

A Comparison of Functional Behavioral Assessment and Functional Analysis Methodology among Students with Mild Disabilities

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ABSTRACT: Functional behavioral assessment (FBA) and functional analyses (FA) are grounded in the applied behavior analysis principle that posits problem behavior is functionally related to the environment in which it occurs and is maintained by either providing access to reinforcing outcomes or allowing the individual to avoid or escape that which they find aversive. Previous research has pointed to the limitations across FBA methodologies in comparison to the direct experimental trials used in FA. The purpose of this study was to evaluate the degree to which hypotheses generated by common FBA strategies (i.e., interview, rating scale, and direct observation) match hypotheses generated through FA trials. Results of a multiphase descriptive study indicated that traditional school personnel with behavioral expertise were able to generate FBA hypotheses that were later confirmed by independent review and largely aligned with FA outcomes. The impact of the findings for the field and implications for future research and practice are discussed.

■ In their seminal article, Baer, Wolf, and Risley (1968) outlined the interconnectedness and functional relationships between an individual's behavior and environmental events that precede and follow. However, at that time, behavioral interventions for significant challenging behavior largely remained focused on the "form" of the problem behavior and intervention strategies consisted of reinforcing appropriate behavior and punishing inappropriate behavior. In the late 1970s and early 1980s, researchers began to shift their focus from the form of problem behavior to the "function" the problem behavior served for the individual (Carr, 1977; Carr & Durand, 1985; Iwata, Dorsey, Slifer, Bauman, & Richman, 1982). Early research demonstrated that by (a) identifying what occasions and/or what maintains problem behavior (i.e., the function of the problem behavior) and then teaching an appropriate replacement behavior that more efficiently accesses the same or similar outcomes as the problem behavior and (b) altering the environment to withhold reinforcement that was maintaining the problem behavior, problem behavior can be significantly reduced (Carr & Durand, 1985). Three possible functions of problem behavior have been empirically validated: (a) access external reinforcing stimuli, (b) avoid aversive stimuli, and (c) access automatic or

sensory reinforcing stimuli (Conroy & Stichter, 2003). Throughout the 1980s and early into the 1990s, the majority of research on functional behavioral assessment (FBA), functional analysis (FA), and functional communication training was conducted within clinical settings with young adults with significant disabilities (Blakeslee, Sugai, & Gruba, 1994; Nelson, Roberts, Mathur, & Rutherford, 1999).

As the evidence base supporting FBA/FA to determine function-based interventions grew within the literature on low-incidence disabilities, research on FBA/FA extended to school, home, and other settings (Lalli, Browder, Mace, & Brown, 1993; Northup et al., 1995), as well as to students with and at risk for high-incidence disabilities (Kamps et al., 1995; Kern, Childs, Dunlap, Clarke, & Falk, 1994; Lewis & Sugai, 1996a, 1996b; Umbreit, 1995) in the early 1990s. The reauthorization of the Individuals with Disabilities Education Act (IDEA) in 1997, which included regulatory language mandating an FBA be conducted to develop a behavior intervention plan (BIP) if a child with a disability is suspended from school beyond 10 days, brought forth a rapid increase in research within school settings among students with mild disabilities (Dunlap et al., 2006; Fox & Davis, 2005; Scott & Kamps, 2007). Shortly after the 1997 IDEA regulations,

the literature base supporting FA to guide intervention development within clinical settings was fairly robust; however, several within the field of emotional and behavioral disorders were quick to point out that the knowledge base at that time was not mature enough to provide a clear consensus on essential elements of applied FBAs within school settings (Nelson et al., 1999; Sasso, Conroy, Stichter, & Fox, 2001).

Over the past 20 years, a plethora of FBA/FA research conducted within educational settings using a range of assessment strategies, targeting a range of problem behaviors, and including students with varying disabilities has emerged (Gage, Lewis, & Stichter, 2012; Solnick & Ardoin, 2010; Wood, Blair, & Ferro, 2009). Equally important, research has shown that interventions guided by FBA/FA are more efficacious in reducing problem behavior in comparison with non-function-based strategies (Gage et al., 2012; Ingram, Lewis-Palmer, & Sugai, 2005; Liaupsin, Umbreit, Ferro, Urso, & Upreti, 2006; Newcomer & Lewis, 2004; Park & Scott, 2009; Payne, Scott, & Conroy, 2007; Stichter, Lewis, Johnson, & Trussell, 2004).

Although the evidence supporting the use of FBA/FA to guide interventions for students with mild disabilities and those at risk continues to grow, the field has not reached consensus on the minimal features of an FBA/FA and the requisite skill sets school personnel need to competently complete an FBA/FA within school settings (Scott & Kamps, 2007). Functional analyses typically involve the direct manipulation of antecedent and consequent variables paired with the direct measurement of student behavior (Neef & Peterson, 2007). Because FA involves the direct experimental manipulation of variables under controlled trial conditions, it is typically viewed as essential to empirically identify functional relationships but less feasible within typical educational settings (Gage et al., 2012). The limited feasibility of FA within schools is related to (a) the lack of personnel with expertise to design and implement trials, (b) the time involved in conducting multiple trial configurations, and (c) the need for sophisticated direct observation data collection across trials.

Functional behavior assessments are more commonly conducted in school settings and typically include both indirect measures—such as interviews, rating scales, and archival reviews—and direct observations through descriptive summaries of behavioral patterns (Borgmeier, Loman, Hara, & Rodriguez, 2015;

Scott & Kamps, 2007). Because environmental events are not directly manipulated as part of the assessment, FBAs rely on personnel with expertise in applied behavior analysis to review multiple measures to draw summary hypotheses about what is occasioning and maintaining problem behavior (Borgmeier et al., 2015). Unfortunately, reviews of FBAs and BIPs conducted by school personnel within the decade following the 1997 IDEA regulations showed a lack of fluency with the process. For example, Blood and Neel (2007) in a review of FBAs and BIPs found little correspondence between the two. Scott and colleagues (2004) found less than a quarter of behavior plans were guided by the FBA. Similarly, Barton-Atwood, Wehby, Gunter, and Lane (2003) found that common rating scales used in FBAs had inconsistencies across educators' ratings.

