The Treatment Utility of Functional Analyses for Disruptive Classroom Behavior.

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THE TREATMENT UTILITY OF FUNCTIONAL ANALYSES
FOR DISRUPTIVE CLASSROOM BEHAVIOR

A Dissertation
Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
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in
The Department of Psychology

by
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B. S., University of Southwestern Louisiana, 1989
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ABSTRACT

Disruptive classroom behaviors are a frequent referral problem in school settings. Although there are several intervention approaches that are commonly used in classroom settings, no standard methodology exists for developing interventions to decrease behavior problems. The primary purpose of this investigation was to develop interventions based upon a functional analysis of disruptive behavior of developmentally normal children in classroom settings, and to analyze treatment effectiveness.

Functional analyses which investigated the effect of peer attention, teacher attention, and negative reinforcement (escape) were conducted with five participants. The variable maintaining disruptive classroom behavior was peer attention for all participants. Following the functional analyses, an intervention using differential reinforcement and extinction was conducted, which resulted in near zero levels of disruptive behavior across all participants. These near zero levels of disruptive behavior were associated with increases in on-task behavior, and were maintained as intervention procedures were conducted and modified over time.

Second, this investigation was conducted to determine whether variables maintaining disruptive classroom behaviors according to a functional analysis (Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994) are identified as preferred using standard preference and reinforcer assessments. Two methods of preference assessment and a reinforcer
assessment were conducted with each participant. The highest level of agreement was found between the functional analysis and the reinforcer assessment, which identified peer attention as most preferred by four participants.

The results of this study suggest that functional analyses may be conducted in regular education settings to identify variables maintaining disruptive behavior, and that intervention strategies based upon functional analyses may lead to positive reductions in disruptive behavior. In addition, the results of this study provide preliminary evidence for the comparability of functional analyses and reinforcer assessments, in that agreement was found in the identified variable for three of five subjects. Future investigations are needed in order to further understand whether variables maintaining disruptive behavior may also reinforce appropriate academic behavior, such as work completion. In addition, it would be important to determine whether variables that are not identified as reinforcers for an individual would have an influence on disruptive behavior in the context classroom interventions.
CHAPTER 1

INTRODUCTION

This study examined the treatment utility of a functional analysis methodology (Neef & Iwata, 1994) for decreasing disruptive behaviors of developmentally normal students in classroom settings. The purpose of this study was to identify environmental events in classrooms that maintain disruptive classroom behavior, and to arrange environmental contingencies so that the environmental event that maintained inappropriate behavior was provided to reinforce appropriate behaviors, such as work completion and on-task behavior.

A functional analysis was conducted using an assessment protocol that has evolved from the use of functional analysis procedures to address severe behavior problems of developmentally disabled individuals. These procedures were developed by Iwata, et al., (1982/1994) and consist of systematically observing the effect of various experimental conditions on target behaviors, in an effort to identify the function of those behaviors. Functional analysis methods have been refined and extended by numerous researchers for use as an assessment procedure with different populations and in a variety of settings, including regular education classrooms. However, the extent to which functional analyses lead to effective interventions for disruptive classroom behavior in regular education settings has not been demonstrated.
The information obtained in the functional analysis was used to direct subsequent intervention efforts. All interventions included reinforcement of appropriate behavior and extinction. Specifically, the item or event that was determined to maintain disruptive classroom behavior via a functional analysis was withheld contingent upon the occurrence of target behaviors and delivered contingent upon the occurrence of alternative appropriate behaviors. The effect of this manipulation on inappropriate and appropriate behaviors was observed as the intervention was implemented in the classroom setting, and repeated over time for the remainder of the school year.

A standardized preference assessment was also administered to each subject. The purpose of this assessment was to identify preferences of each subject from several categories of items or events that are readily available in classroom settings. Specifically, these categories included the same variables that were investigated in the functional analysis; that is, teacher attention, peer attention, and nonexclusionary time out (or escape). The preference assessment included one survey directed toward identifying the degree to which the student liked each of a number of potential reinforcers, and a verbal stimulus choice procedure which was used to identify the degree to which students differentiated between categories in their verbally identified preferences. Following the preference assessment, a standardized reinforcer assessment was conducted. The purpose of the
The purpose of conducting the preference and reinforcer assessments was to determine whether variables demonstrated to maintain disruptive classroom behavior through functional analysis are identified as preferred by students through preference and reinforcer assessments. In making this comparison, the number of subjects for which the same stimulus category is identified using these different methods was determined. This comparison provided a preliminary consideration of the relative value of these methods in identifying environmental classroom variables that have some relation to disruptive classroom behaviors.

The proposed study addressed referrals from teachers or school administrators concerning disruptive behavior problems of elementary or middle school children. Using single case methodology, observations and interventions took place in naturalistic school settings. The experimenter, acting as a teacher's aide, implemented all assessment and intervention conditions throughout the study. The classroom teachers were provided with a written explanation of the intervention steps, and provided with materials so that the intervention could be implemented by the teachers if desired.
**Major Research Questions**

**Question 1**

Can functional analysis methods developed for developmentally normal children be used in classroom settings to identify maintaining variables for disruptive classroom behavior? One purpose of this study was to provide a further demonstration of the feasibility of conducting functional analyses within classroom settings in order to identify variables maintaining disruptive classroom behavior. Given the extensive literature pertaining to the functional analysis of behavior in developmental disabilities, it was predicted that general functional analysis methods that are analogous to methods used with developmentally disabled individuals would identify child-specific reinforcement contingencies for individuals in this study.

**Question 2**

What is the treatment utility of functional analysis for decreasing disruptive classroom behaviors and increasing appropriate alternative behaviors? A second purpose of this study was to demonstrate that interventions based on the results of functional analyses would effectively decrease disruptive classroom behavior, and increase an alternative, appropriate behavior. It was hypothesized that functional analyses would lead to the development of effective interventions for developmentally normal students in classroom settings.
Question 3

To what extent will intervention strategies derived from functional analyses lead to effective outcomes in classroom environments over time? A third purpose of this investigation was to consider the generalization of treatment effects over time. It was hypothesized that intervention strategies developed to address disruptive classroom behaviors would be effective as they were repeated for the remainder of the school year.

Question 4

To what extent are items identified as maintaining problem behaviors through functional analysis also identified as preferred by individuals through reinforcer assessment? A fourth purpose of this study was to consider not only the influence of teacher attention, peer attention, and escape from academic tasks on disruptive classroom behaviors, but also whether these events were preferred by the subjects being considered.
CHAPTER 2

REVIEW OF THE LITERATURE

Disruptive Behavior in Classroom Settings

Definition and Prevalence

Disruptive behavior may be defined as any behavior exhibited by a child that interferes with the learning opportunities of the target student and other students. Becker, Madsen, Arnold, & Thomas (1967) identified several categories of problem behaviors that commonly occur in classrooms, which include gross motor behavior, noises with objects, vocalizations, and aggression. Other problem behaviors may include fighting, tantrums, work incompletion, and noncompliance (Jenson, Reavis, & Rhode, 1994). Four dimensions of disruptive behavior have been identified through empirical investigation using the Sutter-Eyeberg Student Behavior Inventory (SESBI; Sutter & Eyeberg, 1984). These dimensions include the above stated behaviors, and are: (a) attentional difficulties; (b) emotional-oppositional behavior, (c) overt aggression toward others, and (d) covert conduct behaviors (Teegarden & Burns, 1993; Burns & Owen, 1990).

Although many children exhibit disruptive classroom behaviors to some degree or at some point during childhood, there appears to be a subset of children who exhibit these and other behavior excesses with higher frequency and/or intensity (Jensen, Reavis, & Rhode, 1994).
Kratochwill, & Van Someren (1985) reported that as many as 20-30% of students exhibit at least moderate behavior problems as they enter elementary school. Disruptive behaviors exhibited in classroom situations interfere with the teachers' ability to provide instruction (Casey, Skiba, & Algozzine, 1988), and the reduction of disruption in the classroom has overall benefit for all students in the setting (Lentz, 1988).

Many educators in regular education and special education settings strive to decrease the frequency and intensity of these observable disruptive behaviors (Sabatino, 1983). Positive effects of interventions targeting behavior problems in classroom settings have been reported (Broden, Bruce, Mitchell, Carter, & Hall, 1970; Lentz, 1988; Pfiffner & Barkley, 1990). However, disruptive classroom behaviors have been described as somewhat stable over time (Achenbach & Edelbrock, 1981), greatly resistant to change (Jenson, et al., 1994), and to be a common referral problem. There is a continuing need for developing effective intervention strategies for managing disruptive behavior in educational settings.

**Behavioral Interventions for Disruptive Classroom Behavior**

Reviews of research on the use of interventions in classroom settings suggest that behavioral interventions are very effective for increasing appropriate behavior and decreasing inappropriate behavior that occurs in classroom settings (Casey, et al., 1988). However, no single
intervention has been identified that is effective across populations, behavior problems, or individual students. That is, what is found to be effective for one student may not be equally effective for others.

Differential reinforcement procedures are frequently used to decrease problem behaviors (Cooper, 1987b; Lentz, 1988; Vollmer, Iwata, Zarcone, Smith & Mazaleski, 1993). One example is differential reinforcement of other behavior (DRO), during which the specified reinforcer is delivered upon the absence of target behaviors for a certain length of time. A DRO procedure does not specify any particular behavior that is to be exhibited to earn the reinforcer. It may also include a "resetting" feature, which requires a certain length of time to pass between target behaviors.

In addition, evidence exists for the effectiveness of differential reinforcement of alternative behaviors (DRA) as an intervention for problem behaviors in classroom settings. Specifically, DRA can be used not only to reduce inappropriate classroom behavior, but it can increase academic performance as well (Lentz, 1988). Ferritor, Buckholdt, Hamblin & Smith (1972) used DRA procedures to address classroom disruptions. Their procedures included ignoring inappropriate behavior, and delivering positive attention and tokens contingent upon on-task or appropriate behavior. As a result, classroom disruptions were greatly decreased, and the combination of attention and tokens was effective for increasing academic behaviors. Similar procedures were demonstrated to be effective in several subsequent

An important element of any differential reinforcement procedure may be extinction. Extinction is a procedure that requires that no occurrence of the target behavior is reinforced (Cooper, 1987a). Extinction reduces behaviors previously maintained by positive reinforcement or negative reinforcement (Cooper, 1987b). Although extinction may be effective when used alone, it is frequently combined with other procedures. For example, extinction may be combined with reinforcement of appropriate behaviors. When appropriate behaviors are reinforced, the individual is given the opportunity to learn or produce more appropriate behaviors (Cooper, 1987b), and intervention effectiveness may increase.

There are advantages and disadvantages to the use of differential reinforcement procedures. One advantage is its use for increasing appropriate behaviors through non-aversive means. A second advantage is that an item or event that is found to maintain behavior can be applied differentially. A limitation of the use of differential reinforcement is the necessity of observing the individual over time for the occurrence of target or alternative behaviors. A second limitation is the possibility of an increase in target behaviors in the form of an extinction burst. Finally, it is possible that very low rates of reinforcement will be delivered when target
behaviors occur frequently, or when alternative behavior is exhibited infrequently (Vollmer et al., 1993).

