at least 12 months, and 3) the individual must provide daily classroom instruction for students in the facility.

Two teachers met the inclusion criteria, voluntarily consented to participate in the study, and completed brief demographic forms describing the subject they teach at the facility, their current teaching certifications, the manner in which they acquired their teaching certifications, and the number of years they have been teaching in the Texas Juvenile Justice Department (see Appendix B). *Teacher A* held a bachelors degree in education, which he acquired through an accredited university educator preparation program. At the time of the study, he had three years teaching experience in TJJD and held a state Social Studies composite certification in grades 8 through 12. Teacher A taught a combined World History and Geography class in the school for general population youth. *Teacher B* held a juris doctorate and acquired all-level special education and 4-8 generalist state teaching certifications through an alternative certification program. At the time of this study, Teacher B had three years teaching experience in TJJD. Teacher B taught all subjects in the Crisis Stabilization Unit (CSU), a separate classroom in the mental health
side of the facility for students who were experiencing chronic behavior problems in the main school.

**Students.** Participating teachers were asked to nominate five students with whom they would like to work and met the following inclusion criteria: 1) the student has been incarcerated in a TJJD facility for at least six months, and 2) the student has engaged in high rates of low-intensity behavior (e.g., off-task, out-of-seat, verbal outbursts). With regard to student inclusion criteria, it is important to note two things. First, because the behavior assessment procedure was to be carried out in the classroom, youth who exhibited high-intensity behaviors that frequently resulted in referral or admission to secure confinement (e.g., assault, self-injury, property destruction) were not considered for participation in this study. Secondly, because chronic serious behavior issues are the catalyst for incarceration of all youth in the environment, special education diagnoses in which challenging behavior is common (e.g., EBD, LD, ADHD) were not a necessary pre-requisite to participate in this project; however, all of the final subjects included were served under the IDEA category of EBD.

Teacher A nominated five students and Teacher B nominated three students for participation in the current study. The list of potential student participants was presented to the facility principal. Serving as a representative of the state agency and legal guardian of the youth, she granted consent for participation in the study (see Appendix C). The researcher, a facility caseworker, and a child advocate spoke with each nominated youth in the common area of their dorm. Each nominated youth was presented a verbal and written explanation of the study that included an overview of the project, student participant responsibilities, and instructions on how they may withdraw at any time.
without penalty from the researcher, their teacher, or other facility personnel. If a youth agreed to participate, both the student and the child advocate, who was present to insure there was no coercion applied to force youth participation, were asked to sign the student assent form (see Appendix D). All eight nominated youth assented to take part in the study. Due to limited data collector availability, participating teachers were then asked to prioritize their nominations and choose two students for participation in the project. In the end, Teacher A had one student, Joe, participate in all phases of the study, and Teacher B had two students, Alex and Sammy, participate in the first phase of the study (see Table 1 for a summary of student participant demographic information).

The juvenile justice population is a very transient one. Almost immediately after signing the assent, the schedules for three of Teacher A’s students were changed and either moved to other classrooms or to a period where no data collector was available. Within two weeks of signing assent, paperwork was submitted for Teacher A’s fourth student and he was released from the facility. At the same time, one of Teacher B’s students was moved back to the main school. This left one participating student for Teacher A and two for Teacher B. The original intent was to have all three students participate in each phase of the study, but immediately before intervention was to begin, a sudden decision was made to move one of Teacher B’s students back to the main school and the other student to a halfway house closer to his home. This action limited their participation to the first phase of the study and was the reason why Teacher A’s student was the only youth who participated in both the TBFA and intervention phases of this study.
Joe, a youth in Teacher A’s World History and Geography class, was a 16-year-old Hispanic male with a diagnosis of emotional behavioral disorder. His challenging behavior included frequent class disruptions (e.g., inappropriate language, work refusal, horseplay). Records indicated that Joe was classified as a 10th grader at the time of this study and was performing academically at a 4.4 grade level in math and a 5.4 grade level in reading, according to academic achievement tests administered at intake. No previous functional behavior assessment or behavior intervention plan was found in the review of records.

Alex, a youth in the Crisis Stabilization Unit of this facility, was a 14-year-old Hispanic male with a diagnosis of emotional behavioral disorder. Teacher B reported his challenging behavior was disruption (e.g., verbal disruption, frequent request for time-out or security self-referrals, inappropriate language). A review of records indicated that Alex was classified as a 9th grader at the time of this study and was performing at a 2.4 grade level in math and a 4.6 grade level in reading according to academic achievement tests administered at intake. A functional behavior assessment and behavior intervention plan conducted in 2014, prior to Alex’s adjudication, noted problem behaviors of non-compliance and aggression with a hypothesized function of escape.

Finally, Sammy, another student in the Crisis Stabilization Unit, was a 14-year-old African-American male with a diagnosis of emotional behavioral disorder. Teacher B reported his challenging behavior was work refusal (e.g., verbal refusal, looks out window, talks quietly to himself, closes eyes, puts head on desk). A review of records indicated that Sammy was classified as a 9th grader at the time of this study with a present grade level performance of 4.7 in math and 6.4 in reading according to academic
achievement tests administered at intake. Although Sammy’s records did not include a functional behavior assessment, they did include a behavior intervention plan (BIP) dated early 2013. The BIP addressed issues of threats and verbal aggression with a hypothesized function of adult and peer attention. No data was included with the BIP to indicate the effectiveness of interventions proposed to deal with the issues he was having in public school prior to his adjudication.

Table 1

*Participating Student Demographics*

<table>
<thead>
<tr>
<th>Student</th>
<th>Age</th>
<th>Ethnicity/Gender</th>
<th>Disability Diagnosis</th>
<th>Challenging Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joe</td>
<td>16</td>
<td>Hispanic/male</td>
<td>Emotional Behavioral Disorder</td>
<td>Disruption (e.g., inappropriate language, work refusal, horseplay)</td>
</tr>
<tr>
<td>Alex</td>
<td>14</td>
<td>Hispanic/male</td>
<td>Emotional Behavioral Disorder</td>
<td>Disruption (e.g., verbal disruption, frequent request for time-out or security self-referrals, inappropriate language)</td>
</tr>
<tr>
<td>Sammy</td>
<td>14</td>
<td>African-American/male</td>
<td>Emotional Behavioral Disorder</td>
<td>Work refusal (e.g., verbal refusal, looks out window, talks quietly to himself, closes eyes, puts head on desk)</td>
</tr>
</tbody>
</table>

**Setting.** The facility in which this study took place is located in north central Texas. It serves over 300 youth and is divided into two distinct sides. Side One is the
mental health placement for TJJD. Within this side is the Crisis Stabilization Unit, a separate classroom for youth who are struggling in the main school. Side Two serves youth who were referred to as the general population. A chain-link fence separated sides One and Two, and a tall chain-link fence topped with concertina wire enclosed the entire facility. Facility personnel are allowed to move freely between the sides through monitored gates. Youth are allowed to move between the sides in groups or alone if escorted by a juvenile corrections officer, caseworker, or other authorized personnel.

**Training**

Schools on both Sides One and Two observed block schedules on Tuesday and Thursday each week, allowing half days for teacher administrative duties and to attend multi-disciplinary team meetings. Teacher training in the TBFA procedure took place in a classroom in the Side Two school during one of these afternoons (see teacher training procedures below).

**TBFA and Intervention**

The TBFA procedure for all students and intervention for Joe took place in participating teachers’ classrooms. Teacher A taught Joe in a combined World History and Geography class in the Side Two school for the general population. Approximately 12 students were in this classroom at any given time (population range, 8 to 16 years of age). After presenting one lesson to the entire class that incorporated both history and geography, Teacher A assigned either history or geography work to be completed based on each student’s course enrollment. Most in-seat work consisted of worksheets that came with the curriculum provided by the state. Because TJJD employs project-based learning in all its facilities, this class was engaged on some days in working on projects
(e.g., creating cardboard shields with their family crest) instead of the traditional worksheets. All classroom materials (e.g., textbooks, student work folders) were kept behind the teacher’s desk or in a locked file cabinet and were passed out and collected at the beginning and end of each lesson. Pencils were also kept behind the teacher’s desk and must be accounted for before students are allowed to leave the classroom. At least one juvenile corrections officer was typically present throughout the entire class period.

Teacher B was the sole teacher in the Crisis Stabilization Unit on Side One. The number of students in her classroom varied considerably over the course of this project ranging from two to six students. Teacher B was tasked with instructing all subject areas to her students with the support of content area teachers from the main school. On occasion, another teacher from the main school on Side One assisted during math class. In addition to the students and teacher, between two and four juvenile corrections officers were frequently present in the classroom and occasionally served as tutors. Textbooks and pencils were kept behind the teacher’s desk and passed out and collected at the beginning and ending of each lesson. Folders for each subject with student work and supplemental helps were kept under each student’s desk. The CSU classroom was located immediately outside the dorm used to house these youth. Correctional staff took students from the classroom back to their dorm for restroom breaks, or to the infirmary for medication, two or three times a day.

**Phase 1: Functional Behavior Assessment**

The purpose of Phase 1 was to (a) create an operational definition for specific problem behaviors, (b) identify frequent patterns/relationships between problem behavior and environmental antecedents and consequences, and (c) develop hypotheses about the
function of behavior using the indirect and descriptive methods of a functional behavior assessment (FBA). The FBA took place in the following three steps: (1) review of student records, (2) completion of rating scales, and (3) collection of direct observation data during normal classroom activities. Each step is described in detail in the remainder of this section and a summary of tools and procedures for this phase is provided in Table 2. Procedures in this phase were conducted by outside experts with advanced training in behavior assessment procedures; a similar level of expertise might not be available within juvenile justice settings.

Table 2

Summary of tools and procedures

<table>
<thead>
<tr>
<th>Tool or procedure</th>
<th>Who completed</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| School Archival Records Search (Walker et al., 1991) | Investigator | • Identify trends in behavior referrals  
• Identify academic deficits |
| Functional Assessment Checklist for Teachers and Staff (March et al., 2000) | Teacher and Investigator | • Help define problem behaviors  
• Identify antecedents and consequences  
• List previously tried strategies  
• Hypothesize function |
| Direct observation (Cooper, Heron, & Heward, 2007) | Investigator | • Help define problem behavior  
• Identify patterns in antecedents and consequences  
• Hypothesize function |
Step 1: Records review. Using an adaptation of the School Archival Records Search (SARS; Walker, Block-Pedago, Todis, & Severson, 1991; see Appendix E), a review of records took place to glean the following information for participating students: (a) basic demographic information including student age, current grade level enrollment, and ethnicity, (b) basic behavioral information including (if applicable) the date and findings of the most recent FBA and suggested interventions from the corresponding behavior intervention plan (BIP), and (c) basic academic information including the existence of a special education diagnosis and performance on intake assessments (e.g., academic assessments of reading and mathematics, IQ tests). Each youth remanded to a long-term TJJD facility is required to undergo a battery of academic and psychological testing at the intake facility before final placement decisions are made. Results from these tests, as well as behavioral referral data and school performance information, can be found in student records that accompany youth to their placement in a long-term facility. This review took place as soon as student assent and guardian consent for participation was secured and was meant to shed light on possible trends in behavior referrals as well as academic deficits that might precipitate inappropriate classroom behavior.

Step 2: Rating scales and interviews. Teachers A and B were asked to complete a Functional Assessment Checklist for Teachers and Staff (FACTS; March et al., 2000; see Appendix F) for each of their participating students. This rating scale was completed within one week of gaining student assent and guardian consent for participation. Teachers were interviewed by the researcher to confirm information included on the FACTS and to ask clarifying questions if needed.
**Step 3: Direct observation.** Direct observations of behavior were conducted by the investigator for each participating student in the participating teacher’s classroom using an ABC assessment (Walker et al., 1991; see Appendix G). The investigator noted target student behavior in the $B$ column, environmental antecedents to that behavior in the $A$ column, and environmental consequences for the behavior in the $C$ column. Direct observations were conducted for an entire class period for at least 3 days or until a clear pattern in antecedents and consequences to behavior was evident. Functional hypotheses were developed by reviewing the ABC data, identifying patterns in antecedent and consequent events, and analyzing their relationship with student behavior. A functional hypothesis statement was written by the investigator for each participating student and shared with their respective participating teacher for confirmation and agreement (see Results).