Recent work on establishing the essential features of efficacious FBAs shows strong promise (Gage et al., 2012; Lane, Kalberg, & Shepcaro, 2009). For example, Scott and colleagues (2004) demonstrated that, through a school-based team process that examined multiple data sources and included school personnel with behavioral expertise, educators were able to accurately identify functional relationships between problem behavior and environmental events (Scott et al., 2004; Payne et al., 2007). Lane, Weisenbach, Phillips, and Wehby (2007) further expanded on the teaming approach advocated by Scott and colleagues (2004) and created a problem-solving rubric to assist educators in determining the function of problem behavior with minimal assistance. Focusing on the essential skills needed to interpret typical FBA measures, Borgmeier et al. (2015) demonstrated that with minimal targeted professional development, the majority of educators participating in their study were able to identify the same function of problem behavior as experts. Other research has demonstrated that teachers (e.g., Kamps, Wendland, & Culpepper, 2006) and school support personnel such as paraprofessionals (e.g., Bessette & Wills, 2007) can accurately complete FBAs with appropriate supports and guidance.

In one of the few studies to directly compare FBA and FA methodologies within educational settings among students with mild disabilities, Cunningham and O'Neil (2007) examined the degree to which traditional indirect FBA hypotheses were confirmed through direct FA manipulations. Using two rating

scales, student interviews, and classroom observations, school personnel (e.g., classroom teachers, school psychologists) developed independent hypotheses regarding the function of student behavior, along with summaries across measures, for 20 students with emotional/behavioral disorders. The FBA results were then compared with brief FA trials conducted by researchers using Northrup and colleagues' (1991) FA trial conditions and procedures. Results indicated some agreement among the FBA measures but little convergence with the FA trials.

In a similar study, Alter, Conroy, Mancil, and Haydon (2008) examined the alignment of resulting hypotheses between two rating scales, the Functional Analysis Interview (O'Neill et al., 1997) and the Motivation Assessment Scale (Durand & Crimmins, 1992), direct observations using an Antecedent-Behavior-Consequence (ABC) format, and FA trials among four young children at risk for emotional/behavioral disorders. They reported little convergence between the rating scale hypotheses and the ABC observation or FA hypotheses but complete agreement between the ABC observations and the FA hypotheses.

In the 18 years since the IDEA mandate advocating, and in some instances requiring, an FBA to guide intervention development, a substantial amount of progress has been made. Significant effects on improved outcomes have been documented across studies for students with mild disabilities in educational settings (Gage et al., 2012). Building on the logic of multidisciplinary teams found within special education, research has demonstrated that educators can, with sufficient technical assistance and professional development, accurately identify the function of problem behavior (Borgmeier et al., 2015; Lane et al., 2007; Payne et al., 2007). And yet, when compared with the gold standard of FA, FBA outcomes, especially using indirect methods, remain inconsistent in hypothesis development (Alter et al., 2008; Cunningham & O'Neill, 2007). The purpose of this study was to ascertain the degree to which the current FBA technology aligns with FA trials using school personnel with behavioral expertise. Specifically, the study was designed to answer the following research questions:

1. To what degree do FBA hypotheses generated by school personnel with behavioral expertise align with FA generated hypotheses?
2. To what degree do FBA methods (i.e., rating scale, interview, and ABC observations) triangulate to identify function of problem behavior?
3. If disagreements in hypothesized functions generated from FBA measures and FA are found, are there specific functions or contexts that are common across the agreements and/or disagreements?

Method

Overview

This descriptive study was conducted through four phases. Phase 1 consisted of teacher student nominations and direct observations to confirm the presence of low-intensity, high-frequency disruptive problem behavior (e.g., minor disruptions during work time, out of seat, distracting other students). Phase 2 was the completion of an FBA, which included a rating scale, a guided teacher interview, and direct observations within settings noted as problematic, for each participant. Hypotheses regarding the function of problem behavior were developed from each measure as well as a summary hypothesis across all FBA measures. In Phase 3, direct manipulations of four structural variables occurred through brief analog FA (Northrup et al., 1991). In Phase 4, independent hypotheses were developed for the FA trials based on visual analysis of the graphed data.

Participants

Students. Six students with mild disabilities who demonstrated low-intensity, high-frequency problem behaviors participated in the study. All of the participants spent the majority of their school day in pull-out special education classrooms: two classrooms at an elementary school and one classroom at a middle school. The schools were selected by the school district based on the large number of challenging students served within the two buildings. Participants were included in the study based on teacher referral and preliminary observations in the classroom confirming high rates of problem behavior. "George" was a 15-year-old White boy in eighth grade with an IDEA diagnosis of autism. George displayed a range of behavioral concerns including negative responses to correction from adults, verbally threatening peers, failure to start work when prompted, and fixating on off-topic points during instruction. "Zeke" was a 12-year-old African American

boy in the sixth grade identified with traumatic brain injury. Behavioral concerns for Zeke included making disrespectful comments to adults and peers, drawing during work time, not coming to class with materials, and verbally threatening peers. “Malcolm” was a 9-year-old African American boy in the third grade with an identification of emotional/behavioral disorder. Behavioral concerns for Malcolm included yelling during class, throwing objects, rolling on the floor, wandering the classroom during instruction time, and making rude comments to other students. “Irene” was a 10-year-old White girl in the fourth grade identified with a learning disability in reading, written expression, and math. Noted behavioral concerns including whining, refusal to work, and loud disruptions during class time. “Terrance” was a 10-year-old African American boy in the fourth grade with an educational identification of language impairment and sound system disorder. Behavioral concerns for Terrance included making loud noises during class, interrupting others, refusal to work when given tasks, and physical aggression directed toward peers. “James” was a 9-year-old African American boy in the third grade with an educational identification of language impairment and sound system disorder. Behavioral concerns for James included shouting out during instruction, refusing to work when given a difficult task, and disrupting other students while they were working.