**Effectiveness of Interventions**

Many variables influence the effectiveness of behavioral interventions. Specifically, treatment integrity, treatment strength, treatment acceptability, teacher motivation, and student motivation have been identified and discussed in literature on interventions. However, it is not yet clear how variables that impact on intervention effectiveness should be measured, or to what degree each variable actually impacts the effectiveness of specific interventions.

**Integrity.** Intervention integrity, or procedural integrity, is the extent to which an intervention is implemented as it is intended (Gresham, Gansle, & Noell, 1993; Gresham, 1989). For instance, if a teacher is asked to provide a response following inappropriate behaviors, it is important that this response be delivered consistently (Casey, et al., 1988). When implementing an intervention, all steps should be understood and remembered, and all necessary materials should be available. Therefore, it is useful to have written instructions for an intervention, and to observe its implementation for accuracy. In addition, integrity may be influenced by other variables that influence intervention effectiveness, such as those discussed below.
**Strength.** The strength of an intervention refers to the delivery of a variable in some quantifiable amount that is considered necessary for treatment effectiveness (Yeaton & Sechrest, 1981). Strength might be measured by the number of treatment components that are delivered, the frequency at which these components are delivered, or the intensity with which they are delivered. For behavioral treatments, the schedule of reinforcement is an essential component of treatment strength that can be quantified and measured. Currently, no standard exists by which optimal strength of interventions might be identified prior to treatment. However, each of the above indicators of treatment strength are most commonly considered when developing behavioral interventions.

**Acceptability.** Another factor related to intervention effectiveness is the degree to which it is considered to be acceptable by those using it. Acceptability refers to the appropriateness of both the intervention for the target behavior and also the setting in which it is implemented as perceived by the person responsible for carrying out the treatment recommendations. Variables influencing intervention acceptability include the complexity of the intervention (Elliott, Witt, Galvin, & Peterson, 1984), the severity of the target behavior (Frentz & Kelley, 1986; Martens, Witt, Elliott & Darveaux, 1985), the amount of time required to implement the intervention (Witt, Elliott, & Martens, 1984) and type of intervention (Elliott, et al., 1984; Witt, et al., 1984). Acceptability of interventions may be especially
important because individuals might be less likely to use unacceptable interventions (Wolf, 1978).

Teacher motivation. Teacher motivation also influences intervention effectiveness. Waguespack & Moore (1993) reviewed a number of factors that influence a teacher’s motivation to implement behavioral interventions. One significant factor that reduces teacher motivation is the belief that they cannot do anything to bring about a change. For example, the teacher may feel that the problem behavior is due to something outside of his or her control, or due to some stable property within the child. Witt, George, Spera, DiGiovanni & Jones (1994) gathered empirical evidence of this by asking teachers to indicate their willingness to intervene on specific problems. Based on teachers’ responses to written descriptions of problem situations, it was found that teachers were less motivated to intervene when the behavior problem of concern was perceived to be related to family issues or some internal psychopathology.

Student motivation. A final factor influencing intervention effectiveness is the degree to which the intervention addresses the environmental variables that are directly influencing the students’ behavior. Some interventions may be ineffective because they are chosen arbitrarily; that is, they do not address the function of the behavior. Some behavioral interventions frequently have been based upon the topography of the behavior, or the type of behavior problem. However, two individuals may
engage in a similar behavior, but do so because their behaviors are maintained by different environmental events (i.e., one child may talk out in order to get the teacher’s attention, and another in order to get out of doing his work). An intervention developed according to the function of the behavior is likely to be more effective (Iwata, Vollmer, & Zarcone, 1990; Lentz, 1988). Seeking this match decreases the likelihood of inadvertently reinforcing the behavior that is targeted, and increases the chance that the intervention will have an impact on the behavior.

Because of the risks associated with unsuccessful interventions, it is important to study and to observe factors that influence intervention effectiveness. Intervention failure is correlated with, at least, placement in special education, school suspension, school expulsion, the use of corporal punishment, and the prescription of psychotropic medication (Stoner & Carey, 1992). Another risk to intervention failure is resistance to future interventions. Resistance could develop due to learning that occurs during a failed intervention, or to a decrease in teacher motivation to try anything else. Therefore, strategies are needed to determine which interventions may be most helpful. In particular, it is helpful to obtain specific information about the target student, and about variables that influence the student’s inappropriate and appropriate behavior.
Variables Maintaining Disruptive Behavior

Some problem behaviors such as disruptive classroom behaviors are learned, and may be maintained by events that occur in the environment, in the same way that desirable behaviors are reinforced (Carr, 1981). Lentz (1988) identified several variables that are present in classroom environments, that have been found to be functionally related to disruptive classroom behavior. The most common classroom variables are teacher attention, peer attention, and the opportunity to escape from academic tasks.

Teacher Attention

A substantial amount of research indicates that teacher attention is an important variable influencing student behavior in school settings. Attention may be described as verbal statements, physical gestures, or eye contact that is provided to the student by another individual in the setting. Attention may be presented in several forms, such as disapproval (reprimand), sympathy, reasoning, redirection, praise, and neutral attention (Mace, 1994). One source of attention, the teacher, is readily available for children in the classroom. Teacher attention has been shown to be reinforcing for both appropriate and inappropriate behaviors, and these reinforcing effects have been demonstrated with positive, neutral, and negative forms of attention, such as reprimands (Becker, et al., 1967; Kazdin, 1982; Schutte & Hopkins, 1970; Schwarz & Hawkins, 1970). The
effect of teacher attention often depends upon the situation and the child being considered (Van Houten & Doleys, 1983).

It has been suggested that classroom teachers rely heavily on verbal reprimands to control disruptive classroom behaviors (Heller & White, 1975; Johnson, 1985; White, 1975). However, this contingent aversive attention may not effectively decrease behavior problems, and may actually reinforce problem behaviors (Van Houton & Doleys, 1973, Lentz, 1988). In addition, positive reinforcement of behavior problems often occurs because these behaviors are serious enough or disruptive enough that they cannot be ignored, thus resulting in the child getting some type of attention (Patterson, 1982; Wahler, 1975).

Becker, et al. (1967) presented a number of experimental demonstrations of the influence of teacher attention on students' classroom behavior, and differentiated between several categories of teacher attention. These authors demonstrated that a combination of different types of attention was most effective in decreasing identified problem behaviors and increasing alternative appropriate behaviors. Specifically, teacher attention was more effective when problem behaviors were followed by no attention from the teachers (ignoring), and positive verbal reinforcement was provided for alternative appropriate behaviors. These actions by the teacher were observed to have similar effects on neighboring peers' behavior, which was observed as well.
In 1970, Broden, et al. provided further demonstration of the effects of teacher attention on students' behavior. Second grade boys identified for exhibiting disruptive behavior were provided with teacher attention (praise) for attending appropriately during class. Moreover, when the teacher provided positive attention to one student, a neighboring peer was observed to engage in more appropriate attending as well. Data on disruptive behaviors were reported to decrease according to teachers and observers.

In a recent study, Dunlap et al. (1993) investigated the effect of teacher attention on students through direct classroom observations. In this investigation, the level of on-task and inappropriate behaviors of students were observed as they were exposed to high levels of teacher attention and low levels of teacher attention during classroom work periods. Using a reversal design, it was demonstrated that frequent delivery of specific praise for appropriate behaviors was related to an increase in those appropriate behaviors and a decrease in inappropriate behaviors. This study provided consideration of individual student responses to the manipulation of teacher attention, and also provided an example of a methodology that can be used to investigate the effect of teacher attention and other variables in classroom settings.
Peer Attention

Peers constitute another readily available source of attention in classrooms. Peer attention has been demonstrated to influence the behavior of students in classroom settings in many ways. Peer attention has been demonstrated to reinforce both inappropriate and appropriate behavior (Solomon & Wahler, 1973; O'Leary & O'Leary, 1977). In addition, peers have been used in a number of experimental manipulations and have been demonstrated to be effective in delivering and/or withdrawing attention contingent upon student behavior.

In classroom settings, students' behaviors appear to affect the behavior of other students near them. For example, Broden, et al. (1970) demonstrated that the disruptive behavior of one student resulted in an observed increase in the disruptive behavior of neighboring students. Researchers have also demonstrated that if one student's disruptive behavior decreases, there is a corresponding positive effect on students nearby (Hall, Lund, & Jackson, 1968; Hall, Panyan, Rabon, & Broden, 1968; Thomas, Becker, & Armstrong, 1968).

Brief functional analysis procedures have been used to investigate the effect of peer attention as a reinforcer on student's target behaviors. Broussard & Northup (1995) investigated the effect of peer attention on the disruptive classroom behavior of one subject. During functional analysis conditions, the level of disruptive behavior of the target student was
compared across conditions in which peers were absent and peers were present. It was found that significantly more disruptive behavior and fewer appropriate academic behaviors occurred when peers were present. Functional analysis conditions were followed by brief treatment probes, during which the target student engaged in appropriate attending behavior for a specified period of time in order to earn time to interact with a peer. In this investigation, peers that were included in the conditions were those that the target student were observed to interact with in and out of class daily.

Negative Reinforcement (Escape)

A third variable that may influence the behavior of students in classroom settings is the opportunity to escape academic tasks. In any classroom setting, the goal of the teacher is having students complete assigned work. Some students do not complete work because they lack necessary skills to perform the task. However, some students have the necessary skill but lack sufficient motivation to perform. In classroom settings, the presentation of academic materials is a cue to begin work for most students. However, for some it may become a cue to engage in disruptive behavior designed to avoid a task (Haring & Phillips, 1972; Casey, et al., 1988).

Negative reinforcement may maintain classroom behavior problems (Iwata, 1987). It is hypothesized that academic demands are aversive
events that students want to escape or avoid (e.g., Carr & Durand, 1985; Gunter, Jack, Shores, & Carrell, 1993). In addition, students may have task specific preferences, and want to escape or avoid non-preferred activities rather than all activities (Foster-Johnson, Ferro, & Dunlap, 1994). However, empirical demonstrations of behavior maintained by negative reinforcement continue to be quite rare for children who are of average intellectual functioning (Northup, Vollmer, & Serrett, 1993).

Carr, Newsom & Binkoff (1980) demonstrated that demands can be a powerful discriminative stimulus for aggressive behavior, and that the cessation of demands may serve as a negative reinforcer for aggressive behavior. They also examined the effect of different strategies for decreasing aggressive behavior. These strategies included: (a) decreasing the aversiveness of the demand situation by introducing preferred reinforcers, (b) escape-extinction, which is preventing the individual from escaping the situation, and (c) reinforcing an alternative, appropriate escape response. These authors suggested that a growing body of evidence indicates that escape may maintain a broad range of child problem behaviors. In addition, the opportunity for escape is likely to maintain behaviors in a wide variety of school settings, due to the significant number of demand situations presented.

