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Effects of functional communication training and self-monitoring with programmed generalization for three students with or at-risk for emotional behavioral disorders.

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EFFECTS OF FUNCTIONAL COMMUNICATION TRAINING AND SELF-MONITORING WITH PROGRAMMED GENERALIZATION FOR THREE STUDENTS WITH OR AT-RISK FOR EMOTIONAL BEHAVIORAL DISORDERS

By

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B.B.A. Belmont University, 2003
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DEDICATION

This dissertation is dedicated to Mr. D.

and the Professionals of Westlane Middle School

“No Excuses”

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First, thank you to my wife, Jessica. This would not have been possible without you. For every late night and early morning while I was locked away working on this study, you were working three times harder to take care of our kids and keep this ship sailing. Not to mention you simultaneously earned a degree while incubating and birthing a human. I am in awe. I love you and I will make it up to you.

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ABSTRACT

EFFECTS OF FUNCTIONAL COMMUNICATION TRAINING AND SELF-MONITORING WITH PROGRAMMED GENERALIZATION FOR THREE STUDENTS WITH OR AT-RISK FOR EMOTIONAL BEHAVIORAL DISORDERS

Jonathan L. Burt

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The use of functional assessment based interventions to address the problem behavior of students with emotional/behavioral disorders (EBD) is supported by an emerging evidence base. Few studies, however, have assessed the generality (i.e., the transfer of behavior change across settings, behavior, or students) of function-based interventions for this population. This study employed a multiple baseline across students design to evaluate setting generalization of functional communication training (FCT) with self-monitoring for three students with or at-risk for EBD. FCT yielded significant reductions in problem behavior and increased rates of appropriate attention recruitment (i.e., hand-raising) for all three participants in isolation. However, no change in behavior was observed during concurrent observations in a generalization setting. Subsequently, self-mediated physical and verbal stimuli were introduced in the generalization setting to promote skill transfer. Each student responded to the generalization programming procedures with reduced rates of problem behavior and increased rates of hand-raising in generalization settings. Results of the study support the

use of programmed generalization strategies with function-based interventions for students with EBD.

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CHAPTER 1

INTRODUCTION

The purpose of this chapter is to introduce the concept of generalization and to advocate for its inclusion as a primary dependent variable in behavioral research for students with emotional/behavioral disorders (EBD). The problems inherent in interventions that fail to achieve generalized outcomes is discussed in association with the poor educational outcomes of students with EBD. This chapter next provides an overview of generalization and related concepts followed by a discussion of functional behavioral assessment and its usefulness in developing interventions that produce generalized outcomes.

Statement of the Problem

If a purpose of education is to teach our students knowledge and skills to such an extent that they may independently apply that knowledge and use those skills to accomplish self-determined goals, then the need for interventions and instructional techniques capable of achieving this is self-evident. What then can be said about the efficacy of academic and behavioral interventions applied to students with EBD in relation to this purpose? Post-secondary outcomes for students with EBD are among the worst of any special education subgroups (Nelson, Benner, Lane, & Smith, 2004; Reid, Gonzalez, Nordness, & Trout, 2004; Wagner, Kutash, Duchnowski, Epstein, & Sumi, 2005). This persists despite the development of an emerging evidence base of purportedly

successful individualized interventions within the context of multi-tiered systems of supports (Benner, Kutash, Nelson, & Fisher, 2013; Horner, Sugai, & Anderson, 2010; Maggin, Wehby, & Gilmore, 2016; Sugai et al., 2000). If interventions designed to address academic and behavioral challenges of students with EBD in school are believed to be improving why do the outcomes remain the same?

A potential explanation for the breakdown between the effort to educate students with EBD and positive post-secondary outcomes may be found among the limitations of behavioral interventions at producing generalized outcomes (i.e., generalization). Generalization or generality refers to the transfer of behavior change to novel settings, circumstances, behaviors, or people and the maintenance of those effects over time. Failure to produce generalization following a behavioral intervention suggests that a student will remain dependent upon contextual features of the intervention setting to produce appropriate responding. Unless every other setting which a student with EBD encounters is fine-tuned to approximate those essential contextual features, he or she will not be successful. This is the task charged to teachers of students with EBD: either change every setting to accommodate the needs of the student, or teach the student to meet her needs within less accommodating settings.

This problem is exacerbated by the sheer numbers of students with or at-risk for EBD. Of the nearly six million students receiving special education services in the 2014/2015 school year, 347,752 were certified with a formal distinction as students with an emotional disturbance (ED; USDOE, 2015). This corresponds to roughly 1 of every 100 students in the general population. While 1% of the student body does not appear to be an overwhelming figure, the prevalence of students with or at-risk for ED may in fact

be higher due to a vague federal definition of ED paired with ambiguous certification procedures which often lead to arbitrary eligibility decisions erring on the side of underrepresentation in the population at-large and overrepresentation in minority populations (Forness & Knitzer, 1992; Kauffman & Landrum, 2013; Wiley, Brigham, Kauffman, & Bogan, 2013). The proper identification of students with ED is further complicated by the comorbidity of behavioral disorders deserving of ED consideration with other special education categories such as other health impairment, learning disabilities, and/or language impairments (Forness, 2011; Hollo, 2012). These factors taken together lead to an actual rate of ED believed to be much higher than 1% (Forness, Freeman, Paparella, Kaufman, & Walker, 2012).

Among students with ED, 43% receive a majority of their educational services in general education settings (USDOE, 2015). Given that the prevalence of students with EBD is believed to be much higher, then the percentage of students receiving services in general education settings should likely be higher as well. This suggests there is a critical mass of students who experience significant behavioral challenges across multiple settings and are nonresponsive to primary or school-wide behavior intervention efforts (as per the definition of ED) but are still required to receive their education in the highly variable complex environments of general education classrooms. It is imperative that behavioral interventions target the transfer of training effects to non-training, uncontrolled settings for students to develop independence with self-management skills.

With academic objectives, the importance of generalized outcomes is easily demonstrated. If the aim is to teach a student to read CVC words, for example, one would not claim success if the child could only read the specific words acquired in

training sessions. To be considered successful instruction, the student should be able to read new CVC words in various contexts and formats, in the presence of familiar and unfamiliar instructors, and maintain those skills after instruction has ended; all of which are defining features of generalized behavior change. As demonstrated here, for academic goals, generalization is an indispensable criterion for intervention success (Stecker, Fuchs, & Fuchs, 2005).

The same standards, however, are not always applied to interventions targeting the remediation of problem behavior as demonstrated by consistent reports of successful behavioral interventions in the absence of demonstrations of successful generalization (Rutherford & Nelson, 1988). However, for students with EBD who frequently experience significant academic and behavioral skill deficits both of which impair the students' ability to function in school, the need for social skills and self-management skills to generalize beyond tightly controlled training settings is as essential as it is for their academic skills.

The challenges associated with the generalization of behavior change are widely acknowledged by the behavioral field as a whole, and the development of generalization promotion strategies has historically been elevated as a primary research concern (Landrum & Lloyd, 1992; Stokes & Baer, 1977; Swan, Carper, & Kendall, 2015); yet few studies have been published which even attempt to measure the generalization of behavioral intervention effects (Arnold-Saritepe, Phillips, Mudford, De Rozario, & Taylor, 2009; Ingersoll & Wainer, 2013). Of those that do measure generalization, fewer still attempt to systematically analyze the independent variables responsible for the transfer of effects. The need for continued research on interventions capable of

producing generalization is important for all populations; but for students with EBD this need is critical.

Generalization: Definitions and Distinctions

Before a final case can be made for the importance of continued research addressing setting generalization in behavioral interventions for students with EBD, clear differentiation is warranted among four related but often confused terms within the behavioral literature regarding behavior change transfer: stimulus generalization, response generalization, generality, and generalization.

Stimulus generalization. Prior to 1977, behavioral researchers most consistently used the term generalization to refer to two basic behavioral principles: stimulus generalization and response generalization (Spradlin & Simon, 2011). The classic example of stimulus generalization was first demonstrated via Pavlovian conditioning of the salivary response in dogs (Pavlov, 1927). Following the pairing of a 1000Hz tone with the presentation of meat powder, the tone became a conditioned stimulus thus able to elicit salivation by its presentation alone. The 1000Hz tone was the only tone paired with food in initial training conditions. During generalization probes, however, other similar but untrained frequencies were also able to elicit salivation while more dissimilar frequencies did not. A 900Hz tone, for example, elicited salivation whereas a 700 Hz did not. The evocative effects of the training tone was said to have generalized to other stimuli, hence the term stimulus generalization.

An example of stimulus generalization with operant conditioning was reported by Lalli, Mace, Livezey, and Kates (1998) in their assessment and treatment of self-injury of a 10-year-old girl (Val) with a severe intellectual disability. Val was admitted for

medical treatment to address head-hitting to the nose, ears, and eyes which required her to wear a helmet for most the day. Researchers conducted a functional analysis and determined head-hitting was evoked by care-giver proximity and maintained by physical touch. Researchers analyzed rates of head-hitting as a function of caregiver distance and demonstrated that head-hitting occurred only when care-givers were within 9 m of Val. Physical distances between .5 m and 9 m were demonstrated to be generalized discriminative stimuli whereas distances beyond 9 m were not.

Response generalization. Conversely, response generalization is observed when the evocative effects of a single stimulus are observed with topographically or otherwise dissimilar responses (Skinner, 1938). Keller and Schoenfeld (1950) summarized three unique experimental demonstrations of response generalization in the forms of topographical, response force, and response duration generalization. All shared the similar feature in that only one trained stimulus was used to produce the variations in response forms. A more thorough demonstration of the nuances between stimulus and response generalization is outside the scope of this paper; suffice it to say, however, such was the status of the terms for much of the 1950s and 1960s as basic and clinical experimentalists firmly established stimulus and response generalization among the fundamental principles of a natural science of behavior (Edelstein, 1989).

Generality. Researchers in the applied field beginning in the 1960s began using the term generality to refer to the broad pragmatic goals of applied behavioral therapies; that is, durable behavior change across settings, behaviors, and subjects (Baer, Wolf, & Risley, 1968; Stokes & Baer, 1977). Baer et al. (1968) included generality as one of seven principle features of applied behavior analysis and defined it as follows: “a

behavior change may be said to have generality if it proves durable over time, if it appears in a wide variety of possible environments, or if it spreads to a wide variety of related behaviors" (p. 96). Within the discussion of generalized behavior change, Baer et al. interchanged generality with generalization, thus suggesting the terms were synonymous.

Critics of the term-swap argued that failure to distinguish between generality (i.e., general transfer of training effects) and stimulus/response generalization (i.e., fundamental behavioral processes) could have long-standing negative implications; those implications being confusion and misunderstanding regarding precisely what behavioral principles were responsible for the presence or absence of generalized behavior change in any given case (Johnston, 1979). For example, Johnston (1979) argued for the need to distinguish between stimulus generalization and setting generalization (one component of generality), the former being a relatively simple behavioral principle based upon stimulus control, the latter being a complex process facilitated by all the variables within the four-term contingency (Michael, 1993).

While the debate regarding what to call it persists (Cuvo, 2003), and the conceptual theories regarding how it happens continues to evolve (Kirby & Bickel, 1988; Stokes & Osnes, 1989), an intervention's generality is now widely referred to as generalization, and the most durable definition of generalization which is still in use today is "the occurrence of relevant behavior under different, non-training conditions, without the scheduling of the same events in those conditions as had been scheduled in the training conditions" (Stokes & Baer, 1977, p. 350).

Generalization in Behavioral Intervention Research

Generalization's place among the applied field's primary research concerns was codified by Stokes and Baer (1977) in the publication of "An Implicit Technology of Generalization." This paper was the first attempt to synthesize decades of fragmented research into the beginnings of a conceptual system by compiling the most promising strategies for the promotion of generalized behavior change available at the time (Osnes, & Lieblin, 2003). The authors conceded, however, that from the existing literature base one could only infer a viable technology was available for discovery - hence the use of the term implicit in the title. The precise technology of programmed generalization that the authors hoped would follow would need to be worked out in subsequent research. From their review of 270 single case research studies that assessed any form of generalization (i.e., across time, settings, situations, participants, or behaviors), they extracted and summarized seven tactics that proved useful in achieving some degree of generalized outcomes: introduce to natural maintaining contingencies, train sufficient exemplars, train loosely, use indiscriminable contingencies, program common stimuli, mediate generalization, and train to generalize. Two additional strategies, train and hope and sequential modification, were also discussed but these were distinguished as non-strategies as they either fail to demonstrate generalization in the first place (i.e., sequential modification) or fail to identify the independent variable responsible for generalization (i.e., train and hope).

To grow beyond an implicit to a well-supported explicit technology of generalization, applied researchers needed to do more than simply demonstrate the transfer of treatments effects to untrained settings, situations, or behaviors. They needed to systematically isolate the contextual variables responsible for producing this

generalized outcome (Johnston, 1979). Critics of Stokes and Baer (1977) argued that the tactics and strategies offered in the article failed to prescribe a precise research agenda which the field could follow to begin to refine the technology (Osnes & Lieblin, 2003). What would likely follow, they argued was more of the same: superficial, or worse, spurious demonstrations of generalized intervention effects (or not) with no way of discerning the independent variables responsible for producing the effects.

As predicted, reviews of the literature in the decade to follow revealed the field had not progressed beyond the state of affairs in the late 1970s. Rutherford and Nelson (1988), in what is likely the most comprehensive review of generalized behavior change in the literature, reviewed 5,300 educationally relevant single-case research articles published in behavioral journals after 1977. Among these articles were only 103 studies in 87 articles (less than 2% of all articles) that even measured the maintenance and generalization of intervention outcomes; far fewer systematically programmed for these effects. While all studies that reported generalization measures demonstrated at least partial success, the authors of this review concluded that the "technology of generalization called for by Stokes and Baer in 1977 [was] still in the formative stages" (p. 313).

Still, from this exhaustive review, the authors were able to report on the prevalence of programming strategies as recommended by Stokes and Baer (1977). Among the 103 studies analyzed and in order of decreasing prevalence were the following strategies: train and hope (N=39); train sufficient exemplars (N=15); mediate generalization (N=13); indiscriminable contingencies (N=12); program common stimuli, (N=12); sequential modification (N=8); introduce to natural maintaining contingencies

(N=7); train to generalize (N=3); train loosely (N=1). Two conclusions were supported by this review: an explicit technology of generalization had not sufficiently progressed, and train and hope remained the predominant strategy.

Subsequent reviews reiterated the conclusions of Rutherford and Nelson (1988). Chandler, Lubeck, and Fowler (1992) identified 73 studies of social skills training (SST) for preschoolers. Seventy percent (N=51) of the studies utilized one or more of the generalization tactics promoted in Stokes and Baer (1977), a marked improvement from the results of Rutherford and Nelson. Offering another optimistic result, the authors reported an upward trend in the success of generalization tactics when comparing interventions published within 5-year increments years following Stokes and Baer. The authors offered the sobering caveat, however, that these results may be due to publication bias in favor of more successful interventions and not a result of refined technology, a problem that has yet to be addressed in the literature.

Concurrently, Landrum and Lloyd (1992) summarized the state of generalization research pertaining to the social behavior of children with emotional or behavioral disorders (EBD). While not claiming to have conducted an exhaustive review, Landrum and Lloyd concluded similarly with Rutherford and Nelson (1988) in that too few studies report generalization outcomes and those that do often contain methodological flaws which prevent the interpretation of the utility of the various programming strategies. Landrum and Lloyd concluded their review with a research agenda for generalization promotion. Primary among the authors' charges was the call for researchers to make generalization the dependent variable of the study. While behavior change strategies are critical and should continue to be refined among the research community, researchers

must also begin to analyze the promotion of generalization of these behavior changes as the rule rather than the exception.

Finally, Osnes and Lieblin (2003) replicated the search procedures and inclusion criteria of Stokes and Baer (1977) nearly 25 years after the original study was published in an article perhaps ironically titled “An explicit technology of generalization.” The irony of the title is reflected by the authors’ conclusion that generalization research (i.e., studies that specifically target generalization as a dependent variable) has failed to generalize. Echoing the findings of the previously mentioned review, Osnes and Lieblin (2003) praised the increased inclusion of maintenance and generalization measures in published studies but lamented the scarcity of studies that systematically evaluate how generalization occurred, cautioning the field to "remember that the conceptualization continues to be stronger than the empirical base that supports it" (p. 372).

There still appears to be no consensus in the empirical literature regarding the critical components of interventions that have a high probability for generalization. Regardless, progress has been made as a result of continual refinements in the conceptualization of programmed generalization (e.g., Kirby & Bickel, 1988; Stokes & Osnes, 1989), the development of practitioner manuals to guide practice (e.g., Haring, 1988; Horner, Dunlap, & Koegel, 1988), and a steady increase in the publication of studies that measure and report generalization data (Swan, Carper, & Kendall, 2015). However, regarding the original call to systematically investigate the behavioral processes responsible for generalized responding (Stokes & Baer, 1977), the words of Baer, Wolf, and Risley (1987) still hold true today: "the problem is far from solved; we still have no system for matching the most suitable generalization promotion method to

the behavior change at hand, and no certainty that there is such a system to be found" (p. 321).

The lack of generalization research among behavioral intervention studies may be due in part to a conceptual misunderstanding regarding the functional variables responsible for producing generalized responding (Johnston, 1979). Take for example, setting generalization. As mentioned earlier, setting generalization requires that a behavior change facilitated in one environment transfers to another environment. One mechanism which may be responsible for the transfer of treatment effects is stimulus generalization - in that similar properties between various environmental stimuli in the generalization setting have the same evocative effects on behavior as stimuli in the training setting. If behavior change does not occur, it could be due to discriminated stimulus control of training stimuli (Kirby & Bickel, 1988). However, there are many other possible reasons why a transfer of effect was not observed. It may be that there is an absence of the motivating operation in the generalization setting. It may be a result of a history of insufficient or altogether absent schedules of reinforcement. It may be due to competing contingencies placed on incompatible or alternative behaviors. A full range of variables must be considered for a complete analysis of the presence or absence of generalized behavior change.

Due to the necessity of obtaining a broad understanding of the contingencies operating in generalization settings that may or may not be responsible for the presence or absence of generalized responding, leaders within the field of educational research for students with EBD point to functional behavioral assessment as a technology which may potentially aid in the design and implementation of behavioral interventions that lead to

generalized behavior change (Gresham, Bao, & Cook, 2006; Maag, 2005; Maag, 2006; Nelson, Roberts, Mathur, & Rutherford, 1999).

Functional Behavioral Assessment

Functional behavioral assessment (FBA) is an applied technology based upon the basic scientific principles of behavior (e.g., reinforcement, extinction, stimulus discrimination, etc.) derived from the experimental analysis of behavior (EAB; Dixon, Vogel, & Tarbox, 2012). At the heart of FBA and all behavioral technologies is the question "what makes a person do what they do?" To answer this question from a behavioral perspective, a systematic assessment of environmental variables believed to be functionally related to the occurrence of problem behavior is required. FBA permits a systematic assessment of the antecedent motivating operations responsible for occasioning problem behavior, discriminative stimuli which signal the availability of reinforcement, and functional consequences which reinforce and maintain problem behavior, all of which may be responsible for the presence or lack of generalized responding.

Behavioral assessment offers numerous benefits, both pragmatic and humanistic, to the treatment of problem behavior (Hanley, 2012). Prior to the refinement of preintervention analyses (e.g., Carr & Durand, 1985; Iwata, Dorsey, Bachman, Slifer, Bauman, 1982/1994), behavioral interventionists typically utilized seemingly arbitrary environmental modifications to effect behavior change (Hanley, Iwata, & McCord, 2003). Functional behavioral assessment is now established as the hallmark of best-practice in the treatment and remediation of problem behavior for students with EBD

(Scott & Kamps, 2007), and is widely regarded to be an essential feature of any behavior plan targeting the reduction of problem behavior.

Consensus among behavioral experts remains elusive, however, regarding what constitutes the essential features of a valid and useful FBA (Gable, Park, & Scott, 2014; Sasso, Conroy, Stichter, & Fox, 2001). Commonly recommended features of a functional assessment can be categorized as either indirect or direct technologies. Indirect assessments involve gathering asynchronous information about the topography of problem behavior and contextual variables possibly functionally related to its occurrence. Examples of indirect assessment include archival record reviews (e.g., individual education plans, psychological evaluations, office referrals), teacher/student/parent interviews, and behavioral rating scales. Each of these sources of information is considered an indirect assessment because it does not involve direct observation of the problem behavior. Direct assessments, by contrast, include narrative records in the form of ABC assessments and functional analyses. Direct assessments can be further subcategorized as either descriptive or analytic depending on whether or not the observation involves systematic manipulation of variables thought to be functionally related to the target behavior.

When considering the generalizability of functional assessment technology in schools, one must factor the technical complexity of hypothesis verification techniques such as structural analysis (Stichter, Hudson, & Sasso, 2005) or functional analysis (Iwata, Dorsey, Slifer, Bauman, & Richman, 1994). Whether hypothesis verification techniques will become standard practice in schools remains to be seen (Anderson & St. Peter, 2013; Gable, Park, & Scott, 2014).

Regardless which form of FBA one chooses, applied researchers seem to agree that the ultimate purpose of an FBA is to inform the development of an effective intervention (Anderson & St. Peter, 2013; Hanley, 2012). If the definition of an effective intervention is simply the reduction of problem behavior in an isolated setting, then FBA technologies are unquestionably useful in this regard (Anderson, Rodriguez, & Campbell, 2015; Ervin, Radford, Bertsch, & Piper, 2001; Gage, Lewis, & Stichter, 2012, Goh & Bambara, 2010; Heckaman, Conroy, Fox, & Chai, 2000; Lloyd, Weaver, & Staubitz, 2015; McKenna, Flower, Kyung, Ciullo, & Haring, 2015; Wood, Oakes, Fettig, & Lane, 2015). However, if evidence is required of generalization resulting from an FBA-based intervention as a criterion for intervention success, the utility of FBA-based interventions is far less certain (Gresham, Watson, & Skinner, 2001). As of now, there are no published reviews of generalized behavior change resulting from functional assessment based interventions. Therefore, the following question remains unanswered: How successful are function-based interventions at producing generalized behavior change?

CHAPTER 2

LITERATURE REVIEW

To examine the prevalence of generalized behavior change across settings resulting from function-based interventions for students with EBD, a systematic review of the literature was conducted to answer the following three questions: 1) how many FBA-based intervention studies for students with EBD included measures of setting generalization; 2) what were the outcomes of studies that included generalization measures; and 3) what study designs permitted an analysis of the independent variables responsible for promoting setting generalization? To identify articles related to these questions, a four-phase literature search was conducted.

Method

Phase I. First, the reference lists of all published functional behavioral assessment literature reviews likely to contain studies relevant to this research question were obtained. Each of the reviews consulted in Phase I identified single-case research studies that included graphed results of a functional behavioral assessment conducted in a non-clinical setting. Fourteen reviews comprised of 331 articles were identified in Phase I. Most notable among all the reviews, was Anderson, Campbell, and Rodriguez (2015) in which 229 articles (69% of all previously published articles) were accounted for. This exhaustive review served as a template for the present review for two reasons. First, it included indirect descriptive (e.g., interviews and rating scales), direct descriptive (e.g.,

ABC narrative recordings), and direct experimental verifications (e.g., structural or functional analyses) in its broad definition of functional behavioral assessment. In the absence of clearly established best practice regarding essential components of functional behavioral assessment in schools (Scott & Kamps, 2007), all forms of assessment are considered in this review. Second, Anderson et al. focused exclusively on school based assessments, further refining the base of studies relevant to this review. Previous exhaustive FBA reviews (e.g., Beavers, Iwata, & Lerman, 2013; Hanley, Iwata, & Mccord, 2003) excluded studies that only employed indirect or descriptive assessments and included studies conducted in home, community, or clinical settings.

Phase II. Next, the database of previous reviews was extended by conducting an electronic search of 52 behavioral, psychological, medical, and educational journals within Medline, Psycinfo, ERIC, and Academic Search Complete databases which have published at least one previous FBA study as reported in earlier FBA reviews. Using a variety of search terms addressing functional behavioral assessment (e.g., "functional behav* assessment", "functional analy*", "structural assess*", "structural analy*") titles and abstracts were reviewed for any additional FBA studies published since 2013, the most recent year screened in Anderson, Campbell, and Rodriguez (2015). This yielded 387 articles which required further screening. To be admitted to Phase III, an article must have contained a single-case research study incorporating at least one form of behavioral assessment in a school setting to address the problem behavior of a student with or without disabilities. An additional 55 articles combined with the 336 articles identified in Phase I yielded a total of 391 school-based functional behavioral assessment articles.

Phase III. Phase III involved a review of the methods section for the 391 articles to identify only articles which included an intervention following functional assessment for at least one student with or at-risk for EBD. A total of 133 articles met these criteria. To summarize up this point, the 133 articles remaining contained single-case research studies which implemented a functional assessment based intervention for at least one student with or at-risk for an emotional/behavioral disorder in a school setting.

Phase IV. Finally, full text PDFs of the remaining 133 articles were reviewed to identify any study that included measures of setting generalization. To reiterate, setting generalization is defined as the extent to which behavior change in initial intervention settings is observed in non-intervention settings without implementing the entire intervention protocol in generalization settings.

Although seemingly straightforward, the use of this definition proved to be problematic under special circumstances according to the design used in the study. In the case of multiple baseline study designs, intervention procedures are applied sequentially across three or more dimensions (i.e., subjects, behaviors, settings, etc.). A functional relation between the intervention and observed behavior change can be claimed if and only if behavior change occurred after the application of the intervention (Gast, Lloyd, & Ledford, 2014). In the case of multiple baseline across settings study designs, the demonstration of intervention effects for a single participant across multiple settings may appear at first glance to be a clear demonstration of sequential modification. However, if behavior change is observed in settings other than the initial training setting prior to implementation of the intervention, it may be the case that a student was taught a

functional skill in the initial training settings and she applied the skill in an alternate setting without the aid of training procedures.

This is purported to have been the case in Lane, Smither, Huseman, Guffey, and Fox (2007) in which a function-based packaged intervention was implemented for a 6-year-old child exhibiting disruptive behavior in a general education classroom. Concurrent with the implementation of the intervention protocol in the general education classroom, behavior change was observed in both the general education and specials classroom indicating either the self-management skills acquired in the general education setting generalized to the specials classroom or a confounding independent variable was responsible for the behavior change in both settings. If behavior change is observed in secondary settings prior to the onset of the intervention, it is impossible to demonstrate a functional relation between the intervention and this outcome using a multiple baseline across settings design. For this reason, studies that only employed a multiple baseline across settings design were omitted from review (Lane, 2007a; Lane, 2007b; Haydon, 2012; Knapczyk, 1988; Knapczyk, 1992).