**Reliability.** At the conclusion of the FBA process, all student information from the records review, checklists, and direct observations were given to the investigator’s advisor for a separate independent evaluation. The investigator and her advisor were in agreement with the hypotheses derived from the findings of the FBA process.

**Phase 2: Teacher Training**

The purpose of Phase 2 was to train participating teachers in the procedures of trial-based functional analysis (TBFA). Previous TBFA research has largely been conducted with younger student populations diagnosed with autism or developmental delay and examined traditional functional analysis conditions of attention, escape, tangible, and automatic reinforcement. Given the age, behavioral characteristics, and unique environment of incarcerated youth, this investigation was limited to testing for
possible escape and attention functions of behavior. Based on the work of Kunnavatana, Bloom, Samaha, and Dayton (2013), TBFA training consisted of three basic components: 1) a didactic presentation, 2) an instructional role play, and 3) a post-training integrity assessment. Each component was be carried out by the researcher and is explained in detail below.

**Component 1: Didactic presentation.** In keeping with the model developed by Kunnavatana and colleagues (2013), teacher training began with a verbal presentation to explain principles of reinforcement and functions of behavior, a brief explanation of analog functional analysis methodology (e.g., Iwata et al., 1994), and the basis for and procedures of trial-based functional analysis (TBFA). A manual was created that outlined each discussion topic to aid in training and serve as a reference once the trial-based functional analysis began (see Appendix H).

**Component 2: Instructional role-play.** During the second training component, teacher participants engaged in role-playing activities in order to practice conducting attention and escape trials. During this activity, the teachers took turns acting as the target student while the other practiced conducting the trials. Conditions for role-play activities were based on common events and problem behaviors and suggested by teachers on the day of training. If an error was made, the researcher stopped the role-play and provided immediate feedback to the teacher. Teachers were encouraged to ask clarifying questions regarding the process and procedures of TBFA during this portion of the training until they felt comfortable with the process.

**Component 3: Post-training integrity.** Lastly, teachers were asked to conduct practice *in vivo* trials in their classrooms to ensure they were able to conduct trials with
fidelity during regular classroom activities with other students and staff present. A task-analyzed checklist of TBFA steps was used to assess the procedural integrity of teachers conducting both attention and escape trial conditions (see Appendix I). The researcher provided immediate feedback to any teacher who did not conduct a trial with 100% accuracy. Practice trials took place for 2 consecutive school days before Phase 3 began. A summary of how each trial condition took place is depicted in Figure 3.

Figure 3

Summary of TBFA trial conditions

Phase 3: Teacher-conducted trial-based functional analysis

Phase 3 consisted of direct experimental manipulation of antecedent and consequence variables utilizing a trial-based functional analysis (TBFA) based on the
work of Sigafoos and Saggers (1995). The purpose of this phase was to provide a brief teacher-mediated *in vivo* assessment of student behavior from which a functional hypothesis could be derived and a corresponding intervention developed. Variations required to fit the juvenile justice context are also discussed.

**Procedures.** The TBFA procedure in this study was intended to determine whether problem behavior was maintained by positive reinforcement in the form of contingent teacher attention or by negative reinforcement in the form of escape from task demands. Ten trials under two conditions (attention and escape) were carried out over several days. Teachers were able to complete all trials in 11 days over a 4-week period. The number of weeks to complete 11 days of trials was due to events such as participating students in secure confinement, cancellation of school due to facility-wide behavior issues, or scheduled teacher workdays in which classes were were not held. These trials were incorporated into existing classroom procedures and initiated by the regular classroom teacher. In previous research, attention trials were conducted during classroom activities in which the teacher naturally had the opportunity to interact socially with students. Escape trials were conducted during instructional classroom activities in which students were asked to complete academic tasks. In the current study, both escape and attention trials were conducted during periods of individual seatwork because unstructured free time poses a safety and security risk in juvenile justice settings. Because classroom schedules varied slightly from day to day, no set order of trials was required; the only requirement was that at least one trial of each type be conducted per class period per day. Trials in this study began with the control segment followed by the test segment. During the attention condition, the teacher provided continual attention
during the control segment by discussing the assignment at hand or engaging in conversation about the student’s general well being. During the test segment, the teacher withheld attention while remaining in close proximity to the student (i.e., within 10-feet) and reoriented to the student to redirect behavior if the target behavior occurred. In the escape condition, the teacher withheld attention, task demands, and preferred materials during the control segment by passing out materials and getting other students started on the day’s assignment. During the test segment of the escape condition, the teacher presented a task demand with verbal prompts every 10-seconds if the student was unengaged in the activity. If the target behavior occurred during the test segment, the task demand was removed for 30 seconds and then reintroduced. Unlike analogue functional analysis, there is no generic comparative control condition in a TBFA. Instead, variables are manipulated in the control segment of each trial in an attempt to control for confounding variables to the greatest extent possible within the natural setting during regularly occurring activities. A summary of the control and test segments for the attention and escape conditions is presented in Table 3.
Table 3

Trial segment summary

<table>
<thead>
<tr>
<th>Condition</th>
<th>Control segment</th>
<th>Test segment</th>
<th>Consequence for behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attention</td>
<td>Continual teacher attention is provided to the student for the duration of this segment and takes place during independent seatwork with activities that are not difficult for the student</td>
<td>Teacher remains in close proximity to the student (within 10 feet) but withholds attention until the problem behavior occurs</td>
<td>Teacher reorients to the student and provides attention in the form of redirection</td>
</tr>
<tr>
<td>Escape</td>
<td>Teacher withholds attention, task demands, and preferred materials for the duration of this segment by addressing needs of other students (i.e., passing out materials for class)</td>
<td>Teacher presents task to student, issues instruction, and provides verbal prompts every 10 seconds if student is unengaged</td>
<td>Teacher removes task demand for 30 seconds and then reinstates</td>
</tr>
</tbody>
</table>

Attention trials. Each teacher was provided with a vibrating timer secured to the wrist that was started at the beginning of the control segment and vibrated to signal the start of the test segment. During attention trials, the teacher provided continual attention to the target student through eye contact and maintaining conversation for the entire 1-minute control segment. If teachers disengaged with the student for longer than three seconds, the trial was ended and no data was collected. If the teacher disengaged but reoriented to the participating student within three seconds, the trial continued and qualified for data collection. At the end of the control segment, the teacher initiated the
test segment by saying something like, “I’ll be right back” and turning to speak with another student, looking through papers, or engaging in some other activity while remaining within close proximity (i.e., within 10 feet) to the target student. If the student engaged in the problem behavior during this portion of the trial, the test segment immediately ended with the teacher reorienting to the student and providing attention in the form of redirecting behavior. The presence or absence of the target behavior was recorded for each segment of the trial. The theory is that attention maintained behavior would be indicated more often during the test condition when the youth was being ignored compared with the control condition in which the youth had the undivided attention of the teacher.

**Escape trials.** During the control segment of the escape trials, the teacher refrained from interacting with the student and prevented access to work tasks or preferred materials for the entire duration of the control segment. In the juvenile justice setting of this study, this segment took place while the teacher was passing out materials and getting other students started on the day’s assignment. The test segment of the escape trial began with the teacher presenting the student with an academic task and stating expectations for task completion through verbal instruction and modeling when necessary. The teacher verbally prompted the student to complete the task every 10 seconds if the child was not engaged in the activity. If the problem behavior occurred at any time during the test condition, the teacher removed the task immediately for the remainder of the segment and no longer than 30 seconds. Again, each teacher was provided with a vibrating timer that was started at the beginning of the control segment and vibrated to signal the start of the test segment. The presence or absence of the target
behavior was recorded for each segment of the trial. The theory was that escape maintained behavior would be indicated more often during the test condition when the youth was presented with and expected to complete an academic task compared with the control condition in which no demands were placed on the student.

Data collection. In addition to the timers mentioned in the previous section, teachers were provided with a prepared data collection sheet with spaces for the control and test segments of each trial (see Appendix J). Data was collected using an event recording procedure by indicating the occurrence or non-occurrence of problem behavior during each segment of each trial.

Data analysis. TBFA data is compared across test and control segments rather than across conditions. Raw data from this investigation was converted to percentage of trials with problem behavior by dividing the number of trials in which problem behavior occurred during the control segment by the total number of trials and multiplying by 100 and by dividing the number of trials in which problem behavior occurred during the test segment by the total number of trials and multiplying by 100. These numbers were calculated for each condition and represented in histogram form, which is standard procedure in the previous literature. If the percentage of trials was greater during the test segment of one condition, per Sigafoos and Sagger (1995), an hypothesis that the problem behavior is being reinforced and maintained by that condition (i.e., gaining teacher attention or escape from task demand) is established. By way of example, a visual analysis of Figure 4 showed that challenging behavior occurred most frequently (80%) during the test segment of the attention condition trials. This analysis indicated that the problem behavior is maintained by attention. Conversely, the data presented in
Figure 5 showed that challenging behavior occurred most frequently during the test segment of the escape condition trials (90%) and indicated the problem behavior is maintained by escape from an aversive stimulus. It is important to note that safety and security concerns prevented a clean control segment in attention condition from taking place (i.e., the segment took place during independent seatwork), which differs from the attention control segments in previous studies. This variable was taken into account when analyzing the data.

Figure 4

*Example of graphed data – attention maintained behavior*
Implementation fidelity. The researcher collected data on the implementation fidelity of each participating teacher using the same fidelity checklist administered during the training phase. The researcher and a second data collector simultaneously recorded fidelity data during 30% of the trials and achieved 100% inter-rater reliability. Inter-observer agreement (IOA) between data collectors was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100 to arrive at a percentage. Implementation fidelity data were gathered during the post-training fidelity check, not during the actual implementation of the TBFA in the classroom.

Phase 4: Intervention

During Phase 4, a reversal design (Gast, 2010) was used to evaluate the effectiveness of an intervention derived from the functional hypothesis developed for Joe.
This step provided further confirmation to the validity of FBA and TBFA hypotheses. As stated earlier, Alex and Sammy were removed from Teacher B’s classroom before an intervention could be implemented and evaluated, leaving Joe as the only student participant in this phase.

**Procedures.** An intervention was developed for Joe based on the data collected and analyzed during Phases 1 and 3. Because two methods were used to develop functional hypotheses, two intervention possibilities existed for use in this phase of the investigation: (1) one intervention if the results of the FBA and TBFA agree and (2) two interventions if the result of the FBA and TBFA differ. Both the FBA and TBFA hypotheses indicated the function of Joe’s behavior was escape (see Results); therefore, one intervention was developed and tested for this youth.

**Baseline.** During baseline conditions, Joe was asked to complete the typically assigned worksheets that accompany the agency’s general education curriculum. Baseline data was collected for five data points, when a clear level and trend was visually evident.

**Intervention.** Hypotheses from the FBA and teacher-conducted TBFA indicated the function of Joe’s behavior was escape. The researcher presented the teacher with an adaptation of Umbreit et al. (2007) function-based intervention decision matrix (see Appendix K) to help in developing an appropriate intervention plan. This decision matrix was used to determine an appropriate function-based intervention which would have included measures commonly taken in traditional public schools such as shortening assignments after a certain portion has been completed according to a predetermined mastery criteria, or allowing the student to engage in a preferred activity after successful completion of a predetermined portion of the assignment. Due to the academic deficits
and safety and security concerns previously mentioned, these options were determined to be unfeasible in the corrections environment. Following a review of the data and discussion of Joe’s classroom performance, Teacher A shared his belief that Joe’s behavior was motivated by aversive or boring assignments; consequently, an antecedent-based approach was taken and Joe was given alternate assignments that were project-based and required higher-order thinking skills than the typical worksheet based assignments that accompanied the agency’s curriculum.

**Data collection.** The independent variable for this study consisted of the intervention developed for Joe, and the dependent variable was the percent of intervals on-task. The operational definition of on-task was “working on assigned work, oriented toward the teacher during lecture, engaging in on-topic class discussion, or sitting quietly and not disturbing others during down time.”