Consideration of escape as a potential maintaining variable for problem behaviors in classroom settings is important for at least two
primary reasons. First, by engaging in a variety of inappropriate behaviors (e.g., talking out, playing with objects, off-task behavior), students in educational settings may escape academic tasks. Second, time out, a frequently used classroom intervention, allows a student to escape academic tasks. Time out may include physically moving a child to some area designated for time out (exclusionary time out) or it may involve withholding both attention and the opportunity to interact in a class activity (nonexclusionary time out). For some students, the use of time out procedures as a response to problem behaviors may actually strengthen them, because the opportunity to escape the ongoing activity or task is reinforcing (Plummer, Baer & LeBlanc, 1977; Carr, et al., 1980; Iwata, Pace, Cowdery, Kalsher & Cataldo, 1990).

Identifying Variables Maintaining Disruptive Classroom Behavior

Identifying individualized reinforcers has long been important to practitioners and researchers. Recent research has focused on the identification of items or events that maintain inappropriate behaviors. The methodology developed from this area of research is functional analysis. With functional analysis, researchers have demonstrated that items or events that maintain inappropriate behaviors differ across individuals as well. Another focus in research has been the identification of positive reinforcers that can be utilized to increase appropriate behaviors.
Researchers have clearly demonstrated that reinforcers differ across individuals; that is, an item or event that is reinforcing for one individual may not be equally reinforcing for another individual (Fisher, Piazza, Bowman, Hagopian, Owens, & Slevin, 1992; Northup, Jones, Broussard, & George, 1995). A methodology that has been developed to identify positive reinforcers across individuals is reinforcer assessment. Both functional analysis and reinforcer assessment have been demonstrated to be important to the design of behavioral interventions. Each is briefly reviewed below.

Functional Analysis

In the last decade, functional analysis has been used for a number of different behaviors and in various settings. This method of assessment emphasizes the study of observable behavior under strong experimental control in order to identify environmental conditions that are related to the behavior. Skinner (1953) provided the first definition of functional analysis: "a method of experimental control" involving the manipulation of variables, and the observation of the resulting effect on the behavior of concern.

A review of the literature reveals that several variables have been identified as functionally related to problem behaviors (Lentz, 1988). Through numerous investigations, it has become apparent that events in the environment can be identified at the level of the individual that contribute to the occurrence of target behaviors. However, many early
investigations considered only one behavioral function in isolation, and did not investigate the possibility of behaviors being maintained by more than one variable. In 1977, Carr synthesized earlier work and described three environmental events that could influence problem behaviors. These hypothesized events are: (a) positive reinforcement in the form of contingent social attention, (b) negative reinforcement in the form of escape or avoidance of non-preferred tasks, and (c) self-stimulation or "automatic reinforcement".

In 1982/1994, Iwata et al. introduced a methodology through which several variables thought to have an effect on self-injurious behavior (SIB) could be empirically investigated with developmentally disabled individuals. Through a series of analogue conditions, several hypothesized functions of self-injurious behaviors were presented in randomized order, and the level of self-injurious behaviors was compared across conditions. The results indicated that subjects' problem behavior (SIB) differed based upon the function associated with their self-injurious behavior. The results also provided an empirical basis upon which treatment recommendations could be developed.

Specifically, Iwata et al., (1982/1994) presented four different conditions to subjects. Conditions lasted 10 minutes each, and were presented several times in random order. Occurrence of problem behaviors was compared across conditions through visual inspection of the data. The
first condition was called the demand condition, during which a difficult task was presented to the child, and removed contingent upon the occurrence of the target behavior. The second condition was called the attention condition, which consisted of the provision of adult attention in the form of a reprimand upon occurrence of the target behavior. The third condition, the play condition, functioned as a control condition. It provided noncontingent social attention by an adult, and a variety of materials were available for the subject to manipulate or play with. The fourth condition was alone, where the subject was not provided with any materials to play or work with, and no attention was provided. Through their study, Iwata et al. (1982/1994) demonstrated that problem behaviors were related to specific environmental events, and the events that were identified were idiosyncratic across subjects.

Carr & Durand (1985) also provided evidence that problem behaviors are related to specific environmental events, with the effect of these environmental events differing across subjects. These authors investigated the effect of social attention from adults and the level of difficulty of tasks on problem behaviors such as aggression, tantrums, and self-injury. Specifically, for four children with developmental disabilities, low rates of adult attention resulted in increased problem behaviors, as did a high level of task difficulty. Carr & Durand (1985) suggested that inappropriate behaviors may be considered to be forms of communication. Effective
interventions were developed that involved providing individuals with ways of communicating their needs more appropriately. Through functional communication, subjects were able to gain access to reinforcers without engaging in inappropriate behaviors. The emphasis for this and other functional analysis investigations lies in the understanding of the function of behavior rather than its topography (Carr & Durand, 1985).

Many other researchers have demonstrated the utility of functional analysis procedures for identifying variables that maintain problem behaviors, and for developing intervention strategies (e.g., Mace, Lalli, & Pinter-Lalli, 1991; Wacker et al., 1990). While there are numerous functional analysis methodologies presented in the literature, their use does not necessarily guarantee that a single influencing event will be identified for every individual that is assessed. The results of some functional analyses are inconclusive, and others lead to the identification of two or more variables that maintain behaviors. While these are challenging problems to address, recent researchers have demonstrated the feasibility of addressing behaviors for which inconclusive results or multiple functions are found (Vollmer, Marcus, & LeBlanc, 1994; Day, Horner, & O’Neill, 1994).

Recent extensions. Since publication of Iwata et al.’s (1982/1994) study, a substantial amount of research has been presented in the literature demonstrating the utility functional analysis procedures. In addition, these
procedures have been extended in many ways. One extension includes conducting assessments in natural settings rather than analogue conditions. For example, Northup, Wacker, Berg, Kelly, Sasso, & DeRaad (1994) conducted functional analyses in special education classrooms with students with developmental disabilities who engaged in self-injurious or aggressive behaviors. The subjects' teachers were trained to implement the conditions of the functional analysis. As in Iwata, et al.'s study (1982/1994), the results of the functional analysis procedures demonstrated that the subjects' behaviors were maintained by different functions. Northup, et al. (1994) also used the functional analysis results to develop effective treatments, with effects that were durable over time.

Functional analysis procedures have been used across several subject populations as well. Cooper, Wacker, Sasso, Reimers, & Donn (1990), used a brief functional analysis procedure in an outpatient setting with children with average intellectual abilities. The subjects' parents were trained to conduct the 90-minute assessments directed toward identifying variables that maintained conduct problems. Analogue conditions varied by level of task difficulty and adult attention. Results showed that the subjects' appropriate behavior corresponded to distinct assessment conditions. These assessments were conducted in less time than it typically takes to complete a clinic assessment, and interventions developed based
on the results of the functional analysis were subsequently rated as effective by the children's parents at follow-up.

In another extension of functional analyses, Cooper, et al., (1992) demonstrated the comparability of assessments conducted in both an outpatient clinic and in a special education classroom. These researchers used brief functional analysis procedures to assess conduct problems for children of average intelligence, and demonstrated that the subjects' target behaviors varied systematically with levels of attention and academic demands. In the classroom assessment, the procedures differed from other extensions of functional analysis in that the analyses were conducted by an experimenter rather than the classroom teacher. This procedure allowed for a precise, controlled delivery of the assessment within the setting in which the behavior problems typically occurred, and allowed for the teacher to observe the effect of the experimental conditions as they were conducted.

Functional analysis procedures have been used in classroom settings with developmentally normal children as well. Broussard & Northup (1995) conducted functional analyses of three children in regular education settings. In this study, descriptive information about each student was collected from parent interviews, teacher interviews, and systematic observations. Using this information, hypotheses about the variable most likely to be maintaining problem behaviors were developed. Each hypothesis was tested and confirmed through a subsequent functional
analysis that demonstrated the feasibility of conducting such an investigation in the context of ongoing instruction in a regular education classroom. Although Broussard & Northup (1995) did not experimentally test the influence of all hypothesized variables within each subject, their procedures may be viewed as a first step in developing such an assessment methodology.

In another recent study, functional analysis methodology was again utilized to identify variables maintaining disruptive classroom behavior in classroom settings with developmentally normal children (Northup, Broussard, Jones, George, Vollmer, & Herring, in press). In this study, children diagnosed with ADHD who were attending a summer educational program were provided with a functional analysis. This analysis investigated the effect of contingent teacher attention, contingent peer attention, and contingent escape from academic tasks. This study differed from Broussard & Northup (1995) because it provided an investigation of all three variables within each subject, rather than a single hypothesized variable. The results demonstrated that peer attention influenced each subjects' behavior. The effect of peer attention was evaluated by providing contingent peer attention using peer confederates. Specifically, peer confederates were asked to remind the target students to pay attention to their work when they engaged in specific target behaviors. Following the functional analysis, contingency reversals were conducted to further
confirm the results. These probes consisted of providing a specific item or event contingent upon appropriate behavior and withholding that same variable upon the occurrence of target behaviors. The item or event that was manipulated was identified by the functional analysis to maintain target behaviors.

Advantages and disadvantages. There are advantages and disadvantages associated with the use of functional analyses. One advantage is the use of a precise, objective methodology for an individualized assessment of variables maintaining problem behaviors, that subsequently provides a direct basis for treatment selection (Iwata, et al., 1990; Lehrman & Iwata, 1993). In addition, conducting functional analyses in the natural setting allows for behaviors to be considered in the context of the environment in which they naturally occur, which is an advantage over analogue assessments (Taylor & Romanczyk, 1994).

A limitation of functional analysis procedures is the amount of time needed to conduct them, and the complexity of some experimental manipulations. In the context of school settings, functional analyses would be viewed as a type of direct service, with the examiner conducting observations of the target student under varying conditions, and observations being repeated over time. Another related limitation is that treatments are generally not provided while the analysis is ongoing, which provides the individual with continued opportunity to engage in
inappropriate behavior. A third limitation is the possibility of an increase in aggressive or other problem behaviors when being exposed to the conditions of the functional analysis (Northup, Fisher & Broussard, in press).

Preference Assessment

Some extensions of functional assessment with children of average intellectual abilities have focused on the identification of variables associated with increases in appropriate behavior and/or on variables associated with a particular intervention (e.g., choice, self-monitoring). With these studies, the actual operant function of the target behaviors can only be inferred (Dunlap et al., 1993). However, variables that will maintain appropriate, positive behaviors are not necessarily the same as those that maintain inappropriate, disruptive behaviors (Baer, Wolfe, & Risley, 1968). Still, the accurate identification of positive and negative reinforcement contingencies maintaining both appropriate and inappropriate behaviors may be essential to the development of effective long-term treatments (Iwata, et al., 1990; Northup et al., 1994).

Empirical reinforcer assessment has become an increasingly common practice for professionals working with young children, or with individuals with severe and profound disabilities. Reinforcer assessment is thought to be especially necessary for those individuals who do not have the verbal repertoires that enable them to indicate which stimuli they prefer. A
number of different methodologies have been developed to assess potential reinforcers for those with very limited verbal repertoires. However, less research has been conducted with individuals who do have the verbal ability to indicate preferences.