A second problematic study design involved ABAB withdrawals where some aspect of the setting or situation was modified in the second intervention phase compared to the first. This was exemplified in Austin (2008) for interventions utilizing noncontingent reinforcement to address the attention maintained problem behavior for two elementary students in general education classrooms. During the initial training phase for both students, training occurred in a single setting while other contextual variables were held constant. Following a stable reduction in problem behavior, the intervention was withdrawn and baseline procedures were implemented. A second

application of the intervention was then initiated with procedures identical to the first with one exception.

For both students, a single intervention session occurred in an alternate setting and treatment effects maintained. Although the authors reported this as a demonstration of generalization, according to the definition used in this review this would not be considered setting generalization because these data were obtained under intervention conditions, albeit in a different setting from the original intervention setting. To be considered a measure of setting generalization, continuous or probe measures must have been conducted in settings in which the full intervention protocol was not applied. Four additional studies were omitted from review for this reason (Greer, Neidert, Dozier, Payne, Zonneveld & Harper, 2013; Lane et al., 2009; Rispoli, Ninci, Burke, Zaini, Hatton & Sanchez, 2015; Todd, Horner & Sugai, 1999).

Results

Question 1: Prevalence of setting generalization measures. Four studies or approximately 3% of function-based interventions for students with EBD in school settings included measures of setting generalization. This in and of itself is a noteworthy result as it mirrors the findings of Rutherford and Nelson (1988) nearly 30 years prior. Although, recent reviews of other types of behavioral interventions and for other populations report a slightly increasing trend in the prevalence of generalization measures (e.g., life skills training for students with autism; Neely et al., 2015; functional communication training for children and adolescents with developmental disabilities; Falcomata & Wacker, 2013; cognitive behavioral therapy for adults; Swan, Carper,

Matthew, & Kendall, 2015), this has not been reciprocated within the FBA literature for students with EBD.

Question 2: Setting generalization outcomes. Among the four studies that included setting generalization measures, two were determined to be successful by study authors (Germer et al., 2011; Turton, Umbreit, & Mathur 2011). The remaining studies (Lo & Cartledge, 2006; Majeika et al., 2011) included generalization probes throughout intervention phases but incorporated no programming strategies to attempt to generalize treatment effects to the secondary settings when none were observed. Training effects on the target behavior failed to generalize to novel settings across all generalization probes.

Two studies that reported successful setting generalization contained critical limitations in that baseline data in the generalization setting were not obtained, thus limiting the ability to draw any conclusions as to the independent variable responsible for improved behavior in the generalization setting. In Turton, Umbreit, and Mathur (2011), 3 adolescents with EBD in a self-contained class at an alternative school received descriptive FBAs, the results of which were used to develop individualized function-based interventions. Using a multiple baseline across participants design, immediate improvements in the students' target behaviors were observed following the implementation of the intervention. The intervention for all three students occurred in the self-contained classroom, but due to its success, each student earned class time in less restrictive settings. It was in these settings where generalization measures were obtained. It is unclear based on the study design whether or not the function-based intervention produced the sustained rates of improved behavior in non-training settings. If initial training conditions occurred in an academic setting but subsequent generalization

measures were obtained in a related arts class, for example, it is quite possible the motivating operation for problem behavior was absent in the second setting and no intervention was needed in the first place.

Similarly, Germer et al. (2011) measured percentages of intervals with on-task behavior for a 7-year-old second grade student in a regular education classroom. Results of a descriptive functional behavioral assessment indicated the student's off-task behavior was likely occasioned by difficult classwork and maintained by peer/teacher attention and escape from academic demands. A multicomponent function-based intervention comprised of a seating change near a peer helper, visual schedule, self-monitoring, skills training to request breaks/help, token reinforcement, written teacher feedback, and extinction procedures was applied within an ABAB study design. Application of the package was accompanied by an increase in time on-task and withdrawal of the package resulted in a reduction in time-on task. Three generalization probes were collected during instructional activities in the afternoon. These probes occurred only during intervention phases. As with Turton et al. (2011), the lack of generalization data in baseline conditions precludes an interpretation of the generalization of intervention effects.

Question 3: Study designs. This leaves a single study which measured setting generalization within a study design that permits a valid analysis of setting generalization as a dependent variable. Lo and Cartledge (2006) evaluated the effects of a function-based packaged intervention on the off-task behavior of four elementary students. Results of descriptive FBAs indicated teacher attention was likely the primary reinforcer of problem behavior. The researchers then used skills training procedures to teach each student an appropriate attention recruitment behavior and instructed teachers to

differentially reinforce the replacement behavior while the target behavior was placed on extinction. Additionally, students were trained to self-monitor their performance and received tickets contingent upon high self-monitoring scores as a part of a class wide token economy. Clear improvements in rate of off-task behavior were immediately produced for each student in the intervention setting. Additionally, increased rates of the appropriate attention recruitment response were also observed for each student. Concurrent with the implementation of the intervention, generalization probes were obtained for each student in an alternate setting where intervention procedures were never applied. Researchers collected data on both the frequency of the replacement behavior and percentage of intervals with problem behavior. Although a slight improvement in problem behavior was observed in generalization settings, this could not be attributed to an increase in the use of the functional replacement behavior as the rate of appropriate attention recruitment responses remained at or near zero levels for all participants.

The generalization promotion strategy used in this study amounts to train and hope and therefore does not provide insight as to what features of the intervention led to behavior change in the generalization setting. Nonetheless, this study represents a single example of setting generalization with baseline probes in the functional behavioral assessment literature for students with EBD.

Limitations

Results of this review should be interpreted with consideration of the following limitations. First, restricting the inclusion criteria to include only school-based studies for students with EBD likely eliminated numerous informative studies. The distinction between clinical and school settings is often largely subjective. A self-contained

classroom at a school and group intervention in a hospital setting may be contextually identical. However, the description of the latter setting would have excluded it from inclusion in this review. Second, a similar case can be made for the arbitrary inclusion criteria regarding participant characteristics. Limiting the focus of the review to only students with or at-risk for high-incidence disabilities (i.e., learning disabilities, emotional disturbance, other health impairment, typically developing, etc.) excluded successful demonstrations of setting generalization for other populations within study designs permitting an analysis of generalization as a dependent variable (see Falcomata et al., 2013 for a review of generalization in FCT studies for individuals with autism). Finally, given the availability of such few studies that analyzed setting generalization as a dependent variable, the inclusion of multiple baseline across settings and ABAB withdrawal studies may have provided valuable information had these studies demonstrated co-occurring treatment effects in training and non-training settings as in the case of Lane, Smither, Huseman, Guffey, and Fox (2009).

Implications

Results of this literature review indicate a clear need for more frequent assessment of the generality of function-based interventions and the systematic analysis of independent variables responsible for producing generalized behavior change within functional behavioral assessment based interventions for students with EBD. Whether FBAs are useful assessments in school settings for this population is not in question. Clear evidence has been produced establishing school-based FBAs for students with EBD as, at the very least, an emerging evidence based practice (Gage, Lewis, & Stichter, 2012). Current investigations among the research community continue to deal more with

the generalizability of this technology to school practitioners in the absence of researcher or behavioral specialist support (Gable, Park, & Scott, 2014). Few researchers have studied, in addition to the generalizability of FBA technology, the generality of the intervention's effects.

There are likely both practical and conceptual reasons for the lack of setting generalization measures within FBA intervention research for students with EBD. First, setting generalization requires, at the very least, data collection in two different settings. Behavior change must first be demonstrated in an initial intervention setting and subsequently observed in a non-training setting. This requires more time, additional resources, and extra willing participants, all of which are in short supply in educational research. Second, if strictly influenced by a functional contextual perspective (Hayes, Barnes-Holmes, & Wilson, 2012), one should not expect behavior change observed in an intervention setting to transfer to non-intervention settings if the antecedent and consequent manipulations administered in the initial setting were not administered in secondary settings. Payne, Scott, and Conroy (2007) questioned that "because function is often very contextual and tied to specific settings or circumstances, will we find that the full range of FBA, FA, and intervention planning needs to occur for every context or condition the student encounters on a daily basis?" (p. 173). If results of the only study to measure setting generalization among function-based interventions for students with EBD (Lo & Cartledge, 2006) are any indication, then the evidence-based answer to their question is unfortunately *yes.*

However, the matter is far from resolved. Researchers continue to promote the importance of including assessments of setting generalization in function-based

interventions. Among the 128 function based intervention studies that did not include setting generalization measures, 13 cited the lack of generalization measures as a limitation of the study and recommended that future studies incorporate an assessment of setting generalization into study designs, thus endorsing its applicability to the overall utility of FBA based interventions (Bessette & Wills, 2007; Broussard & Northup, 1997; Bruhn, McDaniel, Fenrando, & Troughton, 2016; Cox, Griffin, Hall, Oakes, & Lane, 2011; Davis, Ninness, Rumph, McCuller, Stahl, Ward & Vasquez, 2008; Ervin, DuPaul, Kern & Friman, 1998; Lane, Barton-Arwood, Spencer & Kalberg, 2007; Lane, Capizzi, Fisher & Ennis, 2012; Lane, Little, Redding-Rhodes, Phillips & Welsh, 2007;; Lane, Rogers, Parks, Weisenbach, Mau, Merwin & Bergman, 2007; Lane, Smither, Huseman, Guffey & Fox, 2007; Liaupsin, Umbreit, Ferro, Urso & Upreti, 2006; Stahr, Cushing, Lane & Fox, 2006; Stichter, Hudson & Sasso, 2005; Turton, Umbreit, Liaupsin & Bartley, 2007; Umbreit, Lane & Dejud, 2004; Whitford, Liaupsin, Umbreit & Ferro, 2013)

Conclusion

Results of a review of 133 functional assessment based intervention studies for students with EBD revealed only four studies which assessed setting generalization. Of those four, one failed to produce generalized outcomes (Majeika et al., 2013), two produced generalized outcomes but did so within study designs that prevent the interpretation of a functional relation (Germer et al., 2011; Turton, Umbreit, & Mathur, 2003) and the remaining study produced generalized outcomes to a limited degree but did not incorporate specific programming procedures to accomplish this (Lo & Cartledge,

2003). In short, we have little to no evidence that function-based interventions are capable of producing setting generalization for students with EBD in school settings.

A logical conclusion if the absence of setting generalization is inherent to function-based interventions is that a student for whom an FBA is required and for whom an FBA-based intervention proves successful will remain bound to the setting in which the intervention is applied. For the student to successfully transition to multiple settings, the intervention protocol in its entirety must travel with the student. Very few post-secondary settings exist in which all environments a person may encounter is supervised and managed by another adult. Therefore, the search continues for FBA-based intervention technology capable of producing generalized behavior change.

Purpose and Research Questions

The primary purpose of the following study is to determine the extent to which behavior change resulting from a function-based intervention in a training setting generalizes to a secondary setting for students with or at-risk for emotional/behavioral disorders. To evaluate this research question, both the research design and intervention procedures used by Lo and Cartledge (2006) were adapted to assess programmed behavior change from an intervention setting to a generalization setting. In their study of the effects of functional communication training (FCT) with self-monitoring for four students with EBD, the researchers demonstrated a functional relation between the acquisition of a replacement behavior and co-occurring reduction in problem behavior in an intervention setting while concurrently assessing the transfer of effects in a generalization setting. Lo and Cartledge included three critical features that will be adopted and adapted to fit the current investigation.

First, the students in the exemplar study were taught a functional communicative response (FCR) as a replacement for the target behaviors using procedures congruent with functional communication training (FCT; Carr & Durand, 1985). Functional communication training is a differential reinforcement procedure whereby a socially acceptable communicative response meant to serve the same function as problem behavior is modelled, prompted, and reinforced while reinforcement for problem behavior is typically minimized or eliminated altogether (i.e., extinction; Hagopian, Fisher, Sullivan, Acquisto, & LeBlanc, 1998). Among individuals with developmental and intellectual disabilities, FCT is the most frequently studied function-based intervention and is supported by a substantial evidence base (Tiger, Hanley, & Bruzek, 2008). A cursory analysis of function-based interventions for individuals with high-incidence disabilities reveals FCT or procedures identical to FCT are commonly used. In fact, among the 133 studies reviewed in preparation for this study, 20 used differential reinforcement procedures to train what could be considered an alternative communicative response. While researchers in the field of EBD and high incidence disabilities do not typically refer to these intervention procedures as FCT, they are procedurally identical.

Second, Lo and Cartledge (2006) monitored both the presence of the target behavior (i.e., classroom disruptions) and frequency of the replacement behavior as dependent variables during the intervention. Among the studies that included setting generalization measures, this was the only to include measures of the functional replacement behavior in both intervention and generalization settings, even though all studies included some form of functional communicative response (FCR) as either the primary or supplementary intervention component. If the hypothesis is that an acquired

FCR in one setting will generalize to another and behavioral improvements will occur in both settings on account of the FCR, then it must be demonstrated that the FCR is exhibited in multiple settings. Inclusion of measures of the frequency of the FCR in addition to global improvements in problem behavior increases the internal validity of the study.

Finally, Lo and Cartledge (2006) conducted probes in the generalization setting during both baseline and intervention phases. The use of multiple probes in both baseline and intervention conditions permits a more rigorous analysis of generalization as compared to other reported demonstrations of setting generalization in which generalization probes were only conducted post-training (e.g., Germer et al., 2011; Turton, Umbreit, & Mathur, 2011).

Using all three of these features within a multiple-baseline across participants design, Lo and Cartledge (2006) demonstrated a clear functional relation between intervention procedures, the acquisition of a functional replacement behavior, and the reduction in classroom disruptions within initial intervention settings. Unfortunately, the effects of the training and intervention procedures failed to generalize to secondary settings.

As a possible explanation for the lack of observed setting generalization, Lo and Cartledge (2006) considered whether a lack of functional assessment of problem behavior in the generalization setting was a limitation in that it is impossible to know whether problem behavior in both settings belonged to the same response class. Referencing Heckaman, Conroy, Fox, and Chait's (2000) review of functional behavior assessments, Lo and Cartledge asserted that "'generality of behavior change would not be an automatic

outcome of intervention' if the behavioral functions are different" in either setting (Lo & Cartledge, 2006, p. 159). This suggests the hypothesis that generality of behavior change might be an automatic outcome of intervention if behavioral functions are the same in each setting. To control for an intervention's potential lack of generality due to targeting behaviors from dissimilar response classes, Lo and Cartledge recommended that researchers conduct functional assessments in both initial intervention and generalization settings. Therefore, in the present study a functional assessment of problem behavior was conducted in the generalization setting using indirect, direct, and experimental procedures to ensure the FCR trained in isolation belonged to the same functional response class as problem behavior in the generalization setting, thus extending the results of Lo and Cartledge.

The research question addresses the hypothesis that an FCR trained and reinforced in an initial intervention setting will generalize to other settings in which problem behavior serves the same function. However, there is reason to doubt at the onset that setting generalization will occur in the absence of additional programming. Although there are examples of FCT producing generalized responding in the absence of specific generalization programming procedures above and beyond those inherent to FCT (i.e., contact natural reinforcers and recruit reinforcement; Carr & Durand, 1992), most published FCT intervention studies that demonstrated successful setting generalization utilized additional programming procedures to facilitate generalized responding (Falcomata & Wacker, 2013). Therefore, it is likely that additional programming will be required to facilitate setting generalization in the present study as well. Fortunately, intervention procedures as designed by Lo and Cartledge (2006) contain components that

lend themselves to the cause. The use of self-monitoring as a component of functional communication training incorporates what Stokes and Osnes (1989) refer to as self-mediated verbal functional mediation. The self-monitoring form itself may function as a discriminative stimulus for appropriate responding in the generalization setting. If setting generalization fails to occur in the absence of specific programming procedures, students will be directed to transport self-monitoring materials to the generalization setting and apply the skills as trained for the intervention setting to the generalization setting.

The specific questions addressed are as follows: 1) Is there a functional relation between a function based intervention conducted in a training setting and improved behavior in a generalization setting? And 2) If no, will additional programmed generalization procedures lead to behavioral improvements in the generalization setting?

CHAPTER 3

METHOD

Participants

Recruitment procedures. Following formal approval of study procedures from the University of Louisville's Institutional Review Board (17.0130) and Jefferson County Public Schools' Data Request Management System, the researcher obtained permission from the principal of the selected study site to recruit teacher and student participants. Students receiving instruction in both pull-out resource and general education inclusion settings were ideal candidates. The researcher invited the school's three special education resource teachers to nominate students with or at-risk for emotional behavioral disorders (EBD) who exhibited frequent off-task and/or disruptive behavior (e.g., making noises, talking out of turn, out of seat, etc.). Students must have had access to at least two instructional settings or situations in which problem behavior occurred and likely served a similar function. Students with moderate/severe intellectual or developmental disabilities as determined by special education eligibility status were excluded from participation in this study.

The school's three resource teachers identified six students for consideration according to the preceding recruitment criteria. The six students were initially screened by a review of office discipline referrals and attendance records. Students with a history of poor attendance (i.e., three or more unexcused absences during the Spring semester) and/or exclusionary discipline from school (i.e., three or more out of school suspensions

during the Spring semester) were to be excluded from participation. Two students were screened out of the study due to truancy since the start of the Spring semester which is the acquisition of three or more unexcused absences as defined by Kentucky State Law 159.50. All four of the remaining students maintained adequate attendance and had acquired fewer than 3 days of suspension per student since the start of the Spring semester.

Each student received study recruitment letters along with parental consent forms. Parental consent was obtained on behalf of each student participant prior to the onset of the study. Next, the researcher obtained participant assent by explaining the purpose of the study, reading aloud the student assent letter, and answering questions related to the study. Each student agreed to participate in the study.

Finally, the researcher obtained consent to proceed with the study from each students' general and special education teachers.

Student participants. Three participants, Albert, Matt, and Darrion (all pseudonyms) agreed to participate and completed all phases of the study. A fourth participant, was initially enrolled in the study but was later withdrawn due to a schedule change resulting in the student's placement in the resource room when and where Matt was scheduled to receive training and generalization probes. The presence of both students in the same setting during the training of one but not the other would result in a potential confound for the latter participant. This occurred during the fourth week of data collection.

Albert. Albert was a 6-year-old White first-grader receiving special education services as a student with an emotional-behavioral disability. Albert received 80% or

more of his special education services in a self-contained classroom for students with behavioral and learning difficulties. Albert had recently been enrolled in his general education first grade class and received special education services in his grade level resource room; however due to repeated acts of physical aggression towards staff and peers, Albert was removed and permanently placed in the self-contained setting prior to the start of the study. Albert attended lunch and special area classes with his typically developing peers. All other academic and social skill instruction occurred in his self-contained classroom. Albert received occupational therapy, speech therapy, and mental health counseling as related services per his individual education program.

Albert had received six office discipline referrals during the 2016/2017 school year prior to the start of the study. Five of the six referrals were for fighting or striking a staff member or peer. Albert received a total of two days of suspension for the various infractions. Teacher reports indicated Albert rarely participated in academic instruction. Attempts to engage Albert in instruction frequently resulted in verbal confrontation in the form of cursing or threats and defiance in the form of work refusal, getting out of his seat, and destroying assignments.

Academically, Albert performed on grade level in reading and math as per informal teacher-made assessments. Albert's performance on standardized assessments were believed to be invalid due to noncompliance with testing procedures. Albert received occupational therapy services to address fine motor skill deficits and speech/language therapy to address articulation deficits.

Matt. Matt was a 9-year-old White fourth-grader receiving special education services as a student with a specific learning disability in reading. Matt received 40-80%

or more of his educational services in his general education classroom. Matt was nominated to participate in the study due to consistent academic noncompliance in the form of work refusal and task avoidance as per teacher reports. If given an academic task beyond his abilities, Matt would typically ignore the assignment until the teacher was available to assist him. While waiting for teacher assistance, Matt would disrupt others by talking to peers, playing with items at his desk, or getting out of his seat. Matt received zero office discipline referrals for the 2016/2017 school year at the time of the study. Matt received 150 mins of special education services in a resource room for math, reading, social skills, and English/language arts. Matt received an additional 30 mins of inclusion support in his general education Math class.

Academically, Matt performed at the 13th percentile in reading and 80th percentile in Math according to the Stanford Achievement Test (Stanford 10) administered on 5/15/2016. As per Matt's most recent IEP dated 2/17/2017, he read fluently at a DRA 4 which is estimated to correspond with a kindergarten reading level. Matt's struggles with reading fluency impacted his ability to comprehend grade level reading passages and likely contributed to his avoiding academic tasks.

Darrion. Darrion was an 11-year-old Black fifth-grader receiving special education services as a student with Other Health Impairment (attention deficit/hyperactivity disorder; ADHD). Darrion received 40-80% or more of his educational services in his general education classroom. Darrion received 60 mins of social skills instruction and 60 mins of English/language arts support in a resource room.

Darrion was nominated to participate in the study due to chronic disruptive behavior during instruction. Per teacher reports, Darrion was described as extremely

impulsive and hyper across all school settings. Darrion struggled with taking responsibility for his actions and often instigated confrontation among his peers.

Darrion had received seventeen office discipline referrals during the 2016/2017 school prior to March of the Spring semester. Darrion received an additional seven referrals after the start of the study for a total of 24 for the school year. Fifteen of the 24 infractions occurred in a classroom setting. Eight occurred on the bus and the remaining infraction occurred in the restroom. Darrion received 14 referrals for failure to respond to questions or requests by staff members. These infractions typically occurred after Darrion had disrupted the learning environment or instigated a confrontation with a peer, and a teacher attempted to address the issue. Darrion received five referrals for fighting/hitting another student, three referrals for horseplay, and one referral for taunting, baiting, or inciting a fight. Various consequences had been assigned in response to these infractions including numerous student conferences, silent lunch detention, walking laps during wellness class, parent conferences, bus suspension, assignment to the positive action classroom (PAC), and out of school suspension. Darrion was suspended a total of 4 days for fighting with other students since the start of the school year.

Academically, Darrion performed at the 1st percentile in language mechanics, 52nd percentile in mathematics, 27th percentile in reading, and 23rd percentile in science according to the Stanford Achievement Test (Stanford 10) administered on 5/15/2016. As per Darrion's most recent IEP dated 3/9/2017, Darrion's social emotional behavior deficits were the primary focus of his goals and services. Per teacher reports, his IEP team initiated an evaluation of Darrion's eligibility for special education as a student with an emotional/behavioral disability. However, due to time constraints and Darrion's

pending transition to middle school, the evaluation had been postponed to the start of next school year. Student participant demographics are summarized in Table 1 below.

Table 1

Student Participant Demographics.

Student	**Albert**	**Matt**	**Darrion**
Age	6	9	11
Grade	1	4	5
Race/Ethnicity	White	White	Black
Gender	Male	Male	Male
Disability	EBD	SLD	OHI

Note. EBD = emotional/behavioral disability; SLD = specific learning disability; OHI = other health impaired.

Teacher participants. Albert, was assigned to a self-contained classroom taught by Mr. D. with assistance from a teacher's aide, Mrs. J. Two of the three student participants, Matt and Darrion, were assigned to one resource room taught by Mrs. F.

Mr. D. was a 59-year-old White male in his 17th year of teaching. Mr. D. had earned a master's degree in education and maintained an endorsement in learning and behavior disorders K-12. Mr. D. taught exclusively in the self-contained resource room for students with learning and behavioral difficulties. At most, 10 students were assigned to this room at any given time. Mr. D. reported having received formal training in functional behavior assessment and intervention planning through his course work throughout his undergraduate and master's degrees. Additionally, Mr. D. received ongoing training through district-wide professional development.

Mrs. F. was a 27-year-old White Female in her third year of teaching. Mrs. F. had earned a bachelor degree in education and was certified to teach special education with a K-12 endorsement in learning and behavior disorders. Mrs. F. maintained a special

education caseload of 15 fourth and fifth graders. Mrs. F. transitioned between her resource room in which 2-6 students received small group instruction and inclusion classrooms in which she provided assistance and co-taught with the general education content area teacher.

Mrs. F. reported having received formal training on functional behavior assessment and intervention planning through her school district in the form of professional development. Additionally, Mrs. F. previously worked as a behavioral technician at a private school for students with autism spectrum disorder where she implemented behavior plans under the supervision of a board-certified behavior analyst. Teacher demographics are summarized in Table 2 below.

Table 2

Teacher Participant Demographics

	Mr. D.	**Mrs. F.**
Age	59	27
Race/Ethnicity	White	White
Gender	Male	Female
Position	SPED teacher	SPED teacher
Grade level taught	1-5	4-5
Years taught	17	3
Degree	Master	Bachelor
Certification	LBD K-12	LBD K-12

Note: SPED = special education; LBD = learning and behavior disorders

Settings

Study site. This study occurred at a public elementary school (grades preschool-5) in a large urban district within the Louisville metropolitan area. According to the most recent data available from the Kentucky Department of Education, 480 students attended the school during the 2015/16 school year, 82% of whom received free or reduced lunch. Sixty-four percent of the students were classified as racial minorities (38% African

American, 19% Hispanic, 6% Asian, 1% American Indian, Alaska Native, Native Hawaiian, or Other Pacific Islander) with an additional 7% classified as multi-racial. The remaining 29% of the student body was classified as White (not Hispanic). Thirteen percent of the students received special education services. All study procedures occurred during the Spring semester of the 2016/2017 school year beginning in March and concluding on the final day of school in May.

Training setting. Functional communication training with self-monitoring (hereafter referred to as "FCT") sessions were conducted in isolated settings for each participant. Albert's training occurred in three locations according to room availability at the time of his scheduled trainings. One training occurred in the Positive Action Curriculum (PAC) intervention room located across the hall from his self-contained classroom. The PAC room offers students in need of temporary removal from classrooms an opportunity to cool down and return to class. This room was made available when not in use by other students. The PAC room contained two teacher desks and one round table where training took place. Five trainings occurred in the family resource center adjacent to Albert's self-contained classroom. This office contained two staff member desks and one round table. Numerous books, toys, and activities lined bookshelves around the room. Training took place at the round table. The final location where Albert's training took place was in a multi-purpose office typically used by independent service providers. The room contained multiple student desks and one teacher desk with numerous shelves for supplies. Albert's training took place with him seated at a student desk. No additional teachers or students were present during Albert's training in any setting.

Darrion and Matt received training in a partitioned corner within their resource room. Darrion and Matt's resource teacher, Mrs. F., expressed two concerns about her students' receiving training in isolation. First, given the timing of the study related to standardized testing, Mrs. F. wanted to minimize the amount of transition time between settings to maximize her students' instructional time. Second, Mrs. F. wanted to minimize any potential liability involved with the researcher working in isolation with her students. Mrs. F. expressed a concern that a study participant had a history of fabricating confrontation between himself and staff members. She requested training and intervention take place in her classroom where she could monitor the intervention and provide accountability. Figure 1 illustrates Matt and Darrion's training setting as indicated by the arrows below.