Data for Joe was collected by the researcher and a second data collector using a 10-second whole interval recording procedure (Gast, 2010) across 7- to 15-minute observation sessions. Session length varied due to issues such as students who were called out of class, sent to the Redirect Room, or allowed to go to the restroom. Occurrences of on-task behavior were recorded on a prepared data collection sheet across baseline and interventions phases (see Appendix L for an example). Daily data was converted to percentage of intervals of on-task behavior and plotted for visual analysis.

**Reliability.** The researcher served as the primary data collector during this phase, with a second data collector present during 40% of the sessions for the purposes of reliability. The second data collector was trained by 1) explaining how classroom observations are conducted and how to use the prepared data sheet, 2) explaining the
operational definition for on-task behavior, and 3) conducting classroom observations with the researcher until inter-observer agreement reached 90% or higher for three consecutive observations. Average inter-observer agreement during this phase was 95% (range, 88 – 100%) and was calculated by dividing the number of intervals in which the two data collectors agreed by the number of agreements plus disagreements, multiplied by 100, and the number reported as percent agreement.

**Phase 5: Social Validity**

A social validity survey was adapted from previous literature (Reimers & Wacker, 1988) and distributed to participating teachers to assess (a) the degree they felt the TBFA training was helpful, (b) the degree the TBFA procedure was manageable in their classrooms, (c) their perception of whether the TBFA process lead to effective interventions for their students, (d) the likelihood they would utilize TBFA to develop function-based interventions for their students in the future, and (e) the degree they felt TBFA was useful in efforts to manage behavior in juvenile justice settings.
Chapter III

Results

Overview

Results of this study are presented in four sections. In Section 1, the results of the functional behavior assessment (FBA) are presented for each subject. In Section 2, the teacher-conducted trial-based functional analyses (TBFA) are reviewed. Section 3 has presented intervention effectiveness data based on the TBFA outcome for Joe. Results of the social validity questionnaire are presented in the final section.

Functional Behavioral Assessment

Individual hypotheses of behavior were developed for each participating student through an indirect teacher checklist and ABC direct observation. Results from each assessment method and their combined hypotheses are reported for each participating student. The researcher and her faculty advisor, who are experts in behavior assessment techniques, conducted the procedures and developed hypotheses in this phase. Similar expertise is unlikely to be found in staff within typical juvenile justice settings.

Records review: Subject one. A review of Joe’s records indicated he has an educational diagnosis of emotional behavioral disorder. The results of his Test of Adult Basic Education (TABE) scores at intake reported he was functioning at a 4.4 grade level in math and a 5.4 grade level in reading. His file did not include a functional behavior assessment or behavior intervention plan.

Records review: Subject two. A review of Alex’s records indicated he has an educational diagnosis of emotional behavioral disorder. The results of his Test of Adult Basic Education (TABE) scores at intake reported he was functioning at a 2.4 grade level
in math and a 4.6 grade level in reading. The most recent FBA in Alex’s file was conducted in January 2014 and reported the following: 1) problem behaviors of non-compliance and aggression, 2) strategies of consistent routines, structured environment, and cool down, 3) reinforcement in the form of activities, privileges, and verbal praise, and 4) a hypothesis of control. There was no data in Alex’s file to report the effectiveness of the strategies listed.

Records review: Subject three. A review of Sammy’s records indicated he has an educational diagnosis of emotional behavioral disorder. The results of his Test of Adult Basic Education (TABE) sores at intake reported he was functioning at a 4.7 grade level in math and a 6.4 grade level in reading. No functional behavior assessment was found in Sammy’s file, but his file included a behavior intervention plan (BIP) dated January 2013. The following was noted in the BIP: 1) problem behaviors of threats and verbal aggression, 2) strategies of anger management, removal of distractions, established routines, extended processing time, choices, proximity control, and extinction, 3) reinforcement in the form of verbal praise, preferred activities, assisting teachers and peers, and a reinforcement menu, and 4) a functional hypothesis of gaining peer and adult attention. The file did not include data reporting the effectiveness of the BIP.

Teacher rating: Subject one. Teacher A completed a Functional Assessment Checklist for Teachers & Staff for Joe. Teacher A reported that Joe’s strengths were his humor, his ability to recall information related to items of interest, and his ability to perform well on projects. Several problem behaviors were indicated to include verbal harassment, inappropriate verbalizations, and disruption. When asked to provide more detail, Teacher A indicated that Joe’s extremely inappropriate remarks, horseplay, and
disruption usually occurred when he was called on and lasted a few minutes at a moderate level of intensity. Predictors to the behavior were reported as negative social influences and academic failure (setting events), as well as reprimand or correction, proximity to peers, structured activities, activities that were too long, and difficult tasks (antecedents). Teacher A noted that Joe typically gained adult and peer attention as well as avoided difficult tasks, reprimands, and negative peer attention when he engaged in the challenging behavior. Teacher A’s summary of Joe’s behavior was that when he was asked to do work, Joe was disrespectful and inappropriate in order to escape assignments, even though Teacher A did not indicate how confident he was in this hypothesis. As for prevention of behavior, Teacher A reported that seating change was the only proactive measure, and reprimand or office referrals were typical responses to Joe’s behavior. After review of the Teacher A’s assessment of the situation, it was determined from this measure that when asked to complete assignments, Joe has engaged in inappropriate behavior (e.g., horseplay, disruption, inappropriate comments) to escape aversive tasks.

**Teacher rating: Subject two.** Teacher B completed a *Functional Assessment Checklist for Teachers & Staff* for Alex. She indicated his problem behaviors as inappropriate language, verbal harassment, disruption, insubordination, work not completed, self-injury, and *other.* An explanation of other was included which Teacher B characterized as requests for time out or security self referrals, verbal disruptions, and expression of suicidal ideation. When asked to provide more detail, Teacher B noted that Alex would insist on being the center of attention and would engage in the above behaviors several times a day. She also noted that the behavior increased in intensity until he was attended to and received a time out, referral to security, or put on suicide
alert. Teacher B noted negative social interaction, conflicts at home, academic failure, and others receiving attention as setting events to the behavior, and physical demands, proximity to peers, tasks that are too long, boring, or difficult as environmental antecedents to the problem behavior. Adult and peer attention and preferred activities were listed as things Alex gains from engaging in his problem behavior, and reprimands and negative peer interactions were listed as things avoided. Teacher B did not indicate how confident she was in her assessment of the situation, she did not provide a summary of behavior, and she did not indicate strategies used for preventing or responding to the behavior. After review of Teacher B’s assessment of this student’s behavior, it was determined that when not receiving attention in the classroom, Alex engaged in disruptive behavior (e.g., inappropriate language, insubordination, threats to self-injury, request for secure confinement) in order to gain adult attention.

**Teacher rating: Subject three.** Teacher B completed a *Functional Assessment Checklist for Teachers & Staff* for Sammy. She indicated three strengths for this student: 1) he was quiet and not physically aggressive, 2) when motivated, he was capable of insightful contributions to class, and 3) he did not feed into others’ verbally confrontational behavior. Sammy’s problem behavior was characterized as unresponsive, withdrawn, and lack of work completion. When asked to provide more detail about the problem behavior, Teacher B noted that Sammy would look out the window, talk to himself, close his eyes, put his head on his desk, do limited or no work, and respond with “I’m fine” when asked to engage in work. Teacher B reported that Sammy’s work refusal was mostly passive, but once he decided not to participate he rarely changed his mind. This behavior was reported to take place from part to the entire class period.
Illness, negative social interaction, conflict at home, lack of trust in others, lack of interest in others, and serious mental health issues were noted as setting events to Sammy’s behavior. Reprimand or correction, boring tasks, and activities that were too long or difficult were indicated as environmental antecedents to the behavior. Teacher B noted that Sammy gained adult and peer attention, as well as avoiding hard tasks, reprimands, negative peer interactions, physical discomfort, and reality by engaging in work refusal. Preferential seating and allowing Sammy to work at his own pace had been used as strategies to prevent behavior, and reprimands and denial of privileges or after school activities had been used as strategies for responding to his challenging behavior. After reviewing Teacher B’s assessment of behavior, it was determined that when asked to complete a difficult task, Sammy was non-compliant (e.g., refused to work, looked out window, talked to himself, withdrew from others) in order to escape task demands.

**ABC direct observations: Subject one.** Direct observations of classroom behavior indicated that when given a task, Joe would engage peers (e.g., talk quietly with, flash signs to) or would withdraw from instruction (e.g., put head on desk, throw away assignment, close textbook). On occasion, Joe asked for another worksheet or piece of paper after having thrown the original away. The teacher was noted to have honored the request each time. The resulting hypothesis from these observations was that when given a task, Joe would be non-compliant (e.g., putting head on desk, flashing signs) or disruptive (e.g., talking with peers, throwing away assignments) to escape a task demand.

**ABC direct observation: Subject two.** Direct observations of classroom behavior indicated that Alex frequently attempted to initiate or engage in conversation with the teacher or other adults in the room. Notes on the setting indicated that there
were two or three juvenile corrections officers present in the classroom at any given time, in addition to the classroom teacher, the facility psychologist on occasion, and the researcher. Most of Alex’s comments were related to the task at hand, sharing his expertise or personal experiences, or pointing out how he was carrying out the task. Consequences to the student’s behavior were consistently noted as some form of adult attention. Two of the three observations included a time of meditation with the facility psychologist, an encouraged but optional activity. During the second observation, Alex did not participate in meditation, but read to himself, put his head on his desk, and eventually asked for a timeout. The first request for a timeout was denied, but the second was granted and a juvenile corrections officer took him out of the room for eight minutes. The resulting functional hypothesis from these observations was that Alex would engage in disruptive behavior (e.g., talkative, asking for removal from the classroom) to gain adult attention.

**ABC direct observation: Subject three.** Direct classroom observations indicated that Sammy frequently engaged in off-task behavior such as closing his eyes, verbal refusal to work, talking or singing to himself, drawing on worksheets, or staring off into space or out the window. He was rarely noticed to have engaged in classroom activities or to orient his gaze toward the teacher. The common response to Sammy’s behavior was to ignore it or to provide gentle redirection that was not repeated or enforced. The resulting functional hypothesis from these observations was that Sammy would engage in off-task behavior (e.g., talking to himself, staring out the window, drawing on his papers) to escape a task demand.
**FBA summary hypotheses: Subject one.** Based on the indirect and non-experimental functional assessment methods, a hypothesis was developed that indicated when Joe was presented with a task in Geography, he engaged in moderate levels of disruption (e.g., talking to peers, head on desk, inappropriate language with peers) to escape task demands (see Table 4).

**FBA summary hypothesis: Subject two.** Based on the indirect and non-experimental methods of functional assessment, a hypothesis was developed stating that when Alex is in the CSU classroom, he engaged in disruptive behavior (e.g., talking to peers, requests for timeout or self-referrals to security) to gain adult attention (see Table 4).

**FBA summary hypothesis: Subject three.** Based on the indirect and non-experimental methods of functional assessment, a hypothesis was developed stating that Sammy engaged in off-task behavior (e.g., head down, staring out window, talking to himself, verbal refusal to engage in tasks) to escape task demands (see Table 4).

*Summary of FBA hypotheses*

<table>
<thead>
<tr>
<th>Student</th>
<th>FACTS</th>
<th>A-B-C Observation</th>
<th>Final FBA Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joe</td>
<td>Escape task demand</td>
<td>Escape task demand</td>
<td>Escape task demand</td>
</tr>
<tr>
<td>Alex</td>
<td>Gain adult attention</td>
<td>Gain adult attention</td>
<td>Gain adult attention</td>
</tr>
<tr>
<td>Sammy</td>
<td>Escape task demand</td>
<td>Escape task demand</td>
<td>Escape task demand</td>
</tr>
</tbody>
</table>

**Functional Behavior Assessment Reliability.** Indirect and non-experimental functional assessment data were independently reviewed by the faculty advisor to
corroborate the hypotheses. Agreement was 100% between the hypotheses generated by the researcher and faculty advisor.