One frequently used method of reinforcer assessment is direct observation of the individual in the presence of the items or events that are potentially reinforcing. When using direct observation, the frequency or duration of the individual’s contact with stimuli is considered. Different types of contact include approaching the target stimuli (physical proximity), choosing the target stimuli by touch or gesture, or interacting with the target stimuli by touch, attention, or manipulation. Using this type of assessment, those stimuli that are contacted most frequently or for the longest period of time are described as preferred by the individual and are presumed to be reinforcers.

Pace, Ivancic, Edwards, Iwata, & Page (1985) provided a demonstration of the combined use of direct observation to identify preferred reinforcers with a subsequent assessment of actual reinforcing effects. Sixteen stimuli were presented to individuals with profound mental retardation over 20 trials, and frequency of approach to each stimulus item was observed. Approach to the various stimulus items differed across the six individuals who were assessed. In a second experiment within the same study, the comparative reinforcing effects of stimuli defined as preferred
and nonpreferred was considered. Overall, preferred items were found to more strongly reinforce simple responses of the participants. An advantage of the procedures presented by these researchers is the ease and efficiency with which they are administered.

Dattilo (1986) provided another example of reinforcer assessment via direct observation by conducting a computerized preference assessment with three children with severe handicaps. A computer program presented visual, tactile, and auditory events upon the participants’ activation of a microswitch, and the number of activations and the amount of time subjects were exposed to the various types of stimuli were measured. All possible combinations of stimuli were presented in pairs, and participants chose which stimuli they preferred. This study demonstrated an efficient and effective way of increasing an individual’s control in the selection of activities.

A second method of assessment is verbal nomination, which involves simply asking people what they prefer (Barrett, 1962). This method is most commonly used with individuals with appropriate verbal abilities, and can be accomplished by using survey or open ended questions (e.g., what is your favorite...). For example, Martin & Paer (1992) asked participants to rate a number of common reinforcers on a likert-type scale. Another example of the survey method of reinforcer assessment is Fantuzzo, Rohrbeck, Hightower, & Work’s (1991) Child Reinforcer Survey,
to which individuals indicate to what degree they like certain reinforcers. This survey provides the choices of "a lot", "a little" or "not at all". A numerical value is given to each response, and the subject's responses to items are summed across categories of reinforcers in order to identify general classes of reinforcers as well as specific preferred items.

Although a number of verbal reinforcement assessment strategies have been developed and frequently used in practice, it may still be important to pair the use of a verbal assessment method with direct observation. Pairing these procedures is desired because agreement between verbal self report and subsequent behavior is often poor (Guevrement, Osnes, & Stokes, 1986; Risley & Hart, 1968). There is a need for further investigation of the accuracy of verbal reinforcer assessment, particularly in determining to what degree stimuli identified as highly preferred will actually maintain behavior in naturalistic settings.

Recent extensions. One way to improve verbal reinforcer assessments has been suggested by Schwartz & Baer (1991) who stated that preference may more accurately be assessed when the items that an individual is choosing between are available simultaneously. When alternatives are concurrently available, an individual is exposed to a situation that is more similar to the natural environment.

Fisher, et al., (1992) included choice during reinforcer assessment for individuals with severe developmental disabilities by presenting all
possible combinations of 16 stimuli to each subject. The percent of trials that an item was chosen yielded a measure of preference. These researchers provided a demonstration that the element of choice is better than no choice for identifying which stimuli would function as potent reinforcers.

Northup et al. (1995) and Northup, et al (in press) presented various data on the use of choice in preference assessment. Specifically, they presented all possible combinations of categories of reinforcers in a verbal questionnaire. This assessment method was called Stimulus-Choice, and with it preference was measured by calculating the number of times a particular category is chosen in reference to the number of times it is presented. Categories of potential reinforcers are then numerically ranked according to preference.

Northup et al. (1995, in press) used categories of reinforcers rather than discrete individual stimuli; however, within each category of potential reinforcers were a list of several specific stimuli. One advantage to using categories may be the substitutability of reinforcers. Reinforcers that are similar to one another may share the same function in their effect on an individual. For example, some items or events appear to have the same physical effect on an individual (e.g., two different songs provide auditory stimulation). Another advantage of using categories is the possible prevention of satiation, because a number of specific stimuli can be made
available from the category. However, there is a need for further investigation of the use of categories of reinforcers in preference assessments.

Recent research has compared different methods of preference assessment for verbal children. Northup, et al. (1995) compared the results of a verbal forced-choice questionnaire, child nomination, and direct observation for identifying actual reinforcers. Their data indicated that subject preference varied across assessment methods; agreement between the three methods occurred for only one of ten subjects. Moreover, these researchers followed their preference assessments with a condition that required the subjects to complete academic work in order to gain access to preferred reinforcers that were simultaneously available. In this experimental condition, it was found that subjects were more likely to choose to work for reinforcers that were identified through the verbal forced choice procedure and direct observation rather than items identified as preferred based upon nomination.

Based upon these studies, it appears that the response format of verbal preference assessments may be important. In addition, not all types of preference assessments are equally useful in identifying items or events that will serve to reinforce behavior in naturalistic situations. There is a need for more extensive evaluations of the reinforcing efficacy of those items chosen by individuals in common preference assessments.
Advantages and disadvantages. One advantage of the use of reinforcer assessment is the brief time period involved in administration. In addition, reinforcer assessment does not require a great deal of materials or expense to conduct. Due to these advantages, reinforcer assessment is a practical method for identifying potent reinforcers for appropriate alternative behaviors.

A disadvantage of reinforcer assessment is that the methodology has not yet been utilized to identify reinforcers for inappropriate behaviors. If reinforcer assessment effectively identifies variables that maintain inappropriate behavior, then the methodology might be an alternative or adjunct to more complex functional analysis procedures. If reinforcer assessment does not identify items or events that maintain inappropriate behavior, then it may not be useful for effectively reducing these behavior problems. However, they may still be useful for identifying the most potent reinforcers for appropriate behaviors.

Future Directions

Functional analysis methodology has been successfully used to select effective treatments for a variety of subjects and a variety of different behavior problems (Carr & Durand, 1985; Durand & Carr, 1981; Durand, Crimmins, Caulfield & Taylor, 1989; Iwata, et al., 1990; Horner & Day, 1991; Repp, Felce & Barton, 1988; Steege, Wacker, Berg, Cigrand, & Cooper, 1989; Touchette, MacDonald, & Langer, 1985; Wacker et al.,
1990; Mace & Lalli, 1991). When developing interventions based upon the identified function of the behavior, the following general strategies are commonly used to manipulate environmental events. First, a reinforcer identified during assessment might be eliminated through extinction, as in the withholding of attention. If the reinforcer cannot be fully eliminated, it might be weakened. Second, differential reinforcement might be used, with the delivery of the reinforcer contingent upon the absence of the target behavior, or upon the occurrence of some alternative, appropriate behavior (Mace, 1994). Third, antecedent manipulations may be used, in the form of changing the environment, task, or curriculum associated with the problem behavior (Dunlap, Kern-Dunlap, Clarke, & Robbins, 1991).

In order for behavioral interventions to be effective, it is important to identify reinforcers that are meaningfully related to both inappropriate target behaviors as well as potent reinforcers for alternative appropriate behaviors. Manipulation of these reinforcers can then be expected to result in an overall improvement in behavior. If it can be demonstrated that preference assessments have utility for identifying meaningful reinforcers for individuals, then these assessments might be useful as a standard component of intervention development. It may be that empirical reinforcer assessments are more likely to identify meaningful and more potent reinforcers, as compared to methods that rely only on child nomination.
There is a similarity between reinforcer assessment and functional analysis, in that both types of assessment are directed toward identifying some item or event that reinforces behavior. However, the two methods of assessment differ in the type of behaviors that are considered in the assessment process. Specifically, functional analysis is usually directed toward identifying events that are maintaining inappropriate behaviors, while reinforcer assessments are generally directed toward identifying events that reinforce appropriate behaviors.

It is generally accepted that young children will rarely be able to verbalize why they are engaging in various inappropriate behaviors (i.e., to get my teacher’s attention), even if they have adequate verbal skills. Thus the methodology of functional analysis may be essential for identifying reinforcers that maintain inappropriate behavior. In addition, recent research has demonstrated that nomination of preferred items or events does not always lead to the identification of actual reinforcers for appropriate behaviors. However, two methodologies, functional analysis, and reinforcer assessment, enable practitioners and researchers to more accurately identify true reinforcers for behavior. It is not known at this time if both methods are necessary in addressing behavior problems; nor has it been investigated whether they will identify the same environmental events as potent reinforcers.
CHAPTER 3

METHOD

Participants

Participants in this study were five elementary school students who exhibited disruptive behaviors in their classrooms. Participants 1 and 2 were referred by their parents, and attended school in East Baton Rouge Parish. Participants 3, 4, and 5 were referred by their teachers, and attended school in Assumption Parish. Inclusion criteria included: (a) attendance in an elementary school classroom (regular or special education), (b) the participant reportedly exhibited disruptive behavior problems on a daily basis for at least a two week period (c) a request for assistance by the classroom teacher or parent, and (d) permission of the classroom teacher to conduct the investigation in the classroom. Please refer to Table 1 for a summary of student characteristics.

Peter was a 8 year old white male in the first grade. He was diagnosed with ADHD and was prescribed medication (Ritalin, 20 mg) by his physician. Although he was classified as a special education student due to speech delays, he was included in a regular education classroom in a public school setting. Referral problems for Peter included overactivity, impulsivity, and verbal disruption.

Frank was a 9 year old white male in the fourth grade. He was prescribed with medication (Ritalin, 10 mg) for ADHD by his physician.
Referral problems for Frank included excessive motor activity, talking out, and verbal and physical disruption.

<table>
<thead>
<tr>
<th>Age</th>
<th>Grade</th>
<th>Diagnosis</th>
<th>Medication</th>
<th>Referral Behaviors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peter</td>
<td>8</td>
<td>1</td>
<td>ADHD</td>
<td>Ritalin, 20 mg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Overactivity, impulsivity, verbal disruption</td>
</tr>
<tr>
<td>Frank</td>
<td>9</td>
<td>4</td>
<td>ADHD</td>
<td>Ritalin, 10 mg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Excessive motor activity, talking out, verbal and physical disruption</td>
</tr>
<tr>
<td>Tony</td>
<td>7</td>
<td>1</td>
<td>ADHD</td>
<td>Ritalin, 5 mg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Poor concentration, excessive motor activity, restlessness, excessive talking</td>
</tr>
<tr>
<td>Sam</td>
<td>7</td>
<td>1</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Off-task, restlessness, impulsivity</td>
</tr>
<tr>
<td>Chris</td>
<td>6</td>
<td>1</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Poor concentration, difficulty sitting still, verbal and physical disruption</td>
</tr>
</tbody>
</table>

Tony was a 7 year old African American male in the first grade. He was diagnosed with ADHD by his physician, and received medication (Ritalin, 5 mg) during the study. Referral problems were poor concentration, excessive motor activity, restlessness, and excessive talking.
Sam was a 7 year old African American male in the first grade. He was referred due to restlessness, impulsivity, and off-task behavior. Chris was a 6 year old white male in the first grade. Referral problems included poor concentration, difficulty sitting still, and verbal and physical disruption. Prior to the time of this study, neither Sam nor Chris had been evaluated for behavioral difficulties, and they were not taking any medication.