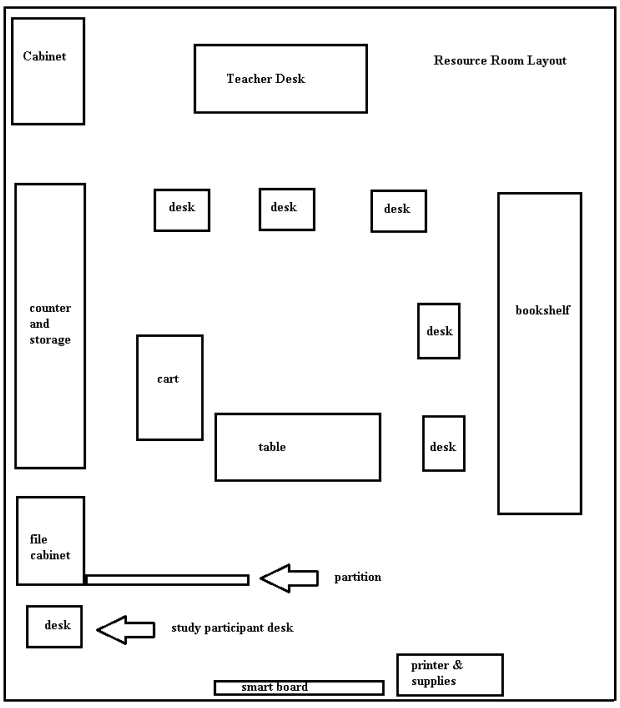


Figure 1. Resource room layout where Matt and Darrion received FCT.

Generalization settings. Concurrent with functional communication training sessions, generalization probes were conducted in each student's resource room during independent work time. Additional generalization probes were conducted in each student's general education setting prior to the conclusion of the study.

Albert received resource instruction in a self-contained classroom taught by Mr. D. with assistance from Mrs. J. The room served up to ten students with learning and behavioral difficulties. Mr. D. conducted small group intervention and whole class instruction in the morning; therefore the afternoon was targeted for generalization probes. From 12:30 to 1:00 P.M., Mrs. J. facilitated independent work time among the students while Mr. D. had a planning period. In practice, however, Mr. D. frequently interacted among the students by assisting with behavioral and learning challenges as they arose. Each student was given a worksheet comprised of academic tasks on the student's independent work level as per IEP goals. Students were expected to work quietly and independently for the total duration of the scheduled independent work time. If students needed assistance they were directed to raise their hand and wait for Mrs. J. or Mr. D. to assist them. Mr. D. implemented a discipline system whereby student's names were written on the chalkboard for behavioral infractions. Students had to earn letters off their name by complying with classroom procedures. If students had any letters of their name still on the board when independent work time expired, they had to continue working on an assignment until all letters were removed. This prevented students from accessing preferred activities such as recess or computer time thus providing motivation for students to keep their names off the board. Figure 2 presents the physical layout of Albert's resource room during generalization probes.

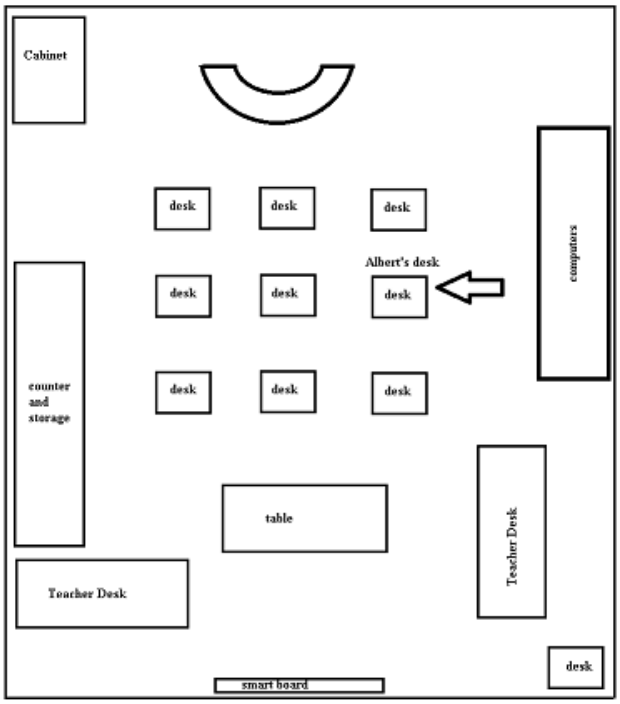


Figure 2. Layout of Albert's classroom during generalization probes in a resource room.

Matt and Darrion each received remedial instruction in core academic content from Mrs. F. in a resource setting. Mrs. F. shared a standard classroom with another special education teacher who taught resource to grade K-3 students on the other side of the room. The room was divided in half by a 4' bookshelf. Mrs. F. typically conducted small group instruction with her students seated at individual student desks while she sat at a rectangular table with a white board and flip chart paper rolling cart used for direct instruction. For the purpose of this study, the researcher directed Mrs. F. to assign 5-10-min independent tasks on each student's independent level as determined by IEP goals. Once the study participant began the assigned task, Mrs. F. would frequently sit at her teacher desk and administer individual assessments (e.g., reading fluency probes) to other students not enrolled in the study.

Mrs. F. enrolled each of her resource students in the school-wide Tier II check-in check-out (CICO) program. At the start of each day, the students received a CICO daily progress report with three to four behavioral expectations listed as column headings and five to ten intervals listed in rows corresponding to areas of concern for the individual student. Each student received feedback from his teacher or supervising adult after each interval in the form of a 0-2 rating and written comments. Provided the student received 80% or more of available points per day, he could choose a prize from the class store maintained and supplied by Mrs. F. The class store was comprised of various snack foods, sweet treats, school supplies, and dollar store style prizes. Both Matt and Darrion participated in the CICO program across all settings. Figure 3 presents the physical layout of Matt and Darrion's resource room during generalization probes.

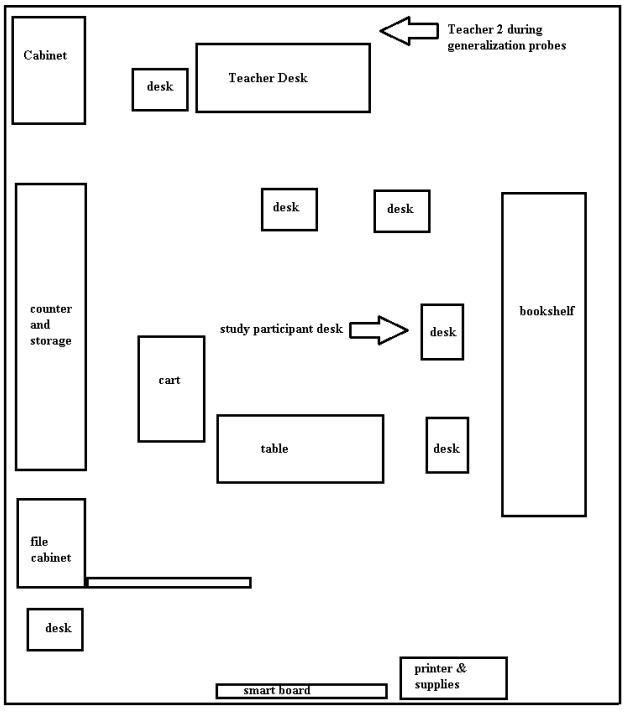


Figure 3. Layout of Matt and Darrion's classroom during generalization probes in a resource room.

Finally, at the conclusion of the study, each student received an opportunity to demonstrate the application of programmed generalization procedures in his general education classroom. Although Albert had been permanently removed from his general education classroom prior to the start of study, Albert's principal, special education teacher, general education teacher, school psychologist, and mother all agreed to permit Albert access to his general education classroom for 5-10 min generalization probes with assistance and supervision from Mrs. J. Albert participated in three generalization probes in his general education classroom during small group rotations which occurred from 12:30 to 1:00 p.m. Albert's class was comprised of approximately 25 first-grade students. Student desks were arranged in groups of six. Students moved in groups of six through four centers during this time. The classroom teacher led small group reading instruction either at a kidney shaped table or on the carpet. Albert was directed to sit at a seat and complete an assignment similar to those he had been completing in his resource room during independent work time. Following completion of the activity, Albert was taken back to his resource room to resume activities per his normal schedule.

Both Matt and Darrion demonstrated programmed generalization procedures in their general education classrooms. Matt participated in two general education generalization probes while Darrion completed one. Each student attended his grade level classroom comprised of approximately 30 students and one teacher. Matt's general education generalization probes occurred in the morning during independent writing at the end of the school year. Each student was required to write a reflection of the school year to be included in the student's end of year portfolio. A graphic organizer with

written prompts was given to each student, and students were expected to respond to the prompts independently.

Similarly, Darrion's generalization probe occurred in the morning on the second to last day of school. Darrion's class had been assigned an end-of-year reflection graphic organizer with which they were to list, draw, or write about memories of their last year of elementary school. Darrion was expected to complete the activity independently.

Materials

Reinforcer inventory. Various dollar store items each costing less than $.25, edible reinforcers, and coupons representing various activities and privileges were compiled by participating teachers to create a reinforcer inventory from which students selected one item prior to each baseline and training session. Examples of items in the reinforcer inventory included edibles (e.g., M&Ms, jolly ranchers, skittles, potato chips), school supplies (e.g., erasers, pencils, folders) and privilege coupons (e.g., 5 mins of extra computer time, 10 mins of basketball with the researcher).

Apple iPad 2®. The iPad was used to record all functional analysis, baseline, training, and generalization sessions. Videos were transferred to a password protected computer and subsequently reviewed and scored by the researcher and secondary observer when necessary for reliability measures. All videos were deleted from the iPad and computer following coding.

MotivAider®. A MotivAider® is an electronic buzzer designed to produce discrete vibrations that signal the end of a pre-set interval. The MotivAider® was set to 2-min fixed intervals and was given to each student at the start of FCT and programmed generalization sessions.

Self-monitoring form. Multiple copies of the self-monitoring forms located in Appendix N and O and shown below in Figures 4 and 5 were pre-printed and given to students in advance of FCT and programmed generalization sessions. A separate self-monitoring form was created for lower elementary students (Albert) and upper elementary students (Matt & Darrion).

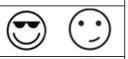
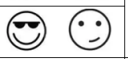
	Stay in Seat 	Work quietly 	Try your best 	Student Signal
1				
2				
3				
4				
5				
Count your cool dudes				Total =

Figure 4. Lower elementary self-monitoring form

	Stay in Seat	Work quietly	Try your best	Raise Hand
1	0 1	0 1	0 1	
2	0 1	0 1	0 1	
3	0 1	0 1	0 1	
4	0 1	0 1	0 1	
5	0 1	0 1	0 1	
Total				Total =

Figure 5. Upper elementary self-monitoring form

Graph paper. 8.5x11 in graph paper with pre-printed axes and labels (Appendix P) was used to assist students in recording performance scores during FCT and programmed generalization sessions.

Raise-your-hand reminder card. A handwritten card similar to the one shown below in Figure 6 was used during each FCT and programmed generalization session as a written prompt to use the functional communicative response.

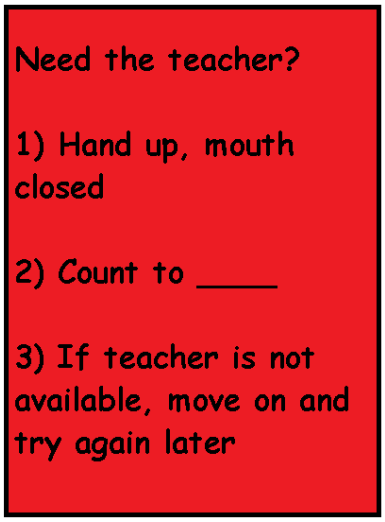


Figure 6. Raise-your-hand reminder card.

Teacher selected assignments. Students were given an academic task selected by their resource teachers in advance of each baseline, FCT, and generalization sessions. Teachers were directed to select academic tasks that could reasonably be completed in 5-10 min but were functionally related to problem behavior as indicated by functional behavior assessment results.

Dependent Variables

The primary dependent variable in both intervention and generalization settings was the frequency of a socially acceptable functional communicative response (FCR; i.e., hand-raising) measured as a count /min. The topography of the replacement behavior was selected to reflect classroom procedures within the specific setting. Across all settings, teachers expected students to raise their hand, wait quietly, and communicate their request when acknowledged by the teacher. Therefore, hand-raising was chosen as the FCR to replace problem behavior for all three participants.

The secondary dependent variable was percentage of intervals with problem behavior defined globally to accommodate a range of each participant's specific

interfering behaviors. In accordance with the literature on function based interventions for students with high incidence disabilities, problem behavior most consistently targeted for remediation is referred to as off-task or disruptive behavior and is characterized by talking out of turn, inappropriate and disruptive speech, failing to engage with instructional materials within a certain period, getting out of seat, walking or running from designated area, making noises, and throwing objects. Off-task and disruptive behavior was targeted together as problem behavior. Problem behavior was measured via partial interval recording procedures as a percentage of total observation time.

Table 3 includes detailed operational definitions for both primary and secondary dependent variables.

Table 3

Operational Definitions of Dependent Variables

Dependent Variable	**Operational Definition**
Functional Communicative Response	Student raises hand raised above the shoulder without making noise until acknowledged by the teacher *Examples:* • Hand raised above the shoulder while continuing to work quietly on the assignment until teacher calls on the student • Hand raised above the shoulder while waiting quietly for teacher until teacher nonverbally acknowledges the child (e.g., nods head, holds up a "one minute" finger sign) *Non-Examples:* • Student raises his hand but puts it down before being acknowledged by the teacher • Student raises hand above the shoulder while stating "I need help" • Student raises his hand while he gets out of his seat to go ask the teacher a question • Student extends hand in front or out to his side but not above the shoulder
Problem Behavior	

Off-task	Student is oriented away from task materials for five or more seconds, delays engagement with materials for five or more seconds, or leaves his seat/designated area without permission *Examples:* • While seated, student spins his pen in his fingers while staring off into space for 5 seconds • Student drops pen on the floor and gets out of his seat to retrieve the pen • Student sits back down and looks in the direction of other students for 5 seconds. *Non-Examples:* • Student is assigned an extended reading passage. Student is oriented towards the materials even though it is unclear he is engaging with the content • Student converses with teacher after requesting help with a task
Disruption	Student makes noises, shouts or talks out without permission, taps or beats on desk, distracts peers, or throws objects *Examples:* • Student shouts out a response during group instruction when teacher has directed students to raise their hands • Student silently makes faces or gestures to other students behind the teacher's back • Student raises hand and says "I need help" • Student raises hand and says "I'm done!" • Student whistles or sings to himself *Non-Examples:* • Student reads a passage aloud quietly • Student drops his pencil on the floor • Student shouts out an answer relevant to instruction when directed by teacher to participate without hand-raising

Interobserver Agreement

A minimum of 25% of all pre-recorded FA, baseline, training, and generalization sessions within each phase were coded by a secondary observer to obtain reliability scores. The secondary observer was recruited among graduate students within the department of special education in the College of Education and Human Development at the University of Louisville. The secondary observer had been informed of the purpose of the study and general study procedures. Operational definitions (see Table 3) of both problem behavior and functional communicative response were presented and discussed

with the secondary observer. Five-min video clips of the student participants obtained during direct observations as a part of the functional assessment were used as training videos. The researcher modelled coding of the video using the data collection forms included in Appendix Q while discussing justification for specific codes. A one ("1") was recorded in any interval containing an instance of problem behavior. A zero ("0") was recorded in any interval in which no problem behavior was observed throughout the entire interval. A plus ("+") was recorded in an adjacent box each time the functional communicative response (FCR) was correctly exhibited. The secondary observer was provided the opportunity to ask questions and participate in discussion as questions arose. Following discussion and resolution of questions, the researcher and secondary observer then independently coded three 5-min video clips for the presence of problem behavior and instances of the FCR.

Interobserver agreement for problem behavior across the three observations was calculated using interval-by-interval procedures (Cooper, Heron, & Heward, 2007). The number of intervals with agreements were divided by total number of scored intervals to obtain a percentage of total intervals with agreements as demonstrated below.

$$\frac{\text{\# of intervals with agreement}}{\text{total \# of scored intervals}} \times 100 = \text{interval-by-interval IOA\%}$$

The target percentage to establish initial interobserver agreement for problem behavior was 80% across three consecutive observations. Three consecutively scored observations resulted in reliability scores of 90%, 97%, and 80% for an average reliability score of 89%.

Interobserver agreement for the functional communicative response (i.e., hand-raising) was calculated using total count measures. Total count interobserver agreement

was obtained by dividing the smaller count by the larger count multiplied by 100 to obtain an IOA percentage as demonstrated below.

$$\frac{\text{smaller } n}{\text{larger } n} \times 100 = \text{total count IOA\%}$$

Although total count is reported to be among the least reliable methods for calculating IOA (Cooper, Heron, & Heward, 2007), the discrete topography of hand-raising coupled with the explicit criterion that hand-raising must be acknowledged by the teacher to be counted as such increased the probability of accurate coding. Therefore, total count measures were chosen to compute reliability for hand-raising. The researcher and secondary observer scored 100% across three consecutive observations during observer training. Tables 4 and 5 present IOA between the primary researcher and secondary observer for functional communicative responses and problem behavior across all conditions.

Table 4

Mean Interobserver Agreement for Functional Communicative Response (Range)

	Albert	**Matt**	**Darrion**
Baseline	100 (n/a)	100 (n/a)	100 (n/a)
FCT	95 (90, 100)	100 (n/a)	100 (n/a)
Generalization	100 (n/a)	100 (n/a)	100 (n/a)
Programmed Generalization	91.7 (93.3, 100)	100 (n/a)	100 (n/a)

Note. FCT = functional communication training with self-monitoring; all scores represent correct responses /min.

Table 5

Mean Interobserver Agreement for Problem Behavior (Range)

	Albert	**Matt**	**Darrion**
Baseline	84.9 (73.3, 96.5)	87.0 (82.6, 91.3)	94.4. (92.1, 96.8)
FCT	80.0 (76.2, 84.6)	77.0 (62.5, 92.2)	97.5 (95, 100)
Generalization	94.0 (90.3, 96.7)	98.2 (96.4, 100)	98.15 (96.2, 100)
Programmed Generalization	79.2 (69.4, 88.9)	94.7 (89.5, 100)	93.3 (n/a)

Note. FCT = functional communication training with self-monitoring; all scores represent percent of intervals with problem behavior.

Response Definitions and Measurement Procedures

All functional analysis, baseline, training, and generalization sessions were video recorded using an Apple iPad 2 ® tablet computer. The purpose of recording was to facilitate accurate initial coding and to aid in obtaining reliability measures. To accommodate confidentiality concerns raised by the Data Request Management System administrators of Jefferson County Public Schools, all videos were deleted following initial data recording from the researcher or after secondary coding for reliability purposes if necessary.

Functional analysis. The researcher served as the interventionist during each functional analysis (FA) session. Ten second partial interval recording procedures were used to establish the prevalence of problem behavior during three test conditions and three control conditions per student. Multiple FA sessions were conducted per day with each session separated by at least two min. Elevated rates of responding in the test condition compared to near zero rates in the control condition was considered

confirmation of a functional relation between test conditions and problem behavior. One test condition and one control condition per student of the functional analysis sessions were scored by the secondary observer to obtain interobserver agreement.

Baseline. The researcher served as the interventionist in each baseline session. The researcher assigned each student an academic task and directed him to complete the task quietly and independently. Baseline session lasted between 5 and 10 mins and were video recorded. Video recordings were subsequently reviewed and evaluated for the presence of problem behavior by the researcher using 10-second partial interval recording procedures. A count /min measure was used to record the occurrence of hand-raising. Observations in the baseline session occurred once per day.

Functional communication training. The researcher served as the exclusive trainer for each student participant. Students were trained to use an alternative communicative response (i.e., hand-raising) as a functionally equivalent replacement to problem behavior (FCR) and to self-monitor his use of the FCR during ongoing training sessions. An initial training session to introduce students to the materials and procedures lasted approximately 10-mins in length. This training session was scored via self-report by the researcher according to treatment integrity criteria outlined in Appendix F.

Ongoing training sessions occurred in isolation for each student participant. These training sessions were video recorded and later reviewed and coded by the researcher for the presence of problem behavior and occurrences of the FCR as per procedures outlined above.

Generalization. Generalization probes were conducted in resource settings for each student for no less than 33% of baseline and FCT sessions. Measurement

procedures were identical to those described above for baseline and FCT conditions. All sessions were video recorded and subsequently scored using 10 second partial interval procedures for the presence of problem behavior by the researcher. A count /min was used to record the occurrence of hand-raising.

Study Design

A multiple baseline across participants design (Gast & Ledford, 2014) was used to analyze the relation between FCT, problem behavior, and hand-raising across training and generalization settings. Multiple baseline designs are characterized by the staggered introduction of the independent variable. Within these study designs, a functional relation may be inferred if behavior change is observed among participants' data only after the introduction of the independent variable (Horner et al., 2005). Threats to internal validity by way of confounding variables are controlled by staggering the introduction of the independent variable across participants.

A multiple baseline across participants design was chosen due to the inclusion of skills training procedures (i.e., FCT) as a component of the independent variable. As a general rule, if an intervention involves instruction as an independent variable and skill acquisition as a dependent variable, this would potentially produce an irreversible effect which precludes the use of ABAB withdrawal or reversal designs to show a functional relation. A multiple baseline design is most appropriate due to the irreversibility of skill acquisition (Gast, Lloyd, & Ledford, 2014).

Furthermore, the ABAB withdrawal design involves the removal and subsequent reapplication of a potentially effective intervention to observe repeated effects on the dependent variable. Such procedures are often contraindicated when addressing problem

behavior of students with EBD due to a likelihood of aggressive responses. For these reasons, a multiple baseline across participants was the most appropriate study design.

Experimenter and Data Collectors

The researcher, a doctoral candidate in Curriculum and Instruction at the University of Louisville, served as primary interventionist and data collector in all functional assessment, baseline, training, and generalization settings. The researcher is a board-certified behavior analyst (BCBA) with 10 years' experience as a special education teacher of students with high incidence disabilities and a behavioral therapist of children with developmental and intellectual disabilities. A secondary observer, a special education graduate student within the College of Education and Human Development at the University of Louisville, provided reliability measures across all assessment, baseline, training, and generalization settings. The secondary observer held a K-5 Kentucky teaching license and had six years' experience as a public-school teacher of Kindergarten and first grade students.

Study Procedures

Functional assessment. A functional behavioral assessment was conducted for each student which included indirect assessments (i.e., records review and teacher interview), direct observation of problem behavior in multiple academic settings, and experimental verification of hypothesized function in the form of a functional analysis.

Records review. Student participant cumulative records were reviewed for data relevant to the topography and function of target behaviors. Specific documents targeted within the cumulative records were office discipline referrals, attendance records, and academic performance. The researcher reviewed each student's Individualized Education

Plans and psychoeducational evaluations. The purpose of the records review was to identify variables potentially related to the form and function of problem behavior to assist with the development of an operational definition of problem behavior.

Indirect assessment. The researcher administered The Functional Assessment Checklist for Teachers and Staff (FACTS; March et al., 2000) to Mr. D. and Mrs. F. Although developed as a written protocol to be completed independently by teachers, the FACTS can be used to guide a structured discussion between an interviewer and responder. Mr. D. completed the FACTS on behalf of Albert, and Mrs. F. completed the FACTS on behalf of Matt and Darrion. The purpose of this indirect assessments was to involve the resource teacher in the process of developing a testable hypothesis regarding the function of problem behavior. Indirect assessments, while not sufficient in and of themselves to produce a valid and reliable evaluation of behavioral function, may serve to increase buy-in from the consumers of behavior support services (Hanley, 2012). Additionally, indirect assessments can be a useful tool to highlight idiosyncratic conditions functionally related to the occurrence of problem behavior but are easily overlooked by outside specialists during direct observations (Anderson & St. Peter, 2013).

Operational definition of problem behavior. The researcher in collaboration with the resource teachers developed a working definition of problem behavior from data collected during indirect assessments and the records review. This operational definition was unique to each student and was comprised of all topographies of behavior likely to serve the hypothesized function.

Direct observation. The researcher then conducted one 10-30 mins direct observation of each student in both resource and general education settings during activities where problem behavior was reported likely to occur. Direct observation recording forms located in Appendix Q were used to document and confirm the presence of the purported contingent relation between antecedent conditions, occurrences of problem behavior, and maintaining consequences.

Hypothesis development. In collaboration with the resource and general education teachers for each student, the researcher generated a hypothesis of behavioral function derived from records review, indirect assessments, and direct observation using the competing pathways template diagrammed in Figure 7. The functional hypothesis statement included the antecedent conditions most likely to evoke problem behavior, the operational definition of problem behavior, and functional consequence(s) most likely maintaining the problem behavior.

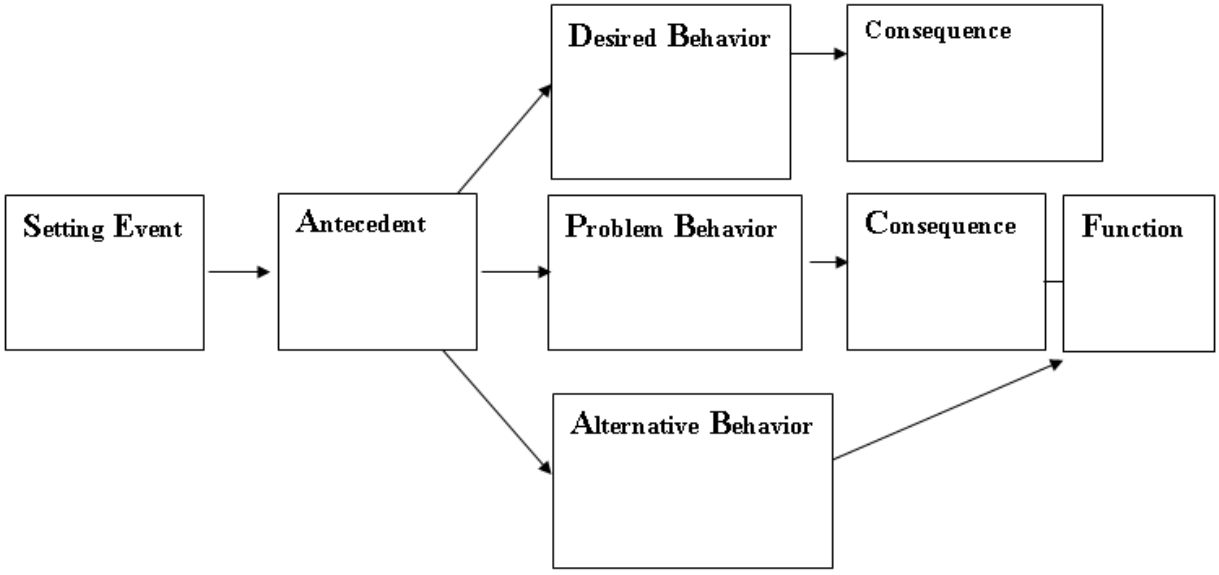


Figure 7. Competing behavior pathway diagram. (Adapted from O'neill et al., 1997).