**Trial-based Functional Analysis**

Trial-based functional analysis data is compared across test and control segments rather than across conditions as in an analogue functional analysis. Raw data is converted to *percentage of trials with problem behavior* for the test and control segments of each trial condition and represented in histogram form. Visual analysis is then used to determine under which condition the target behavior occurred most often, thereby establishing a functional hypothesis of behavior. Both attention and escape trial conditions in this study were conducted within the classroom setting during periods independent seatwork. This deviates from previous research but was necessary due to safety and security concerns that are unique to the juvenile justice environment.

**Subject one.** Results of the teacher-conducted trial-based functional analysis (TBFA) indicated that disruptive behavior was exhibited during the attention condition trials for 40% of the control segments and 40% of the test segments. During the escape condition trials, Joe exhibited disruptive behavior during none of the control segments and 40% of the test segments (see Figure 6). Due to the nature of the class, attention trials were conducted during times of individual seatwork when task demands were present during both segments of the condition; therefore, when taken collectively, the TBFA outcomes indicated a functional relation between task demand and disruptive behavior, and it can be hypothesized that the function of Joe’s disruptive behavior was to escape task demands.
Subject two. Results from the teacher conducted trial-based functional analysis indicated that Alex exhibited disruptive behavior in the attention condition trials during 10% of the control segments and 70% of the test segments. Disruptive behavior was noted in the escape condition trials for 70% of the control segments and 0% of the test segments (see Figure 7). When taken together, results from the TBFA indicate a functional relation between Alex’s disruptive behavior and gaining adult attention.
Subject three. Results of the teacher-conducted trial-based functional analysis indicated that during the attention condition trials, Sammy exhibited the target behavior for 50% of the control segments and 50% of the test segments. During the escape condition trials, problem behavior was recorded during 20% of the control segments and 20% of the test segments (see Figure 8). These results initially appear inconclusive, but a behavioral function was determined upon closer inspection. In order to account for the effect setting adaptations might have on the TBFA outcome for Sammy (e.g., conducting attention trials during periods of task demand), a decision was made to re-aggregate and reanalyze the data in the following categories: 1) percentage of all segments with no task demand and no attention, 2) percentage of all segments with task demand and teacher attention, and 3) percentage of all segments with task demand and no attention. In these
categories, behavior occurred least frequently during segments with no task demand and no attention (20%), slightly more frequently during segments with task demand and teacher attention (35%), and most frequently during segments with task demand and no teacher attention (50%). If Sammy were engaging in target behavior to gain teacher attention, his rates of behavior should have been higher during all trial segments in which teacher attention was not provided; this was not the case. Target behaviors were noted more often during segments in which task demands were present, and highest when task demands were present and teacher attention, even in the form of assistance, was not available; therefore, it can be argued that the results of the TBFA confirmed the FBA functional hypothesis of task avoidance for Sammy’s behavior.

Figure 8

*Results of Sammy’s TBFA*
Agreement and non-agreement comparisons. Agreement across functional behavior assessment and trial-based functional analysis outcomes was found for all subjects in this study (see Table 5).

Table 5

Agreement and non-agreement summary across subjects

<table>
<thead>
<tr>
<th>Subject</th>
<th>FBA</th>
<th>TBFA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joe</td>
<td>Escape task demand</td>
<td>Escape task demand</td>
</tr>
<tr>
<td>Alex</td>
<td>Gain adult attention</td>
<td>Gain adult attention</td>
</tr>
<tr>
<td>Sammy</td>
<td>Escape task demand</td>
<td>Escape task demand</td>
</tr>
</tbody>
</table>

Intervention

An antecedent-based intervention was developed and implemented for Joe based on FBA and TBFA findings. A withdrawal design (Gast, 2010) was implemented to demonstrate three replications of the intervention and to establish a functional relation between dependent and independent variables. Both FBA and TBFA hypotheses were confirmed for Joe and a functional relation established. Results are reported below.

Intervention results. Data for baseline (A) and intervention (B) conditions for Joe are presented in Figure 9. Overall, a visual analysis of the data indicated clear level changes when the independent variable was in effect. While baseline two and three show increasing trends in behavior, the overall level of performance returned to very low percentages when compared with the level of performance during intervention conditions.
Inter-observer agreement. Reliability measures were taken for 40% of the direct observations in this phase with an average of 95% agreement between raters (range, 88% to 100%).

Social Validity

A social validity survey was given to both participating teachers at the completion of this study. The survey utilized a Likert-type scale ranging from 0 (Not Applicable) to 5 (Strongly Agree) and asked eleven questions covering three broad categories: 1) two questions were related to learning and conducting the trial-based functional analysis procedure, 2) six questions were related to intervention effectiveness and the likelihood the intervention would be used again, and 3) three questions were related to whether the teacher would use the TBFA again, recommend it to others, and if they believed it was relevant to the juvenile justice setting (see Appendix M for instrument).
**Conducting the TBFA.** Both participating teachers agreed or strongly agreed that the procedures for conducting the TBFA were easy to learn. Both teachers also agreed that the TBFA procedures were easy to conduct in the classroom.

**Intervention effectiveness.** Teacher A was the only participant who could respond to the questions on intervention effectiveness. Responses indicated Teacher A strongly agreed that the intervention decreased the student’s challenging behavior, that it made a meaningful difference in the student’s classroom behavior, and that the intervention would be used again with the same or similar students. Teacher A agreed that the intervention increased the student’s appropriate behavior, was easy to implement in the classroom, and made a meaningful difference in the student’s academic performance.

**Appropriateness of TBFA in JJ settings.** The two participating teachers agreed or strongly agreed that they would use the TBFA procedure again with their students and that they would recommend its use to other teachers. Both teachers strongly agreed that TBFA can be useful in juvenile justice schools to help with behavior management in the classroom.
Chapter IV

Discussion

Overview

The purpose of the current study was to extend the existing trial-based functional analysis (TBFA) research by determining (a) whether hypotheses from researcher-conducted traditional functional behavior assessment align with those from teacher-conducted trial-based functional analysis, (b) whether hypotheses from trial-based functional analysis will result in effective intervention in a juvenile justice setting, and (c) whether trial-based functional analysis is considered socially valid by classroom teachers and appropriate for use in the juvenile justice education setting. Previous research has explored the use of teacher-conducted trial-based functional analysis for individuals with developmental disabilities, autism spectrum disorder, or intellectual disabilities in public schools (Bloom, Lambert, Dayton, & Samaha, 2013; Kodak, Fisher, Payden, & Dickes, 2013; Lambert, Bloom, & Irwin, 2012; Rispoli, Davis, Goodwyn, & Camargo, 2012), special schools (Bloom, Iwata, Fritz, Roscoe, & Carreau, 2011; LaRue, Lenard, Weiss, Bamond, Palmieri, & Kelley, 2010; Sigafos & Meikle, 1996; Sigafos & Saggers, 1995; Tucker, Sigafos, & Bushnell, 1998), and residential settings (Schmidt, Drasgow, Halle, Martin, & Bliss, 2014). Previous research has also compared TBFA outcomes to those of analogue functional analyses (Bloom, Iwata, Fritz, & Carreau, 2011; LaRue, Lenard, Weiss, Bamond, Palmieri, & Kelley, 2010; Rispoli, Davis, Goodwyn, & Camargo, 2012) and functional behavior assessment (Rispoli, Davis, Goodwyn, & Camargo, 2012). The current study extends the literature base by examining the TBFA procedure in juvenile justice settings with necessary context related modifications, and with students diagnosed...
with EBD. Findings related to the purposes of the present study are organized by research question. Limitations of the study, implications for practice, and recommendations for future research are also discussed.

Do hypotheses from an expert-conducted FBA align with hypotheses from a teacher-conducted trial-based functional analysis?

The first purpose of this study was to determine if hypotheses from a teacher-conducted trial-based functional analysis would align with those from a researcher-conducted traditional functional behavior assessment. If a functional assessment of behavior were to happen in a juvenile corrections setting, it would likely take the form of a typical school-based functional behavior assessment consisting of indirect and non-experimental measures; therefore, in determining whether TBFA would be appropriate in juvenile justice settings, it was necessary to compare it to what would be considered standard procedure.

Only one study to date has examined the correspondence between hypotheses derived from functional behavior assessments and trial-based functional analysis. Just as in the current study, Rispoli and colleagues (2012) compared outcomes of researcher-conducted FBA and teacher-conducted TBFA. Both studies found exact correspondence between FBA and TBFA outcomes for all participating students. The current study differed from the work of Rispoli et al. in several ways. First, the current work took place in a long-term correctional school, not a traditional public school. Second, current participating students had diagnoses of emotional behavioral disorder as opposed to some form of developmental delay. Third, all students were adolescent males. Fourth, and
perhaps most notably, the restrictive correctional setting necessitated variations to the trial conditions to ensure safety of students and staff.

The theory behind trial-based functional analysis states behavior will be most frequent during the test segment of the trial condition that served as the function of the individual’s behavior. In an applied setting where trials are embedded in naturally occurring classroom activities, attention trials should ideally be carried out when no other demands are being placed on the student and the teacher is able to provide and withdraw attention, such as periods of down time or “free” time. Escape trials should be carried out during times when task demands are being placed on the student and the teacher has the ability to introduce or withdraw the demand (e.g., Bloom, Iwata, Fritz, Roscoe, & Carreau, 2011; Kodak, Fisher, Payden, & Dickes, 2013). The nature of the juvenile corrections setting and the need for safety necessitates that students have little, if any, down time in a class period; therefore, both the attention and escape trials in this study were carried out when students were expected to engage in individual seatwork and a potentially aversive task demand was continually present. This situation differs, for example, from the study conducted by Rispoli and colleagues (2012) when attention trials could be carried out during leisure activities and no aversive task demand was present and the potential effects are worth noting. Conducting attention trials during periods of independent seatwork presents the risk that behavior occurring during that condition might serve the function of escape from a task demand instead of simply gaining teacher attention. Additionally, teacher prompting during the test segment of escape trials might point to a function of gaining teacher attention as opposed to simply avoiding an aversive task. While the topography of trial segments and lack of a generic control condition is
inherent to TBFA methodology and the need to conduct trials during periods of independent seatwork is a necessary modification for the juvenile justice environment, it is important to consider the possible effects these variables have on accurate analysis of TBFA outcomes.

Results from Joe and Alex’s TBFA were relatively easy to determine from the graphed data. In contrast, results of Sammy’s TBFA were not immediately apparent and were worthy of a more detailed explanation. To match the functional hypothesis of escape derived from the FBA, Sammy should have exhibited more behavior during the test segment of the escape condition trials and should have shown increased rates of behavior during either segment of the attention condition when task demands were present. Visual analysis of the TBFA data, however, revealed Sammy exhibited equally moderate levels (50%) of challenging behavior during both the control and test segments of the attention condition trials and equally low rates of challenging behavior (20%) during both the control and test segments of the escape condition trials. At first glance, the outcome of Sammy’s TBFA appeared inconclusive, but closer inspection of the data indicated a probable function of escape from task demands. It is important to note that the level of sophistication required to interpret Sammy’s data was dependent on the researcher’s advanced knowledge of behavior assessment methods; it is unlikely a juvenile justice teacher with limited to no training in advanced behavior assessment techniques and analysis would have come to the same conclusion when looking at the data.

Results from the functional assessment of all three participating students answered this research question by confirming that the results of teacher-conducted trial-
based functional analyses did align with outcomes from researcher-conducted functional behavior assessments. This finding added to the TBFA literature base by providing a second demonstration of the correspondence of FBA and TBFA findings and by extending the application of the TBFA procedure beyond public, special, and residential school settings to the juvenile justice education environment, and beyond student with developmental delays to those with emotional behavioral disorders.

*Will hypotheses derived from trial-based functional analyses result in effective intervention in a juvenile justice setting?*

Previous research has demonstrated that interventions derived from TBFA findings were effective in dealing with the challenging behavior of study participants regardless of age, diagnosis, or placement (Bloom, Lambert, Dayton, & Samaha, 2013; Lambert, Bloom, & Irwin, 2012; Schmidt, Drasgow, Halle, Martin, & Bliss, 2014; Sigafoos & Meikle, 1996; Tucker, Sigafoos, & Bushnell, 1998). Outcomes of this phase of the current study were consistent with those findings.