Written consent was obtained from the parents of each participant (Appendix A). In addition, written agreement to participate was obtained from the classroom teachers (Appendix B). All teachers were asked to agree to: (a) complete paper and pencil measures about the participant and procedures used, (b) participate in a structured interview (Appendix C) and at least one consultation meeting with the experimenter, and (c) allow observations to be conducted in the classroom. In addition, teachers completed a Teacher Information Form (Appendix D).

**Setting and Materials**

This study was conducted in the elementary schools which the participants attended. Reinforcer assessment, functional analysis, and interventions were conducted in the participants' usual classroom settings, with the exception of participants 1 and 2, whose reinforcer assessments and functional analyses were conducted in an experimental classroom setting during an ADHD summer program at the University Lab School at
LSU. However, their intervention observations were conducted in their regular classroom settings.

Peter’s regular classroom setting was a first grade public school classroom in Baker in which he was included as a special education student. His class of 25 students was led by one teacher, and Peter completed the same tasks as other students in the classroom. Frank attended a private school in Baton Rouge, and intervention sessions were conducted in a classroom of approximately 10 students. Tony, Sam, and Chris each attended a first grade classroom in a rural public school, in Napoleonville, and attended classes of approximately 25 students.

Task materials for reinforcer assessment conditions were worksheets of simple math problems on which the participant was observed to average at least 90% accuracy. Other materials were laminated coupons of various colors that functioned as token reinforcers. The color of each coupon represented a category of potential reinforcers that were identified to the participants.

Task materials for baseline, functional analysis, and intervention procedures were math or language arts seatwork activities. Multi-skill worksheets were presented at the appropriate level of difficulty as required for assessment conditions. Sessions conducted within the participant’s classroom also used academic tasks presented by the classroom teacher according to her lesson plan.
Response Definitions and Measurement

Independent Variables

Functional analysis assessment. Independent variables for the functional analysis were contingent teacher attention (reprimand), contingent peer attention, and contingent nonexclusionary time out (NTO). Contingent was defined as occurring within the same or subsequent 10-s interval in which the target behavior occurred (or within 20-s).

Teacher and peer attention were defined as any statement, gesture, or physical contact between the participant and a teacher, or the participant and a peer. Nonexclusionary time out was procedurally defined as: (a) a teacher saying "time out" and removing a previously presented "difficult" academic task from the participant’s desk and turning and moving away from the participant for a period of 30 seconds following the occurrence of a target behavior, (b) no teacher or peer attention occurring during the 30 seconds when the task was removed, and (c) escape ending when the teacher placed the participant’s work back on his or her desk without verbal comment. It was expected that this procedure could function as a mild punishment for some students and as a brief escape (negative reinforcement) for others.

Functional analysis intervention. The intervention generally consisted of the extinction of inappropriate behaviors, and differential reinforcement of alternative appropriate behavior (DRA). Specifically, the consequence
identified by the functional analysis as being associated with the highest average level of target behaviors (peer attention) was withheld upon occurrence of the target behaviors, and delivered contingent upon the occurrence of some alternative, appropriate behaviors (e.g., appropriate attention to task, remaining seated).

Preference assessment. A preference assessment was conducted in two steps: (a) a Reinforcer Assessment Survey, and (b) a Verbal Stimulus Choice procedure. The independent variable for each of these procedures was the category of potential reinforcers that was identified as preferred by the participant.

Reinforcer assessment. A reinforcer assessment was conducted during which the participants completed worksheet tasks in order to gain access to reinforcers (token coupons). The independent variable in this assessment was the category of potential reinforcers for which the participant engaged in the greatest amount of work.

Dependent Variables

Disruptive classroom behavior. The primary dependent variable was disruptive classroom behavior. Specifically, disruptive behaviors included the violation of established classroom rules through actions such as inappropriate vocalizations, getting out of seat, or playing with objects. Target behaviors were individually defined for each participant using the operational definitions listed in Table 2 (Barkley, 1991). Additional
dependent variables were the percentage of off-task behavior exhibited during observations, the amount of academic work completed by the participant (if assigned), and the accuracy of work completed. Data were collected on these additional dependent variables to investigate the correspondence between disruptive behaviors and academic work.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Target Behaviors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavior</td>
<td>Operational Definition</td>
</tr>
<tr>
<td>Out of Seat</td>
<td>Any time the child’s buttocks break contact with the flat surface of the seat.</td>
</tr>
<tr>
<td>Vocalization</td>
<td>Any vocal noise or verbalization made by the child.</td>
</tr>
<tr>
<td>Playing With Objects</td>
<td>Touching any object in the room besides the desk, work materials, pencil, and clothing.</td>
</tr>
<tr>
<td>Off-Task</td>
<td>The interruption of the child’s attention to the task to engage in some other behavior. Attention is defined as visually looking at the task materials.</td>
</tr>
</tbody>
</table>

Treatment acceptability. The degree to which teachers found the functional analysis intervention acceptable was determined using the Intervention Rating Profile - 15 (IRP-15; Martens, Witt, Elliott & Darveaux, 1985). The IRP-15 was designed to measure whether a teacher considers an intervention appropriate for the participant prior to implementing it in the classroom (Appendix E). Items are rated on a 6-point Likert-type scale, with the lowest point (1) being "strongly disagree" and the highest point (6)
being "strongly agree". Reliability of this instrument has been reported as a coefficient alpha of .98 for the total score (Witt & Elliott, 1985). The IRP-15 was administered prior to implementation of the final intervention phase.

Data Collection

**Functional analysis.** During baseline, functional analysis, and intervention sessions, an observer recorded the occurrence or nonoccurrence of all dependent and independent variables as they were defined for each participant. All teacher and peer attention was recorded regardless of its contingent occurrence. All responses were recorded manually using a 10-s partial interval recording procedure with a tape recorder signaling each interval that was heard only by the observer through the use of a single earphone. Observations were conducted by trained undergraduate and graduate participants from an unobtrusive location in the classroom.

**Preference assessment.** During administration of the Reinforcer Assessment Survey and Verbal Stimulus Choice procedure, questions were read aloud to each participant individually, and the participant's verbal responses were recorded by the experimenter.

**Reinforcer assessment.** During the reinforcer assessment, an observer recorded the participants' on-task behavior using a 10-s partial interval recording procedure while the participant completed the math
worksheets. The observer counted the number of problems that were completed for each category of reinforcement. The number of coupons from each category that was earned was also recorded.

Functional analysis intervention. Intervention conditions involved the presentation of a series of contingency reversal conditions that were developed by the researchers based upon the results of the functional analyses. These sessions were conducted in the participants' classrooms. Data that was collected included the percentage of intervals in which target behaviors occurred, the amount of academic work completed, the percentage of that work that was correct, and the integrity of the intervention. Intervention sessions were conducted weekly or biweekly for the remainder of the school year, which ranged from 18 to 32 weeks.

Interobserver agreement. Observers participated in direct instruction and practice in observation procedures, and achieved an 80% agreement criterion before observing sessions for this study. Initially, all observers were provided with written definitions of independent and dependent variables, and these definitions were discussed in detail. Videotaped sessions of functional analysis conditions conducted in a classroom setting were used for training. Agreement on the occurrence and nonoccurrence of independent and dependent variables was assessed across a minimum of 3 training sessions. Training sessions continued until the 80% criterion was achieved.
Two independent observers simultaneously but independently collected data for a minimum of 20% of sessions, which was approximately equally dispersed across all phases of the study. Agreement was calculated on an interval-by-interval basis for each response definition by dividing the total number of agreements by the total number of agreements plus disagreements and multiplying by 100% (Kazdin, 1982).

**Procedural integrity.** Teacher, peer, and therapist behaviors were observed to assess the degree to which intervention sessions were conducted as intended. Procedural integrity was calculated in two ways for every session for each participant. First, integrity was calculated as a percentage of target behaviors that were followed by the independent variable that was specified for each assessment condition, and the nonoccurrence of any other independent variable during the same or subsequent 10-s interval. Second, a percentage of intervals was calculated for the occurrence of independent variables that was not contingent upon a target behavior, in order to indicate experimental control.

**Design**

Functional analysis conditions were conducted in a multielement single subject design. Following the functional analysis, contingency reversal conditions were presented to provide further evidence for the relationship between target behaviors and maintaining variables. These sessions were conducted during a specified academic period until a clear
pattern of treatment effect emerged. Evaluation of the effect of treatment was conducted through visual inspection of the data. The effect of the intervention over time was evaluated through weekly or bi-weekly observations for the remainder of the school year. In addition, brief reversals to assessment and/or baseline conditions were conducted for each participant.

The results of the reinforcer assessment were compared with the functional analysis for each participant. Specifically, it was determined whether the most preferred category of potential reinforcers identified by each participant was the same category of events that was considered to be associated with the highest average level of target behaviors according to the functional analysis. Simple exact agreement scores were calculated in order to examine correspondence between these assessment methods.

**Procedure**

**General Procedures**

**Parent interview.** A parent interview was conducted to explain the details of the experiment and obtain written consent to work with the child in the classroom. The parents were provided with a written explanation of the project, and informed consent was obtained. Parents were briefly interviewed in order to determine any other factors that may contribute to the child’s classroom behavior (e.g., health or family problems).
Teacher consent and interview. Details of the investigation were explained to the teacher in verbal and in written form, including (a) the rationale for the study, (b) the role he or she would have in conducting the functional analysis, intervention, and follow-up, (c) the role of the observers who would be in the classroom, and (d) the specific conditions that would be conducted. The teacher signed the Teacher Consent Form indicating understanding of the experiment and agreement to participate, and completed the Teacher Information Form (Appendices B and D).

A brief interview also was conducted with the classroom teacher in order to obtain more information about the referral problem. The specific purpose of this interview was to derive an operational definition of the behavior(s) of concern, and to ask the teacher to identify antecedents and consequences of the behavior(s). A structured interview was developed based on two interview formats frequently used to obtain information from individuals who work or live with children referred for behavior problems. These are the Functional Analysis Interview Form (O’Neill, Horner, Albin, Storey, & Prague, 1990) and the Problem Identification Interview (Bergan & Kratochwill, 1990). The complete interview is provided in Appendix C.

Behavior rating scales. Each teacher was asked to complete the Teacher Report Form and the Social Skills Rating System (Teacher Form), and each parent was given the Child Behavior Checklist and the Social Skills Rating System (Parent Form). These instruments provide information
about a number of broad problem areas associated with children, and helped to identify any concerns that may have limited a child’s ability to participate in the study, or necessitate specific alternative interventions. Scores obtained on these instruments are presented in Table 3.

The Social Skills Rating System (SSRS: Gresham & Elliott, 1990) is a standardized, norm-referenced scale for assessing a child’s social behavior with regard to teacher-participant relationships, peer-participant relationships, and academic performance. Teacher and parent forms are available for preschool through 12th grade. The SSRS measures the rater’s perceived frequency and importance of social behaviors in the areas of social skills, problem behaviors, and academic competence. Across forms and levels (i.e., age, grade), the Social Skills Scale is reported to have a median coefficient alpha of .90. Test-retest reliability ranges from .65 to .93.