Verification. The researcher then designed functional analysis test conditions to be implemented in each student's resource setting. The purpose of the functional analysis was to verify the accuracy of the hypothesis statement. The researcher followed functional analysis procedures as described by Hanley, Jin, Vanselow, and Hanratty (2014) which are referred to as synthesized contingency analyses (SCA). SCAs differ from standard functional analysis procedures (e.g., Iwata, Dorsey, Slifer, Bauman, & Richman, 1994) in that multiple putative reinforcers are not tested in separate test conditions compared to a control condition. All suspected reinforcers are included in a single test condition and are compared to a single control condition in which the establishing operation for problem behavior is mitigated or altogether absent.

For example, a student who exhibits problem behavior believed to serve both an escape and attention function during independent seat work would be administered a single test condition in which both escape from the task and teacher attention are programmed to occur contingent upon problem behavior during brief (i.e., 2-5 mins) sessions. The control condition would involve preempting the behavior-reinforcement contingency by decreasing the motivating operation for escape (e.g., reducing the difficulty of the task or removing the task demand altogether) and providing adult attention on a fixed-time schedule.

Figure 8 represents an example of an SCA generated graph of the hypothetical scenario described above. SCAs represent an evolution of analog functional analyses and are meant to address several often-cited limitations of the procedures first described by Iwata, Dorsey, Slifer, Bauman, and Richman (1982) Hanley (2012) offers a detailed

discussion and proposed remediation of the limitations often associated to functional analysis procedures.

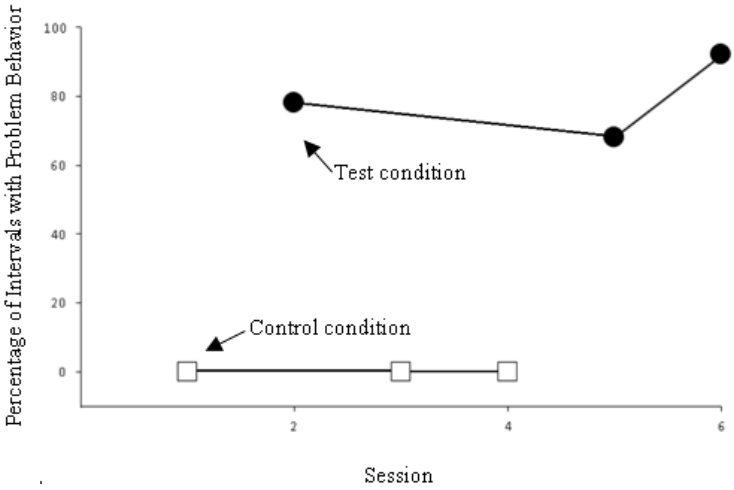


Figure 8. Example of a graph resulting from a synthesized contingency analysis

For this study, test and control conditions were unique to each participant due to the idiosyncratic nature of problem behavior for students with high-incidence disabilities in complex educational settings (Anderson & St. Peter, 2013). Specific FA procedures are described in detail for each student in Appendices A-C.

Functional analysis sessions were 5 mins in length and alternated between test and control conditions in a counter-balanced manner to control for sequencing confounds. Provided differentiated responding is observed between test and control conditions, functional analysis test sessions may be considered baseline data against which interventions can be compared (Hanley, Jin, Vanselow, & Hanratty, 2014). For each participant, the final two test sessions from the functional analysis served as the first two baseline sessions within the study. The purpose of this technique is to reduce the total number of baseline sessions needed to establish pre-intervention level and trend thus reducing the time between assessment and intervention.

Functional Behavioral Assessment Results.

The functional behavioral assessment for each student included an indirect assessment interview using the Functional Assessment Checklist for Teachers and Staff (FACTS), direct observation of the student in his resource classroom, and functional analysis of problem behavior conducted in each student's resource classroom. Results of the FBA are presented for each student below.

Albert. The researcher in collaboration with Albert's resource teacher, Mr. D., completed the Functional Assessment Checklist for Teachers and Staff (FACTS; Appendix R). Mr. D. indicated that Albert's primary interfering behaviors included screaming, crying, cursing, yelling, back talk, task avoidance, lying on the floor, getting out of his seat, threats, and physical aggression towards peers. These behaviors occurred at all times throughout the day primarily in the self-contained setting during independent academic tasks with heavy writing components. These behaviors were more likely to occur before lunch when Albert was hungry or when he was directed to transition from free time on the computer to an academic task. Mr. D. hypothesized these behaviors were most likely reinforced and maintained by escape in the form of task avoidance. Results of the FACTS were used to complete the competing behavior pathway for Albert. Figure 9 depicts responses derived from Albert's FACTS interview.

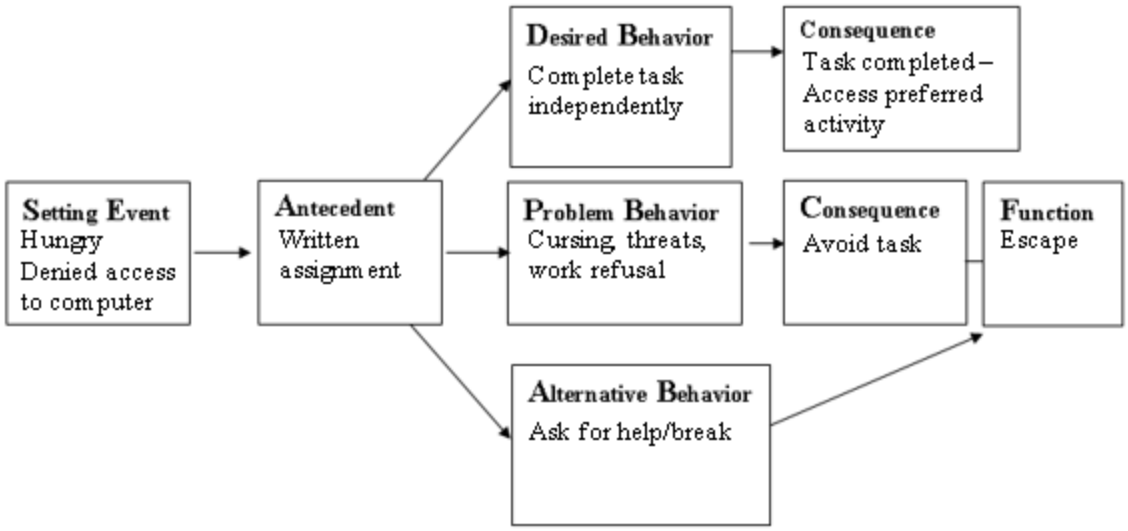


Figure 9. Competing pathways diagram for Albert

A functional analysis was conducted between a test condition in which Albert was assigned an academic task with a written component and a control condition consisted of a similar academic task to be completed on the computer. In the test condition, problem behavior resulted in the researcher attending to Albert and offering assistance or offering to remove items from his worksheet. In the control condition, problem behavior was ignored and the researcher attended to Albert on a fixed-time (i.e., FT-20 sec) schedule to offer assistance and encouragement. Figure 10 displays results from Albert's functional analysis.

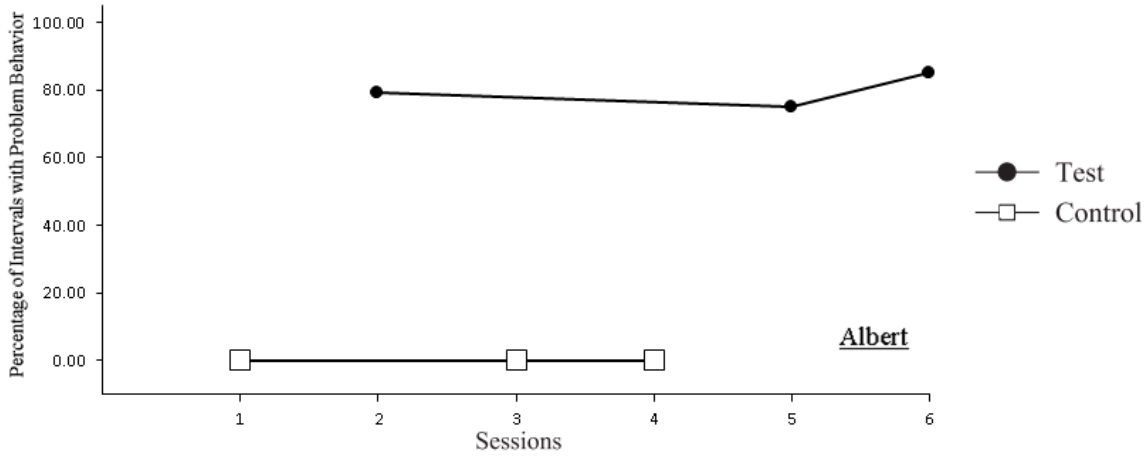


Figure 10. Functional analysis results for Albert.

The FA revealed differentiated responding with zero rates of problem behavior in the control condition (M = 79.7) and elevated rates of problem behavior in the test condition demonstrating a high degree of experimental control (Jessel, Hanley, & Ghaemmaghami, 2016). As anecdotal evidence supporting the hypothesis that Albert's problem behavior was maintained by task avoidance instead of teacher attention, during the FA control condition, Albert repeatedly told the researcher to "get away" or "leave me alone."

Results of Albert's functional behavioral assessment indicated problem behavior was likely evoked by task demands with written components and reinforced by escape from the task demands or task avoidance. As a replacement to escape maintained problem behavior, Albert was taught to raise his hand and ask for assistance or for items to be removed from his worksheet.

Matt. The researcher in collaboration with Matt's resource teacher, Mrs. F., completed the Functional Assessment Checklist for Teachers and Staff (FACTS; Appendix S). Mrs. F. indicated that Matt's primary interfering behaviors included task avoidance (e.g., staring off into space), work refusal, and disruptive behaviors (e.g.,

shouting out). Although Matt engaged in task avoidance in most academic settings, he became disruptive and argumentative primarily in the resource room in response to being redirected to his classwork. Matt frequently shouted out requests for help or statements such as "I can't do this" or "this is boring." These behaviors were more likely to occur when Matt did not take his medication. Task avoidance reportedly occurred exclusively during assignments with heavy reading components. Due to Matt's significant deficits in decoding, fluency, and comprehension, any assignment which required independent reading would likely be aversive to him. Mrs. F. hypothesized these behaviors were most likely reinforced and maintained by escape in the form of task avoidance or assistance from the teacher. Results of the FACTS were used to complete the competing behavior pathway for Matt. Figure 9 depicts responses derived from Matt's FACTS interview.

Competing Behavior Pathway. Figure 11 depicts responses derived from Matt's FACTS interview.

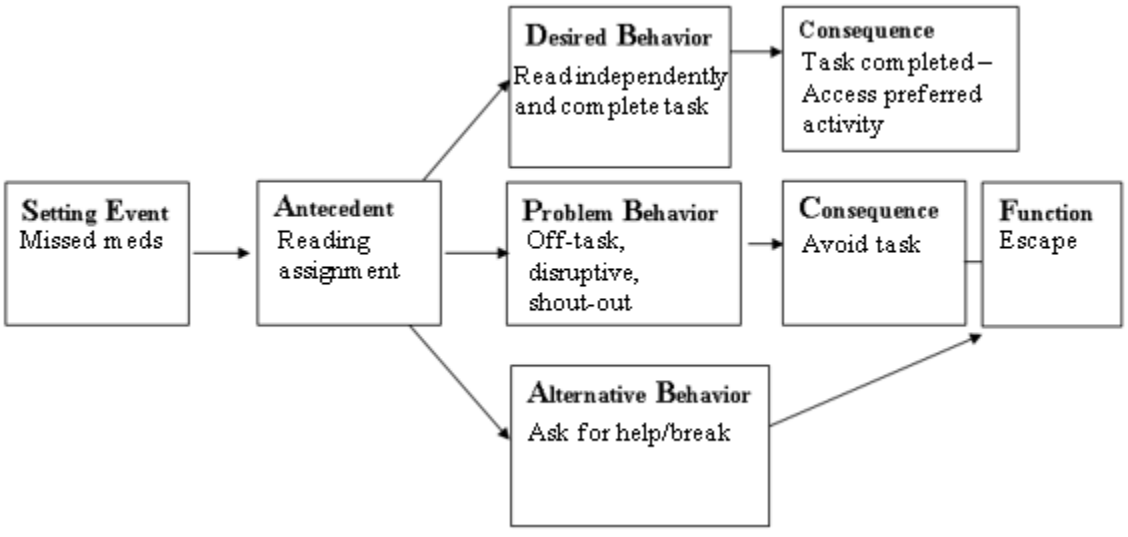


Figure 11. Competing pathways diagram for Matt

A functional analysis was conducted between a test and control condition in both of which Matt was assigned a grade level academic task with a reading component. In

the test condition, the researcher provided help and encouragement with the assignment for approximately 20 s following instances of problem behavior. In the control condition, the researcher provided consistent assistance noncontingent to problem behavior and problem behavior was ignored. Figure 12 displays results from Matt's functional analysis.

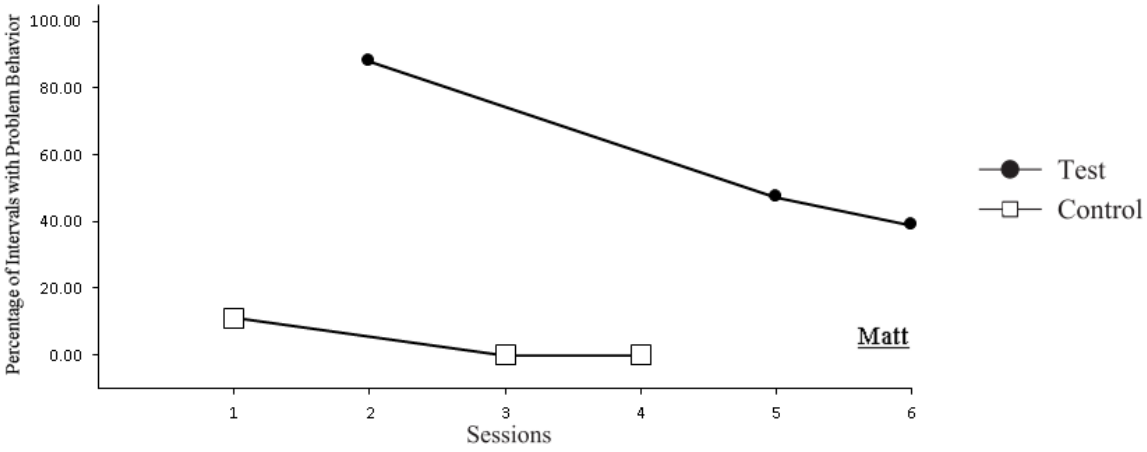


Figure 12. Functional analysis results for Matt.

Matt's FA revealed differentiated responding with high rates of problem behavior in the test condition (*M* = 58.07) and near zero rates (*M = 3.67)* of problem behavior in the control condition demonstrating a high degree of experimental control. Results of Matt's functional behavioral assessment indicated Matt's problem behavior was likely evoked by assignments with heavy reading components and maintained by escape from the task in the form of teacher help or task avoidance. To address his off-task and disruptive behavior, Matt was taught to raise his hand and request help from a teacher.

Darrion. The researcher in collaboration with Darrion's resource teacher, Mrs. F., completed the Functional Assessment Checklist for Teachers and Staff (FACTS; Appendix T). Mrs. F. described Darrion's problem behavior to be chronic and pervasive across all settings. Darrion's primary problem behaviors included shouting out during

instruction, getting out of his seat without permission, making rude comments to others, and making noises. When corrected for his disruptive behavior, Darrion would often deny having done anything. If a teacher administered any type of punitive consequence (e.g., loss of privilege or office referral), Darrion would become upset and defiant. Darrion frequently claimed the discipline procedures were unfair and accused teachers of targeting him when other students were doing the same things. These behaviors were more likely to occur when Darrion did not take his medication or if he had previously experienced conflict at home, on the bus, or in a previous class. Mrs. F. stated that Darrion's problem behavior occurred "all the time" in many settings throughout the day. However, Mrs. F. indicated these behaviors occurred less frequently in the general education classroom during formal instruction. Mrs. F. hypothesized Darrion's problem behavior were most likely reinforced by teacher and peer attention. Results of the FACTS were used to complete the competing behavior pathway for Darrion. Figure 13 depicts responses derived from Darrion's FACTS interview.

Figure 13 depicts responses derived from Darrion's FACTS interview.

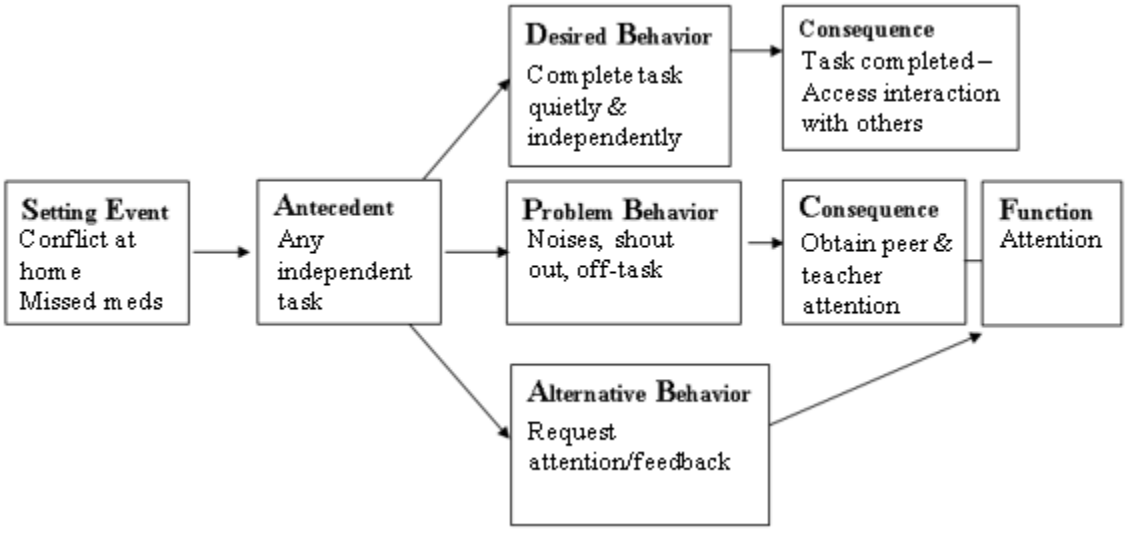


Figure 13. Competing pathways diagram for Darrion

A functional analysis was conducted between a test and a control condition in both of which Darrion was assigned a grade level academic task on his independent level. During the test condition, the researcher left Darrion alone unless and until he engaged in problem behavior. The researcher attended to problem behavior in the test condition with a mild rebuke (e.g., "c'mon now, you know better than that) and encouragement in the form of feedback on Darrion's performance. During the control condition, the researcher attended to Darrion continuously by offering statements of praise and encouragement on a fixed schedule (i.e., approximately every 20 sec). Problem behavior in the control condition was ignored. Figure 14 displays results from Darrion's functional analysis.

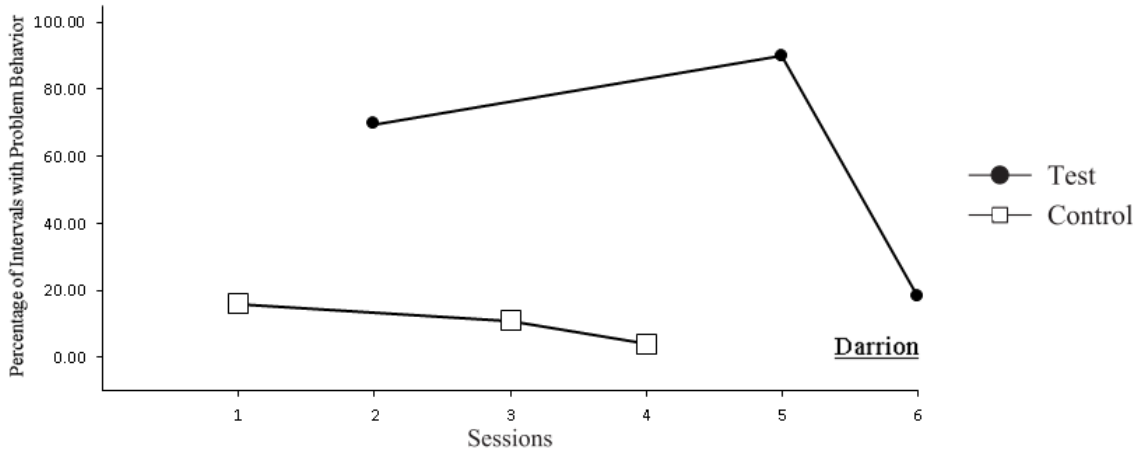


Figure 14. Functional analysis results for Darrion.

Darrion's FA revealed differentiated responding with low to high rates of problem behavior in the test condition (*M* = 59.25) and low rates (*M = 10.33)* of problem behavior in the test condition demonstrating a moderate degree of experimental control. Results of Darrion's functional behavioral assessment indicated Darrion's problem behavior was likely evoked by the absence of attention from others and maintained by

adult attention. To address attention-seeking problem behavior, Darrion was taught to raise his hand and request feedback on his school work.

Baseline. Baseline data were obtained for no less than five total sessions per student, including the final two test sessions of the functional analysis. The researcher facilitated baseline for each student in his training setting. The researcher obtained academic tasks identified by the functional behavior assessment as likely to evoke problem behavior. The researcher informed the student that he was to complete an academic task quietly and independently, and that following completion of the task or after 10 mins expired, he would be taken back to his resource room. The researcher checked for understanding and answered any procedural questions the student asked. The researcher then walked away from the student but remained within the student's view. All instances of problem behavior and/or hand-raising were immediately attended to by the researcher.

Functional communication training. Following five consecutive stable data points within baseline conditions, the researcher implemented functional communication training procedures. Albert was the first to complete five baseline sessions with accompanying generalization probes, therefore he was chosen to first receive FCT. Matt and Darrion remained in baseline conditions until Albert received three consecutive FCT sessions resulting in 80% or more reduction in problem behavior. At that point, Matt was chosen to next receive FCT due to the relative consistency of his data within baseline compared to Darrion's, who missed three consecutive days of school during baseline due to illness. Finally, Darrion received FCT following three consecutive FCT sessions with 80% or more reduction in problem behavior for Matt.

Initial FCT. During one initial FCT session, behavioral skills training procedures were used to teach each student a functional communicative response (FCR) that served as a replacement to problem behavior. An initial training session occurred with each student during which the researcher discussed the purpose of the training and introduced the basic procedures. The researcher informed the student that he would be learning a skill to help improve classroom behavior, but first he needed to pick some prizes to earn for working hard on the new skill. The selected reinforcer was set aside within view of the student while he was directed to take his seat.

The researcher presented a scenario in which problem behavior typically occurred for the target student and discussed the consequences that typically follow the problem behavior. The researcher next introduced the FCR as an alternative way to get what the student wanted without the side effects of getting in trouble, disrupting the lesson, or missing out on learning opportunities. The researcher modelled hand-raising and demonstrated non-examples which included a hand raised to the front or to the side but not above the shoulder and shouting out for the teacher while simultaneously raising a hand. The researcher directed the student to practice the behavior while providing feedback and addressing skill deficits as necessary. When the student demonstrated proficiency using the skill, the researcher then simulated situations relevant to the resource setting identified from indirect assessments and direct observation. Following the presentation of the discriminative stimulus for a given academic situation, the student was then immediately prompted to use the student signal and reinforcement per the function of the behavior was provided on a FR-1 schedule (i.e., each instance of hand-raising was acknowledged and reinforced). Positive or corrective feedback was provided

as necessary, and the student repeated these procedures until a successful demonstration of hand-raising was observed for each of the stimulus conditions.

Next, the researcher introduced self-monitoring procedures. The researcher presented the raise-your-hand reminder card to the student and told him that the purpose of the card was to remind him the appropriate way to get what he wants during class. Each raise-your-hand reminder card contained a line directing the student to "count to _____". The researcher wrote "5" on the blank line and told students they were going to have to wait 5 s with their hand raised before being acknowledged. Next, the researcher gave a copy of the self-monitoring form to the student and stated the purpose of the form was to provide a way to keep track of how well he performs the skill. The student then received the MotivAider® set to go off at 20-sec intervals and was shown how it functions. The researcher then modelled the procedures for self-assessment following the buzz of the device. Note that Albert stated he did not like the buzzing from the MotivAider® therefore his monitoring procedures were changed such that the researcher or teacher would prompt him to self-assess at the appropriate intervals.

Next, the student received opportunities to practice positive examples where he remained on task at the time of the buzzer and negative examples where he was not on task at the time of the buzzer. The researcher prompted the student to record the corresponding score and addressed any performance deficits that became evident during training. Finally, the researcher and student participated in three 1-min scenarios where the student practiced independently using the self-monitoring form. Provided the student scored 80% accuracy compared to researcher scores, the student completed initial functional communication training procedures.

Ongoing FCT. Prior to the start of each ongoing FCT session, the student was directed to select a reinforcer from the reinforcer inventory. The reinforcer was set aside within view of the student. The researcher provided the student with the raise-your-hand reminder card, self-monitoring form, and daily graph sheet. The student was required to score above 80% on three consecutive trials before functional communication training is complete. Should students score less than 80%, the specific deficient areas will be targeted with additional modelling, rehearsal, and feedback and a series of three trials re-administered until a score of 80% is achieved across three consecutive trials.

Generalization. Concurrent with baseline and FCT sessions, generalization probes were obtained in the generalization setting for no less than 33% of total sessions per phase. In other words, after every two sessions in baseline or FCT phases on average, an observation occurred in the generalization setting. The researcher directed teachers to assign an academic task on the student's independent level which required approximately 5-10 mins to complete.

Teachers in the generalization setting were alerted to the onset of the study and were informed of the study's purpose and procedures. Therefore, they were aware that the students would eventually be trained to use a functional communicative response (i.e., hand-raising) to replace problem behavior. However, teachers in the generalization setting were not informed of the timing of phase changes between baseline and FCT.

Programmed generalization (resource setting). If generalized responding failed to occur by the end of FCT schedule fading, the following programmed generalization procedures were implemented. Students were given a copy of the self-monitoring form, daily graph sheet, and raise-your-hand reminder sheet prior to each

programmed generalization session. Darrion and Matt received the MotivAider® preset to 2-min intervals. Albert's resource teacher or teacher's aide received the MotivAider® for his programmed generalization sessions. The researcher directed the students to follow procedures as trained during FCT. The researcher gave a copy of the programmed generalization fidelity form to the resource teachers (Appendices L & M). Teachers were told and/or reminded that the student had been working on hand raising with the researcher in training sessions. The researcher then modelled the gesture prompt used when students exhibited problem behavior. The researcher then set-up the iPad® to face the student's work area and began recording the session. The researcher then left the work area and remained out of sight from the student for the duration of the session. The teachers facilitated the beginning of the independent work time using the script outlined in the fidelity form. Teachers then permitted the student to work independently.