FBA specialists. Three FBA specialists with a minimum of 5 years of special education-related experience conducted the FBAs within the school settings. The first was a school psychologist, the second was a former special education teacher, and the third was a former special education teacher and consultant. All had completed FBAs within their professional roles, and all indicated they had received the training through an advanced behavior management course typically found in a master’s degree program. All were enrolled in a doctoral program in special education. At the time of the study, they had not received additional coursework or training specific to FBA/FA.

Setting

Both schools were located in one suburban school district that serves approximately 17,000 students. The elementary school enrolled 407 students in Grades K–5, who

were 56% White and 23% African American, with 61% of students receiving free or reduced lunch. The middle school enrolled 587 students, who were 52% White and 35% African American, with 60% of students receiving free or reduced lunch. The district served approximately 13% of students on individualized education plans (IEPs). The FBA direct observations occurred across school settings in both general and special education classrooms based on teacher report of problematic times, activities, and settings. The FA trials were all conducted in participants’ special education classrooms during periods when other students were not present or in an isolated section of the classroom when other students were present.

Functional Behavioral Assessment

Functional Assessment Interview. The Functional Assessment Interview (FAI; O’Neill et al., 1997) is an interview for parents, teachers, or other caregivers. We used only the teacher version within the present study. The interview includes 11 sections soliciting information about problem behaviors, setting events, antecedents, consequences, efficiency of the problem behaviors, communication skills, previous interventions, and identification of replacement behaviors and possible reinforcers. The culmination of the interview is the development of a summary statement, or hypothesis, about the function of the student’s behavior. The FAI interviews were conducted in a one-on-one setting with one of the FBA specialists and the participant’s special education teacher. If the teacher case managed more than one of the included participants, FBAs were conducted one after another in order to conserve teacher time.

Problem Behavior Questionnaire. The Problem Behavior Questionnaire (PBQ; Lewis, Scott, & Sugai, 1994) is a 15-item rating scale in which teachers rate the frequency with which an event is likely to occur on a scale from 0 (*never*) to 3 (*25% of time*) to 6 (*always*) used to identify the function of a problem behavior. Examples of items (with construct being assessed by the item) include the following:

- When the problem behavior occurs, do peers verbally respond or laugh? (access to peer attention)
- If the student engages in problem behavior, do you provide one-on-one instruction to get student back on task? (access to teacher attention)

- Does the problem behavior stop when peers stop interacting with the student? (escape peer attention)
- Does the problem behavior occur during specific academic activities? (escape teacher attention)
- Is the problem behavior more likely to occur following unscheduled events or disruptions in class routines? (setting events)

We gave teachers the PBQ to complete independently for each participant. Teachers were given time before and after filling out the form to ask clarifying questions.

Structured direct observation. We recorded descriptive analyses of problem behaviors using an ABC format (Neef & Peterson, 2007). The FBA specialists conducted observations during instructional activities in both general and special education settings, depending on individual student schedules and noted times of problematic behaviors. Observers wrote a narrative of events prior to (antecedents) and immediately following (consequences) instances of problem behaviors. Repeated patterns of behavior occurring reliably in the presence of specific antecedents and/or consequences were noted leading to hypotheses about function of behavior.

Direct observations were conducted in at least three different settings, including structured (i.e., content area classrooms) and less structured (i.e., electives) environments. Observations were conducted in general education and/or special education classrooms, depending on where high rates of problem behavior typically occurred, as indicated by the participant's teacher. Observations were conducted throughout targeted tasks or class periods averaging 30 to 45 min per observation. No additional training or instructions were given to the FBA specialists during this phase of the study.

Functional Analysis Procedures

Brief analog conditions (10 min) were developed and randomly ordered to assess function by manipulating structural variables that have been documented to occasion and/or maintain appropriate and inappropriate behavior (Conroy & Stichter, 2003; Lewis & Sugai, 1996b; Northrup et al., 1995). Six variables were combined to produce eight independent trials in which students experienced all possible combinations: (a) teacher attention, (b) no teacher attention, (c) peer attention, (d) no peer attention, (e) hard tasks, and (f) easy

tasks. The baseline condition consisted of the participant engaging in a "free time" activity of their choice with no task demands or teacher attention.

During teacher attention conditions, teachers wore timers that buzzed on a fixed 1-min interval schedule. Teachers gave specific performance feedback based on student behavior (e.g., "great job working," "keep trying"). During no teacher attention conditions, teachers were instructed to ignore all student behavior, unless problem behavior began to escalate and safety was an issue. Peer attention conditions consisted of the classroom teachers selecting two to three peers to be present within the trial who were highly likely to attend to off-task behavior displayed by the subject. Peers were not given any additional instructions with respect to the target student (Lewis & Sugai, 1996a, 1996b). No peer attention conditions consisted of the classroom teachers selecting two to three peers who were highly likely to ignore off-task behavior. Peers during the no peer attention condition were prompted prior to the trial to work quietly and ignore any disruptions (Lewis & Sugai, 1996a, 1996b). Hard tasks consisted of independent assignments selected by the teacher that the student, with assistance, was unlikely to complete with 50% or better accuracy. Easy tasks consisted of independent assignments selected by the teacher that the student without assistance was likely to complete with 80% or better accuracy. Tasks across all subjects consisted of independent reading or math and writing worksheets. The combination of the three variable pairs produced the following eight combinations: (a) hard task, teacher attention, peer attention; (b) easy task, no teacher attention, no peer attention; (c) hard task, no teacher attention, peer attention; (d) easy task, teacher attention, no peer attention; (e) easy task, teacher attention, peer attention; (f) hard task, no teacher attention, no peer attention; (g) easy task, no teacher attention, peer attention; and (h) hard task, teacher attention, no peer attention. The order in which the eight combinations were implemented was randomly selected prior to the FA for each subject. Final graphs, however, followed a common order to keep visual review consistent.

The FBA specialists worked with each teacher to prepare materials and identify peers. Prior to each 10-min trial, the FBA specialist used cue cards to prompt teachers for each upcoming trial combination. If the teacher

had a question about the upcoming trial, they were able to ask the researcher during transitions between trial conditions. All of the eight FA trials for each student were completed across 1 to 2 consecutive school days.