The Child Behavior Checklist (CBCL) (Achenbach & Edelbrock, 1983) is a widely used scale for assessing children aged 4-16. Based on a parent’s rating, a child can be compared to a normative standardization sample of children, when raw scores are translated to T scores that are compared with scores of same-sex, same-age children. A T-score is calculated for each of several syndromes identified through factor analysis. The average T-score is 50, and a T-score of 70 or greater exceeds the 98th percentile in the normative standardization sample and represents
<table>
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<tr>
<th></th>
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* Denotes a T-Score that is significantly above average.
significant deviations. Test-retest reliability of the CBCL is reported to be .89 at a 1-week retest (Achenbach & Edelbrock, 1983). Validity of the CBCL is reported based upon the observation of clinically higher scores for referred children as compared to nonreferred children (Achenbach & Edelbrock, 1981; 1983), and correlations with other empirically derived measures (Achenbach & Edelbrock, 1983).

The Teacher's Report Form (TRF) is a scale designed for teachers, which is also norm-referenced and has been factor-analyzed to identify several syndromes. Like the CBCL, raw scores on the TRF are translated to T-scores, which range from 1-100 and average 50. A T-score on any syndrome on the TRF indicates a score above the 98th percentile in the normative sample and significant deviation. The TRF is reported to be a reliable and valid instrument for identifying significant problem areas for children (Achenbach & Edelbrock, 1986).

Preference assessment. A modified version of the Reinforcer Assessment Survey was administered to each participant (See Appendix F). This survey is composed of 21 specific stimuli, organized into three categories: (a) teacher attention, (b) peer attention and (c) negative reinforcement (escape, or "get out of..."). Each item was read to participants verbally, with the following instructions:
"I am going to name some things that kids sometimes get in school. I want to know how much you like each of these things. After I name each thing, you tell me if you like it a little, a lot, or not at all" (Fantuzzo, et al., 1991).

Each item received a ranking, according to the participant's answer; not at all = 0; a little = 1; and a lot = 2. The maximum ranking is 14 on each category, and a percentage score for each category was calculated by dividing the obtained score by the maximum ranking. Categories with a percentage score of 75 or greater were considered highly preferred by the participant.

Following administration of the Reinforcer Assessment Survey, each participant was presented with a Verbal Stimulus-Choice procedure (See Appendix G). A questionnaire was read to the participant in which all possible pair combinations were presented verbally. Specific stimuli were presented as representing each of the categories. That is, participants were asked "would you rather... (e.g., have a teacher do something, like say "good job", or help you with your work) or ... (e.g., get out of things; like math or recess)." The questionnaire was introduced with the question, "Which would you do a lot of hard work to get?" In order to counterbalance presentation of categories, all possible combinations of categories were presented twice. The second presentation of each category was in the reverse order of the first presentation. As a result, each category of reinforcers was presented a total of four times.
Categories were rank ordered on the basis of the frequency of the participant's selections. A percentage score was calculated by dividing the number of times a category was chosen by the number of times it was presented as an alternative (i.e., four).

Finally, a reinforcer assessment was conducted with each participant. The number of math problems required by each participant to be completed to earn reinforcers was determined individually based on an average number of problems completed per minute during a minimum of three baseline observations. During baseline, the participant was seated at a table across from the examiner with a math worksheet and a pencil. There were no contingencies for working, and the participant was given the instruction: "You can do as much as you want, as little as you want, or nothing at all. We will stop you if you don’t do any for 1-min." The session continued until the participant worked no problems for 1-min, or for a maximum of 5-min.

Each category of reinforcers was associated with a particular color, and token coupons represented the reinforcers within each category. The categories that were identified were peer attention, teacher attention, and escape. Participants were told that a peer attention coupon (purple) could be exchanged for time to spend with a friend in the back of the room to play a game or read a book together. Participants were told that a teacher attention coupon (red) could be exchanged for spending time with the
teacher, for a hug, or to sit with the teacher, etc. Escape coupons (green) could be exchanged for getting out of one’s seat and moving around the room while everyone else is working.

Prior to beginning the behavioral choice assessment, each participant was shown several coupons of each color, and told what category of reinforcers each color represented, using examples from the survey. The colors and categories were reviewed verbally until the participant indicated understanding by naming each color and category of reinforcers associated with it.

Following the identification of coupons, the participant was seated at a table with a math worksheet. Four of each of the types of coupons were placed on the table before the participant, and were made available contingent upon completed math problems. The following instructions were given: "You can earn up to six coupons for doing math problems. For every "x" (number) problems you complete, you can have one coupon. You may choose which coupon you want from the three types before you. We will stop if you don’t do any problems for 1-min or if you say "Done". The criterion number of problems to work were marked on each worksheet. The participant was allowed to pick up the coupon when it was earned, and was prompted to do so by the experimenter. Coupons were cashed in immediately following the reinforcer assessment session, with participants being allowed to cash them in any order that they wished.
Functional analysis. At least three structured classroom observations were conducted by trained observers during ongoing academic activities prior to the functional analysis. The specific activity during these observations was independent seatwork. The purpose of these observations was to: (a) arrive at an operational definition of the target behavior(s), (b) identify the baseline level of target behaviors, and (c) to systematically describe the instructional environment in an effort to identify factors that may have affected the participant's academic or behavior problems. Observers recorded data using a 10-s partial interval recording procedure during 10 minute sessions.

Prior to conducting any assessment conditions, each participant's instructional level was determined through the use of Curriculum Based Assessment probes in math and reading (Deno & Mirkin, 1977). Levels of mastery and frustration were also determined in order to identify academic materials and tasks for use as necessary for each experimental condition.

Each participant's reading level was determined by calculating the number of words read correctly by the child when they read for one minute from his or her basal reader. Each participant's math level was determined through the administration of multi-skill math probes at the participant’s grade level, and calculating the number of correct problems. Tasks at mastery level were defined as those on which participants averaged a correct score of at least 90%. Tasks at a frustrational, or "difficult" level
were defined as those on which participants achieved a correct score of 50% or lower. Tasks at instructional level were those on which participants were observed to achieve between 70 and 90% percent correct (Deno & Mirkin, 1977; Starlin, 1982; Shapiro & Lentz, 1986).

The functional analysis conditions were based on those used by Iwata et al., (1982/1994), and Broussard & Northup (1995). For all participants, the assessment included the conditions of peer attention, teacher attention, and escape from academic tasks (time-out); all sessions lasted 10-min. The consequences specified for each assessment condition were provided immediately following all target behaviors. The experimenter acted as therapist and provided the appropriate consequences. A minimum of three sessions of each assessment condition were presented in random order. Sessions continued until a clear difference emerged through visual inspection of the data, or until a maximum of seven sessions of each condition were presented.

(1) Contingent teacher attention. During the contingent teacher attention conditions, the participant was given academic work at mastery level based on prior CBM. Prior to the start of the session, the participant was given directions to remain in his seat and to work quietly until told to stop. During the session, the therapist maintained a proximity of approximately 3 m, but ignored the participant except to provide a reprimand contingent upon the occurrence of a target behavior. Reprimands
consisted of a brief neutral statement related to the task directions (e.g., "you need to stay in your seat"). During these sessions, participants in the experimental classroom setting were seated in a desk approximately 2 m removed and faced away from other students in the classroom. However, participants in regular education settings remained in their regularly assigned seats in the classroom.

(2) Contingent peer attention. During peer attention conditions, the target participant was seated at a table or in a group arrangement of desks with at least two peers and given academic work at mastery level. Peers were given similar work appropriate to their instructional levels as identified by their classroom teacher. All participants were provided with the instructions to stay in their seats and work quietly until asked to stop. All target behaviors of the participant as well as occurrences of peer attention were recorded. The experimenter maintained a proximity of approximately 3 m and ignored the behavior of all participants, except in the event of potentially harmful behaviors such as aggression or climbing. In the event of a potentially harmful behavior, the therapist immediately provided physical redirection without verbal comment to the target participant. If the behavior persisted, the session was terminated.

For the peer attention condition, a peer "confederate" was identified based on informal observations of interactions between the target participant and peers in the classroom. A confederate was asked to assist
the target participant by reminding him about a classroom rule when the participant engaged in a target behavior. Specifically, the peer confederate was privately instructed to "pay attention to what (the participant) is doing", and if they see them (engaging in the specified target behavior), "say something to them about that." Peers were given examples of things that they could say (e.g., "you are supposed to be working"); however, they were specifically told to "say whatever you think you should or whatever you think of." During peer attention sessions, the peer confederate was prompted to attend to the target participant as needed by a light touch on the shoulder by the experimenter.

(3) Nonexclusionary time-out (NTO). During the NTO conditions, each participant was given a worksheet at frustrational level, based on prior CBM. In addition, the participant was given the following instruction: "If you ___________(target behavior), you will be in time-out for 30-s. During time-out you must stay in this seat." Contingent upon the occurrence of a target behavior, the worksheet was immediately removed, and the therapist said "time out" and turned and moved away from the participant. After 30 s, the therapist placed the worksheet back on the participant's desk. If the participant was in his seat, no other interaction occurred when the worksheet was returned. If the participant was away from his desk, a 3-step prompt procedure (guided compliance without praise) was used to direct the participant to be seated. During these
sessions, participants in the experimental classroom setting were seated at a desk approximately 2 m removed and faced away from other participants in the classroom. However, participants in regular education settings remained in their regularly assigned seats in the classroom.

**Functional analysis intervention.** The classroom intervention was a series of contingency reversal conditions that used differential reinforcement procedures combined with extinction. In general, the consequent event found to be associated with higher average levels of target behaviors was presented contingently for alternative appropriate behaviors, and withheld following when target behaviors occurred. For all participants, this variable was peer attention. The purpose of these conditions was (a) to provide additional evidence that the target behaviors were functionally related to the designated independent variable (Iwata, et al., 1982/1994, Northup, et al., 1991), and (b) to investigate the effect of such an intervention over time.

The first intervention condition conducted with each participant was a 10-minute session during which the participant was reinforced for each minute of appropriate work. This was a one-minute period without the occurrence of target behaviors during which the participant was on task for at least 10 seconds. Reinforcement was delivered with a token coupon that could be exchanged for 1 minute of peer interaction following the session. Each participant had the opportunity to earn 10 coupons during each
session, which could be exchanged for up to 10 minutes of peer interaction. This intervention condition is noted with the abbreviation l1, which represents the one minute period of appropriate work that was required for participants to earn a coupon.

A minimum of three l1 sessions were conducted with each participant. A minimum of 2 sessions with zero or near zero levels of disruptive behavior was required before changing to the next condition. Subsequently, the session length and reinforcement criterion were progressively increased. During later phases, only 1 session with zero or near zero levels of disruptive behaviors was required before a condition change.