Immediately following the completion of the TBFA phase of this study, baseline data collection began for all three participating students. Sudden placement changes prevented Alex and Sammy from participating in the intervention phase of this study; therefore, intervention data were collected for Joe only. Results from both the FBA and TBFA indicated that Joe engaged in challenging behavior to escape task demands, which allowed Teacher A and the researcher to determine an effective intervention.

Knowing the function of a student’s behavior, teachers are enabled to develop a function-based intervention, which has been shown to be effective in managing challenging behavior (e.g., Gage, Lewis, & Stichter, 2012; Lane, Kalberg, & Shepcaro,
Consequent stimuli are altered by function-based interventions, resulting in a greater likelihood of desired behavior by the student, rather than in challenging behavior. Examples of function-based interventions for escape from task demands included allowing the student a short break after completion of a predetermined number of problems on a worksheet or the choice of a problem to skip after the correct completion of an assigned problem. As stated earlier in this paper, these youth entered juvenile justice with very few credits, which necessitated they remain in the instructional environment and complete as much work as possible. Additionally, unstructured free time could pose a potential threat to safety in juvenile corrections environments and must be avoided in the school setting. As a result, the researcher met with Teacher A to determine a course of action that would address Joe’s need to escape an aversive task while remaining appropriate for the setting, which called for something other than a typical function-based approach.

Teacher A shared his belief that Joe was an intelligent youth and his aversion to the assignments was driven primarily by boredom. They decided the best approach was antecedent modification, which work by altering or removing environmental triggers to challenging behavior, thereby reducing the likelihood of its occurrence. Like function-based interventions that utilize consequence modifications, antecedent modifications have also shown to be effective in behavior management (e.g., Conroy & Stichter, 2003; Park & Scott, 2009; Stichter, Lewis, Johnson, & Trussell, 2004). In Joe’s case, the intervention consisted of providing Joe with project-based tasks as opposed to the typical
worksheet-based assignments routinely used in juvenile justice classrooms and met his need to escape an aversive task.

A withdrawal design (Gast, 2010) was used to evaluate the effectiveness of this intervention. During baseline conditions, Joe was given the worksheet assignments that came with the facility’s curriculum, which he was allowed to complete alone or with a peer. His average percent of intervals on-task during these conditions was low (22.6%). During interventions conditions, Joe was allowed to forgo the standard worksheet assignments when asked to complete a project-based task, which he was also allowed to complete alone or with a peer. His average percent of intervals on-task during these conditions increased dramatically (89.2%). Project-based assignments were introduced and withdrawn three times, and despite moderate levels of variability in the data, clear level changes between baseline and intervention phases demonstrated a functional relation between the dependent and independent variables.

Joe’s behavior was effectively managed while simultaneously meeting environmental specific needs of keeping him in the classroom engaged in academic activities and meeting his need to escape tasks he found unappealing. These results answered this research question by confirming that TBFA can produce an effective behavioral intervention, adding to findings from previous TBFA research. The current study extended previous research by utilizing an antecedent, as opposed to a consequent, environmental modification to control behavior.
To what degree do classroom teachers consider trial-based functional analysis socially valid and appropriate for the juvenile justice setting?

Participating teachers were asked to complete a short social validity survey at the completion of this study. A Likert-type scale was used to evaluate the level of agreement with 11 statements related to the study: two regarding the ease of learning and conducting the TBFA procedure, six regarding intervention effectiveness and the likelihood the intervention would be used again, and three regarding whether teachers would use the TBFA procedure again, if they would recommend it to other teachers, and if they believed it was relevant to the juvenile justice setting.

On the whole, teacher opinion of the TBFA procedure and resulting interventions were highly favorable. Both teachers agreed TBFA was easy to learn and conduct, evidenced by their ability to carry it out during normal classroom activities with 100% fidelity after only a short training. Both teachers also indicated their intent to use the procedure again, a finding consistent with previous research (Schmidt, Drasgow, Halle, Martin, & Bliss, 2014), and to recommend it to others. Despite the favorable reaction, there were two unexpected findings.

First, teachers were initially asked to conduct four 2-minute trials per day, which, in the best-case scenario, would have spanned five class days. In reality, due to events such as participating students in secure confinement, cancellation of school due to facility-wide behavior issues, or scheduled teacher workdays in which classes were not held, teachers took 11 days over a 4-week period to complete all trials. Given the length of time to gain results, it was expected that teachers would not wish to use TBFA in the future. Their willingness to do so might speak to the ability TBFA provided for teachers
to manage behavior in their classrooms, without the need for outside professionals who might disrupt an already volatile environment by serving as a novel audience for challenging behavior.

Second, and relatedly, both teachers felt TBFA was appropriate for use in the correctional environment. Again, the length of time to determine a functional hypothesis in this particular study led the researcher to expect the opposite reaction from teachers on this point. Again, teacher opinion on the utility of TBFA in juvenile justice settings might point to their recognition of 1) the ability of teachers to carry this procedure out in their own classrooms with no disruption from outsiders and 2) the accuracy of the findings as evidenced by the effectiveness of related intervention.

In conclusion, teacher responses to the social validity questionnaire answered this research question by confirming that participating teachers found the TBFA procedure easy to learn and implement, useful in producing effective behavior interventions, and an appropriate procedure for managing challenging behavior in the juvenile justice school environment; however, these results should be interpreted with caution since only two teachers took part in this study and could be easily identified, possibly influencing their rating responses to the statements.

**Limitations**

Although results from this study were promising, several limitations are worth noting. First, the nature of the correctional environment was restrictive, unpredictable, and transient. Rigid facility schedules limited time for teacher and data collector training. The year-round school schedule included several pre-planned breaks and teacher work days that contributed to the number of weeks it took to collect the TBFA, baseline, and
intervention data. Additionally, participating students were subject to secure confinement as well as unplanned facility-wide lock-downs for behavior infractions on both individual and group levels, which further slowed the data collection process by preventing school attendance and interrupting intervention implementation. Change of placement decisions happened quickly with little notice, as they did with Alex and Sammy, preventing them from participating in the intervention phase of this study. Lastly, safety and security concerns prevented the use of function-based interventions such as free time or decreased workload for Joe that might have produced even more definitive results.

Second, there are limitations related to the modifications necessary for the TBFA to be conducted in a juvenile justice setting. In a traditional analogue procedure, a generic control condition serves as a comparative measure against all other test conditions. In the TBFA variation of functional analysis, there is no comparative control; rather, variables are purposefully manipulated in the control segment of each trial to try and minimize the effects of confounding variables to the greatest extent possible in the natural environment. Due to safety and security concerns that are unique to the juvenile justice setting, all trial conditions had to be carried out during times when task demands were present; therefore, a true control segment in the attention trial condition was not possible. Relatedly, the need to frequently prompt student engagement during the test segment of the escape condition might have served the function of teacher attention for some students. These variables, while unavoidable, potentially confounded the data making the function of student behavior less immediately apparent through visual analysis. As a result, teachers were not confident in determining function based on the
TBFA data and required consultation from the researcher, who had advanced training in applied behavior analysis.

Third, though the researcher had been present in the environment for several weeks before data collection began, her presence might have influenced student behavior and potentially confounded the data. Fourth, teacher feedback on the social validity scale might have been influenced by the inability to protect anonymity, resulting in inflated reported perceptions of the ease of implementation of TBFA in the classroom, desire to implement the procedure in the future, or whether TBFA is appropriate in juvenile corrections settings.

Lastly, while three replications of an intervention sufficed to establish a functional relation between variables in a single-subject design, intervention data on only one youth limited the generalizability of the same intervention to all youth in juvenile justice classrooms.

**Implications for practice**

As stated earlier, juvenile justice schools often have lacked personnel with adequate training in special education, which would include those with training in functional assessment methodologies. This study demonstrated that juvenile justice classroom teachers with no formal training in special education, applied behavior analysis, or functional assessment were able to learn an experimentally rigorous functional analysis procedure in one brief training session and to implement that procedure with fidelity in their classrooms during normal daily activities. Additionally, results of this study demonstrated that outcomes from the trial-based functional analysis matched those of the functional behavior assessment. The small number of participants
limits the generalizability of the findings, yet they suggest TBFA is potentially an accurate and contextually relevant method of behavior assessment for juvenile justice settings.

Results of this study suggested that juvenile justice teachers had the capacity to learn and execute empirically rigorous methods of behavior assessment, executed them with fidelity, and provided themselves with the data necessary to develop effectual interventions for students with moderate levels of behavior, though facility personnel with advanced training in functional assessment might be valuable with particularly difficult cases.

**Implications for future research**

This study was the first examination of trial-based functional analysis in a juvenile justice setting. Due to the small number of participants, replication is warranted to substantiate the findings. Future research should replicate this work in other restrictive settings to include juvenile corrections classrooms, detention center classrooms, disciplinary alternative education placements, and separate classrooms for children with emotional or behavioral disorders. Within juvenile justice settings, researchers need to consider providing advanced training to facility special educators in the areas of functional behavior assessment, applied behavior analysis, and trial-based functional analysis. In taking a “train the trainer” approach, researchers could empower facility personnel in these very restricted settings to teach and sustain research-based practices of behavior management without the need to rely on outside experts.

Further study is also needed for the tact taken to curtail Joe’s challenging behavior. The function of Joe’s behavior was escape from aversive task demands.
Instead of reinforcing completion of those tasks with a break or free time that might pose a threat to safety in the environment, an antecedent modification was made in the form of differentiating instructional process and product by providing a project-based assignment. Investigating the effect of simply changing instructional delivery, process, and/or product to make lessons more relevant or interesting has on behavior in correctional classrooms would also be worth future examination. Lastly, future research might investigate the extension of TBFA in juvenile justice settings from the classroom to the dormitory setting. Although education staff are not present in the dorm areas of the juvenile corrections environment, researchers might consider evaluating if caseworkers, senior correctional staff, or mental health professionals could be taught to implement and to determine behavioral function for effective behavior management on the dorm.

**Conclusion**

Over two million American youth will have come into contact with the juvenile justice system this year with approximately 37,000 progressing to placement in long-term secure care facilities (Sickmund et al., 2015). Compulsory education laws remain in effect while youth are incarcerated and juvenile justice education might well be the last chance these youth have to earn a GED or high school diploma. As a result, juvenile justice classrooms need efficient and effective behavior assessment strategies that yield effective interventions to enable youth to remain in the academic environment and earn the credits necessary for high school graduation and to have an increased probability of employment after release. These assessment methods need to be efficient and contextually relevant in the very restrictive correctional classroom environment and need to be easily carried out by personnel already in the environment and not dependent on
outside experts. Despite the modifications necessary to implement in juvenile justice classrooms, results of this study suggest that one such procedure potentially exists.

Previous research has shown TBFA to be an experimentally rigorous method of functional assessment that has been carried out with fidelity by classroom teachers or caregivers of individuals with developmental or intellectual disabilities and has resulted in effective interventions for those individuals. The current study extended previous research by offering another demonstration of teacher-conducted trial-based functional analysis to a restrictive disciplinary setting with children with emotional behavioral disorders and the findings were promising, even taking necessary contextual modifications and their potentially confounding influence into account. First, functional hypotheses derived from each component of the functional behavior assessment (i.e., indirect measure and ABC direct observations) aligned for all participating youth, and final researcher-conducted FBA hypotheses showed direct correspondence with functional hypotheses derived from the teacher-conducted TBFA for all three participants. Second, data collected during the intervention phase for Joe showed the intervention developed from the TBFA was effective in reducing challenging behavior in the classroom evidenced by increasing rates of on-task behavior during interventions conditions. And third, feedback from participating teachers indicated the following: 1) the TBFA procedure was easy to learn and implement in the classroom, 2) Teacher A indicated the TBFA made a meaningful difference in his student’s classroom behavior and academic performance, 3) the participating teachers would use the procedure again in their classrooms and recommend the use of TBFA to other teachers, and 4) both
participating teachers indicated TBFA was appropriate for use in juvenile justice classrooms to help manage behavior.
Dear Teacher,

The Texas Juvenile Justice Department is participating in a research project in collaboration with the University of Missouri entitled “An Examination of Teacher-conducted Trial-based Functional Analysis in a Juvenile Justice Classroom”. The purpose of this study is to establish the most effective way for juvenile justice teachers to determine why challenging behavior occurs in the classroom and intervene accordingly. This form is to request your permission to participate in the research project.