Across the FA trials, student behavior was measured through direct observation duration recording as “on-task” (i.e., subject complying with task demands and teacher directions per the lesson format) and “off-task” (i.e., subject not complying with task demands and teacher directions) using observation software loaded on handheld devices. Given the range of noted behavioral concerns across the subjects, on- and off-task behavior were chosen as mutually exclusive categories that would provide a common metric across subjects. In other words, off-task included any of the noted concerns such as yelling, wandering the classroom, disrupting peers who were working, whereas on-task represented both the absence of any problem behavior and the presence of expected appropriate behavior for the presented task (e.g., listening to teacher during instruction, completing independent assignment). Off-task behavior was further differentiated into three categories: (a) off-task alone, in which the participant did not attempt to engage the teacher or peers; (b) off-task with peers, in which the participant interacted verbally or nonverbally with peers or attempted to engage peers; and (c) off-task with teacher, in which the participant was engaged in conversation with the teacher not related to the task (Lewis & Sugai, 1996a). The differentiation of off-task also provided a measure of fidelity of peer and teacher behavior across the attention conditions. For example, it was expected that high percentages of off-task with peers would be present within the peer attention conditions if the student’s behavior was peer attention maintained and none to little off task with teacher would be expected during the no teacher attention conditions.

Throughout the FA trials, reliability was measured through interobserver agreement (IOA) between two independent observers across 50% of the trials. The IOA was calculated by dividing the smaller by the larger amount of each off-task behavior category, dividing by 100, and then averaged to produce a mean IOA across all subjects and trials.

FBA and FA Hypothesis Generation

Given that the purpose of the study was to examine how various FBA/FA strategies, in the

hands of school personnel with some level of expertise, align in their generation of hypotheses, paired with the fact that there are no clear “scoring” criteria for each of the FBA and FA methods used, consensus across FBA specialist and an independent review of each of the measures was used to determine individual measure and summary hypotheses. To generate reliable hypotheses for each FBA measure, across FBA measures (i.e., FBA summary hypotheses), and from the FA trials, the following steps were followed. The FBA specialists uploaded copies of the FAI, PBQ, and ABC for each participant to a shared secure drive. Their individual instrument and summary hypotheses were stored in separate files. An independent reviewer with expertise in FBA/FA, but who did not participate in the FBA or FA trials, generated hypotheses for each participant for each FBA instrument and across FBA instruments (i.e., FBA summary hypotheses). The independent reviewer was an assistant professor in special education with more than 10 years of experience assisting school teams with FBA and behavior plans. For each participant, the FBA specialist and expert reviewer were asked to generate primary, and in some cases, secondary hypotheses. The primary hypotheses derived from the FBA instruments were formed based on scoring recommendations for the FAI and PBQ and the majority of repeated observed patterns in the ABC. Secondary hypotheses were noted if FAI and PBQ scoring and ABC review also revealed patterns common to an alternative hypothesis (e.g., student acts out to escape difficult task and also receives high rates of adult and peer attention during the outburst). Following independent expert review, all hypothesis statements were reviewed, and the FBA specialist and expert reviewer discussed any instances in which disagreements were found in order to reach a final summary hypothesis for the FBA. The same process was followed with the FA trial data. Data were graphed, and the FBA specialist and the expert independently generated primary and, in some cases, secondary hypotheses for each participant. In instances of disagreement, the pair met and reached consensus on a final FA summary statement. All independent FBA measure hypotheses, summary FBA hypotheses, and FA summary hypotheses were then reviewed by the first author and entered into a table to allow comparisons within and across FBA/FA hypotheses.

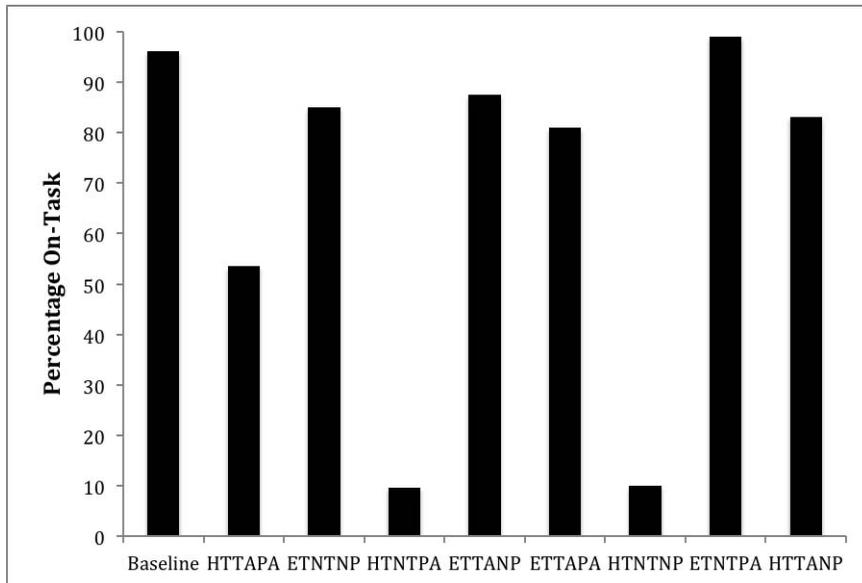


Figure 1. Percentage of on-task behavior across Functional Analysis trials for George. TA = teacher attention, NT = no teacher attention, PA = peer attention, NP = no peer attention, HT = hard task, ET = easy task.

Results

Functional Behavioral Assessment

Hypothesized functions across two independent raters (an FBA specialist and the expert reviewer) were established for each FBA measure independently (FAI, PBQ, and ABC) and across all three as summary statements (see *Table 1*). For four participants (George, Malcom, Irene, and Terrance), all three FBA measures resulted in the same primary hypothesis across both the FBA specialist and expert reviewer. For the remaining two participants, individual FBA measures did not lead to the same primary hypothesis; however, two of three measures did align for both students. For James, when the secondary hypothesis was considered, all three FBA measures resulted in summary hypotheses of escape tasks and access adult attention.