Teacher responses to student behavior during independent work were not programmed; therefore, teachers were free to respond to hand-raising or problem behavior in any manner they chose. However, Albert's teacher or teacher's aide were prompted by the MotivAider® to assist him in completing the self-monitoring form at 2-min intervals. The researcher returned and collected materials after the student finished the assignment of after 10 mins elapsed. The researcher did not offer any feedback or coaching to either the resource teacher, teacher's aide, or student during any programmed generalization session.

Programmed generalization (general education setting). Following a demonstration of generalized responding in each student's resource setting, similar programmed generalization procedures were implemented in the student's general

education setting. Albert's teacher aide accompanied him to his first-grade general education classroom and facilitated programmed generalization procedures in the same manner as before. Matt and Darrion, however, were given the MotivAider®, a copy of the self-monitoring form, daily graph sheet, and raise-your-hand reminder at the start of an independent activity prearranged by the general education teacher, but no formal prompting or introduction of the activity occurred. Each general education teacher was told of the purpose of the observation but none received explicit training regarding hand-raising procedures. As before, a session ended when the student finished his assignment or ten mins elapsed. No feedback or discussion regarding student or teacher performance occurred between the researcher and teachers or students.

Treatment Integrity

Treatment integrity checklists were maintained via researcher self-report for functional analysis, initial FCT training, and ongoing FCT training components. The researcher also completed treatment integrity checklists for all generalization and programmed generalization sessions on behalf of the resource and general education teachers. See Appendices A-M for treatment integrity checklists. Treatment integrity scores were computed by dividing total observed components by total planned components and multiplying by 100 as illustrated by the formula below.

$$\frac{\text{total observed components}}{\text{total planned components}} \times 100 = \text{fidelity \%}$$

Table 6

Treatment Integrity for Study Procedures

	Albert	**Matt**	**Darrion**
Baseline	100%	100%	100%
FCT	100%	100%	100%
Generalization	100%	100%	100%
Programmed Generalization	76.9%	100%	100%

Note. FCT = functional communication training with self-monitoring; all scores represent percent of intervals with problem behavior.

Social Validity

A distinction between basic and applied research is the degree to which intervention outcomes produce meaningful improvements in the quality of life of the consumer (Wolf, 1978). This concept is broadly labeled social validity and its assessment is recommended as one of seven indicators of high-quality applied single-case research studies (Horner et al., 2005). The social validity of the proposed study was assessed using the Intervention Rating Profile-15 (IRP-15; Martens, Witt, Elliott, & Darveaux, 1985). The IRP-15 is a formal Likert-type rating scale with which teachers are asked to rate their perceptions of intervention characteristics ranging from 1 (*strongly agree*) to 6 (*strongly disagree*). A total score of 52.5 or greater would represent a moderate level of acceptability (Carter, 2010). Teachers 1 and 2 completed the IRP-15 rating scale following the conclusion of the study.

The researcher intended to evaluate each student's perception of the acceptability and effectiveness of the intervention using the Children's Intervention Rating Profile (CIRP; Will & Elliot, 1985). However, Darrion and Albert did not attend school the last day of school which corresponded with the final day of the study. Numerous attempts to contact Darrion and Albert's family via phone call over the summer were unsuccessful. Therefore, only Matt's social validity data are available for review.

Data Analysis

Visual analysis of graphed data serves as the primary means of interpreting a functional relation within this study. A functional relation between intervention protocol and rates of problem behavior and the functional communicative response (FCR) is assumed if behavior change is observed in training settings only after the introduction of the FCT and self-monitoring protocol. Likewise, a functional relation between programmed generalization procedures and rates of problem behavior and the FCR is assumed if behavior change is observed in generalization settings only after the introduction of programmed generalization procedures.

A visual analysis of graphed data is supplemented by an evaluation of intervention effects using the Tau-U statistical measure (Parker, Vannest, Davis, & Sauber, 2011). Tau-U analyses produce a measure of effect size that accounts for baseline trend in addition to data overlap from adjacent conditions, thus offering a more nuanced analysis compared to parametric analyses of non-overlap data points which do not account for baseline trends (Parker, Vannest, & Davis, 2011, Shadish, Hedges, & Pustejovsky). Rakap (2015) references the following guidelines for interpreting Tau-U

scores which are applied to the results of this study: .65 or lower equal weak effects; .66 to .92 equal medium to high effects; and .93 to 1.0 equal strong effects.

Finally, results of the social validity surveys are presented and interpreted to demonstrate the acceptability and relevance of study procedures to important outcomes for both teachers and students.

CHAPTER 4
RESULTS

The purpose of this chapter is to present the results of functional communication training and self-monitoring with programmed generalization to address the problem behavior of three students with or at-risk for emotional/behavioral disorders (EBD). Included among the results are interobserver agreement and treatment integrity measures across all baseline, FCT, and programmed generalization phases. Next, functional behavioral assessment summaries with competing pathway diagrams, functional analysis graphs, and behavioral function summary statements are presented for each student. This is followed by graphic and statistical analyses of intervention effects in both training and generalization settings across baseline, FCT, and programmed generalization phases. This chapter concludes with a presentation of intervention social validity ratings by Teachers 1, 2, and one student participant, Matt.

Functional Communication Training with Self-monitoring

Following the conclusion of the functional behavioral assessment, each student received functional communication training in isolation following the establishment of baseline levels and trends for two dependent variables. Baseline conditions were identical to the test conditions within functional analyses and occurred in isolation with the researcher as exclusive interventionist. The primary dependent variable was a rate of functional communicative responses (i.e., hand-raising) expressed as a count /min. The

secondary dependent variable was prevalence of problem behavior expressed as percentage of intervals. Figures 15 and 16 present graphed results of FCT in isolation on hand-raising and problem behavior.

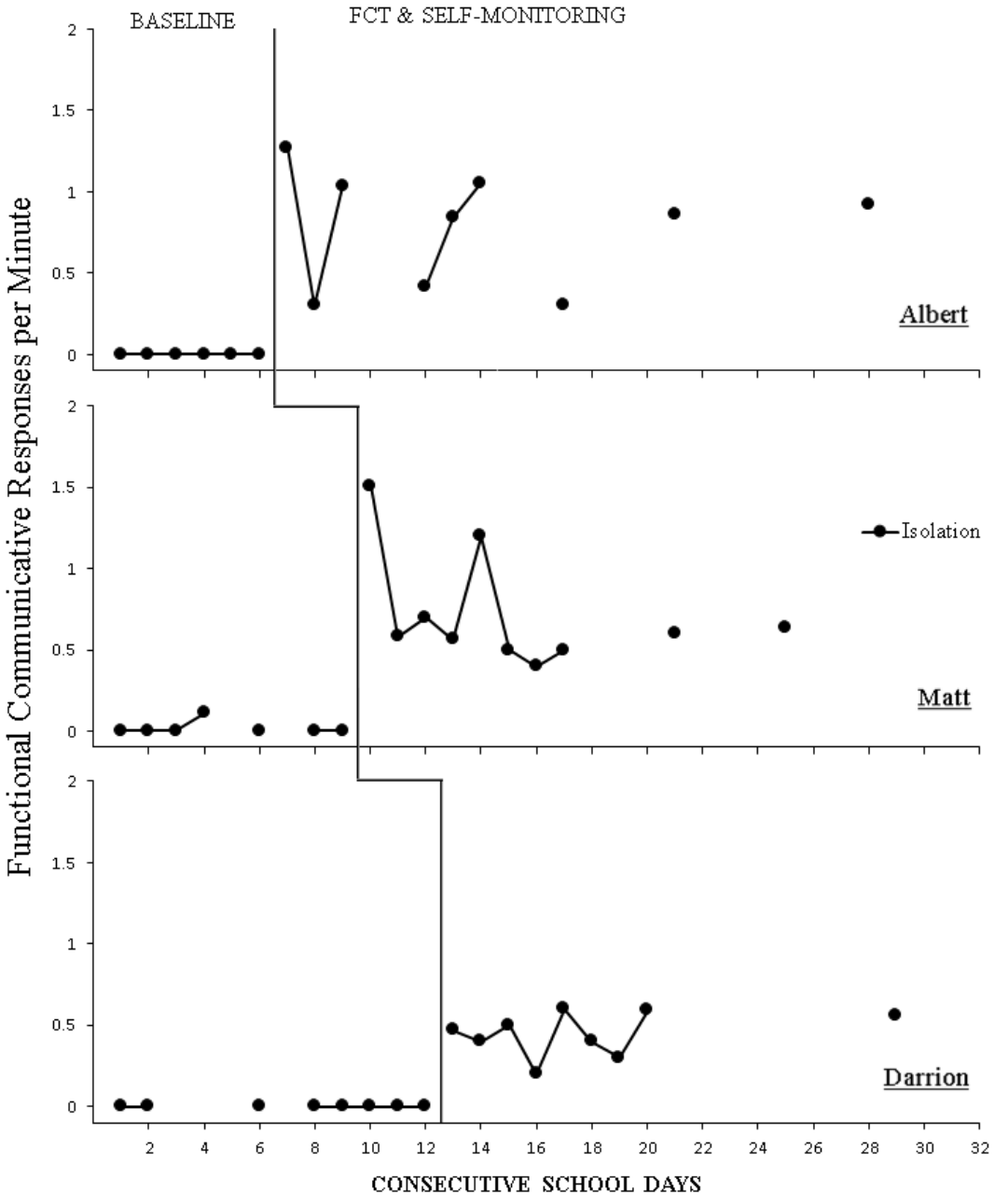


Figure 15. FCR /min following functional communication training with self-monitoring in isolation

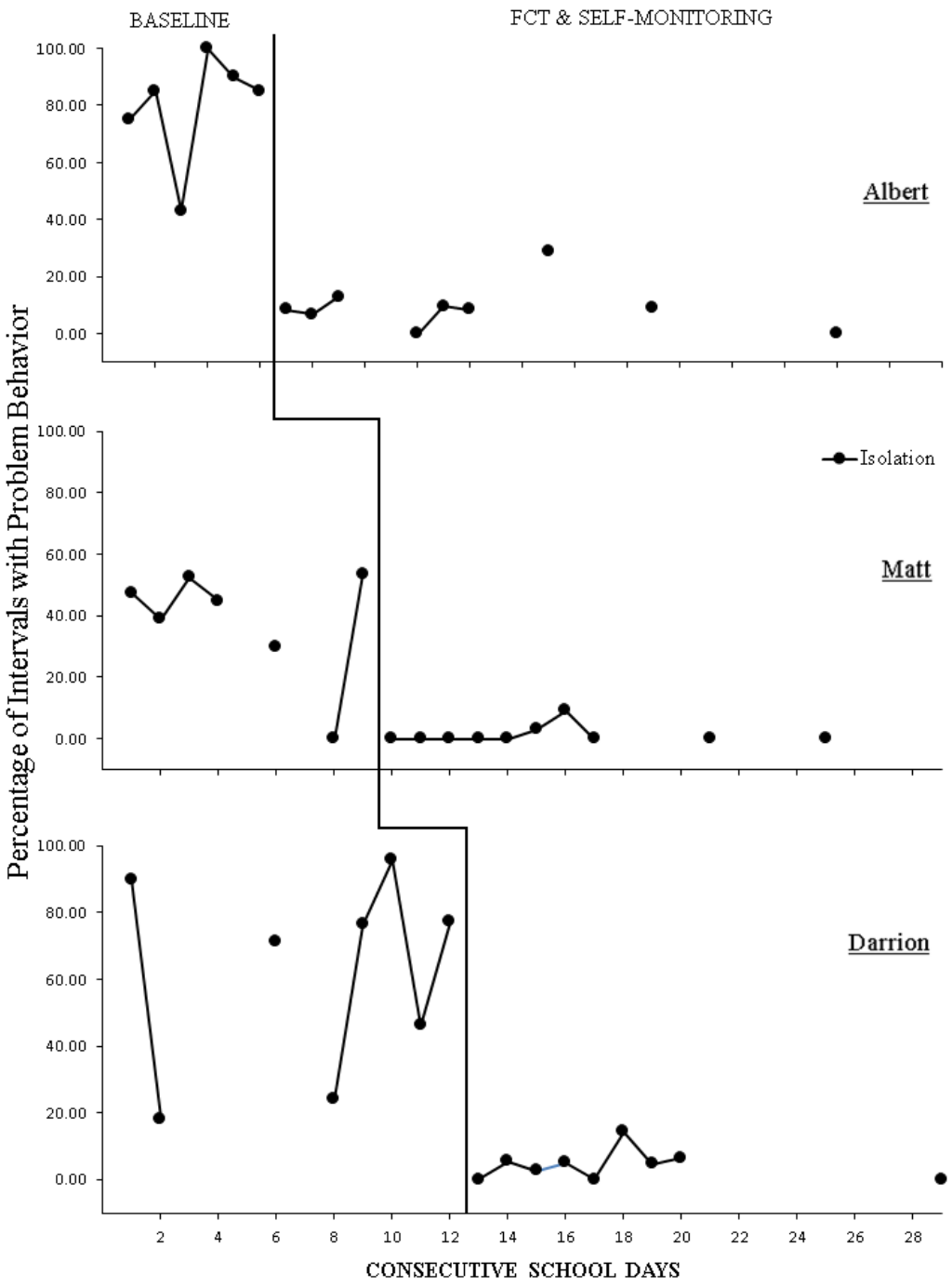


Figure 16. Percentage of intervals with problem behavior following functional communication training with self-monitoring in isolation.

Albert. During baseline, Albert did not raise his hand resulting in a mean FCR frequency of zero /min. Level and trend maintained at zero levels throughout baseline. Following FCT, the mean FCR frequency increased to .82 /min (range of .3 to 1.27). Visual analysis demonstrated an abrupt increase in hand-raising with highly variable yet elevated rates sustained throughout the condition. FCT on hand-raising in isolation had a strong positive effect (Tau-U = 1.00, 90% CI = 0.43 to 1.00, $p < .05$).

During baseline, problem behavior was observed in 79.67% of intervals (range of 43 to 100) with a slight increasing trend. Following FCT, problem behavior was reduced to 7.65% (range 0 to 12.9) with a slightly increasing trend. Visual analysis revealed an abrupt change in level following introduction of FCT. FCT on the percent of intervals with problem behavior had a strong negative effect (Tau-U = -1.00, 90% CI = -1.00 to -0.43, $p < .05$).

Matt. During baseline, Matt initiated one instance of hand-raising resulting in a mean FCR frequency across all sessions of .02 /min (range 0 to 0.1). Level and trend maintained at near zero levels throughout baseline. Following FCT, the mean FCR frequency increased to .74 /min (range of .4 to 1.51). Visual analysis demonstrated an abrupt increase in hand-raising with variable yet elevated rates compared to baseline sustained throughout the condition. The effect size of FCT on hand-raising was strong (Tau-U = 1.00, 90% CI = 0.49 to 1, $p < .05$).

During baseline, problem behavior was observed in 38.15% of intervals (range of 0 to 53.57) with a variable yet level trend. Following FCT, problem behavior was reduced to 1.52% (range 0 to 9.09) with a stable trend near zero levels. Visual analysis revealed an abrupt change in level following introduction of FCT. The effect size of FCT

on percent of intervals with problem behavior was strong (Tau-U = -0.82, 90% CI = -1.00 to -0.31, $p < .05$).

Darrion. During baseline, Darrion did not raise his hand resulting in a mean FCR frequency of zero /min. Level and trend maintained at zero levels throughout baseline. Following FCT, the mean FCR frequency increased to .43 /min (range of .2 to .6). Visual analysis demonstrated an abrupt increase in hand-raising with relatively stable and elevated rates sustained throughout the condition. The effect size of FCT on hand-raising was strong (Tau-U = 1.00, 90% CI = 0.51 to 1.00, $p < .05$).

During baseline, problem behavior was observed in 62.44% of intervals (range of 18.18 to 95.83) with a slight increasing trend. Following FCT, problem behavior was reduced to 4.79% (range 0 to 14.29) with a slightly increasing trend. Visual analysis revealed an abrupt change in level following introduction of FCT. The effect size of FCT on percent of intervals with problem behavior was strong (Tau-U = -1.00, 90% CI = -1.00 to -.51, $p < .05$).

Overall effect size. An omnibus effect size aggregated among each participant's baseline to FCT data was calculated. Overall effects of FCT on hand-raising in isolation was strong (Tau-U = 1.00, 95% CI = .64-1, $p < .05$). Overall effects of FCT on problem behavior in isolation was strong (Tau-U = -0.94, 95% CI = -1.00 to -.58, $p < .05$). Table 7 presents the mean functional responses /min, mean percentage of intervals with problem behavior, and Tau-U results for FCT and self-monitoring. in isolation.

Table 7

Mean Results and Effect Sizes for Functional Communication Training in Isolation

	Albert	**Matt**	**Darrion**	**Weighted Average**
FCR				
Baseline	0.00	0.02	0.00	-
FCT	0.82	0.74	0.43	-
Mean Difference	0.82	0.72	0.43	-
Tau-U	1.00	1.00	1.00	1.00
p-value	<.05	<.05	<.05	<.05
90% CI	[0.43, 1.00]	[0.49, 1.00]	[0.51, 1.00]	[0.64, 1.00]
Problem Behavior				
Baseline	79.67	38.15	62.44	-
FCT	7.65	1.52	4.79	-
Mean Difference	-72.02	-36.63	-57.65	-
Tau-U	-1.00	-0.82	-1.00	-0.94
p-value	<.05	<.05	<.05	<.05
90% CI	[-1.00, -0.43]	[-1.00, -0.31]	[-1.00, -0.51]	[-1.00, -0.58]

Note. CI = confidence interval; FCR = functional communicative response. FCR is presented as an average of responses /min for each condition. Problem behavior is presented as an average percentage of intervals for each condition.

Generalization

Concurrent to FCT in isolation, generalization probes were obtained in each student's resource room. Generalization probes were administered by each student's resource teacher and were comprised of independent activities identified via functional assessment to occasion problem behavior. Figures 17 and 18 present graphed results of

FCT in isolation on hand-raising and problem behavior in a generalization setting. Note that generalization probes are represented by open squares and are overlaid closed circles representing data from FCT in isolation.

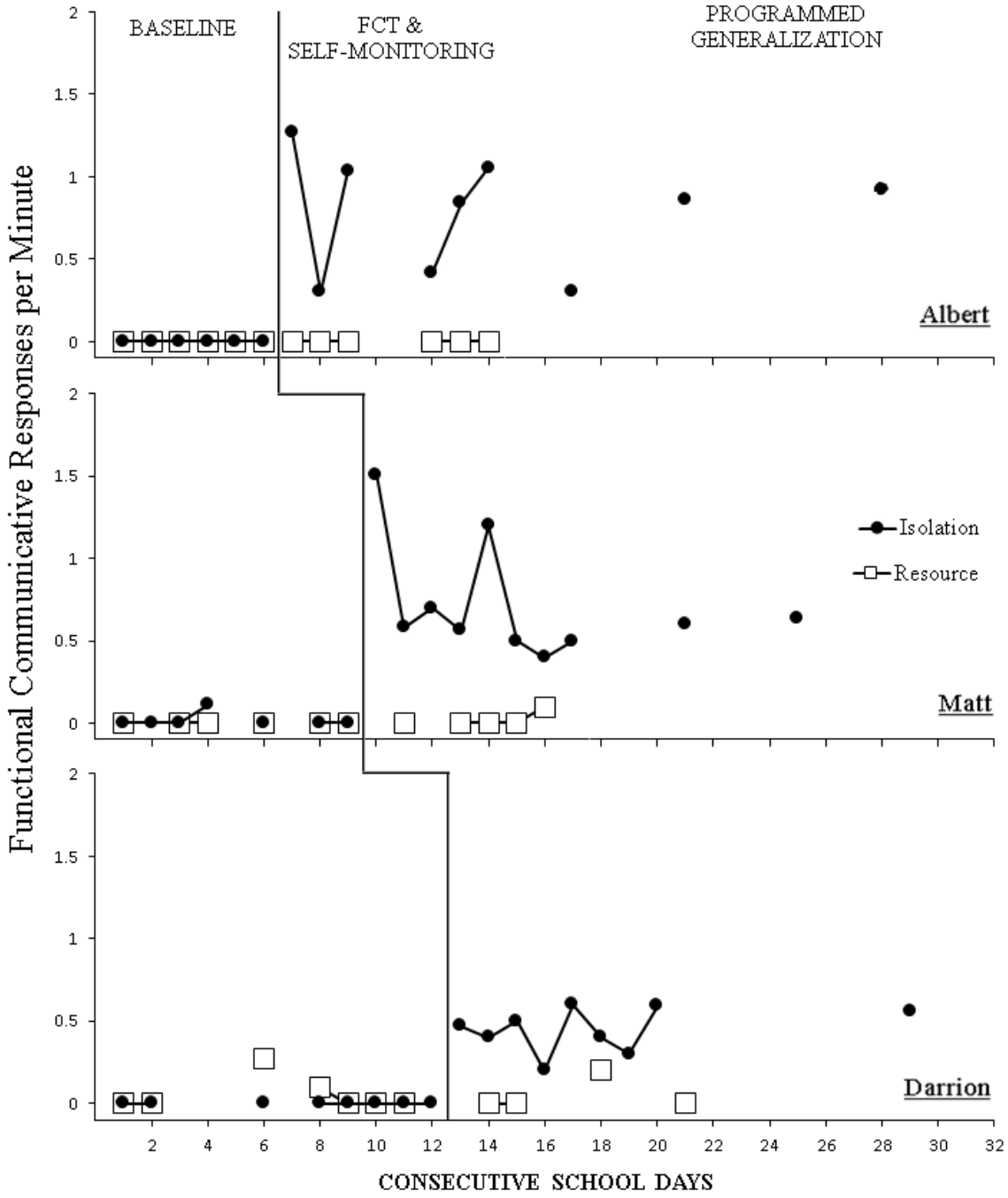


Figure 17. FCR /min following functional communication training with self-monitoring in a generalization setting (resource).

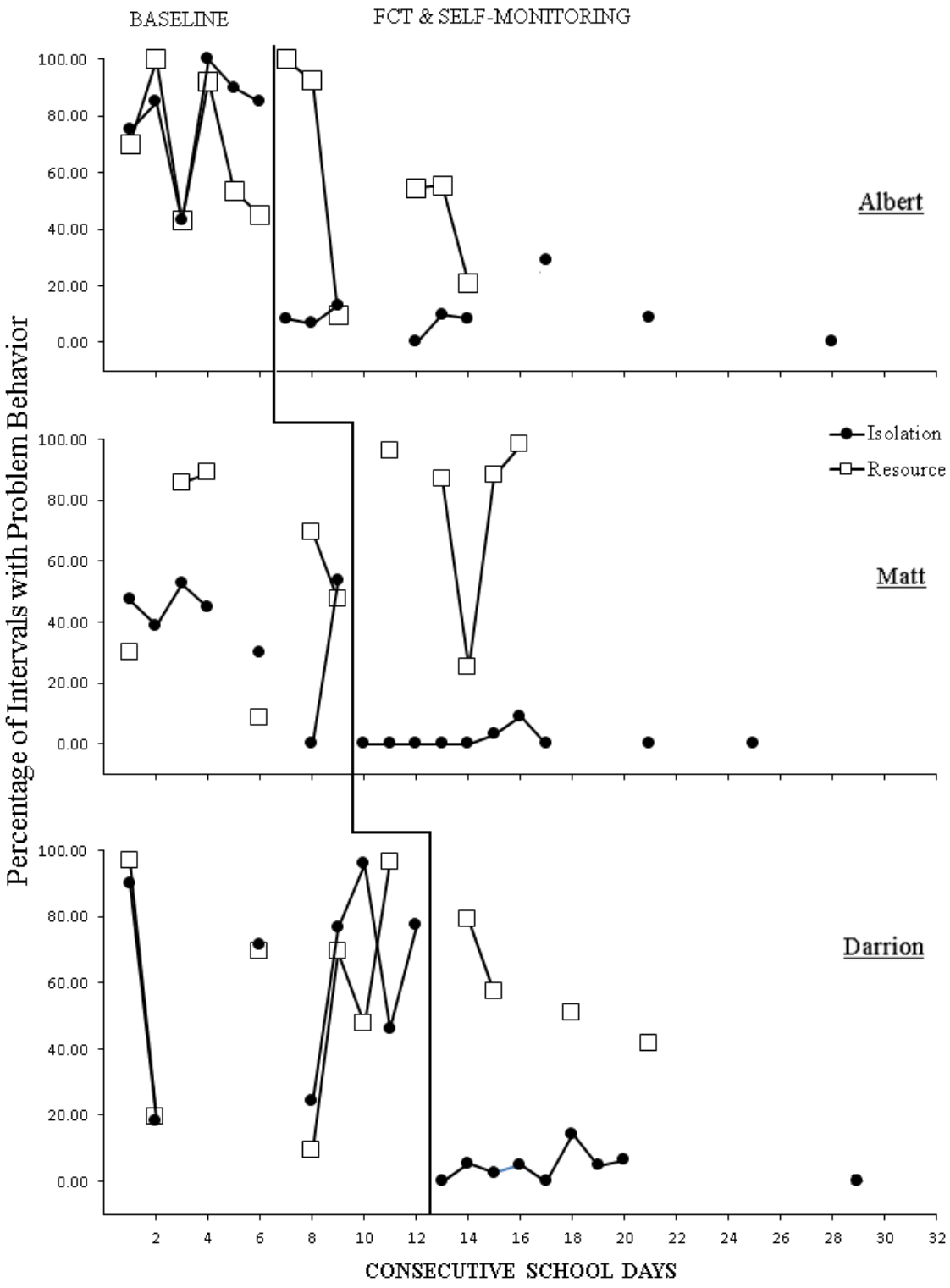


Figure 18. Percentage of intervals with problem behavior following functional communication training with self-monitoring in a generalization setting (resource).

Albert. During generalization probes in baseline conditions, Albert did not raise his hand resulting in a mean FCR frequency of zero /min. Level and trend maintained at zero levels throughout baseline. Following FCT in isolation, the mean FCR frequency in resource setting maintained at zero levels resulting in no effect (Tau-U = 0, 90% CI = -.57 to .57, $p > .05$).

During baseline, problem behavior was observed in 67.26% of intervals (range of 42.86 to 100) with a slight decreasing trend. Following FCT in isolation, problem behavior was reduced to 55.48% (range 9.52 to 100) with a decreasing trend. Visual analysis revealed minimal change in level of problem behavior in resource following introduction of FCT in isolation. The effect size of FCT on percent of intervals with problem behavior was weak (Tau-U = -.08, 90% CI = -.65 to .49, $p > .05$).