As a teacher, your participation would involve three primary activities. First, we will ask you to provide information about student behavior as part of a functional behavior assessment (FBA) through the completion of a short questionnaire. Second, you will be asked to conduct a trial-based functional analysis (TBFA) during your regularly scheduled classroom activities for student participants in this study. The TBFA will require approximately 16 minutes a day for 5 days. Lastly, you will be asked to implement a behavioral intervention based on the findings of the TBFA that is tailored to student need. The total amount of time required for participation in this project will not exceed 8 weeks.

Clinical functional analysis is the “gold standard” in determining behavioral function. Trial-based functional analysis (TBFA) is an abbreviated version of this process, yet maintains its experimental rigor. During this project, potential functions of behavior (i.e. escape and attention) will be briefly and systematically examined during regular classroom activities using the TBFA procedure. Student behavior will be measured when teacher attention is both present (test condition) and absent (control condition), as well as when difficult tasks are both present and absent. Each test and control condition will last no longer than 2 minutes. Rates of student behavior will be compared between test and control conditions; the condition under which the most behavior occurs across the 5 days of data collection will indicate the function of behavior for that child. This information will then serve as the basis for an individualized behavior intervention aimed at reducing rates of challenging behavior and increasing academic engaged time in the classroom. In addition to assessing TBFA effectiveness on individual student performance, we will also be collecting archival data in the form of rates of behavior referrals. Specifically, we will look at the number of behavior referrals you wrote (e.g., average per month) prior to and after implementing the TBFA procedure in your classroom. This will give us insight regarding the effectiveness of TBFA on overall rates classroom behavior.

Teachers, not researchers, will be interacting with students during this project. Therefore, participating teachers will receive training, support, and on-going technical assistance by facility and University of Missouri research staff. The goal of this project is to provide you additional efficient and effective tools to manage challenging classroom behavior, keeping students in the classroom, and improving their academic performance.
Appendix A
Teacher Consent Form

Given the subject population (i.e., incarcerated youth), there is greater than minimal risk for participation in this study. Additionally, you might experience possible discomfort from having data collectors in your classroom and the short-term inconvenience of learning and implementing a new behavior assessment method. We do, however, anticipate the benefits of decreased challenging behavior in your classroom, increased instructional time, increases in academic achievement, and a newly acquired skill for assessing and effectively intervening in challenging behavior in the future.

Any data or answers to questions will remain confidential with regard to your identity. Any information collected through this project that personally identifies you will not be released or disclosed without your separate written consent. All data will be stored without identifying information. An identification numbering system will be used for all participants and only the research staff will have the list of names and identification numbers.

Your participation in this study is completely voluntary and you are free to withdraw at any time without jeopardizing your relationship with the Texas Juvenile Justice Department and your particular facility. Refusal to participate will involve no penalty or loss of benefit to which you are otherwise entitled.

It is not the policy of the University of Missouri to compensate human subjects in the event the research results in injury. The University of Missouri, in fulfilling its public responsibility, has provided medical, professional and general liability insurance coverage for any injury in the event such injury is caused by the negligence of the University of Missouri, its faculty and staff. The University of Missouri also provides, within the limitations of the laws of the State of Missouri, facilities and medical attention to subjects who suffer injuries while participating in the research projects of the University of Missouri. In the event you have suffered injury as the result of participation in this research program, you are to contact the Risk Management Officer, telephone number (573) 882-1181, at the Health Sciences Center, who can review the matter and provide further information. This statement is not to be construed as an admission of liability.

If you have any questions about this study and what is expected of you, you may contact Tichelle Bruntmyer, M.Ed., at 512-245-6006, or Tim Lewis, Ph.D., at 573-882-0561. You may report problems that may result from your participation in this study to the Campus Institutional Review Board, University of Missouri, 573-882-9585. All reports or correspondence will be kept confidential.

To confirm you have read and understand the above information, that you have received answers to any questions you may have asked, and to consent to participate in the study, please sign below. Please keep a copy of this letter and return the signed copy to the research staff.

__________________________
Date
__________________________
Signature of participating teacher
Appendix B

Teacher Demographic Form

Participating Teacher Demographic Information

Name: ______________________________________________________

Subject taught: ________________________________________________

Certification(s) held: Primary - ________________________________
       Secondary - _____________________________________________
       _______________________________________________________
       _______________________________________________________

How did you earn your teaching certification?  _University program (Ed.degree)
       _Alt. certification program
       _Other ______________________

In what setting are you currently teaching?  ____ Mart
       ____ MRTC
       ____ CSU
       ____ Phoenix Program
       ____ Other ______________________

How many years have you been teaching for TJJD?  _________________

Take a moment to think of students with whom you would want to use the
TBFA procedure. Please list these students in rank order from 1 (first choice;
most concerning) to 5 (least concerning).

1. _______________________________________________________

2. _______________________________________________________

3. _______________________________________________________

4. _______________________________________________________

5. _______________________________________________________

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August 1, 2015

Dear Guardian,

The Texas Juvenile Justice Department is participating in a research project entitled “An Examination of Teacher-conducted Trial-based Functional Analysis in a Juvenile Justice Classroom”. This research is in cooperation with the University of Missouri and focuses on positive classroom behavior supports for incarcerated students. The purpose of this study is to establish the most effective way for classroom teachers to determine why challenging behavior occurs in the classroom and intervene accordingly. This form is to request your permission for a youth in your facility to participate in the research project.

This project will begin with behavior assessments (specifically, the use of a trial-based functional analysis, or TBFA, procedure) that will allow teachers to determine how the classroom environment might be contributing to challenging behavior and develop interventions related to these findings that will prevent those behaviors in the future. Interventions will be developed for each participating student that will be matched to their specific needs and designed to keep them in the classroom and engaged in learning.

Clinical functional analysis is the “gold standard” in determining behavioral function. Trial-based functional analysis (TBFA) is an abbreviated version of this process, yet maintains its experimental rigor. During this project, potential functions of behavior (i.e. escape and attention) will be briefly and systematically examined during regular classroom activities using the TBFA procedure. Student behavior will be measured when teacher attention is both present (test condition) and absent (control condition), as well as when difficult tasks are both present and absent. Each test and control condition will last no longer than 2 minutes. Rates of student behavior will be compared between test and control conditions; the condition under which the most behavior occurs across the 5 days of data collection will indicate the function of behavior for that child. This information will then serve as the basis for an individualized behavior intervention aimed at reducing rates of challenging behavior and increasing academic engaged time in the classroom.

For all students involved in the study, the following information will be collected: 1) a review of student records to identify potential academic deficits, patterns in types and frequency of behavior, and the date and findings of the most recent functional behavior assessment; 2) observational data related to the youth’s challenging classroom behavior; and 3) observational data related to the efficacy of classroom behavior interventions. Teachers, not researchers, will be interacting with students during this project.

Given the population, there is greater than minimal risk for participation in this study. The possible risks associated with this study are a feeling of invasion of privacy on the part of the youth due to the information gathered, as well as potentially feeling uncomfortable about being observed in his classroom.
The possible benefits of participating in this study are improvements in classroom behavior, decreased behavior referrals, increases in academic engaged time, and improvements in academic performance.

Any data or answers to questions will remain confidential with regard to the youth’s identity. Any information collected through this project that personally identifies the youth will not be released or disclosed without your separate written consent, except as specifically required by law. All data will be stored without identifying information. An identification numbering system will be used and only the research staff will have the list of names and identification numbers.

Participation in this study is completely voluntary and youth are free to withdraw at any time without jeopardizing their relationship with the Texas Juvenile Justice Department and the particular facility. Refusal to participate will involve no penalty or loss of benefit to which youth are otherwise entitled.

It is not the policy of the University of Missouri to compensate human subjects in the event the research results in injury. The University of Missouri, in fulfilling its public responsibility, has provided medical, professional and general liability insurance coverage for any injury in the event such injury is caused by the negligence of the University of Missouri, its faculty and staff. The University of Missouri also provides, within the limitations of the laws of the State of Missouri, facilities and medical attention to subjects who suffer injuries while participating in the research projects of the University of Missouri. In the event you have suffered injury as the result of participation in this research program, you are to contact the Risk Management Officer, telephone number (573) 882-1181, at the Health Sciences Center, who can review the matter and provide further information. This statement is not to be construed as an admission of liability.

If you have any questions about this study and what is expected of you, you may contact Tichelle Bruntmyer, M.Ed., at 512-245-6006, or Tim Lewis, Ph.D., at 573-882-0561. You may report problems that may result from your participation in this study to the Campus Institutional Review Board, University of Missouri, 573-882-9585. All reports or correspondence will be kept confidential.

To confirm you have read and understand the above information, that you have received answers to any questions you may have asked, and to consent to allow your child to participate in the study, please sign below. Please keep a copy of this letter and return the signed copy to the research staff.

___________________________________________
Date                                    Signature of guardian

_______________________________________________________________
Name of youth for which consent is granted
August 1, 2015

Dear Student,

Your facility school is participating in a research project with the University of Missouri entitled “An Examination of Teacher-conducted Trial-based Functional Analysis in a Juvenile Justice Classroom”. The purpose of this study is to establish the most effective way for teachers to determine why challenging behavior occurs in the classroom and intervene accordingly. This form is to request your permission to participate as a subject in the research project. Your guardian has already given their permission to allow you to participate in this important study.

If you choose to participate in the study, your teachers will conduct assessments to determine why you might be having trouble in their classroom. As a result, they will implement interventions designed to make it easier for you to behave appropriately, get along better with staff and students, and do better in school. The possible risks of you participating in the study are a feeling of invasion of privacy because of some of the questions asked in the assessments, as well as maybe feeling uncomfortable while being observed in the classroom. However, research staff will do all they can to not let others know they are observing you. The possible benefits from participation in this study are improvements in behavior and academic performance. The entire study will last approximately 8 weeks.

Any data collected or answers to questions will remain confidential. All information you provide will be stored without your identifying information. An identification numbering system is being used to protect the identity of participants an only research staff will have the list of names and identification numbers.

Your decision to participate is completely voluntary. You are free to withdraw from this study at any time without jeopardizing your relationship with your facility. When completing the assessment, you may skip any questions you determine are uncomfortable to answer. Refusal to participate will involve no penalty or loss of benefit to which you are otherwise entitled.

If you have any questions about this study and what is expected of you, you may contact Tichelle Bruntryer, M.Ed., at 512-245-6006, or Tim Lewis, Ph.D., at 573-882-0561. You may report problems that may result from your participation in this study to the Campus Institutional Review Board, University of Missouri, 573-882-9585. All reports or correspondence will be kept confidential.

To confirm that you have read and understand the above information, that you have received answers to any questions you may have asked, and to consent to participate in the study, please sign below.