When comparing the FBA specialist summary hypothesis to the expert review, there was complete agreement for half of the participants (George, Malcom, and James). For Zeke, there was agreement on the primary hypothesis. For the remaining two participants (Irene and Terrance), the expert reviewer's secondary hypotheses aligned with the FBA specialists' summary hypotheses.

Functional Analysis

On-task behavior across baseline and each of the eight FA trials was plotted and visually analyzed for patterns suggesting possible function. Low percentages of on-task behavior across common variables, independent of other presented and withdrawn variables, were examined to determine function. For example, if low percentages of on-task behavior were observed across hard task conditions, independent of teacher and peer attention, a hypothesis of escape/avoid was posited. High on-task within the two attention conditions, independent of task difficulty, suggested attention-maintained behavior (likewise, lower percentages during no attention). Individual participant FA data are presented in *Figures 1 through 6*.

As seen in *Figure 1*, George was able to remain on task during conditions in which he was presented easy tasks and high rates of teacher attention. Low percentages of on-task behavior were observed when he was presented with hard tasks and received no teacher attention. When presented with a hard task paired with teacher attention, on-task behavior was higher, leading to the conclusion that his problem behavior served to escape difficult tasks, but the probability of problem behavior was lower during hard tasks when teacher

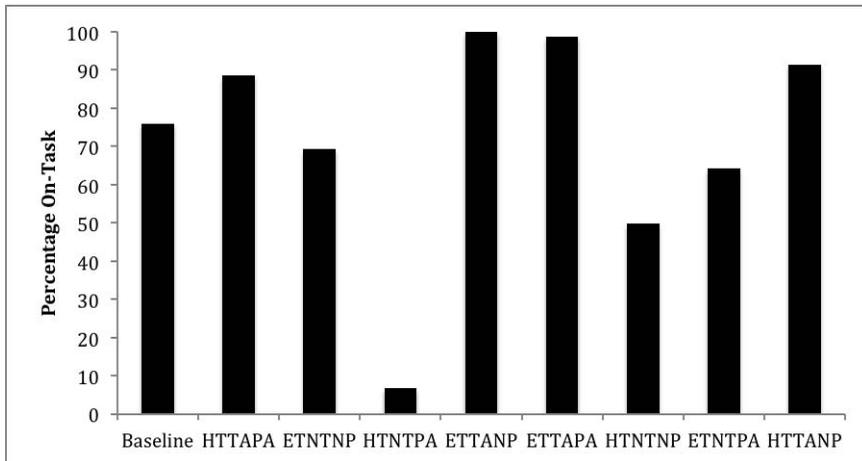


Figure 2. Percentage of on-task behavior across Functional Analysis trials for Zeke. TA = teacher attention, NT = no teacher attention, PA = peer attention, NP = no peer attention, HT = hard task, ET = easy task.

attention was present. Peer attention did not appear to have any maintaining or occasioning influence. A similar pattern was observed for Zeke, who also displayed low percentages of on-task behavior during trials in which hard tasks and no teacher attention were present (see Figure 2). A secondary influence for Zeke appeared to be peer attention when hard tasks were present with no teacher attention, as noted during the FA trial. Similar to George, a hypothesis of escaping tasks was drawn. Also similar to George, the impact of the difficult

task appeared to be influenced by teacher attention and peer attention when teacher attention was not delivered.

For students Malcolm and Irene, both displayed clear patterns of escaping difficult tasks when teacher attention was absent (see Figures 3 and 4). Similar to the two middle school students described above, teacher attention appeared to occasion and maintain on-task behavior. In other words, when presented with difficult tasks, both students engaged in problem behavior to avoid the work, but if

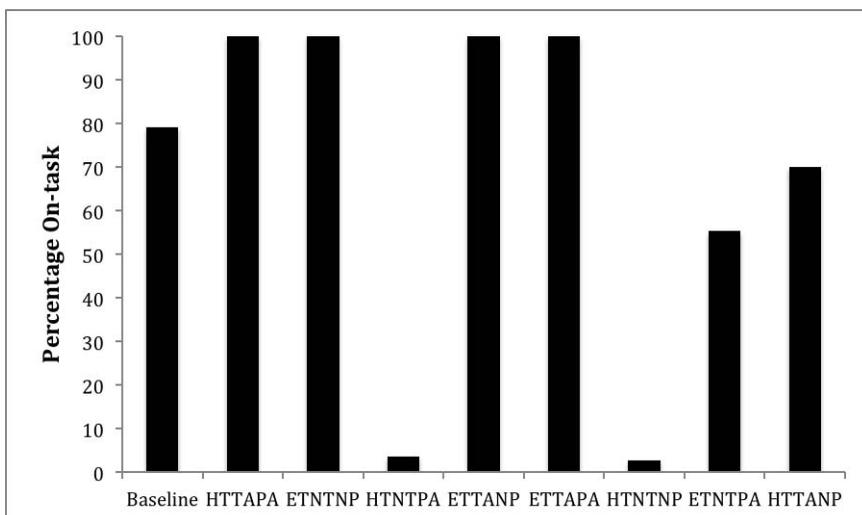


Figure 3. Percentage of on-task behavior across Functional Analysis trials for Malcolm. TA = teacher attention, NT = no teacher attention, PA = peer attention, NP = no peer attention, HT = hard task, ET = easy task.