Matt. During generalization probes in baseline conditions, Matt did not raise his hand resulting in a mean FCR frequency of zero /min. Level and trend maintained at zero levels throughout baseline. Following FCT in isolation, Matt exhibited one instance of hand raising in the resource setting resulting in a weak positive effect (Tau-U = .2, 90% CI = -.4 to.8, $p > .05$).

During baseline, problem behavior was observed in 55.04% of intervals (range of8.7 to 88.89) with a highly variable yet level trend. Following FCT in isolation, problem behavior in the resource setting increased to 78.92% (range 25 to 98.21) with a variable but stable trend. The effect size of FCT in isolation on percent of intervals with problem behavior in resource was moderate (Tau-U = .53, 90% CI = -.07 to 1, $p > .05$).

Darrion. During generalization probes in baseline conditions, Darrion raised his hand four times for an average of .05 /min per session (range of 0 to .28). Level and

trend maintained at near zero levels throughout baseline. Following FCT in isolation, Darrion exhibited an average rate of hand-raising of .05 /min per session (range of 0 to .2) resulting in a weak negative effect (Tau-U = -.04, 90% CI = -.66 to .59, $p > .05$).

During baseline, problem behavior was observed in 58.3% of intervals (range of9.09 to 97) with a highly variable yet level trend. Following FCT in isolation, problem behavior in the resource setting decreased slightly to 57.8% (range 41.7 to 78.95) with a stable and negative trend. The effect size of FCT in isolation on percent of intervals with problem behavior in resource was negatively weak (Tau-U = -.07, 90% CI = -.69 to .55, $p > .05$).

Overall effect size. An omnibus effect size aggregated among each participant's generalization data was calculated. Overall effects of FCT in isolation on hand-raising in resource was weak (Tau-U = 0.05, 95% CI = -0.36 to 0.46, $p > .05$). Overall effects of FCT in isolation on problem behavior in a resource setting was weak (Tau-U = 0.12, 95% CI = -0.29 to 0.54, $p > .05$). Table 8 presents the results of FCT and self-monitoring on the FCRs and problem behavior in a generalization setting (i.e., resource room)

Table 8

Mean Results and Effect Sizes for Functional Communication Training in a Generalization Setting.

	Albert	**Matt**	**Darrion**	**Weighted Average**
FCR				
Baseline	0.00	0.00	0.05	-
FCT	0.00	0.02	0.05	-
Mean Difference	0.00	0.02	0.00	-
Tau-U	0	0.02	-0.04	0.05
p-value	>.05	>.05	>.05	>.05
90% CI	[-0.57, 0.57]	[-0.4, 0.8]	[-0.66, 0.59]	[-0.36, -0.46]
Problem Behavior				
Baseline	67.26	55.04	58.3	-
FCT	55.48	78.92	57.8	-
Mean Difference	-11.78	23.88	-0.49	-
Tau-U	-0.08	.53	-0.07	0.12
p-value	>.05	>.05	>.05	<.05
90% CI	[-0.65, 0.49]	[-0.07, 1.00]	[-0.69, 0.55]	[-0.29, -0.54]

Note. CI = confidence interval; FCR = functional communicative response. FCR is presented as an average of responses /min for each condition. Problem behavior is presented as an average percentage of intervals for each condition.

Programmed Generalization

Following the observation of non-effects of FCT in isolation on hand-raising and problem behavior in a resource setting, programmed generalization procedures were introduced. Materials used in isolation were sent with the students to their resource room and resource teachers were given a treatment integrity form (excluding prompting

procedures) outlining procedures used in isolation to introduce the activity. Figures 19 and 20 represent graphed results of programmed generalization procedures. Note that generalization probe data in the resource setting were treated as baseline data against which programmed generalization results were compared. The black arrow indicates when FCT was introduced in isolation.

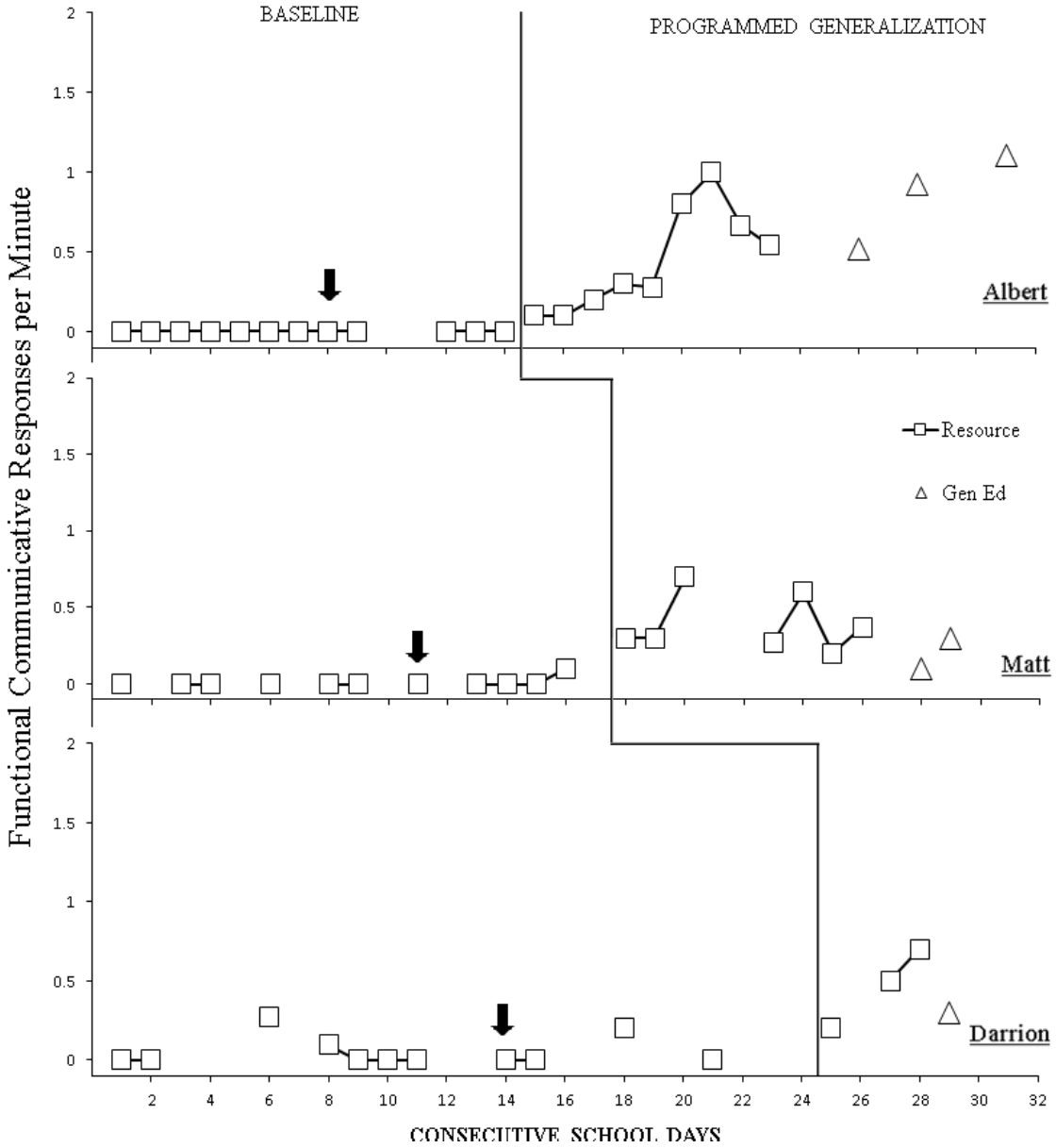


Figure 19. FCR /min following programmed generalization procedures in resource and general education settings. Note: arrows indicate the start of FCT in isolation.

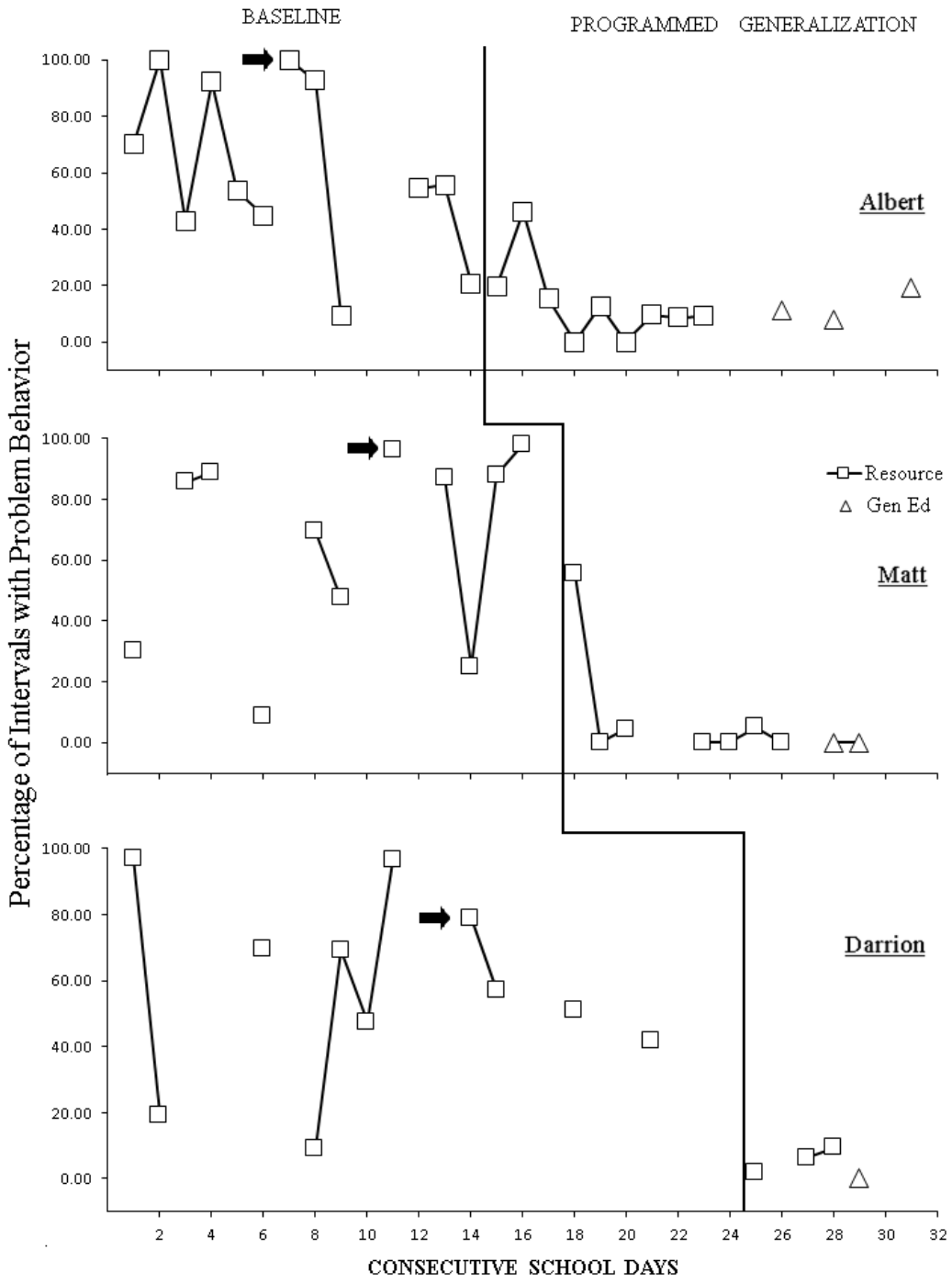


Figure 20. Percentage of intervals with problem behavior following programmed generalization procedures in resource and general education settings. Note: arrows indicate the start of FCT in isolation.

Albert. During generalization probes in a resource setting prior to the introduction of programmed generalization procedures, Albert did not raise his hand resulting in a mean FCR frequency of zero /min. Level and trend maintained at zero levels throughout generalization probes. Following programmed generalization procedures, Albert raised his hand an average of .3 responses /min per session (range of .1 to .8) resulting in a strong positive effect (Tau-U = 1,90 % CI = .51 - 1, $p < .05$).

During generalization probes in a resource setting prior to the introduction of programmed generalization procedures, Albert exhibited problem behavior in 61.37% of intervals (range of 9.52 to 100) with a highly variable slightly decreasing trend. Following programmed generalization procedures, problem behavior in the resource setting decreased to 13.54% (range 0 to 46.34) with a stable slightly downward trend. The effect size of programmed generalization on percent of intervals with problem behavior in resource was strong (Tau-U = -.85, 90% CI = -1 to -.42, $p < .05$).

Matt. During generalization probes in a resource setting prior to the introduction of programmed generalization procedures, Matt initiated one instance of hand-raising resulting in a mean FCR frequency of .01 /min per session (range of 0 – 0.1). Level and trend maintained near zero levels throughout generalization probes. Following programmed generalization procedures, Matt raised his hand an average of .4 responses /min per session (range of .2 to .7) resulting in a strong positive effect (Tau-U = 1, 90 % CI = .5 to 1, $p < .05$).

During generalization probes in a resource setting prior to the introduction of programmed generalization procedures, Matt exhibited problem behavior in 65.9% of intervals (range of 8.7 to 98.21) with a highly variable slightly increasing trend.

Following programmed generalization procedures, problem behavior in the resource setting decreased to 10.78% (range 0 to 55.32) with a stable level trend. Visual analysis reveals a latent effect of programmed generalization procedures after one session. Programmed generalization procedures resulted in a strong negative effect on percent of intervals with problem behavior in the resource setting (Tau-U = -.88, 90% CI = -1 to -.38, $p < .05$).

Darrion. During generalization probes in a resource setting prior to the introduction of programmed generalization procedures, Darrion maintained a rate of .05 FCRs/min per session (range of 0 to .28). Level and trend maintained near zero levels throughout generalization probes. Following programmed generalization procedures, Darrion increased hand-raising to an average of .47 (range of .2 to .7) responses /min per session resulting in a strong positive effect (Tau-U = .91, 90 % CI = .27 - 1, $p < .05$).

During generalization probes in a resource setting prior to the introduction of programmed generalization procedures, Darrion exhibited problem behavior in 57.89% of intervals (range of 9.09 to 97) with a highly variable stable trend. Following programmed generalization procedures, problem behavior in the resource setting decreased to 5.77% (range 1.75 to 9.3) with a stable slightly increasing trend. Visual analysis revealed an immediate effect of programmed generalization procedures on problem behavior. Programmed generalization procedures resulted in a strong negative effect on percent of intervals with problem behavior in the resource setting (Tau-U = -.94, 90% CI = -1 to -.3, $p < .05$).

Overall effect size. An omnibus effect size aggregated among each participant's programmed generalization data was calculated. Programmed generalization procedures on hand-raising in a resource setting produced strong positive effects (Tau-*U* = .97, 95% CI = .6 -.1, $p < .05$). Overall effects of programmed generalization procedures on problem behavior in a resource setting were strong and negative (Tau-*U* = -.88, 95% CI = -1 to -.52, $p < .05$). Table 9 presents the results programmed generalization procedures on the FCRs and problem behavior in a generalization setting (i.e., resource room).

Table 9

Mean Results and Tau-U Effect Sizes for Programmed Generalization in a Generalization Setting.

	Albert	**Matt**	**Darrion**	**Weighted Average**
FCR				
Baseline	0.00	0.01	0.05	-
Pro Gen	0.3	0.4	0.47	-
Mean Difference	0.3	0.39	0.42	-
Tau-U	1.00	1.00	0.91	0.97
p-value	<.05	<.05	<.05	<.05
90% CI	[0.51, 1.00]	[0.5, 1.0]	[0.27, 1.00]	[0.6, -0.1]
Problem Behavior				
Baseline	61.37	65.9	57.89	-
Pro Gen	13.54	10.78	5.77	-
Mean Difference	-47.83	-55.12	-52.12	-
Tau-U	-0.85	-0.88	-0.94	-0.88
p-value	<.05	<.05	<.05	<.05
90% CI	[-1.00, -0.42]	[-1.00, -0.38]	[-1.00, -0.3]	[-1.00, -0.52]

Note. CI = confidence interval; FCR = functional communicative response; Pro Gen = programmed generalization. FCR is presented as an average of responses /min for each condition. Problem behavior is presented as an average percentage of intervals for each condition.

Social Validity

The social validity of intervention procedures and effects from the teachers' perspectives was assessed using an adapted version of the Intervention Rating Profile-15 (IRP-15, Witt & Elliot, 1985). The IRP-15 includes fifteen statements designed to reflect the responder's perception of the effectiveness and acceptability of an intervention. A responder may rate an item on a Likert-scale from 1 (strongly disagree) to 6 (strongly agree). A sum of ratings of all 15 items can range from 15 to 90, with higher scores representing greater acceptability. Table 10 displays Mr. D.

Table 10

Adapted IRP-15 Ratings by Teacher and Item

Survey Item	**Mr. D (Albert)**	**Mrs. F. (Matt)**	**Mrs. F (Darrion)**	**Mean**
1. This was an acceptable intervention for the child's needs.	6	6	6	6
2. Most teachers would find this intervention appropriate for children with similar needs.	6	6	6	6
3. This intervention provide effective in supporting the child's needs.	6	6	6	6
4. I would suggest the use of this intervention to other teachers.	6	6	6	6
5. The child's needs were severe enough to warrant use of this intervention.	6	6	6	6
6. Most teachers would find this intervention suitable for the needs of this child.	6	6	6	6
7. I would be willing to use	6	6	6	6

this intervention in the classroom setting.				
8. This intervention did *not* result in negative side effects for the child.	6	6	6	6
9. This intervention would be appropriate for a variety of children.	6	5	5	5.3
10. This intervention was consistent with those I have used in classroom settings.	5	3	3	3.7
11. The intervention was a fair way to handle the child's needs.	6	5	5	5.3
12. This intervention was reasonable for the needs of the child.	6	6	6	6
13. I liked the procedures used in this intervention.	6	5	5	5.3
14. This intervention was a good way to handle this child's needs.	6	5	5	5.3
15. Overall, this intervention was beneficial for the child.	6	6	5	5.7
Total Score	89	83	82	

Average total scores among Mr. D. on behalf of Albert and Mrs. F. on behalf of Matt and Darrion equaled 84.7 corresponding to a rating of high acceptability (Parker, 2010). Nine items received maximum scores from both teachers on behalf of each participant. Item 10 received the lowest average score (M=3.7, range=3-5), which indicates teachers only slightly agreed that the intervention was consistent with those they have used in classroom settings.

Mr. D. rated the intervention a total score of 89 which represents maximum scores for all but one item. Mr. D. included the following comments in addition to the rating scales on behalf of his experience with Albert's intervention:

> The interventions were an integral part of my student's improvement in his behavior. This young man needed structure and he got it. He needed positive reinforcements to reverse the benefits of his previous behaviors, most of which were due to task avoidance. Once he realized that the benefits of doing schoolwork outweighed those from task avoidance, his progress has been wonderful, in academics, as well as in behavior. I appreciated the work done by [the researcher], and I will continue to use the strategies he fine-tuned me with to help all my students.

Mr. D. rated a single item less than the maximum score of 6. Item 10 reflects the consistency of intervention procedures with typical classroom procedures, and Mr. D. stated that he typically does not employ formal positive behavior supports in his intervention plans but knows that he should. Mr. D. stated on multiple occasions that he had an interest in collaborating with the researcher with future students with behavioral challenges. Mrs. F. did not include written comments with her survey responses.

Regrettably, among the three student participants, only Matt completed a social validity survey at the conclusion of the study. The researcher had arranged data collection to occur up to and on the final day of school. Albert and Darrion did not attend school that day and therefore did not complete the Children's Intervention Rating Profile (CIRP) interview with the researcher. Numerous attempts to contact Albert and Darrion's

families over the summer were unsuccessful. Table 11 lists Matt's responses to the CIRP survey. Note a score of 1 equals "I agree" while a score of 6 equals "I do not agree."

Table 11

Adapted CIRP Ratings by Matt

Survey Item	**Score**
1. The program we used was fair	2
2. I think my teacher was too harsh on me.	6
3. Being in this program caused problems with my friends	5
4. There were better ways to teacher me	4
5. This program could help other kids too.	1
6. I liked the program we used.	1
7. Being in this program helped me do better in school	1

The CIRP utilizes reverse coding for items 1, 5, 6, and 7 meaning a 1 corresponds to a 6, 2 correspond to a 5, and so on. With reverse scoring, Matt rated FCT with self-monitoring and programmed generalization a 38 with an average per item score of 5.4. The highest possible score is 42 suggesting Matt viewed the intervention procedures and effects favorably. Further supporting this conclusion were several interactions that occurred between Matt and the researcher. After the second session of FCT, Matt asked if he could keep the FCT materials and MotivAider® to use them in his resource class to help keep him on task. The researcher informed Matt that he could not take the materials to another setting. Matt stated that he needed them to remember how to get help. An interaction similar to this occurred a second time just prior to beginning programmed generalization procedures. The researcher was pleased to inform Matt that he would soon be able to use the materials in other settings.

Not all anecdotal evidence supports the social validity of the preceding intervention and study procedures. On at least two occasions, Albert stated that he did not want to use the materials during programmed generalization sessions. Upon being handed the materials in his classroom before the start of one observation, Albert said “Ah, not again” and pushed the materials to the floor. Without being instructed to do so, the teacher picked up the materials and proceeded with programmed generalization procedures. Albert eventually complied with protocol and completed a successful programmed generalization session.

While social validity measures for this study are limited, the teacher and student ratings coupled with anecdotal observations indicate high degree of acceptability.

CHAPTER 5

DISCUSSION

In this chapter, I provide an overview of the research questions and offer an interpretation of the results within the context of previous research. Next, I discuss the study limitations and conclude with suggested implications for practice and recommendations for future research.

Overview

Functional assessment based interventions (FABI) to address problem behavior for students with or at-risk for emotional/behavioral disorders are supported by an emerging evidence base (Gable, Park, & Scott, 2014). However, a consistently cited limitation of FABI research is the lack of evidence demonstrating an intervention's effects on student behavior outside training settings. I designed this study to address this limitation by implementing a functional assessment based intervention in a training setting and observing concurrent effects in a generalization setting; in other words, I wanted to see what happens when a student leaves an intervention and goes into a less restrictive setting.

I modeled this study after the only study I could find within the EBD literature that included generalization measures across all phases of the study (Lo & Cartledge, 2006). Although three additional FABI studies included generalization probes (Germer et al., 2011; Majeika et al., 2011; Turton, Umbreit, & Mathur, 2011), these probes occurred

only during intervention phases; thus precluding comparison to baseline levels and preventing interpretation of a functional relation. Lo and Cartledge represents a single study to include continuous probes of intervention effects in a generalization setting across both baseline and intervention phases. Following the introduction of functional communication training with self-monitoring for four students with EBD, the authors reported substantial improvements in appropriate requesting in the intervention setting with minimal gains if any observed in generalization settings. Lo and Cartledge recommended future researchers address this limitation by conducting a functional assessment of problem behavior in the generalization setting to ensure the replacement behavior trained in FCT would likely serve a functional purpose in the generalization setting. This study serves as a replication of Lo and Cartledge's procedures within a training setting, while extending their research by including a pre-intervention assessment of problem behavior in the generalization setting.

Research Questions

I designed this study to answer the following questions: (a) Is there a functional relation between a function-based intervention conducted in a training setting and improved behavior in a generalization setting; and (b) if no, will additional programmed generalization procedures lead to behavioral improvements in the generalization setting?

Summary of Findings

Functional communication training with self-monitoring produced immediate increases in hand-raising while reducing problem behavior in isolated training settings; however, no improvements to hand-raising or problem behavior were observed in the generalization resource settings. In short, FCT with self-monitoring failed to produce

setting generalization for all three participants representing results consistent with previous research (e.g., Lo & Cartledge, 2006).

Embedded within the FCT with self-monitoring intervention were several useful features that easily lent themselves to generalization programming (e.g., self-monitoring materials as programmed common physical and verbal stimuli). After introducing programmed generalization procedures, rates of hand-raising and problem behavior improved in each generalization setting. Furthermore, each student demonstrated at least one successful application of programmed generalization procedures in his general education classroom. Statistical analyses of intervention effects using the Tau-*U* calculator within www.singlecaseresearch.org demonstrated strong positive effects for FCT on hand-raising in isolation with varied yet weak effects in generalization settings. FCT produced strong negative effects of problem behavior in isolation with varied yet weak negative effects of problem behavior in generalization settings. Finally, programmed generalization procedures produced strong positive effects on hand-raising in generalization settings with strong negative effects on problem behavior.

In short, and to reiterate: Question 1- is there a functional relation between a function-based intervention conducted in a training setting and improved behavior in a generalization setting? Answer – no; and question 2, if no, will additional programmed generalization procedures lead to behavioral improvements in the generalization setting? Answer – yes.

The preceding results evoke at least two obvious follow-up questions: (a) Why did FCT and self-monitoring fail to produce collateral improvements in a generalization setting; and (b) how did programmed generalization procedures accomplish this? These

questions extend beyond the ability of this study to answer, however, due to a common limitation first referenced in the introduction – unsystematic introduction of the independent variable (Landrum & Lloyd, 1992; Rutherford & Nelson, 1988; Stokes & Baer, 1977; Osnes & Leiblien, 2003; Stokes & Osnes, 1989). During programmed generalization, I sent all training materials with the students and programmed the teacher's introduction of the assignment. Training materials included the MotivAider®, raise-your-hand reminder card, self-monitoring form, and daily graph sheet. Any of the physical features of those materials could have served as common stimuli responsible for facilitating stimulus generalization between training and generalization settings. The raise-your-hand reminder card could have served as common verbal stimuli that acted as a prompt for appropriate requesting. If stimulus discrimination was primarily responsible for the lack of setting generalization, then programmed common stimuli likely facilitated the transfer.

Additionally, previous progress using the self-monitoring form and daily graph sheet each could have been conditioned motivating operations increasing the value of sustained progress in subsequent programmed generalization sessions (Michael, 2004). For example, if the student had only one or two data points on his graph sheet when programmed generalization procedures were introduced, he may not have been sufficiently motivated to keep the trend going, to use lay terms. However, with five or six data points above the goal line, the benefits of staying on task and raising his hand may have become more valuable to the student. Therefore, if insufficient motivation was responsible for the lack of setting generalization, then the introduction of conditioned motivating operations likely facilitated the transfer.