________________________________________  _______________________________________
Date                                               Signature of Student
Appendix E  Student Archival Data Form

Name_____________________________  Date______________________________

Age________  Grade_______

SPED dx______________________________________________________________

Date of last FBA_______________________  Date of last BIP____________________

**Academics:**

Math grade level _________________  Reading grade level ____________________

Notes:
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

**Behavior:**

Current interventions listed in BIP:
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Appendix F

Functional Assessment Checklist for Teachers and Staff (FACTS-Part A)

Student/ Grade: ___________________________ Date: ___________________________
Respondent Name: ___________________________ Relationship to student: __________________

Student Profile: Please identify at least three strengths or contributions the student brings to school.
___________________________________________________________________________________
___________________________________________________________________________________

Problem Behavior(s): Identify problem behaviors

<table>
<thead>
<tr>
<th>Problem Behavior</th>
<th>Likelihood of Problem Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tardy</td>
<td>Low: 1 2 3 4 5 6 High: 1 2 3 4 5 6</td>
</tr>
<tr>
<td>Fight/physical Aggression</td>
<td>Low: 1 2 3 4 5 6 High: 1 2 3 4 5 6</td>
</tr>
<tr>
<td>Disruptive</td>
<td>Low: 1 2 3 4 5 6 High: 1 2 3 4 5 6</td>
</tr>
<tr>
<td>Theft</td>
<td>Low: 1 2 3 4 5 6 High: 1 2 3 4 5 6</td>
</tr>
<tr>
<td>Unresponsive</td>
<td>Low: 1 2 3 4 5 6 High: 1 2 3 4 5 6</td>
</tr>
<tr>
<td>Inappropriate Language</td>
<td>Low: 1 2 3 4 5 6 High: 1 2 3 4 5 6</td>
</tr>
<tr>
<td>Insubordination</td>
<td>Low: 1 2 3 4 5 6 High: 1 2 3 4 5 6</td>
</tr>
<tr>
<td>Vandalism</td>
<td>Low: 1 2 3 4 5 6 High: 1 2 3 4 5 6</td>
</tr>
<tr>
<td>Verbal Harassment</td>
<td>Low: 1 2 3 4 5 6 High: 1 2 3 4 5 6</td>
</tr>
<tr>
<td>Work not done</td>
<td>Low: 1 2 3 4 5 6 High: 1 2 3 4 5 6</td>
</tr>
<tr>
<td>Self-injury</td>
<td>Low: 1 2 3 4 5 6 High: 1 2 3 4 5 6</td>
</tr>
<tr>
<td>Verbally Inappropriate</td>
<td>Low: 1 2 3 4 5 6 High: 1 2 3 4 5 6</td>
</tr>
<tr>
<td>Other</td>
<td>Low: 1 2 3 4 5 6 High: 1 2 3 4 5 6</td>
</tr>
</tbody>
</table>

Describe problem behavior: ___________________________________________________________

Identifying Routines: Where, When and With Whom Problem Behaviors are Most Likely.

Select 1-3 Routines for further assessment: Select routines based on (a) similarity of activities (conditions) with ratings of 4, 5 or 6 and (b) similarity of problem behavior(s). Complete the FACTS-Part B for each routine identified.

### Functional Assessment Checklist for Teachers & Staff (FACTS-Part B)

**Routine/Activities/Context:** Which routine(only one) from the FACTS-Part A is assessed?

<table>
<thead>
<tr>
<th>Routine/Activities/Context</th>
<th>Problem Behavior(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Provide more detail about the problem behavior(s):**

- What does the problem behavior(s) look like?
- How often does the problem behavior(s) occur?
- How long does the problem behavior(s) last when it does occur?
- What is the intensity/level of danger of the problem behavior(s)?

**What are the events that predict when the problem behavior(s) will occur? (Predictors)**

<table>
<thead>
<tr>
<th>Related Issues (setting events)</th>
<th>Environmental Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ illness</td>
<td>___ reprimand/correction</td>
</tr>
<tr>
<td>___ drug use</td>
<td>___ physical demands</td>
</tr>
<tr>
<td>___ negative social</td>
<td>___ socially isolated</td>
</tr>
<tr>
<td>___ conflict at home</td>
<td>___ with peers</td>
</tr>
<tr>
<td>___ academic failure</td>
<td>___ Other</td>
</tr>
<tr>
<td>___ reprimand/correction</td>
<td>___ structured activity</td>
</tr>
<tr>
<td>___ physical demands</td>
<td>___ unstructured time</td>
</tr>
<tr>
<td>___ socially isolated</td>
<td>___ tasks too boring</td>
</tr>
<tr>
<td>___ with peers</td>
<td>___ activity too long</td>
</tr>
<tr>
<td>___ Other</td>
<td>___ tasks too long</td>
</tr>
</tbody>
</table>

**What consequences appear most likely to maintain the problem behavior(s)?**

<table>
<thead>
<tr>
<th>Things that are Obtained</th>
<th>Things Avoided or Escaped From</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ adult attention</td>
<td>___ hard tasks</td>
</tr>
<tr>
<td>___ peer attention</td>
<td>___ reprimands</td>
</tr>
<tr>
<td>___ preferred activity</td>
<td>___ peer negatives</td>
</tr>
<tr>
<td>___ money/things</td>
<td>___ physical effort</td>
</tr>
<tr>
<td>___ with peers</td>
<td>___ adult attention</td>
</tr>
<tr>
<td>___ other</td>
<td>___ other</td>
</tr>
</tbody>
</table>

**SUMMARY OF BEHAVIOR**

Identify the summary that will be used to build a plan of behavior support.

<table>
<thead>
<tr>
<th>Setting Events &amp; Predictors</th>
<th>Problem Behavior(s)</th>
<th>Maintaining Consequence(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**How confident are you that the Summary of Behavior is accurate?**

- Not very confident
- Very Confident

**What current efforts have been used to control the problem behavior?**

<table>
<thead>
<tr>
<th>Strategies for preventing problem behavior</th>
<th>Strategies for responding to problem behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ schedule change</td>
<td>___ reprimand</td>
</tr>
<tr>
<td>___ seating change</td>
<td>___ office referral</td>
</tr>
<tr>
<td>___ curriculum change</td>
<td>___ detention</td>
</tr>
</tbody>
</table>

### A-B-C Data Collection Form

**Student** ________________________  **Observer** ______________________________

**Date** __________________________  **Setting** ________________________________

**Notes on setting**
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

<table>
<thead>
<tr>
<th>Time</th>
<th>Antecedent</th>
<th>Behavior</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Trial-based Functional Analysis:
Theory, Terminology, and Implementation
Guide
Table of Contents

1. Behavior Basics
2. Functional Behavior Assessment
3. Functional Analysis
4. Trial-based Functional Analysis
5. Potential Problems
6. Practice Activities
First things first...

**THANK YOU!**

Your participation in this project is GREATLY appreciated! More than anything, I want this project to be of value to you and your students. It’s important for you to know...

TBFA isn’t just one more thing to do or to add to your already cumbersome workload. TBFA has the potential to:

- Decrease inappropriate behavior in your classroom
- Decrease the amount of time you have to deal with behavior
- Increase the amount of time you have to teach

TBFA also has the potential to positively impact your students by:

- Identifying and removing the motivation to engage in inappropriate behavior in your classroom
- Reducing the number of behavior referrals
- Reducing the amount of time they are removed from the classroom
- Increasing academic engaged time
- Increasing academic performance
- Positively impacting post-release outcomes through gains in academic and social/behavioral skills
Objectives

The objectives of this training are to:

• Understand...
  o The basics of behavior
  o The types of behavior assessment
  o When and why we conduct trial-based functional analysis (TBFA)

• Learn...
  o How to conduct TBFA during regular classroom activities
  o Collect, graph, and analyze the data we collect
  o How to use the data to plan effective interventions

• Practice...
  o Conducting TBFA
  o Collecting, graphing, and interpreting data
Behavior Basics - The A-B-Cs

“All behavior is learned.”

• Think of one of your most challenging students...
  o What are some behaviors that child routinely engages in?
    • ________________________________
    • ________________________________
    • ________________________________
    • ________________________________
    • ________________________________

“Behavior that is reinforced is likely to be repeated.”

• People learn to engage in behavior when the consequences of that behavior are reinforcing to them.
• If this is true...
  o No matter the behavior or the consequence, if the student continues doing it they are being reinforced for engaging in the behavior.

“Consequences to behavior can be predictive and explanatory.”

• 2 types of consequences
  o reinforcement
  o punishment
• Ask yourself, “What is the common consequence to this student’s behavior?”
  o Points to why the behavior continues to occur
  o Is predictive
**Remember**: Behavior that is reinforced is likely to be repeated.

**What is reinforcement?**

- Reinforcement is any stimulus that maintains or increases the likelihood of behavior to occur again in the future.
  - What would you consider a reinforcer?
    - ________________________________________
    - ________________________________________
    - ________________________________________
    - ________________________________________
    - ________________________________________
    - ________________________________________

**IMPORTANT TO REMEMBER:**

- Reinforcers are specific to the individual and the setting, therefore there are no universal reinforcers.
- Food, verbal praise, free time, and computer time can be reinforcing to many students... but it can also be very punishing.
- Negative attention (e.g., public scolding), removal from the classroom, and solitary confinement can be very punishing to some students... but it can also be incredibly reinforcing.

- We can control behavior effectively when we have accurately determined what the child finds reinforcing about engaging in the behavior.
  - First, we need to determine the “function” of behavior.
  - We can then control behavior by manipulating the classroom environment in such a way that only appropriate behavior results in what the child finds reinforcing.
• So.... How do we determine what is reinforcing to your students?

**Functional Behavior Assessment**

Functional Behavior Assessment (or ‘FBA’) is a valuable tool and is frequently used in traditional school settings. It serves 3 main purposes:

1. To hypothesize the function (or purpose) of an undesired behavior
2. To use as a basis for developing interventions
3. To evaluate the effectiveness of an intervention

FBA typically involves the following:

- A review of student records
- Teacher and/or student checklists and rating scales
- Direct observation of student behavior

FBA is limited in that it can identify a *correlation* between behavior and the environment (hypothesis), but is not rigorous enough to identify a causal relationship (*function*). For that, we need a *functional analysis*. 
Functional Analysis

Functional analysis (FA) is the “gold standard” in determining the function of behavior.

Traditional FA consists of systematically manipulating the environment (antecedents and consequences) to empirically demonstrate behavioral function. FA does this by comparing student responses in:

<table>
<thead>
<tr>
<th>Test Conditions</th>
<th>versus</th>
<th>Control Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>(no reinforcement)</td>
<td></td>
<td>(reinforcement)</td>
</tr>
</tbody>
</table>

Before we move on, you might be thinking, “This sounds like a lot of work. Can establishing behavioral function really help me in the classroom?” In a word...

**YES!!**

If we know the function of a student’s behavior, we can,

1. Eliminate the motivation for engaging in problem behavior by no longer reinforcing it, therefore...
2. We can increase appropriate behaviors by ensuring the desired behavior becomes the only one that is reinforced (i.e., meets the child’s functional need)

Traditional functional analyses are rarely used in school settings, however, because they require quite a bit of time, resources, and clinical expertise.
However, there is an adaptation to this procedure that takes a fraction of the time, is just as rigorous, and can be conducted by you during regular classroom activities. It’s called “Trial-based Functional Analysis”.

**Trial-based Functional Analysis**

As we said earlier, traditional functional analysis is the gold standard in determining behavioral function. We also said it was somewhat cumbersome, but trial-based functional analysis (TBFA) is quite possibly the answer to determining function with the same rigor in a fraction of the time. Here is a side-by-side comparison of the two approaches:

<table>
<thead>
<tr>
<th></th>
<th>Standard FA</th>
<th>TBFA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Format</strong></td>
<td>Sessions</td>
<td>Trials</td>
</tr>
<tr>
<td><strong>Conditions</strong></td>
<td>Multiple (and separate) test and control</td>
<td>Test and control together for each type</td>
</tr>
<tr>
<td><strong>Measures</strong></td>
<td>Rate (response per minute), % of intervals, etc.</td>
<td>% of trial segments (test v. control per trial type)</td>
</tr>
<tr>
<td><strong>Structure</strong></td>
<td>Sessions conducted in successive blocks</td>
<td>Isolated trials embedded in regular classroom activities</td>
</tr>
<tr>
<td><strong>Setting</strong></td>
<td>Controlled environment (clinical setting)</td>
<td>Naturalistic environment (regular classroom)</td>
</tr>
</tbody>
</table>

Here are some frequently asked questions:

1. Does TBFA work?  
   **YES!**

2. Can TBFA be conducted by regular classroom teachers?  
   **YES!**

3. Are the interventions based on TBFA findings effective?  
   **YES!**
So how does TBFA work?

The materials required for TBFA are rather simple:

- Timer
- Data collection sheet
- Pencil

Each TBFA trial is a maximum of 4-minutes in length and consists of a 2-minute test segment and a 2-minute control segment.