During the next intervention phase, a coupon was delivered to the participant following 2 minutes of appropriate work during which no target behaviors occurred. These sessions also were 10 minutes, with participants having the opportunity of earning only 5 token coupons. Therefore, participants could earn up to 5 minutes of peer interaction following 10 minutes of appropriate work. This intervention condition is abbreviated l2.

During the next intervention phase, participants earned a token coupon following 5 minutes of appropriate work, and the session length was extended to 15 minutes. Thus, the participant could now earn up to 3 coupons or three minutes of peer interaction following 15 minutes of appropriate work. This intervention condition is abbreviated l5.
During the last intervention phase, participants earned 1 coupon following 10 minutes of appropriate work, and session length was extended to 30 minutes. This allowed participants the opportunity to earn 3 coupons, which provided a 3 minute peer interaction opportunity following 30 minutes of work. This intervention condition is abbreviated I10.

The effectiveness of the intervention for each participant was determined through consideration of a variety of data. The most important criteria was the percent of intervals across treatment sessions in which disruptive behaviors occurred, and the trend in this data. The level of on-task behavior during sessions was also considered.

In addition, procedural integrity was considered when evaluating intervention effectiveness. Specifically, the number of times that the appropriate consequence for appropriate behavior was delivered was divided by the number of opportunities to deliver this consequence. This calculation provided a percentage that reflected the level of integrity. In addition, any other consequence (e.g., teacher attention) that followed target behaviors also was recorded.

Lastly, intervention effectiveness was evaluated by considering intervention acceptability as rated by the classroom teachers. It also was noted whether the teacher implemented the intervention in the classroom outside of sessions conducted for the study.
CHAPTER 4

RESULTS

Peter

Baseline

Across five initial baseline sessions, Peter's target behaviors averaged 28% of intervals (range, 0% to 72%). During these sessions, vocalizations averaged 27% (range, 0% to 70%), and getting out of his seat averaged 5% (range, 0% to 22%). During these conditions, teacher attention contingently followed 2% of target behaviors (range, 0% to 5%), and peer attention contingently followed 60% of target behaviors (range, 0% to 100%).

Functional Analysis

Figure 1(A) shows the data from functional analysis conditions for Peter. The average occurrence of target behaviors (vocalizations, out of seat, and playing with objects) during these conditions was 0% of intervals during teacher attention, 0% of intervals during time-out, and 6% of intervals (range, 0% to 17%) during peer attention. Based on these results, peer attention was determined to be associated with the highest average target behaviors. However, the difference was slight and might also be considered undifferentiated.
Preference Assessment

On the Reinforcer Assessment Survey, Peter indicated no preference among categories, as all categories had a score below 75%. However, ranking of categories by percentage score is in the following order: escape (57%), teacher attention (43%), and peer attention (14%). In contrast, the results of the Verbal Stimulus Choice show that Peter’s highest preference was peer attention, which was chosen in 100% of presentations. Teacher attention was chosen in 50% of presentations, but escape was never chosen.

Reinforcer Assessment

The results of Peter’s reinforcer assessment are presented in Figure 1(B). Peter demonstrated no differentiation across reinforcer categories until the last session. His cumulative number of problems worked were 11 for escape (earning an average of 1.8 coupons), 12 problems for teacher attention (2 coupons), and 13 problems for peer attention (2.2 coupons). Overall, Peter worked more for peer attention coupons. Peter requested to cash in a peer attention coupon first following 50% of reinforcer assessment sessions. He requested to cash in a teacher attention coupon following 17% of sessions, and a escape coupon following 33% of sessions.
Summary

When the data for these four assessment methods are considered, it is found that peer attention was Peter’s most preferred reinforcer according to 3 of 4 methods, the functional analysis, reinforcer assessment, and the Verbal Stimulus Choice, although the difference was small by all methods.

Functional Analysis Intervention

During the intervention phase, intervention conditions were conducted in Peter’s regular education classroom during the school year that followed his participation in the ADHD program at LSU. For Peter, the intervention phase lasted 32 weeks. Data from these conditions is presented in Figure 1(C).

During 11 conditions, target behaviors averaged 2% of intervals (range, 0% to 5%), respectively. Across 12, 15, and 110 conditions, target behaviors averaged 0. At two different points during the intervention phase, peer attention assessment conditions were conducted in order to replicate the effect of peer attention on Peter’s behavior that was observed during the experimental functional analysis. A peer from Peter’s classroom was trained as a confederate. Target behaviors occurred during 7% of intervals during the first replication, and averaged 6% of intervals (range, 3% to 8%) across the second replication. Although Peter’s target behaviors were low during PA sessions, they reflected a higher average than any of the intervention sessions.
Figure 1. Peter
Frank

Baseline

During five initial classroom observations, target behaviors occurred during an average of 63% of intervals (range, 2% to 97%). These target behaviors included vocalizations (M = 61%; range, 2% to 92%), getting out of seat (M = 3%; range, 0% to 10%) and playing with objects (M = 19%; range, 0% to 93%). During these observations, teacher attention contingently followed an average of 34% (range, 7% to 100%) of target behaviors, and peer attention contingently followed 26% (range, 0% to 59%) of target behaviors.

Functional Analysis

Figure 2(A) shows the results of the functional analysis results for Frank. Target behaviors across conditions averaged 26% of intervals (range, 0% to 52%) during teacher attention, 7% of intervals (range, 0% to 15%) during time-out, and 37% of intervals (range, 0% to 58%) during peer attention. The data from these functional analysis conditions indicated that peer attention was associated with the highest average target behaviors than the other conditions that were presented.

Preference Assessment

On the Reinforcer Assessment Survey, Frank indicated a high preference for peer attention, with a percentage score of 79%. His next preference was escape (71%), followed by teacher attention (50%). The
results of the Verbal Stimulus Choice indicated similar preferences for escape and peer attention, with each being chosen in 75% of presentations. Teacher attention was not chosen in any presentation.

**Reinforcer assessment**

The results of Frank's reinforcer assessment are presented in Figure 2(B). His preference was stable across sessions, with his preferred coupon being peer attention. He worked an total of 243 problems to earn 27 peer attention coupons, and 126 problems to earn 14 escape coupons. Frank earned no teacher attention coupons. Following each reinforcer assessment sessions, Frank requested to cash in a peer attention coupon first.

**Summary**

When the data from the four assessment methods are considered, it is found that peer attention was Frank's preferred category of reinforcement using three of four methods. These methods are functional analysis, reinforcer assessment, and Reinforcer Assessment Survey.

**Functional analysis intervention**

The intervention phase was conducted over 30 weeks. Data for intervention conditions are shown in Figure 2(C). Target behaviors averaged 0% of intervals across I1 conditions, and .8% of intervals across I2 conditions (range, 0% to 2%). During a single peer attention assessment condition, target behaviors occurred during 92% of intervals. During the I5 and I10 conditions, target behaviors were zero.
Figure 2. Frank
Tony

Baseline

During three classroom observations, target behaviors averaged 70% of intervals (range, 50% to 87%). These target behaviors included vocalizations (M = 43%; range, 40% to 45%), out of seat (M = 41%; range, 2% to 75%) and playing with objects (M = 12%; range, 5% to 18%). During these observations, peer attention contingently followed an average of 3% of target behaviors (range, 0% to 10%), and teacher attention contingently followed an average of 4% of target behaviors (range, 0% to 7%).

Functional Analysis

Figure 3(A) shows Tony’s functional analysis results. The occurrence of target behaviors was lowest during time-out conditions, with target behaviors averaging 7% of intervals (range, 4% to 9%). During teacher attention conditions target behaviors averaged 22% of intervals (range, 5% to 33%). Target behaviors were highest during the peer attention conditions, with an average of 51% of intervals (range, 23% to 83%).

Preference Assessment

On the Reinforcer Assessment Survey, Tony indicated a high preference for all categories, with a 100% score for teacher attention, an 86% score for peer attention and an 86% score for escape. The results of the Verbal Stimulus Choice also indicate a high preference for teacher
attention, which was chosen in 100% of presentations. Peer attention was chosen in 50% of presentations, but escape was never chosen.

**Reinforcer Assessment**

The results of Tony’s reinforcer assessment are presented in Figure 3(B). The total number of problems worked for peer attention coupons was 128, to earn a total of 16 coupons. Tony worked a total of 104 problems to earn 13 teacher attention coupons, and he worked 8 problems to earn 1 escape coupon. Tony requested to cash in a peer attention coupon first following 80% of sessions, and to cash in a teacher attention coupon first following 20% of sessions.

**Summary**

Based upon the results of the four assessment methods, it is found that peer attention was the preferred category based upon the two empirical methods (functional analysis and reinforcer assessment). However, teacher attention was the preferred category for the methods based upon verbal report (Reinforcer Assessment Survey and Verbal Stimulus Choice).

**Functional Analysis Intervention**

Tony’s intervention phase was conducted over approximately 20 weeks. The data for these sessions is presented in Figure 3(C). For 11 conditions, target behaviors averaged 12% of intervals (range, 0% to 20%). During these conditions, Tony was observed to work quietly for the
Figure 3. Tony
first several minutes, but to begin fidgeting, talking, and standing up near his chair during the last minutes of each session. Therefore, three 5 minute sessions were conducted in order for Tony to experience maximum reinforcement for appropriate behavior. These were called I1B sessions. Across I1B sessions, target behaviors were 0.

Across I2 sessions, target behaviors averaged 1% of intervals (range, 0% to 6%). During a return to peer attention, Tony’s target behaviors averaged 11% of intervals (range, 10% to 13%) across 5 sessions. During I5 and I10 sessions target behaviors were 0%.

Sam

Baseline

During initial classroom observations, target behaviors averaged 19% (range, 3% to 37%) of intervals. These target behaviors included vocalizations (M = 12%; range, 3% to 17%) and playing with objects (M = 7%; range, 0% to 22%). Peer attention contingently followed an average of 26% (range, 0% to 60%) of target behaviors, while teacher attention contingently followed an average of 46% (range, 9% to 100%) of target behaviors.

Functional Analysis

Figure 4(A) shows the results of Sam’s functional analysis observations. Target behaviors across conditions averaged 2% of intervals (range, 0% to 4%) during time-out, 4% of intervals (range, 3% to 5%)
during teacher attention, and 23% (range, 8% to 37%) during peer attention. Based on these results, it was determined the highest average target behaviors occurred during peer attention conditions.

Preference Assessment

On the Reinforcer Assessment Survey, Sam indicated a high preference for peer attention and teacher attention, with a percentage score of 93% for each. Escape was less preferred, with a score of 50%. The results of the Verbal Stimulus Choice indicated no preference; Sam chose each reinforcer category twice (50% of presentations).

Reinforcer Assessment

The results of the reinforcer assessment show that Sam’s preferred category of reinforcers was peer attention. Across seven sessions, he completed a total of 144 problems for peer attention coupons, earning a total of 18 coupons. Sam worked 80 problems to earn 10 teacher attention coupons, and 112 problems to earn 14 escape coupons. Sam requested to cash in a peer attention coupon following 100% of sessions.