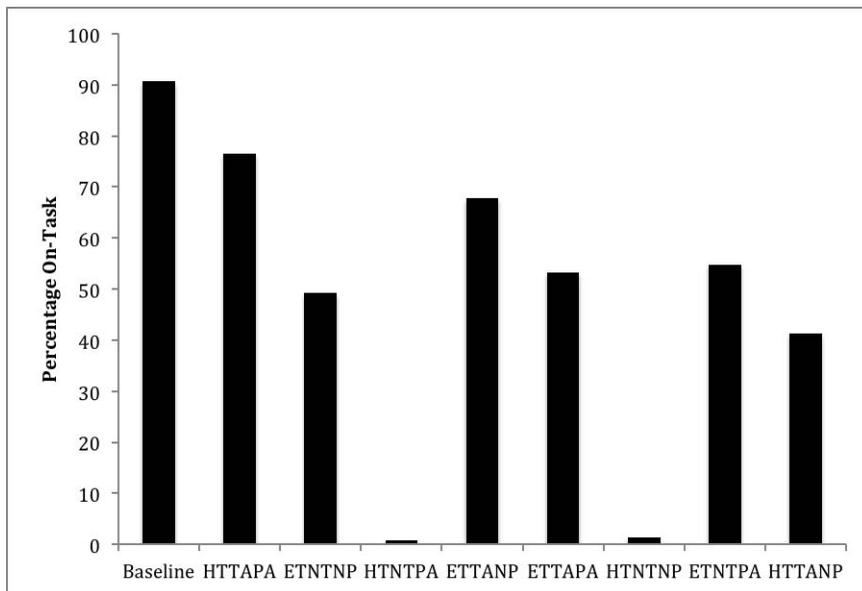


Figure 4. Percentage of on-task behavior across Functional Analysis trials for Irene. TA = teacher attention, NT = no teacher attention, PA = peer attention, NP = no peer attention, HT = hard task, ET = easy task.

teacher attention was present, on-task behavior was higher. Peer attention did not appear to be an influencing factor for either participant.

James's FA data also demonstrated a similar pattern of avoiding hard tasks but indicated he was able to maintain appropriate behavior when teacher attention was present regardless of task difficulty (see Figure 5). Less clear are the Functional Analysis results for Terrance

(see Figure 6). The lowest percentages of on-task behavior were observed when teacher attention was absent, independent of task difficulty and peer attention. A similar pattern is observed during the hard task condition when teacher attention was present. Among the trials in which on-task behavior was observed more than 50% of the time, the condition with the lowest on-task behavior percentage was during

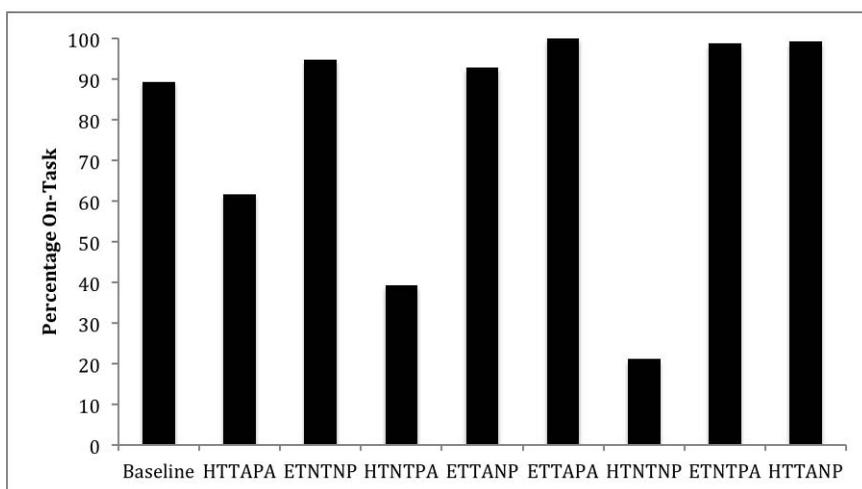


Figure 5. Percentage of on-task behavior across Functional Analysis trials for James. TA = teacher attention, NT = no teacher attention, PA = peer attention, NP = no peer attention, HT = hard task, ET = easy task.

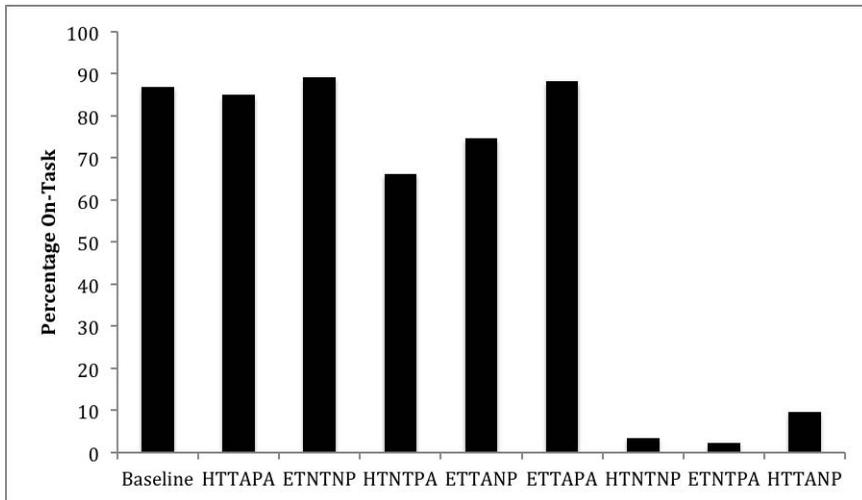


Figure 6. Percentage of on-task behavior across Functional Analysis trials for Terrance. TA = teacher attention, NT = no teacher attention, PA = peer attention, NP = no peer attention, HT = hard task, ET = easy task.

hard tasks and no teacher attention. Although not as conclusive as those for other participants, a primary hypothesis of escaping tasks was drawn given the low mediating impact of teacher attention in the final trial and lower percentage in the third trial.

FBA and FA Comparison

Table 2 presents the primary and secondary summary hypotheses across FBA and FA. Across summary FBA and FA trials, there was 100% agreement across subjects Irene, Terrance, and James on both primary and secondary hypotheses. For the remaining participants, the FBA hypothesis of adult attention did align with the secondary FA hypotheses; however, the FA primary hypothesis of escaping task was not consistent with the FBA summaries. Interestingly, escape task was noted on two of the three FBA measures for students George and Zeke and one of the measures for Malcolm (see Table 1).