Finally, each teacher in the resource generalization setting received a copy of the treatment fidelity form I used to train students in isolation. Therefore, teachers said the exact words I said when I assigned students their independent work. This could have served as additional common stimuli helping to facilitate stimulus generalization. However, it also could have served a role in modifying the teacher's behavior throughout the generalization probe. If before, when a student raised his hand, a teacher may not have noticed or ignored the behavior, thus resulting in an extinction procedure. Answering the question why the teacher ignored the behavior requires the same analysis I am applying to student hand-raising. Either there was a lack of stimulus control or a lack of motivation for the teacher to attend to hand-raising. The programmed generalization procedures could have introduced both a discriminative stimulus and motivating operation that altered the frequency of teacher attending to student hand-raising. This, in effect, possibly modified the reinforcement contingencies in the generalization setting. Therefore, if hand-raising was more likely to contact reinforcement in the programmed generalization condition, students would be more likely to raise their hands.

In sum, the study design simply does not permit an evaluation as to what variables within the four-term contingency (i.e., discriminative stimulus + motivating operation> response>reinforcement; Michael, 2004) were absent or insufficient during generalization probes but were present during programmed generalization. Nonetheless, this study demonstrates the potential of programmed generalization procedures to extend results of a common functional assessment based intervention for students with EBD.

Limitations

The results of this study should be interpreted with the following internal and external threats to validity in mind.

Internal validity. Internal validity is the degree to which data accurately reflect the phenomena they purportedly represent (Gast & Ledford, 2014). A study with a high degree of internal validity is a believable study. Several threats to internal validity reduce the believability of this study's results. The first and perhaps most critical threat to internal validity is the relatively low interobserver agreement (IOA) within the secondary dependent variable, percentage of intervals with problem behavior. IOA of 80% is generally recommended as the minimum acceptable standard, although many researchers argue even this benchmark is insufficient (Gast & Ledford, 2014). In two conditions (i.e., baseline and FCT for Albert) IOA remained at or slightly above this minimum threshold – 84.9% and 80.0% respectively. In two other conditions (i.e., FCT for Matt and programmed generalization for Albert), IOA fell below the minimum standard – 77% and 79.2% respectively. Due to the relatively few IOA measures obtained (i.e., 25% across all conditions), there simply were not enough measures to average with the low scores. In both conditions where IOA fell below 80%, myself and the secondary observer convened to address discrepancies. Within Matt's FCT condition, there was disagreement on how to score Matt's problem behavior while he was raising his hand. I scored this as on-task while the secondary observer scored it as a non-scored interval. Within Albert's programmed generalization probe, there was disagreement regarding how to score Albert's response to bids for attention from his peers. In isolation and resource, Albert's responding to teacher interaction was marked as a non-scored interval.

Regardless, such IOA weakens the strength of the findings due to the raising of questions regarding the believability of the data. IOA for the primary dependent variable remained strong throughout the study (M = 98.9%, range of 83.3 to 100). Overall, there is strong support that the effects of FCT on hand-raising in isolation and generalization settings were accurate with less support of the effects on problem behavior.

Second, I, as the primary researcher, served as primary observer across all phases of the study. Once again, this was necessitated by the number of observations required initially of four study participants across multiple settings and the limited resources (i.e., time and people) available to me. A preferable approach would have been to have an otherwise unaffiliated observer score videos as primary observer with myself serving as secondary observer.

A third categorical limitation and perhaps no less critical than dependent variable reliability is the reliance on researcher self-report for treatment integrity measures. Treatment integrity refers to the degree to which an intervention was implemented as intended. I, quite unsurprisingly, rated all conditions in which I was primary interventionist as 100% while I scored programmed generalization implementation for Albert as 76.9%. The believability of these treatment integrity scores along with IOA is threatened due to a principle akin to the placebo effect – I as researcher likely wanted there to be a functional relation; therefore I was more likely to see one when there is, in fact, not.

Finally, the recruitment of three participants from Mrs. F.'s caseload created the potential, and actualized, threat of interference among the three participants. Although initially scheduled to receive generalization and programmed generalization probes when

each student was apart from the others in Mrs. F.'s classroom. The schedule change of the fourth participant into Matt's scheduled resource time presented a threat necessitating participant four be dropped from the study. Still, Matt and Darrion overlapped at times in the resource room although this was controlled for during generalization probes. By having one of her students receive intervention (i.e., Matt) while the other remained in baseline (i.e., Darrion), Mrs. F. could have adjusted her interactions with Darrion in response to Matt's training, thus leading to behavior improvement prior to the implementation of the intervention. This did not appear to be the case overtime although Darrion did exhibit elevated rates of hand-raising the day Matt received programmed generalization procedures.

This presented a potential confound due to Mrs. F.'s ability to observe training procedures prior to her receipt of programmed generalization procedures as per the study design. The nature of the research question required teachers in the generalization setting conduct business as usual while FCT occurred in training settings. Had Mrs. F. observed training procedures, she may have adapted her instruction in response thus precluding the ability to infer a functional relation between FCT and generalized behavior change. The use of the partition provided an opportunity for the students to receive training in the resource room while reducing Mrs. F.'s ability to directly observe training procedures.

External validity. External validity refers to the degree to which study procedures and results are applicable and relevant to other populations. In other words, external validity equates to the generalizability of study procedures and results. Several limitations of this study limit the generalizability of findings to other populations and circumstances. First, the stated goal of this project was to address the lack of

generalization research for students with EBD. Only one of three participants within this study received special education services as a student with an emotional/behavioral disability. Of the three participants, Albert, the only participant with EBD, demonstrated the most convincing demonstration of intervention effects due to the length of time spent in the programmed generalization phase. My overall conclusion would be more applicable to the target population had I been able to recruit additional participants with EBD.

Next, academic tasks within each baseline, training, and generalization probes were non-operationalized and therefore not controlled. In theory, any positive improvement on problem behavior in FCT or programmed generalization conditions could be functionally related to easier or more preferred assignments. This however would likely have been the case in baseline as well therefore overall average rates of problem behavior would still permit an analysis of intervention effects.

Recommendations for Future Research

As discussed previously, FCT with self-monitoring and programmed generalization produced clear improvements in isolation with no effect in a generalization setting. Behavior change was observed after the introduction of programmed generalization procedures; however, it is not clear what exactly caused the transfer of treatment effects to the generalization setting. Future researchers should analyze the individual components of the packaged approach for their relative effects on behavior change in the generalization setting.

If generalization is the primary research question, then generalization measures should be the primary dependent variable and treated as such. Future researchers would

be wise to collect data continuously in generalization settings rather than as probed data. Continuous data collection would permit a tighter analysis of generalized behavior change related to the independent variable.

Finally, generalization measures as with sunscreen should be applied at all times. I tried, but could not think of a research question that would not at least to some degree lend itself to a generalization component. Future researchers should heed the call of Stokes and Baer (1977) those many years ago and make generalization research a primary focus.

Implications for Practice

It is safe to conclude that a functional assessment based intervention for students with or at-risk for EBD is not likely to generalize from a training setting to a generalization unless and until some type of programming occurs. Therefore, practitioners should begin with the end in mind and prepare programming procedures at the onset of an intervention. Exactly what those procedures should be remains a question that is far from resolved within educational and behavioral literature.

However, this study hints at the potential benefits of self-monitoring as a tool to facilitate setting generalization of function-based interventions. Self-monitoring includes many components that when trained in a more restrictive setting can be transferred to a less restrictive setting which may serve to mitigate the variables responsible for problem behavior in the less restrictive setting. Practitioners may wish to replicate the procedures used in this study, paying particular attention to the role the procedural fidelity script plays in prompting the teacher to watch for and reinforce hand-raising.

Conclusion

I close by reiterating a question raised in the introduction - What can be said about the efficacy of academic and behavioral interventions applied to students with EBD that fail to generalize? While exploring an answer to this question and in light of this study, I am reminded that the failure of our technology to produce generalized outcomes is not necessarily a mistake; "it may simply be the best [we] can do under the circumstances. The real mistake is to stop trying" (Skinner, 1971, p. 153). And so the search continues for functional assessment based strategies capable of producing generalized behavior change. Toward this end, behavioral researchers and interventionists in schools would be wise to heed the advice of Osnes and Leiblein (2003) and "plan no empirical investigation and interventions without generalization promotion as part of the research and intervention plan" (p. 372).

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LIST OF APPENDICES

APPENDIX A: FUNCTIONAL ANALYSIS PROCEDURES - ALBERT

Date: _____ Student: _____ *Treatment integrity* ☐
Activity: _____
Duration: _____

1 = yes 0=no	**Test Procedures**
☐	1) Have student sit at a desk and assign an academic activity with heavy written component
☐	2) Direct student to complete the activity independently and quietly
☐	3) Answer any procedural questions student may have
☐	4) Walk away from student
☐	5) Attend to hand raising or problem behavior according to hypothesized function of problem behavior (escape by removing task items or assisting with a question)
☐	6) After each assistance walk away from the student
☐	7) Repeat steps 5-6 as necessary
	8) Conclude session after 10 minutes or upon completion of the activity

Date: _____ Student: _____ *Treatment integrity* ☐
Activity: _____
Duration: _____

1 = yes 0=no	**Control Procedures**
☐	1) Have student sit at a computer and begin a complete a computer based academic task
☐	2) Direct student to complete the activity
☐	3) Tell the student you will offer assistance at regular intervals (~20 s)
☐	4) Attend to student at ~20 second intervals
☐	5) Ignore off-task or disruptive problem behavior
☐	6) Repeat steps 4-5 as necessary
	7) Conclude session after 10 minutes or upon completion of the activity

APPENDIX B: FUNCTIONAL ANALYSIS PROCEDURES - MATT

Date: _____ Student: _____ *Treatment integrity* ☐
Activity: _____
Duration: _____

1 = yes 0=no	**Test Procedures**
☐	1) Have student sit at a desk and assign an academic with heavy reading component
☐	2) Direct student to complete the activity independently and quietly
☐	3) Answer any procedural questions student may have
☐	4) Walk away from student
☐	5) Attend to hand raising or problem behavior according to hypothesized function of problem behavior (assistance with task)
☐	6) After ~20 s of assistance, walk away from student
☐	7) Repeat steps 5-6 as necessary
☐	8) Conclude session after 10 minutes or upon completion of the activity

Date: _____ Student: _____ *Treatment integrity* ☐
Activity: _____
Duration: _____

1 = yes 0=no	**Control Procedures**
☐	1) Have student sit at a desk and assign an academic with heavy reading component
☐	2) Direct student to complete the activity
☐	3) Tell the student you will offer assistance as needed
☐	4) Read questions and answer choices aloud as student encounters them
☐	5) Ignore off-task or disruptive problem behavior
☐	6) Repeat steps 4-5 as necessary
☐	7) Conclude session after 10 minutes or upon completion of the activity

APPENDIX C: FUNCTIONAL ANALYSIS PROCEDURES - DARRION

Date: _____ Student: _____ *Treatment integrity* ☐
Activity: _____
Duration: _____

1 = yes 0=no	**Test Procedures**
☐	1) Have student sit at a desk and assign an academic activity on student's independent level
☐	2) Direct student to complete the activity independently and quietly
☐	3) Answer any procedural questions student may have
☐	4) Walk away from student
☐	5) Attend to hand raising or problem behavior according to hypothesized function of problem behavior (feedback and attention)
☐	6) After ~20 s of feedback or attention walk away from student
☐	7) Repeat steps 5-6 as necessary
☐	8) Conclude session after 10 minutes or upon completion of the activity

Date: _____ Student: _____ *Treatment integrity* ☐
Activity: _____
Duration: _____

1 = yes 0=no	**Control Procedures**
☐	1) Have student sit at a desk and assign an academic activity on student's independent level
☐	2) Direct student to complete the activity
☐	3) Tell the student you will offer feedback and attention at regular intervals (~20 s)
☐	4) Attend to student at ~20 second intervals
☐	5) Ignore off-task or disruptive problem behavior
☐	6) Repeat steps 4-5 as necessary
☐	7) Conclude session after 10 minutes or upon completion of the activity

APPENDIX D: BASELINE ISOLATION PROCEDURES

Date: _____ Student: _____ *Treatment integrity* ☐
Activity: _____
Duration: _____

1 = yes 0=no	**Procedures**
☐	1) Have student sit at a desk and hand academic task likely to evoke problem behavior (see FBA results)
☐	2) Direct student to complete the activity independently and quietly
☐	3) Answer any procedural questions student may have
☐	4) Walk away from student
☐	5) Attend to hand raising or problem behavior according to hypothesized function of problem behavior.
☐	6) After ~20 s of assistance or encouragement, walk away from student
☐	7) Repeat steps 5-6 as necessary
☐	8) Conclude session after 10 minutes or upon completion of the activity

APPENDIX E: GENERALIZATION PROBES RESOURCE PROCEDURES

Date: _____ Student: _____ *Treatment integrity* ☐
Activity: _____
Duration: _____

1 = yes 0=no	**Procedures**
	1) Have student sit at a desk and hand academic task likely to evoke problem behavior (see FBA results)
	2) Direct student to complete the activity independently and quietly
	3) Answer any procedural questions student may have
	4) Walk away from student
	5) Attend to hand-raising or problem behavior as per usual classroom procedures
	6) Conclude session after 10 minutes or upon completion of the activity

APPENDIX F: INITIAL FUNCTIONAL COMMUNICATION TRAINING PROCEDURES

Date: _____ Student: _____ *Treatment integrity* ☐

Target behavior: _____
Function of target behavior:_____
Functional Communicative Response FCR):_____

1 = yes 0=no	**Hand-Raising Procedures**
	1) Have student choose a reinforcer from reinforcer inventory, set aside for now
	2) Tell the importance of communicating what you need to the teacher in a way that is appropriate and helpful for everyone in the class
	3) Give student raise your hand reminder card and read procedures
	4) Model for student examples and non-examaples of hand raising
	5) Direct student to practice hand-raising and give feedback
	6) Introduce an academic task likely to evoke problem as per FBA results
	7) Prompt the student to use the FCR
	8) Provide the requested reinforcer (e.g., help, break, or attention)
	9) Give student feedback as per FCR guidelines (e.g., quiet, count to 5, move on if help not available)
	10) Tell the student s/he will now do it with real world examples from class
	11) Introduce and implement stimulus condition 1 (see below)
	12) Wait for student to raise hand for 5 s. If no response, prompt the FCR by pointing to the printed FCR procedures.
	13) Ignore problem behavior. Wait several s after problem behavior subsides, and prompt the FCR by pointing to the printed FCR procedures.
	14) Provide the requested reinforcer contingent upon correct FCR
	15) Repeat procedures 11-13 for the remaining two stimulus conditions
	16) Tell the student s/he is awesome and offer an enthusiastic high five
	17) Provide access to preselected reinforcer

Scenario			
Trial 1			
Trial 2			
Trial 3			

APPENDIX G: INITIAL FUNCTIONAL COMMUNICATION TRAINING PROCEDURES

Date: _____ Student: _____ *Treatment integrity* | |

1 = yes 0=no	**Self-monitoring Training Procedures**
	1) Give the student the MotivAider, self-monitoring form, and daily graph sheet prior to the start of the training
	2) Explain purpose of the MotivAideris to buzz every time the student needs to self-check
	3) Let student play with the MotivAider and feel buzzer several times
	4) Tell student every time the buzzer goes off, s/he is to circle the "cool dude" / "oops dude" (early elementary age) or a "0" / "1" (upper elementary age) under each rule depending on whether s/he was following the rule at that time.
	5) Set timer for 20 s and practice 3-5 rounds giving feedback after each round.
	6) Tell the student that s/he can also practice using the student signal if needed.
	7) Have student perform the student signal and offer positive or corrective feedback as needed
	8) Have student practice the student signal three times using three simulated instructional situations identified in assessment phase.
	9) Provide positive or corrective feedback as needed.
	10) Following 3 consecutive trials with appropriate use of the MotivAider and/or student signal, functional communication training is complete. Compute treatment integrity score

Scenario			
Trial 1			
Trial 2			
Trial 3			

APPENDIX H: FCT ONGOING – LOWER ELEMENTARY

Treatment Fidelity

Date: _____ Student: _____

Teacher: _____

1 = yes 0=no	**Procedures**
	1) Have student select reinforcer from inventory and set aside
	2) Start the MotivAider (set for 120 second intervals)
	3) Give student an academic task, self-monitoring sheet, daily graph sheet, and "raise your hand" reminder.
	4) Point to the academic task. Say "you are going to complete an activity on your own."
	5) Point to "raise your hand" reminder. Say "If you need me, raise your hand, count to ____, and wait until I come over to you. Then quietly tell me what you need."
	6) Point to the self-monitoring sheet. Say "After 2 minutes I will come over to you and help you fill out your point card. You get 1 point each time you stay in your seat, work quietly, and try your best for the full 2-minutes"
	7) Point to the daily graph sheet. Say "Yesterday you got <state the number of points earned the previous day> points. How many are you going to try to get today?" Encourage the student (e.g., 'I know you can do it!")
	8) Say "Do you have any questions?"
	9) Walk away from the student
	10) Upon instances of problem behavior, use model prompt
	11) Assist the student upon request for each appropriate FCR
	12) After each 2-minute interval, return to the student and help him complete the point sheet.
	13) After 10 minutes or upon completion of the task, assist the student with coloring his daily graph sheet according to number of points earned on the self-monitoring sheet.
	14) Provided student earned 80% or more of available points, give him the chosen reinforcer.
	15) Offer an enthusiastic high five, fist bump, or side-hug (if and when appropriate) and affirm the student's worth as a human being with a statement such as "That was fantastic. I believe you will be an astronaut one day" or "You are an academic magician." Feel free to use your own.

APPENDIX I: FCT ONGOING – UPPER ELEMENTARY

Treatment Fidelity

Date: _____ Student: _____

Teacher: _____

1 = yes 0=no	**Procedures**
	1) Have student select reinforcer from inventory and set aside
	2) Start the MotivAider and give to student (set for 120 second intervals)
	3) Give student an academic task, self-monitoring sheet, daily graph sheet, and "raise your hand" reminder.
	4) Point to the academic task. Say "you are going to complete an activity on your own."
	5) Point to "raise your hand" reminder. Say "If you need me, raise your hand, count to ____, and wait until I come over to you. Then quietly tell me what you need."
	6) Point to the self-monitoring sheet. Say "After 2 minutes you need to give yourself 1 point for each time you stay in your seat, work quietly, and try your best for the full 2-minutes"
	7) Point to the daily graph sheet. Say "Yesterday you got <state the number of points earned the previous day> points. How many are you going to try to get today?" Encourage the student (e.g., 'I know you can do it!")
	8) Say "Do you have any questions?"
	9) Walk away from the student
	10) Upon instances of problem behavior, use model prompt
	11) Assist the student upon request for each appropriate FCR
	12) After 10 minutes or upon completion of the task, assist the student with coloring his daily graph sheet according to number of points earned on the self-monitoring sheet.
	13) Provided student earned 80% or more of available points, give him the chosen reinforcer.
	14) Offer an enthusiastic high five, fist bump, or side-hug (if and when appropriate) and affirm the student's worth as a human being with a statement such as "That was fantastic. I believe you will be an astronaut one day" or "You are an academic magician." Feel free to use your own.

APPENDIX J: PROGRAMMED GENERALIZATION RESOURCE – LOWER ELEMENTARY

Treatment Fidelity ☐

Date: _____ Student: _____

Teacher: _____

1 = yes 0=no	**Procedures**
	1) Teacher starts the MotivAider (set for 120 second intervals)
	2) Teacher gives student an academic task, self-monitoring sheet, daily graph sheet, and "raise your hand" reminder.
	3) Teacher gives student an activity and points to the <u>academic task</u>. Say "you are going to complete an activity on your own."
	4) Teacher points to "<u>raise your hand" reminder</u>. Say "If you need me, raise your hand, count to ____, and wait until I come over to you. Then quietly tell me what you need."
	5) Point to the <u>self-monitoring sheet</u>. Say "After 2 minutes I will come over to you and help you fill out your point card. You get 1 point each time you stay in your seat, work quietly, and try your best for the full 2-minutes"
	6) Point to the <u>daily graph sheet</u>. Say "Yesterday you got <state the number of points earned the previous day> points. How many are you going to try to get today?" Encourage the student (e.g., 'I know you can do it!")
	7) Say "Do you have any questions?"
	8) Answer any questions the student may have. If the student asks for candy or other rewards for completing the activity, state that the goal is to try your best without needing extra prizes. If n/a scores as "1"
	9) Walk away from the student
	10) Assist the student upon request
	11) After each 2-minute interval, return to the student and help him complete the point sheet.
	12) After 10 minutes or upon completion of the task, assist the student with coloring his daily graph sheet according to number of points earned on the self-monitoring sheet.
	13) Offer an enthusiastic high five, fist bump, or side-hug (if and when appropriate) and affirm the student's worth as a human being with a statement such as "That was fantastic. I believe you will be an astronaut one day" or "You are an academic magician." Feel free to use your own.

APPENDIX K: PROGRAMMED GENERALIZATION RESOURCE – UPPER ELEMENTARY

Treatment Fidelity

Date: _____ Student: _____

Teacher: _____

1 = yes 0=no	**Procedures**
	1) Start MotivAider (set for 120 second intervals) and hand it to the student.
	2) Give student an academic task, self-monitoring sheet, daily graph sheet, and "raise your hand" reminder.
	3) Point to the academic task. Say "you are going to complete an activity on your own."
	4) Point to "raise your hand" reminder. Say "If you need me, raise your hand and wait until I can assist you. Then quietly tell me what you need."
	5) Point to the self-monitoring sheet. Say "After 2 minutes fill out your point card. You get 1 point each time you stay in your seat, work quietly, and try your best for the full 2-minutes"
	6) Point to the daily graph sheet. Say "Yesterday you got <state the number of points earned the previous day> points. How many are you going to try to get today?" Encourage the student (e.g., 'I know you can do it!")
	7) Say "Do you have any questions?"
	8) Answer any questions the student may have. If the student asks for candy or other rewards for completing the activity, state that the goal is to try your best without needing extra prizes.
	9) Walk away from the student
	10) Assist the student upon request
	11) After 10 minutes or upon completion of the task, assist the student with coloring his daily graph sheet according to number of points earned on the self-monitoring sheet.
	12) Offer an enthusiastic high five, fist bump, or side-hug (if and when appropriate) and affirm the student's worth as a human being with a question like "do you ever get tired of rocking so hard?" or a statement such as "if you look up 'brilliance' in the dictionary you would see a blank box with a caption that reads 'picture not available' because they tried to take your picture but you shined too bright."

APPENDIX L: PROGRAMMED GENERALIZATION GEN ED – LOWER ELEMENTARY

Treatment Fidelity

Date: _____ Student: _____

Teacher: _____

1 = yes 0=no	**Procedures**
	1) Teacher starts the MotivAider (set for 120 second intervals)
	2) Teacher gives student an academic task, self-monitoring sheet, daily graph sheet, and "raise your hand" reminder.
	3) Teacher gives student an activity and points to the academic task. Say "you are going to complete an activity on your own."
	4) Teacher points to "raise your hand" reminder. Say "If you need me, raise your hand, count to ____, and wait until I come over to you. Then quietly tell me what you need."
	5) Point to the self-monitoring sheet. Say "After 2 minutes I will come over to you and help you fill out your point card. You get 1 point each time you stay in your seat, work quietly, and try your best for the full 2-minutes"
	6) Point to the daily graph sheet. Say "Yesterday you got <state the number of points earned the previous day> points. How many are you going to try to get today?" Encourage the student (e.g., 'I know you can do it!")
	7) Say "Do you have any questions?"
	8) Answer any questions the student may have. If the student asks for candy or other rewards for completing the activity, state that the goal is to try your best without needing extra prizes. If n/a scores as "1"
	9) Walk away from the student
	10) Assist the student upon request
	11) After each 2-minute interval, return to the student and help him complete the point sheet.
	12) After 10 minutes or upon completion of the task, assist the student with coloring his daily graph sheet according to number of points earned on the self-monitoring sheet.
	13) Offer an enthusiastic high five, fist bump, or side-hug (if and when appropriate) and affirm the student's worth as a human being with a statement such as "That was fantastic. I believe you will be an astronaut one day" or "You are an academic magician." Feel free to use your own.

APPENDIX M: PROGRAMMED GENERALIZATION GEN ED – UPPER ELEMENTARY

Treatment Fidelity

Date: _____ Student: _____

Teacher: _____

1 = yes 0=no	**Procedures**
	1) Teacher hands student MotivAider (set for 120 second intervals)
	2) Teacher gives student an academic task, self-monitoring sheet, daily graph sheet, and "raise your hand" reminder.
	3) Teacher walks away from student
	4) Conclude observation after task is complete or 10 minutes has elapsed.

APPENDIX N: STUDENT SELF-MONITORING FORM – LOWER ELEMENTARY

Date: _____ Student: _____ Setting: Iso Res Gen

	Stay in Seat 	Work quietly 	Try your best 	Student Signal
1				
2				
3				
4				
5				
Count your cool dudes				Total =

APPENDIX O: STUDENT SELF-MONITORING FORM – UPPER ELEMENTARY

Date: _____ Student: _____ Setting: Iso Res Gen

	Stay in Seat	Work quietly	Try your best	Raise Hand
1	0 1	0 1	0 1	
2	0 1	0 1	0 1	
3	0 1	0 1	0 1	
4	0 1	0 1	0 1	
5	0 1	0 1	0 1	
Total				Total =

APPENDIX P: STUDENT DAILY GRAPH SHEET

															Session 24
															Session 23
															Session 22
															Session 21
															Session 20
															Session 19
															Session 18
															Session 17
															Session 16
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															Session 13
															Session 12
															Session 11
															Session 10
															Session 9
															Session 8
															Session 7
															Session 6
															Session 5
															Session 4
															Session 3
															Session 2
															Session 1
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
SCORE															

APPENDIX Q: DIRECT OBSERVATION FORM

Date: _____ Time: _____ Student: _____
Observer: _____ *INITIAL IOA* = ☐
Condition: Baseline Intervention Programmed Generalization
Setting: Iso Resource Gen Ed
Activity: _____
Target behavior: _____
FCR: _____
Total duration of observation: _____

Directions: Record a one ("1") during each interval in which problem behavior occurs. Record a zero ("0") during each interval in which problem behavior does not occur. Record a slash ("/") during intervals in which the student received direct assistance from an adult during at least 5 s during the interval. Record a one ("+") under the column labeled "FCR" for each correct recruitment of adult attention. Record a minus ("--") under the column labeled "FCR" for each incorrect recruitment of adult attention.

		Interval						FCR
		10sec	20sec	30sec	40sec	50sec	60sec	
Minute	0							
	1							
	2							
	3							
	4							
	5							
	6							
	7							
	8							
	9							
		Total "1" = _____ Number of intervals scored = _____						Total "+" = ___ Total "--" = ___

APPENDIX R: FACTS FOR ALBERT

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

Student: Albert Grade 1 Date: March, 2017
Staff Interviewed: Mr. D. Interviewer: Burt

Student Strengths: Identify at least three strengths or contributions the student brings to school.
Academic strengths – letter sound identification, decoding, numeracy
Social/Recreational – wonderful sense of humor
Other - vivid imagination

ROUTINES ANALYSIS: Where, When and With Whom Problem Behaviors are Most Likely.