During the test segment, reinforcement is withheld from the student until they perform the behavior you have targeted for change. Once the target behavior is performed by the student, you will briefly reinforce the behavior. If the behavior occurs at any time during this 2-minute period, the test segment will end with your reinforcement of the behavior.

During the control segment, the student will have access to reinforcement for the entire 2-minute segment.

At the end of each segment, you will simply indicate whether the target behavior occurred or not on the data collection sheet. At the end of data collection, the information on the data sheet will be compiled, graphed, and analyzed to determine the function of your student’s behavior.

It’s that easy!
How will this look in my classroom?

For this project, we will be testing 2 functional conditions:

- attention
- escape

You will conduct 10 trials of each condition over a 5-day period (2 of each type per day). Below is a chart that summarizes how each trial will look:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Control segment</th>
<th>Test segment</th>
<th>Consequence for target behavior in test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attention</td>
<td>Continual teacher attention is provided to the student for the duration of this segment</td>
<td>Teacher remains in close proximity to the student but withholds attention until the problem behavior occurs</td>
<td>Deliver attention (15 s)</td>
</tr>
<tr>
<td>Escape</td>
<td>Teacher withholds attention, task demands, and preferred materials for the duration of this segment</td>
<td>Teacher presents task to student, issues instruction, and provides verbal prompts every 10 seconds if student is unengaged</td>
<td>Remove materials and give break from work (30 s)</td>
</tr>
</tbody>
</table>

Now... let’s talk specifics.
How-to: Attention Trials

The hypothesis: Some students engage in challenging behavior to gain attention from teachers and/or peers.

Attention trials will take place during classroom activities in which you could give attention to the student (e.g., one-on-one tutoring, independent seatwork). The steps are as follows:

Control segment:
1. Begin the control segment by starting the timer.
2. For the next two minutes, give continual attention to the student.
3. At the end of the two-minute segment, the timer will vibrate. Record if the student performed the target behavior (+) or not (−) on the data sheet.

Test segment:
1. Begin the test segment when the timer vibrates to indicate the end of the control segment.
2. For the next two minutes, remain in close proximity to the student but do not give him your attention.
3. IF the student performs the target behavior, end the segment by immediately delivering attention for 15 seconds and return to your previous activity.
4. When the target behavior occurs, record it on the data collection sheet (+). If it does not occur during the segment, record that as well (−).
How-to: Escape Trials

The hypothesis: Some students engage in challenging behavior to escape an aversive situation or individual. Have you ever thought all a student wanted was control? ‘Control’ is a form of escape.

Escape trials will take place during classroom activities in which the student is presented with a work task (e.g., independent seatwork, task routines, small group, one-on-one activities). The steps will go as follows:

Control segment:

1. Begin the control segment by starting the timer.
2. For the next two minutes, withhold attention, task demands, and preferred materials.
3. At the end of the two-minute segment, the timer will vibrate. Record if the student performed the target behavior (+) or not (-) on the data sheet.

Test segment:

1. This segment begins when the timer vibrates to indicate the end of the control segment.
2. For the next two minutes, present task demand to student, issue any needed instructions, provide verbal prompts every 10 seconds if student is not engaged.
3. IF the student performs the target behavior, end the segment by immediately removing the task demand and giving the student a 30-minute break.
4. When the target behavior occurs, record it on the data collection sheet (+). If it does not occur during the segment, record that as well (-) at the end of the 2 minutes.

Data Graphing and Analysis

After you have collected data on 10 attention and 10 control trials, all you need to do is a simple percentage calculation and represent those calculations in bar graph form. Once graphed, you will be able to tell in an instant what the function is of your student’s behavior.

Below is an example of a completed data collection sheet:

<table>
<thead>
<tr>
<th>Date</th>
<th>Control</th>
<th>Test</th>
<th>Date</th>
<th>Control</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/11</td>
<td>-</td>
<td>+</td>
<td>5/11</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5/12</td>
<td>+</td>
<td>+</td>
<td>5/12</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>5/13</td>
<td>-</td>
<td>+</td>
<td>5/13</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5/14</td>
<td>+</td>
<td>+</td>
<td>5/14</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>5/15</td>
<td>-</td>
<td>+</td>
<td>5/15</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Attention: 3/10  Escape: 2/10
Behavior during control: 3/10  Behavior during test: 10/10
The next step is to graph this information. Below is an example of a completed graph:

<table>
<thead>
<tr>
<th>Percentage of segments with behavior</th>
<th>Control</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attention</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Escape</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

So, what does this mean?

*If a student wants attention,* we will see higher rates of behavior during the test segment of the attention condition. This is because he will only gain your attention when he performs the target behavior.

*If a student wants to avoid something,* we will see higher rates of behavior during the test segment of the escape condition. This is because he will only avoid an aversive task when he performs the target behavior.

Looking at the graph above, what is the function of this student’s behavior – attention or escape?
Role Play – Conducting TBFA

1. Decide who will be the “teacher” first.

2. Teacher:
   • Decide which trial you’d like to start with (attention or escape)
   • When you’re ready, start your timer and conduct the first trial.
   • Go through each step as we talked about.
   • Talk about what worked and what didn’t. Try it again! 😊

3. Students:
   • Think of your own students and decide how you will attempt to gain
     the teacher’s attention, or escape work or the classroom.
   • Have fun! (but not too much... be nice!)

4. Take turns practicing each condition at least twice.

5. What do you need clarification on?
Looking at the example below, calculate in how many test and control trials the target behavior occurred for each trial condition.

<table>
<thead>
<tr>
<th>Attention Trials</th>
<th>Escape Trials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Control</td>
</tr>
<tr>
<td>9/1</td>
<td>+</td>
</tr>
<tr>
<td>9/1</td>
<td>-</td>
</tr>
<tr>
<td>9/2</td>
<td>+</td>
</tr>
<tr>
<td>9/2</td>
<td>+</td>
</tr>
<tr>
<td>9/3</td>
<td>+</td>
</tr>
<tr>
<td>9/3</td>
<td>+</td>
</tr>
<tr>
<td>9/4</td>
<td>+</td>
</tr>
<tr>
<td>9/4</td>
<td>-</td>
</tr>
<tr>
<td>9/5</td>
<td>-</td>
</tr>
<tr>
<td>9/5</td>
<td>+</td>
</tr>
</tbody>
</table>

Attention:
Behavior during control: ____ / 10
Behavior during test: ____ / 10

Escape:
Behavior during control: ____ / 10
Behavior during test: ____ / 10
Data Graphing & Analysis

A final word... Potential Problems

1. **Students notice what you’re doing**
   This will most certainly happen, but they likely won’t care; because you are their regular teacher, they are very unlikely to behave any differently even though you are doing something new.

2. **One condition turns into another and/or “life happens”**
   Don’t worry! Simply make note of this on the data sheet (“failed trial”) and try again later.
Appendix I

TBFA Fidelity Checklist

Teacher ___________________________ Observer ___________________________

**We are observing teacher behavior only to see if they are performing each step of the TBFA procedure.

**Procedure Reminder:**

**Attention control** = attend to and/or in close proximity for 1 minute

**Attention test** = no attention and/or not in close proximity for 1 minute or until target behavior occurs

**Escape control** = no demands placed on student for 1 minute

**Escape test** = task or demand given with reminders to work every few seconds; task removed for 30 seconds upon occurrence of target behavior

Indicate whether you observed each of the following steps take place (e.g., checkmark in the box).

<table>
<thead>
<tr>
<th>CONTROL:</th>
<th>Date:</th>
<th>Date:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start timer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continual attn. or no task demand</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Record on data sheet</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST:</th>
<th>Date:</th>
<th>Date:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>No attn. or present task</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attend or remove task if bx occurs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Record on data sheet</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Student: ____________________  Teacher/Class Period: ________________

Target behavior: ____________________________________________________________

Procedure Reminder:
- **Attention control** = attend to and/or in close proximity for 1 minute
- **Attention test** = no attention and/or not in close proximity for 1 minute or until target behavior occurs
- **Escape control** = no demands placed on student for 1 minute
- **Escape test** = task or demand given with reminders to work every few seconds; task removed for 30 seconds upon occurrence of target behavior

**Coding:** “+” if behavior occurs; “-” if behavior does not occur

<table>
<thead>
<tr>
<th>Attention Trials</th>
<th>Escape Trials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Control</td>
</tr>
</tbody>
</table>

Attention:
- Behavior during control: ____ / 10
- Behavior during test: ____ / 10

Escape:
- Behavior during control: ____ / 10
- Behavior during test: ____ / 10
FUNCTION-BASED INTERVENTION PLAN

Student: ____________________ Teacher/Period: ____________________
Function: ___ Attention  ___ Escape
Target behavior: ______________________________________________________
Replacement behavior: ________________________________________________

PART 1: Determining an Intervention Method

PART 2: Formulating the Plan

<table>
<thead>
<tr>
<th>Component</th>
<th>Resulting Intervention Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ M1: Teach a behavior</td>
<td></td>
</tr>
<tr>
<td>___ M2: Environmental change</td>
<td></td>
</tr>
<tr>
<td>___ M3: Adjust contingency</td>
<td></td>
</tr>
<tr>
<td>Function-based reinforcement</td>
<td>Reinforcement: ______________________________</td>
</tr>
<tr>
<td></td>
<td>Criteria for earning:</td>
</tr>
<tr>
<td>Plan to withhold reinforcement for target behavior</td>
<td></td>
</tr>
</tbody>
</table>

(Adapted from Umbreit, Ferro, Liaupsin, & Lane, 2007)
**Appendix L**

**Intervention Data Collection Form**

**Student:** ____________________________  **Date:** __________________________

**Teacher/Period:** ____________________________  **Observer:** __________________________

**Behavior definition:**

**On-task:** working on assigned work, oriented toward teacher during lecture, engaging in on-topic class discussion, sitting quietly & not disturbing others during ‘down time’ (e.g., T or JCO grading paper, waiting for materials to be passed out, waiting for restroom break, etc.)

**Instructions:**
mark a “+” in the box if the student was on-task during the entire interval
mark a “-” in the box if the student was not on-task during the entire interval

<table>
<thead>
<tr>
<th>Minute</th>
<th>Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

% on-task: __________%  IOA: ______
Thank you for taking part in the Trial-based Functional Analysis research project. Please take a few minutes to complete this survey. Your answers are important and you will not be identified by name in any reports that result from this study.

For each item, please circle the number that most closely represents your opinion about various aspects of your involvement in this project.

<table>
<thead>
<tr>
<th>Item</th>
<th>Not Applicable</th>
<th>Strongly Disagree</th>
<th>Neutral</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedures for conducting the TBFA were easy to learn.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Procedures for conducting the TBFA were easy to perform in the classroom.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>The intervention decreased my student’s challenging behavior.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>The intervention increased my student’s appropriate behavior.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>The intervention was easy to implement in my classroom.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>The intervention made a meaningful difference in my student’s classroom behavior.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>The intervention made a meaningful difference in my student’s academic performance.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I will use the intervention again with the same or other students.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I will use the TBFA again with my students.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I would recommend the TBFA to other teachers.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I believe the TBFA can be useful in juvenile justice schools to help with behavior management in the classroom.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
References


to identify interventions based on functional behavior assessment. *Journal of Emotional and Behavioral Disorders, 23*, 78-89.


Gagnon, J., & Barber, B. (2010). Characteristics of and services provided to youth in
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Malmgren, K., & Meisel, S. (2002). Characteristics and service trajectories of youth with


VITA

Tichelle Bruntmyer was born October 18, 1970, in Fort Worth, Texas. She attended public school in Arlington, Texas, and has since earned the following degrees: B.A. in Psychology from Thomas Edison State University, Trenton, New Jersey (2009); M.Ed. in Special Education with concentrations in Learning Disability/Inclusion and Behavioral Disorders/Positive Behavior Supports from Texas State University, San Marcos, Texas (2011); and a Ph.D. in Special Education with an emphasis in Emotional Behavioral Disorders from the University of Missouri-Columbia (2016).

Dr. Bruntmyer resides in New Braunfels, Texas, with her husband and is currently special education faculty in the Department of Curriculum and Instruction at Texas State University.