Reliability and Procedural Integrity

Simple checklists were used to ensure each of the steps of the FBA measures were completed accurately, and this resulted in 100% compliance fidelity. During the FA trials, the rate of teacher attention was computed, with an average rate of one per minute during the teacher attention conditions (range = 0.8–1.1) and zero per minute during the no teacher

attention conditions (range = 0–0.02). During the peer attention conditions, the percentage of time off task with peers was used to confirm the presence and absence of peer attention (see Lewis & Sugai, 1996a, 1996b). Unlike previous research, the percentage of time did not support clear differentiation across the two conditions, with an average percentage of time off task with peers during peer attention at 10.0% (range = 0.0%–27.0%) compared with an average of 4.6% (range = 0%–16.7%) during the no peer attention conditions. The generally low rate of peer attention observed in the FA trials is consistent with ABC direct observations conducted for the FBA, which indicated peer attention was associated with the problem behaviors of only two participants (George and Zeke). Interobserver data were collected across 56% of all FA trials on student total on- and off-task behavior, resulting in an average IOA of 96.4% (range = 87.5%–100%).

Discussion

The purpose of this study was to use the current set of common FBA practices to ascertain the degree to which the current FBA technology produces hypotheses that align with hypotheses derived from FA trials. As seen in Table 2 and across Figures 1 through 6, the majority of FBA summaries were confirmed through the FA trials when both primary and secondary hypotheses were considered. Results are discussed across the three research

TABLE 1
Functional Behavioral Assessment Hypotheses across Measures and Raters

Student	Rater	FBA Method			Summary Hypothesis
		FAI	PBQ	ABC	
George	FBA	A) Adult attention	Adult and peer	Adult and peer	Adult
	specialist	B) Escape task	attention	attention	attention
	Expert	A) Adult attention B) Escape tasks	Adult attention	Adult attention	Adult attention
Zeke	FBA	Escape tasks	Adult attention	Adult and peer	Adult
	specialist			attention	attention
	Expert	A) Adult attention B) Escape tasks	A) Adult attention B) Escape tasks	Adult and peer attention	A) Adult attention B) Escape tasks
Malcom	FBA	Adult attention	Adult attention	Adult attention	Adult
	specialist				attention
	Expert	Adult attention	A) Adult attention B) Escape peers	Adult attention	Adult attention
Irene	FBA	Escape tasks	Escape tasks	Escape tasks	Escape tasks
	specialist				
	Expert	A) Adult attention B) Escape tasks	Adult attention	A) Adult attention B) Escape tasks	A) Adult attention B) Escape tasks
Terrance	FBA	Escape tasks	A) Escape tasks	Escape tasks	Escape tasks
	specialist		B) Adult attention		
	Expert	A) Adult attention B) Escape tasks	A) Adult attention B) Escape tasks	Adult attention	A) Adult attention B) Escape tasks
James	FBA	A) Escape tasks	A) Escape tasks	A) Adult	A) Escape tasks
	specialist	B) Adult attention	B) Adult attention	attention B) Escape tasks	B) Adult attention
	Expert	A) Escape tasks B) Adult attention	A) Escape tasks B) Adult attention	Adult attention	A) Escape tasks B) Adult attention

Note. "A" is the primary hypothesis and "B" is the secondary hypothesis. FBA = functional behavioral assessment. FAI = Functional Assessment Interview. PBQ = Problem Behavior Questionnaire. ABC = Antecedent-Behavior-Consequence observations.

questions; limitations and implications are also discussed.

The primary research question examined the degree to which school personnel who typically complete FBAs could use indirect measures and descriptive observations to generate hypotheses regarding the function of problem behavior that matched hypotheses obtained through a formal FA process. Unlike past research that showed inconsistencies both across FBA measures and between FBA and FA outcomes (Alter et al., 2008; Cunningham & O'Neill, 2007; Payne et al., 2007), the present findings are encouraging in that the FBA specialists generally generated similar hypotheses across rating scales, interviews, and direct observation. Further, at least one of the FBA-

derived hypotheses (i.e., primary or secondary) for all participants aligned with an FA hypothesis (see *Table 2*). Although a variety of factors may have contributed to better accuracy, we hypothesize the increased accuracy can be traced to overall improvements in FBA technology (Gage et al., 2012). The majority of the prior research pointing out inconsistencies and shortcomings in the FBA-BIP process was conducted within 10 years of the 1997 IDEA mandate. Since that time, numerous research studies, educator focused articles, and recommendations related to key components of an efficient FBA process, along with professional development and technical assistance, have become widely available (e.g., Borgmeier et al., 2015). The present study,

TABLE 2
Alignment between Hypotheses Derived from
Functional Behavioral Assessments and Func-
tional Analyses

Student	FBA Hypothesis	FA Hypothesis
George	Adult attention	A) Escape task B) Adult attention
Zeke	Adult attention	A) Escape task B) Adult attention
Malcolm	Adult attention	A) Escape task B) Adult attention
Irene	A) Escape tasks B) Adult attention	A) Escape task B) Adult attention
Terrance	Escape tasks	Escape task
James	A) Escape task B) Adult attention	A) Escape task B) Adult attention

Note. "A" is the primary hypothesis and "B" is the secondary hypothesis.

along with recent applied FBA research (Christensen, Young, & Marchant, 2007; Filter & Horner, 2009; Lane et al., 2009; Loman & Horner, 2013; Park & Scott, 2009; Solnick & Ardoin, 2010; Wood et al., 2009), adds to a growing evidence base supporting the efficacy and accuracy of FBAs conducted by school personnel who have behavioral expertise. At the same time, it should be noted when only primary hypotheses are compared, only 50% of the FBA hypotheses aligned with the FA in the present study.

The second research question examined the alignment between common FBA methods found in schools. As outlined in the results, the majority of measures consistently identified the primary function of each student's problem behavior. Similar to the first question, the alignment between measures has not been found in earlier FBA research, in which the majority of measures failed to consistently report similar function (e.g., Alter et al., 2008; Barton-Atwood et al., 2003; Cunningham & O'Neill, 2007). Agreement is further apparent when including identified secondary hypotheses about the student's function of behavior. Again, methodology, training, and better tools may all have contributed to this improved consistency. Equally important, the inclusion of multiple measures and not limiting hypotheses to a single function, which is rarely the case among children with and at risk for high-incidence disabilities, vastly improve the overall accuracy of the FBA process (Gage et al., 2012; Scott & Kamps, 2007).