Time	Routine/Activity & Staff Involved	Likelihood of Problem Behavior	Specific Problem Behavior	Current Intervention for the Problem Behavior
a.m.	Resource - math	Low 1 2 3 4 5 **6** High	Cursing, yelling, back talk, task avoidance	Redirection, task modification, incentives (computer time)
a.m.	Resource – reading	1 2 3 4 5 **6**		Redirection, task modification, incentives (computer time)
a.m.	Resource – computer based instruction	1 2 3 4 **5** 6		Redirection, task modification, incentives (computer time)
a.m. / p.m.	Resource – unstructured free time	1 **2** 3 4 5 6		Rule reminders, Loss of privilege
a.m. / p.m.	Transitions	1 2 3 4 5 **6**	Cursing, back talk, threats, task avoidance	Redirection
p.m.	Related services – speech/OT/counselor	1 **2** 3 4 5 6		Incentives
p.m.	Lunch / Detention		Physical	PAC room,

		1 2 3 4 5 6	aggression toward peers	parent phone call, conference with principal
p.m.	Independent work	1 2 3 4 5 **6**	Lying on floor, out of seat, cursing, work refusal	Incentives, task modification, loss of privilege

List the Routines in order of Priority for Behavior Support: Select routines with ratings of 5 or 6. Only combine routines when there is significant (a) similarity of activities (conditions) and (b) similarity of problem behavior(s). Complete the FACTS-Part B for each of the prioritized routine(s) identified.

	Routines/Activities/Context	Problem Behavior(s)
Routine	Independent work & transitions from preferred to less preferred tasks	Cursing, yelling, back talk, threats, task avoidance, out of seat, lying on floor, property destruction
If problem behaviors occur in more than 2 routines, refer case to behavior specialist		

BEHAVIOR(s): Rank order the top priority problem behaviors occurring in the targeted routine above:

___ Tardy	___ Fight/physical Aggression	_5_ Disruptive	___ Theft
___ Unresponsive	_1_ Inappropriate Language	_4_ Insubordination	___ Vandalism
___ Self-injury	_3_ Verbal Harassment	__ Work not done	_2_ Other - Threats

Describe prioritized problem behavior(s) in observable terms: Screams obscenities at staff, makes threats to harm staff, says "I hate you", "I hate this school". Leaves assigned area. Refuses to engage in academic tasks. Lays down on floor and refuses to comply with directives. If disciplined for his behavior, Albert may attempt to engage in physical aggression towards staff or will cry inconsolably for extended periods of time unless and until he gets his way or it is time to transition to a preferred activity (lunch).

What is the frequency of the Problem Behavior in the targeted routine (# x's /day or hour)?	**1 / hour**
What is the duration of the Problem Behavior in the targeted routine (in seconds or min)?	**5-10 min**
Is Behavior Immediate Danger to self/others?	**Y N** **If Yes, refer case to behavior specialist**

Adapted by S.Loman (2009) from C. Borgmeier (2005) ;March, Horner, Lewis-Palmer, Brown, Crone & Todd (1999)

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

Identify the Target Routine: Select *ONE* of the prioritized routines from FACTS-Part A for assessment.

Routine/Activities/Context & Staff Name	Problem Behavior(s) – make description observable
Independent work supervised by Mr. D. or TA	Crying, screaming, cursing, threats, work refusal, out of seat, lying on floor – potential for physical aggression

ANTECEDENT(s): *Rank Order* the strongest triggers/predictors of problem behavior in the routine above. Then ask corresponding follow-up question(s) to get a *detailed* understanding of triggers ranked #1 & 2.

Environmental Features (*Rank order strongest 2*)		Follow Up Questions – *Get as Specific as possible*
_1_**a.** task too hard ___**b.** task too easy ___**c**. bored w/ task ___**d.** task too long ___**e.** physical demand ___**f.** correction/repriman d ___Other _____ Describe _____	___**g.** large group instruction ___**h.** small group work _2_**i.** independent work ___**j.** unstructured time ___**k**. transitions ___**l.** with peers ___**m**. isolated/no attention	**If a,b,c,d or e** - describe task/demand in detail – written assignments with numerous problems or questions are most problematic for Albert due to his fine motor skill deficits. **If f** - describe purpose of correction, voice tone, volume etc. _____ **If g, h, I, j or k** - describe setting/activity/content in detail – same as above **If l** – what peers? _____ **If m** – describe -

CONSEQUENCE(s): *Rank Order* the strongest pay-off for student that appears most likely to maintain the problem behavior in the routine above. The ask follow-up questions to detail consequences ranked #1 & 2.

Consequences/Function	As applicable -- Follow Up Questions – *Get as Specific as possible*
___ **a**. get adult attention ___ **b.** get peer attention ___ **c.** get preferred activity ___ **d.** get object/things/money ___ **e.** get sensation ___ **f**. get other, describe	**If a or b** -- Whose attention is obtained? How is the (positive or negative) attention provided?
	If c, d, e, or f -- What specific items, activities, or sensations are obtained?
_1_ **g.** avoid undesired activity/task ___ **h.** avoid sensation ___ **i.** avoid adult attention ___ **j.** avoid peer attention ___ **k.** avoid/escape other, describe	**If g or h**- Describe specific task/activity/sensation avoided? Be specific, DO NOT simply list subject area, but specifically describe type of work within the subject area? Assigned a difficult independent writing task within any subject with multiple problems or questions Can the student perform the task independently? **Y** N Is academic assessment needed to ID specific skill deficits? Y **N** **If i or j** – Who is avoided? _____ Why avoiding this person?

SETTING EVENT(s): *Rank* Order any events that happen outside of the immediate routine (at home or earlier in day) that commonly make problem behavior more likely or worse in the routine above.
_x_ hunger __ conflict at home **_x_** conflict at school __ missed medication __ illness __failure in previous class __ lack of sleep __change in routine __ homework not done __ not sure __ Other_____

SUMMARY OF BEHAVIOR

Fill in boxes below using top ranked responses and follow-up responses from corresponding categories above.

ANTECEDENT(s) / Triggers	Problem Behavior(s)	CONSEQUENCE(s)/ Function
Assigned a difficult independent writing task with multiple problems or questions	Crying, screaming, cursing, threats, work refusal, out of seat, lying on floor – potential for physical aggression	Avoid academic task
SETTING EVENTS		
Hunger, conflict at school (computer not available)		

How likely is it that this Summary of Behavior accurately explains the identified behavior occurring?					
Not real sure					100% Sure/No Doubt
1	2	3	4	**5**	6

Adapted by S.Loman (2009) from C. Borgmeier (2005) ;March, Horner, Lewis-Palmer, Brown, Crone & Todd (1999)

APPENDIX S: FACTS FOR MATT

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

Student: Matt Grade 4 Date: March, 2017
Staff Interviewed: Mrs. F. Interviewer: Burt

Student Strengths: Identify at least three strengths or contributions the student brings to school.
Academic strengths – letter sound correspondence, math
Social/Recreational – kind to others
Other -

ROUTINES ANALYSIS: Where, When and With Whom Problem Behaviors are Most Likely.

Time	Routine/Activity & Staff Involved	Likelihood of Problem Behavior	Specific Problem Behavior	Current Intervention for the Problem Behavior
a.m.	Resource – reading/language arts	Low 1 2 3 4 **5** 6 High	Task avoidance, off-task & disruptions (shout out)	CICO Redirection Loss of privileges
a.m.	Special areas	**1** 2 3 4 5 6	n/a	n/a
a.m.	Lunch	**1** 2 3 4 5 6	n/a	n/a
p.m.	Rotation 1	1 2 3 4 5 **6**	Task avoidance	CICO
p.m.	Rotation 2	1 2 3 4 5 **6**	Off task	CICO
p.m.	Rotation 3	1 **2** 3 4 5 6	Off task	CICO
p.m.	Resource - math	1 2 3 4 **5** 6	Task avoidance, off-task & disruptions (shout out)	CICO Redirection Loss of privileges

List the Routines in order of Priority for Behavior Support: Select routines with ratings of 5 or 6. Only combine routines when there is significant (a) similarity of activities (conditions) and (b) similarity of problem behavior(s). Complete the FACTS-Part B for each of the prioritized routine(s) identified.

	Routines/Activities/Context	Problem Behavior(s)
Routine	Resource classroom during group instruction or independent work with reading/language arts components	Off-task (stare off into space), playful and disruptive with peers, back talk if confronted, "learned helplessness", refuses to engage in academic tasks, fidgets and plays with distractors
If problem behaviors occur in more than 2 routines, refer case to behavior specialist		

BEHAVIOR(s): **Rank order the top priority problem behaviors occurring in the targeted routine above:**

___ Tardy	___ Fight/physical Aggression	_4_ Disruptive	___ Theft
_2_ Unresponsive	_1_ Inappropriate Language	_1_ Insubordination	___ Vandalism
___ Self-injury	_3_ Verbal Harassment	_3_ Work not done	___ Other -

Describe prioritized problem behavior(s) in observable terms: When Matt is expected to attend to lessons with heavy language components (i.e., anything but math) or must complete an activity with independent reading, he will neglect to engage with the task in favor of playing with unrelated objects or interacting with peers. If pressed to get back to task Matt may whine or argue with the teacher

What is the frequency of the Problem Behavior in the targeted routine (# x's /day or hour)?	**4 / day**
What is the duration of the Problem Behavior in the targeted routine (in seconds or min)?	**1-2 min**
Is Behavior Immediate Danger to self/others?	Y **N** **If Yes, refer case to behavior specialist**

Adapted by S.Loman (2009) from C. Borgmeier (2005) ;March, Horner, Lewis-Palmer, Brown, Crone & Todd (1999)

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

Identify the Target Routine: Select *ONE* of the prioritized routines from FACTS-Part A for assessment.

Routine/Activities/Context & Staff Name	**Problem Behavior(s) – make description observable**
Resource room during language arts or reading activities	**Task avoidance, off-task, disruptive (shout outs), and argumentative/defiant if disciplined by the teacher.**

ANTECEDENT(s): *Rank Order* the strongest triggers/predictors of problem behavior in the routine above. Then ask corresponding follow-up question(s) to get a *detailed* understanding of triggers ranked #1 & 2.

Environmental Features (*Rank order strongest 2*)		**Follow Up Questions – *Get as Specific as possible***
_1_ **a.** task too hard ___ **b.** task too easy ___ **c**. bored w/ task _2__ **d.** task too long ___ **e.** physical demand ___ **f.** correction/reprimand ___Other _____ Describe _____	___ **g.** large group instruction ___ **h.** small group work ___ **i.** independent work ___ **j.** unstructured time ___ **k**. transitions ___ **l.** with peers ___ **m**. isolated/no attention	**If a,b,c,d or e** - describe task/demand in detail –any assignment or lesson with strong language components **If f** - describe purpose of correction, voice tone, volume etc. _____ **If g, h, I, j or k** - describe setting/activity/content in detail – **If l** – what peers? _____ **If m** – describe -

CONSEQUENCE(s): ***Rank Order*** **the strongest pay-off for student that appears most likely to maintain the problem behavior in the routine above. The ask follow-up questions to detail consequences ranked #1 & 2.**

Consequences/Function	**As applicable -- Follow Up Questions – *Get as Specific as possible***
___ **a**. get adult attention ___ **b.** get peer attention ___ **c.** get preferred activity ___ **d.** get object/things/money ___ **e.** get sensation ___ **f**. get other, describe_____ _____ _1_ **g.** avoid undesired activity/task ___ **h.** avoid sensation ___ **i.** avoid adult attention ___ **j.** avoid peer attention ___ **k.** avoid/escape other, describe _____	**If a or b** -- Whose attention is obtained? How is the (positive or negative) attention provided? **If c, d, e, or f** -- What specific items, activities, or sensations are obtained? **If g or h**- Describe specific task/activity/sensation avoided? Be specific, DO NOT simply list subject area, but specifically describe type of work within the subject area? Any type of reading task due to Matt's struggles with decoding, fluency, and comprehension. Can the student perform the task independently? **Y** N Is academic assessment needed to ID specific skill deficits? Y **N** **If i or j** – Who is avoided? _____ Why avoiding this person?

SETTING EVENT(s): *Rank* Order any events that happen outside of the immediate routine (at home or earlier in day) that commonly make problem behavior more likely or worse in the routine above.
__ hunger __ conflict at home __ conflict at school _**x**_ missed medication __ illness __failure in previous class __ lack of sleep __change in routine __ homework not done __ not sure __ Other_____

SUMMARY OF BEHAVIOR

Fill in boxes below using top ranked responses and follow-up responses from corresponding categories above.

ANTECEDENT(s) / Triggers	**Problem Behavior(s)**	**CONSEQUENCE(s)/ Function**
Assigned group or individual task with heavy reading components **SETTING EVENTS** **Missed medications**	**Task avoidance, off-task, disruptive (shout outs), and argumentative/defiant if disciplined by the teacher.**	**Avoid academic task**

How likely is it that this Summary of Behavior accurately explains the identified behavior occurring?					
Not real sure					100% Sure/No Doubt
1	2	3	4	**5**	6

Adapted by S.Loman (2009) from C. Borgmeier (2005) ;March, Horner, Lewis-Palmer, Brown, Crone & Todd (1999)

APPENDIX T: FACTS FOR DARRION

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

Student: Darrion Grade 4 Date: March, 2017
Staff Interviewed: Mrs. F. Interviewer: Burt

Student Strengths: Identify at least three strengths or contributions the student brings to school.
Academic strengths – math skills
Social/Recreational – sense of humor
Other – offers to help teachers

ROUTINES ANALYSIS: Where, When and With Whom Problem Behaviors are Most Likely.

Time	Routine/Activity & Staff Involved	Likelihood of Problem Behavior	Specific Problem Behavior	Current Intervention for the Problem Behavior
a.m.	Resource – reading/language arts	Low 1 2 3 4 **5** 6 High	Shout out, off-task, out of seat, rude comments, makes noises, argumentative	CICO Redirection Time-out Loss of privileges
a.m.	Special areas	1 2 3 4 5 **6**	Verbal aggression / physical aggression	CICO Office referral PAC room Phone call home Suspension
a.m.	Lunch	1 2 **3** 4 5 6	Out of seat	Redirection
p.m.	Rotation 1	**1** 2 3 4 5 6	Task avoidance	CICO
p.m.	Rotation 2	**1** 2 3 4 5 6	Off task	CICO
p.m.	Rotation 3	1 2 3 **4** 5 6	Off task	CICO
p.m.	Resource - math	1 2 3 4 5 **6**	Shout out, off-task, out of seat, rude comments, makes noises, argumentative	CICO Redirection Time-out Loss of privileges
a.m./ p.m.	Bus	1 2 3 4 5 **6**	Out of seat, fighting, not following directions	Bus referral Conference Lunch detention

				Bus suspension
a.m./ p.m.	Hallway/bathroom/playground	1 2 3 4 5 **6**	Instigates arguments and fights, bullying	Office referral PAC room Phone call home Suspension

List the Routines in order of Priority for Behavior Support: Select routines with ratings of 5 or 6. Only combine routines when there is significant (a) similarity of activities (conditions) and (b) similarity of problem behavior(s). Complete the FACTS-Part B for each of the prioritized routine(s) identified.

	Routines/Activities/Context	Problem Behavior(s)
Routine	Resource classroom during group or independent work with any assignment	Shout out, off-task, out of seat, rude comments, makes noises, argumentative
If problem behaviors occur in more than 2 routines, refer case to behavior specialist		

BEHAVIOR(s): Rank order the top priority problem behaviors occurring in the targeted routine above:

___ Tardy	_1_ Fight/physical Aggression	_7_ Disruptive	___ Theft
_4_ Unresponsive	_2_ Inappropriate Language	_5_ Insubordination	___ Vandalism
___ Self-injury	_6_ Verbal Harassment	_3_ Work not done	___ Other -

Describe prioritized problem behavior(s) in observable terms: Darrion often attempts to instigate fights with peers by making comments, rude gestures, or noises to annoy others. If called out for it, Darrion will become argumentative, disruptive, and rude to teachers by back talk and denying that anything occurred. If disciplined for his disruptions, Darrion may become extremely upset resulting in screaming, crying, property destruction, and elopement.

What is the frequency of the Problem Behavior in the targeted routine (# x's /day or hour)?	**6 / hour**
What is the duration of the Problem Behavior in the targeted routine (in seconds or min)?	**1 min**
Is Behavior Immediate Danger to self/others?	Y **N** **If Yes, refer case to behavior specialist**

Adapted by S.Loman (2009) from C. Borgmeier (2005) ;March, Horner, Lewis-Palmer, Brown, Crone & Todd (1999)

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

Identify the Target Routine: Select *ONE* of the prioritized routines from FACTS-Part A for assessment.

Routine/Activities/Context & Staff Name	Problem Behavior(s) – make description observable
Resource room / any activity with peers present / Mrs. F.	**Shout out, off-task, noises, rude comments under his breath, rude gestures, bullying**

ANTECEDENT(s): ***Rank Order*** **the strongest triggers/predictors of problem behavior in the routine above. Then ask corresponding follow-up question(s) to get a** ***detailed*** **understanding of triggers ranked #1 & 2.**

Environmental Features (*Rank order strongest 2*)		**Follow Up Questions – *Get as Specific as possible***
__**a.** task too hard ___**b.** task too easy ___**c**. bored w/ task ___**d.** task too long ___**e.** physical demand ___**f.** correction/reprimand ___Other _____ Describe _____	___**g.** large group instruction _2_**h.** small group work ___**i.** independent work ___**j.** unstructured time ___**k**. transitions _1_**l.** with peers ___**m**. isolated/no attention	**If a,b,c,d or e** - describe task/demand in detail –any assignment or lesson with strong language components **If f** - describe purpose of correction, voice tone, volume etc. _____ **If g, h, I, j or k** - describe setting/activity/content in detail – resource room with any peers present **If l** – what peers? _____ **If m** – describe -

CONSEQUENCE(s): ***Rank Order*** **the strongest pay-off for student that appears most likely to maintain the problem behavior in the routine above. The ask follow-up questions to detail consequences ranked #1 & 2.**

Consequences/Function	**As applicable -- Follow Up Questions – *Get as Specific as possible***
_1_ **a**. get adult attention _2_ **b.** get peer attention ___ **c.** get preferred activity ___ **d.** get object/things/money ___ **e.** get sensation ___ **f**. get other, describe_____ _____ ___ **g.** avoid undesired activity/task ___ **h.** avoid sensation ___ **i.** avoid adult attention ___ **j.** avoid peer attention ___ **k.** avoid/escape other, describe	**If a or b** -- Whose attention is obtained? Mrs. F. and peers How is the (positive or negative) attention provided? Peers will become upset and either tell on Darrion or retaliate. Darrion will deny that anything occurred and Mrs. F. will intervene. If Darrion is disciplined he will become upset, defiant, and disruptive. **If c, d, e, or f** -- What specific items, activities, or sensations are obtained? **If g or h**- Describe specific task/activity/sensation avoided? Be specific, DO NOT simply list subject area, but specifically describe type of work within the subject area? Can the student perform the task independently? Y N Is academic assessment needed to ID specific skill deficits? Y N **If i or j** – Who is avoided? _____ Why avoiding this person?

SETTING EVENT(s): ***Rank*** **Order any events that happen outside of the immediate routine (at home or earlier in day) that commonly make problem behavior more likely or worse in the routine above.**

__ hunger _**x**_ conflict at home __ conflict at school _**x**_ missed medication __ illness _**x**_failure in previous class
__ lack of sleep __change in routine __ homework not done __ not sure __
Other_____

SUMMARY OF BEHAVIOR

Fill in boxes below using top ranked responses and follow-up responses from corresponding categories above.

ANTECEDENT(s) / Triggers	**Problem Behavior(s)**	**CONSEQUENCE(s) / Function**
Assigned group or individual task with heavy reading components	**Shout out, off-task, noises, rude comments under his breath, rude gestures, bullying**	**Obtain peer/adult attention**
SETTING EVENTS		
Conflict at home **Missed medication** **Failure in previous class**		

How likely is it that this Summary of Behavior accurately explains the identified behavior occurring?

Not real sure 100%
Sure/No Doubt
1 2 3 4 **5** 6

Adapted by S.Loman (2009) from C. Borgmeier (2005) ;March, Horner, Lewis-Palmer, Brown, Crone & Todd (1999)

CURRICULUM VITAE

JONATHAN L. BURT
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EDUCATION AND PROFESSIONAL CREDENTIALS

DEGREES HELD

M.Ed.	2006	Vanderbilt University, Nashville, TN Special Education; High-Incidence Disabilities; Emotional and Behavioral Disorders (EBD)
B.B.A.	2003	Belmont University, Nashville, TN Business Management

CERTIFICATIONS

BCBA	2015-present	Board Certified Behavior Analyst Behavior Analyst Certification Board
CPI Instructor	2011-2015	Non-violent Crisis Intervention Crisis Prevention Institute
IN Licensure	2009-2013	Special Education Teacher Licensure Modified K-12, Indiana
TN Licensure	2006-2011	Special Education Teacher Licensure Modified K-12, Tennessee

PROFESSIONAL EXPERIENCE

Behavior Support Specialist	2015-present	Clinical Behavior Analysis, Louisville, KY
Leadership Grant Doctoral Student	2014-2017	University of Louisville, Louisville, KY
ABA Program	2013-2014	Indiana Institute of Behavior Analysis, Indianapolis,

Manager		IN
Special Education Teacher	2009-2013	Washington Township Schools, Indianapolis, IN
Special Education Teacher	2007-2009	Hamilton County Schools, Chattanooga, TN
Behavior Therapist	2006-2007	Scarab Behavioral Health, LLC, Nashville, TN
Graduate Research Assistant	2004 - 2005	Vanderbilt University, Nashville TN

PUBLICATIONS

Burt, J. L., & Pennington, R. C. (*In Press*). What to do with extinction: A teacher's guide to using extinction in schools. *Intervention in School and Clinic*.

Pennington, R. C., Ault, M. J., Schmuck, D. G., **Burt, J. L.**, & Ferguson, L. (2016). Frequency of mand instruction reported in behavioral, special education, and speech journals. *Behavior Analysis in Practice.*

PRESENTATIONS

REFEREED

Burt. J.L. (2017). *The effects of functional communication and self-monitoring with programmed generalization for three students with or at-risk for emotional/behavioral disorders.* Poster presentation at the Kentucky Association for Behavior Analysis Annual Conference, Louisville, KY.

Burt, J. L., & Pennington, R. C. (2017). *Generality of function-based interventions for students with EBD.* Presentation at the Association of Behavior Analysis International Annual Conference, Denver. CO.

Hollo, A., & **Burt, J. L.** (2016). *Promoting effective communication with students with emotional and behavioral disorders in schools.* Presentation at the Association of Behavior Analysis International Annual Conference, Chicago, IL.

Burt, J. L., & Hollo, A. (2016). *Functional assessment based interventions for students with high-incidence disabilities: FCT by many other names?* Poster presentation at the Association of Behavior Analysis International Annual Conference, Chicago, IL.

Burt, J. L., & Grant, E. (2015). *ABA and OT: We are better together*. Poster presentation at the Ohio Center for Autism and Low Incidence Annual Conference, Columbus, OH.

Hollo, A., & **Burt, J.** (2015). *Functional Communication Training: An overlooked behavioral intervention for students with EBD?* Presentation at the International Conference on Children and Youth with Behavioral Disorders, Atlanta, GA.

Burt, J., & Hollo, A. (2015). *Communication and problem behavior: Comparing function-based interventions for low- and high-incidence populations.* Poster presentation at the International Conference on Children and Youth with Behavioral Disorders, Atlanta, GA.

Pennington, R. C., & **Burt, J. L.** (2015). *Frequency of mand instruction and contextual variables reported in behavioral, special education, and speech journals.* Poster presentation at the Association of Behavior Analysis International Annual Conference, San Antonio, TX.

Pennington, R. C., & **Burt, J. L.** (2015). *Frequency of mand instruction and contextual variables reported in behavioral, special education, and speech journals.* Poster presentation for the Annual Conference for the Kentucky Association of Behavior Analysis, Louisville, KY.

INVITED

July 2017, Best Practices in Classroom Management.. *Laurel County Public Schools,* London, KY.

March 2017, Keynote Speaker Behavior Management 2.0 and Beyond. *SWWC Behavior Conference*, Marshall, MN.

September 2015. Practical Functional Assessment and Behavior Intervention Plan. *Laurel County Public Schools*, London, KY.

August 2015. Practical Functional Assessment and Behavior Intervention Plan. *Clay County School District*, Manchester, KY.

GRANTS AND AWARDS

Student Research Award	2017	Kentucky Association of Behavior Analysis
Student Spotlight	2016	School of Interdisciplinary and Graduate Studies University of Louisville
Leadership Grant	2014	Department of Special Education, CEHD University of Louisville
OSEP Scholarship	2006	School and University Collaboration Cohorts Endorsing Secondary Special Education Strategies Department of Special Education, Peabody College Vanderbilt University

OSEP Scholarship	2004	Building Capacity to Better Serve Students with Emotional Disturbances: A Collaborative Approach Vanderbilt University
University Scholarship	2004	Dean's Tuition Scholarship Vanderbilt University

COURSES TAUGHT

EDSP 646 Behavioral Approach to Communication	Teaching Assistant
EDSP 442 Learning and Behavior Disorders Practicum	Practicum Supervisor
EDSP 669 Single Case Research Design	Measurement of Dependent Variables in Single Case Research (Guest Lecturer-University of Louisville)
EDSP 100 Intro to Special Education	Responsiveness to Intervention (Guest Lecturer-University of Louisville)

SERVICE

BCBA fieldwork supervisor	2017
Symposium chair for ABAI annual conference	2016
Poster session discussant for ABAI annual conference	2016
President of the Behavior Analysis Student Association of Louisville	2015-2017
KYABA Student Representative to the Executive Council	2015-2016
Guest Reviewer for Education and Treatment of Children	2015
Guest Reviewer for Behavioral Disorders	2015
Student volunteer for KYABA annual conference	2015
Consulting behavior analyst for University of Louisville Autism Center	2015
Special Education Rep. for U of L Graduate Student Council	2014
District Crisis Management Trainer, Washington Township Schools	2013

District Autism Team, Washington Township Schools	2012
Positive Behavior Support Chair,Westlane Middle School	2011
Positive Behavior Support Team Member, Westlane Middle School	2009-2010

PROFESSIONAL ASSOCIATIONS

Council for Exceptional Children (CEC)
- ~ Council for Children with Behavioral Disorders (CCBD)

Association for Behavior Analysis International

Kentucky Association for Behavior Analysis

Tennessee Association for Behavior Analysis

Association for Contextual Behavioral Science