The final research question focused on whether specific functions or contexts were common across cases in which inconsistencies were observed between FBA- and FA-generated hypotheses. For example, do common FBA methods tend to miss one or more particular functions when compared with certain FA condition arrangements (e.g., difficulty of the task or presence/absence of peer attention)? Although the field has routinely pointed out that the likelihood of conducting FA trials in applied settings with the same rigor as found in studies reported in peer-reviewed periodicals is low (Scott & Kamps, 2007), the present outcomes are encouraging in that although disagreements occurred between FBA and FA primary hypotheses, FBA results did in fact point to similar hypotheses when secondary functions were considered. Across students George and Malcolm, all FBA measures pointed toward accessing adult attention as the primary function of problem behavior, whereas the FA trials pointed to escaping hard tasks. However, when both participants were presented with difficult tasks and high rates of adult attention were present directed at appropriate behavior, the percentage of on-task behavior increased dramatically. We hypothesize that it might be the case that both students have learned, when presented with a difficult task, attempting to engage the teacher for attention and assistance potentially lessens the aversive nature of the task (i.e., escape). Likewise, the teachers of both students may have previously learned to not give the students difficult tasks without assistance to avoid the likelihood of high rates of problem behavior. During the FA trials, however, when teacher attention was withheld, neither of these were an option (i.e., no assistance available and presented with a task they may rarely encounter in their classroom). The FBA measures may have simply captured the previous shaping of the teacher's behavior to promote on-task student behavior and the student's shaping of the teacher to avoid giving them hard tasks without assistance (Shores et al., 1993). The practical implication may be the simple inclusion of one or two FA trials that appear to be contraindicated based on the primary hypothesis generated through the triangulation of FBA measures.

Three other related findings from the present study are also worth noting. First, the presence or absence of sources of peer attention appears to have had little impact on this group

of students. This was surprising given past research with at-risk students with similar behavior patterns (Lewis & Sugai, 1996a, 1996b; Northrup et al., 1995) and the call for the inclusion of peer attention with the FBA process (Scott & Kamps, 2007). Second, there were no clear or notable differences in function across the elementary and middle school classrooms or disability categories. The sample was selected based on externalizing behavior patterns, but beyond that, a range of disabilities was represented among the small sample. The primary FBA-generated hypothesis of attention for George, who was diagnosed with autism, and Zeke, identified with traumatic brain injury, was also surprising given the typical patterns of limited social interactions noted among these disability categories. Finally, it was not surprising that the FA trials identified that the primary function of problem behavior for all participants was to escape and avoid difficult tasks. Even among the youngest participants, a clear history of off-task and problem behavior in the presence of challenging tasks appears to have been established, most likely due to the repeated failure experienced across their schooling.

Limitations

As with most applied research, the present study is not without limitations. The first limitation is the small number of students combined with the descriptive nature of the study. Although not intended to measure the efficacy of a standardized FBA/FA protocol, a more rigorous design, including randomized control trials, evaluating the efficacy of educator-based FBAs would allow the field to work toward a better consensus on common FBA practice. A related limitation is the reliance on expert opinion to develop hypotheses about problem behavior, which—although common across the literature—does limit the overall confidence in the conclusions drawn. Second, the present study focused only on externalizing, low-intensity, high-frequency behaviors. It is unknown whether similar positive alignment would occur for internalizing behaviors and/or low-frequency, high-intensity behaviors. Third, all three FBA specialists were currently enrolled in a special education doctoral program. At the point of the study, they had not received additional training in FBA/FA; however, their experiences and skill sets that allowed them to be admitted into an

advanced degree program may be atypical of school personnel with similar job roles. Fourth, the brief FA trials that were implemented to develop hypotheses have been widely used in past FBA/FA research but represent static environmental or structural factors and do not actually manipulate contingencies based on student behavior, a strategy some in the field have argued is necessary to confirm functional hypotheses of problem behavior (see Conroy & Stichter, 2003). Finally, across five of the participants, clear and consistent patterns throughout the FA trials were apparent; however, for Terrance, the final three FA trials did not mirror earlier observed patterns of on-task behavior. It is unclear if the outcome simply reflects fatigue with the trials or whether some other setting event was present.

Implications for Research and Practice

The outcomes of the present study are promising in light of past research demonstrating inconsistencies across FBA strategies within school settings. However, the small number of similar studies, combined with the present study, warrants continued replication and expansion to ascertain the degree to which current training and technology are fulfilling the intent of both recommending and mandating the FBA-BIP process for students with disabilities. It is especially critical that future research examine the necessary skill sets and expertise related to FBA among the informants (e.g., special education teacher) and those conducting the FBA (e.g., school psychologist). In addition, research is needed to examine the “value added” of simple FA manipulations that can confirm secondary functional hypotheses and FBA results by testing contraindicated trials, which may lead to parsimonious yet more robust findings.

The present study’s outcomes are equally encouraging for practice. Using commonly available tools in the hands of school personnel expected to lead the FBA process, when both primary and secondary hypotheses were considered, outcomes were confirmed both by expert secondary review and direct manipulations. When results were mixed, further analysis did not point to errant findings but rather reaffirmed the notion that behaviors can serve multiple functions across educational contexts. Especially notable were the mediating effects of teacher attention during the FA trials under conditions that otherwise

occasion problem behavior. Additional applied research and evaluation is needed within education settings to establish consensus within the field on (a) the minimal combination of FBA and FA assessment strategies, (b) necessary behavioral expertise among personnel involved, and (c) a common problem-solving team format to optimally address problem behavior. Although previously noted that FA or structural trials similar to those presented here are unlikely to occur in school settings given their complexity, simple manipulations such as giving easy and hard tasks, or increasing/decreasing teacher attention, and observing student behavior can be easily added to the FBA process.

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