Summary

The results of these assessments show that peer attention was the preferred category according to the two empirical methods (functional analysis and reinforcer assessment). However, the two verbal methods of preference assessment (Reinforcer Assessment Survey and Verbal Stimulus Choice) did not identify a preferred category.
Figure 4. Sam
**Functional Analysis Intervention**

Data from Sam’s intervention phase are shown in Figure 4(C). This phase was conducted over approximately 18 weeks. Sam’s target behaviors were zero across 11 conditions. During 12 conditions, Sam’s target behaviors averaged 2% of intervals (range, 0% to 7%). During one peer attention condition, Sam’s target behavior was 37% of intervals. During 15 and 110 conditions, Sam’s target behavior was zero.

**Chris**

**Baseline**

During three classroom observations, target behaviors occurred during an average of 11% of intervals (range, 7% to 22%). These target behaviors included vocalizations (M = 9%; range, 2% to 22%), and getting out of his seat (M = 3%; range, 2% to 3%). Peer attention contingently followed an average of 10% (range, 0% to 31%) of target behaviors, and teacher attention contingently followed an average of 14% (range, 0% to 33%) of target behaviors.

**Functional Analysis**

Figure 5(A) shows the functional analysis results for Chris. The results show that target behaviors were highest during peer attention conditions with an average of 28% of intervals (range, 8% to 74%). During teacher attention conditions, target behaviors averaged 4% (range, 0% to
7%) and during time-out conditions, target behaviors averaged .5% (range, 0% to 2%).

**Preference assessment**

On the Reinforcer Assessment Survey, Chris indicated a high preference for peer attention and teacher attention, with percentage scores of 100% and 93%, respectively. Escape was less preferred, with a score of 21%. However, the results of the Verbal Stimulus Choice indicated a high preference for escape (chosen 75% of presentations), with a second preference of peer attention (50%), and teacher attention being least preferred (25%).

**Reinforcer assessment**

Figure 5(B) contains the data from Chris's reinforcer assessment. Across eight sessions, Chris demonstrated a preference for escape coupons. He completed a total of 161 problems to earn 23 time-out coupons, 105 problems to earn 15 peer attention coupons, and 70 problems for 10 teacher attention coupons. Chris chose to cash in a peer attention coupon following 50% of sessions, a teacher attention coupon following 33% of sessions, and escape coupons following 17% of sessions.
Figure 5. Chris
Summary

According to this data, functional analysis and Reinforcer Assessment Survey results indicated that peer attention was Chris's preferred category of reinforcement. However, the reinforcer assessment and Verbal Stimulus Choice results indicated that time-out was his preferred category of reinforcement.

Functional Analysis Intervention

Data for Chris's intervention phase are presented in Figure 5(C). During I1 conditions, target behaviors averaged 1% of intervals (range, 0% to 3%). Target behaviors averaged 1% of intervals during I2 sessions (range, 0% to 2%), and occurred during 35% of intervals during one peer attention condition. Target behaviors were zero during one I5 session, and were 4% of intervals during one I10 session.

On-Task Behavior

Although consequences were provided only for disruptive behavior, on-task appropriate work was also evaluated by observing the percentage of intervals during which participants were attending appropriately to task. This data demonstrates that the intervention procedures positively increased on-task behavior. These data were averaged across conditions, and are presented in Table 4. Data for baseline and functional analysis conditions are presented to allow for comparison across assessment and intervention conditions.
### Table 4
On-Task Behavior

<table>
<thead>
<tr>
<th></th>
<th>Peter</th>
<th>Frank</th>
<th>Tony</th>
<th>Sam</th>
<th>Chris</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline</strong></td>
<td>18</td>
<td>26</td>
<td>64</td>
<td>95</td>
<td>76</td>
</tr>
<tr>
<td><strong>TA</strong></td>
<td>84</td>
<td>40</td>
<td>95</td>
<td>99</td>
<td>99</td>
</tr>
<tr>
<td><strong>TO</strong></td>
<td>93</td>
<td>40</td>
<td>53</td>
<td>95</td>
<td>93</td>
</tr>
<tr>
<td><strong>PA</strong></td>
<td>9</td>
<td>33</td>
<td>55</td>
<td>79</td>
<td>94</td>
</tr>
<tr>
<td><strong>Intervention</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I1</td>
<td>95</td>
<td>99</td>
<td>60</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>I1B</td>
<td>---</td>
<td>---</td>
<td>100</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>I2</td>
<td>95</td>
<td>96</td>
<td>100</td>
<td>99</td>
<td>100</td>
</tr>
<tr>
<td>I5</td>
<td>98</td>
<td>100</td>
<td>100</td>
<td>97</td>
<td>100</td>
</tr>
<tr>
<td>I10</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>98</td>
<td>100</td>
</tr>
</tbody>
</table>

**TA** = Teacher Attention, **TO** = Time-Out, **PA** = Peer Attention

### Procedural Integrity

During all functional analysis and intervention conditions, it was noted whether the occurrence or nonoccurrence of target behaviors were followed by the appropriate contingencies as specified in the method of the study. Procedural integrity was calculated by dividing the number of appropriate contingent responses by the number of opportunities to deliver the response. Average percentages are presented in Table 5.
Table 5
Procedural Integrity

<table>
<thead>
<tr>
<th></th>
<th>Peter</th>
<th>Frank</th>
<th>Tony</th>
<th>Sam</th>
<th>Chris</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time-Out</td>
<td>94</td>
<td>100</td>
<td>100</td>
<td>99</td>
<td>100</td>
</tr>
<tr>
<td>Teacher Attention</td>
<td>94</td>
<td>93</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Peer Attention</td>
<td>97</td>
<td>93</td>
<td>91</td>
<td>89</td>
<td>100</td>
</tr>
<tr>
<td>I1</td>
<td>100</td>
<td>93</td>
<td>98</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>I1B</td>
<td>---</td>
<td>---</td>
<td>100</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>I2</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>PA</td>
<td>92</td>
<td>42</td>
<td>91</td>
<td>91</td>
<td>100</td>
</tr>
<tr>
<td>I5</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>I10</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Acceptability

Ratings of the acceptability of intervention procedures are reflected by the total score on the fifteen item scale, which has a possible range of 15 to 90 points. Overall acceptability scores were 49 (Peter), 88 (Tony), 89 (Sam), and 77 (Chris), indicating high levels of acceptability. A total score was not possible for Frank, because his teacher responded in writing to 7 items without providing a numerical rating. In addition, Peter’s teacher did not respond to two items on the scale (items 10 and 13). Responses on the IRP-15 are presented in Table 6.
<table>
<thead>
<tr>
<th>Item</th>
<th>Peter</th>
<th>Frank</th>
<th>Tony</th>
<th>Sam</th>
<th>Chris</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. This is an acceptable intervention for the child’s problem behavior</td>
<td>4</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>2. Most teachers would find this intervention appropriate for behavior problems in addition to the one described.</td>
<td>3</td>
<td>-</td>
<td>6</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>3. This intervention should prove effective in changing the child’s problem behavior.</td>
<td>3</td>
<td>-</td>
<td>6</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>4. I would suggest the use of this intervention to other teachers.</td>
<td>4</td>
<td>2</td>
<td>6</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>5. The child’s behavior is severe enough to warrant the use of this intervention.</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6. Most teachers would find this intervention suitable for the behavior problem described.</td>
<td>3</td>
<td>-</td>
<td>6</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>7. I would be willing to use this intervention in the classroom setting.</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>8. This intervention would not result in negative side-effects for the child.</td>
<td>5</td>
<td>-</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>9. This intervention would be appropriate for a variety of children.</td>
<td>4</td>
<td>1</td>
<td>6</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>10. This intervention is consistent with those I have used in classroom settings.</td>
<td>-</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>11. The intervention was a fair way to handle the child’s problem behavior.</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>12. This intervention is reasonable for the behavior problem described.</td>
<td>4</td>
<td>2</td>
<td>6</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>13. I liked the procedure used in this intervention.</td>
<td>-</td>
<td>1</td>
<td>6</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>14. This intervention was a good way to handle the child’s behavior problem.</td>
<td>4</td>
<td>2</td>
<td>6</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>15. Overall, this intervention would be beneficial for the child.</td>
<td>4</td>
<td>-</td>
<td>6</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>TOTAL SCORE</td>
<td>49</td>
<td>32</td>
<td>88</td>
<td>89</td>
<td>77</td>
</tr>
</tbody>
</table>
Agreement Among Assessment Methods

The four methods of identifying individual reinforcers across participants were functional analysis (FA), reinforcer assessment (RA), reinforcer assessment survey (RAS), and verbal stimulus choice (VSC). The ranking of the reinforcers that was obtained using each method is presented in Table 7.

<table>
<thead>
<tr>
<th></th>
<th>FA</th>
<th>RA</th>
<th>RAS</th>
<th>VSC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Teacher</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Time-out</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Frank</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Teacher</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Time-out</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Tony</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Teacher</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Time-out</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sam</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Teacher</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Time-out</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Chris</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Teacher</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Time-out</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 8 provides data from the calculation of a percentage score that represents agreement among methods. The method of comparison in the
upper box represents the degree to which each method agrees with each of the other methods in identifying the same reinforcer as the highest preferred. The value in the table is calculated by dividing the number of times each method agreed for each participant by the total number of participants. The lower box in Table 7 presents percentages reflecting the number of times each method agrees with each of the other methods in identifying the same order of preference of the three categories of reinforcers. (The number of agreements is divided by the total number of participants to obtain this percentage).

<table>
<thead>
<tr>
<th></th>
<th>FA</th>
<th>RA</th>
<th>RAS</th>
<th>VSC</th>
</tr>
</thead>
<tbody>
<tr>
<td>FA</td>
<td>---</td>
<td>.80</td>
<td>.60</td>
<td>.40</td>
</tr>
<tr>
<td>RA</td>
<td>---</td>
<td>---</td>
<td>.40</td>
<td>.40</td>
</tr>
<tr>
<td>RAS</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>.40</td>
</tr>
<tr>
<td>VSC</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>FA</th>
<th>RA</th>
<th>RAS</th>
<th>VSC</th>
</tr>
</thead>
<tbody>
<tr>
<td>FA</td>
<td>---</td>
<td>.40</td>
<td>.20</td>
<td>.20</td>
</tr>
<tr>
<td>RA</td>
<td>---</td>
<td>---</td>
<td>.20</td>
<td>.40</td>
</tr>
<tr>
<td>RAS</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>.20</td>
</tr>
<tr>
<td>VSC</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>
CHAPTER 5

DISCUSSION

Major Research Questions

There is a significant body of research investigating the use of functional analyses for developing effective interventions to bring about behavior change in the area of developmental disabilities. The purpose of this project was to investigate the treatment utility of functional analyses conducted in regular education settings to address disruptive behavior of children with normal intellectual functioning. This was accomplished through the investigation of the following specific research questions.

**Question 1**

Can functional analysis methods developed for developmentally normal children be used in classroom settings to identify maintaining variables for disruptive classroom behavior? It was hypothesized that general functional analysis methods that are analogous to methods used with developmentally disabled individuals would identify child-specific reinforcement contingencies for individuals in this study. The findings of this study support this hypothesis. Functional analyses were conducted with five students in classroom settings during ongoing instruction that investigated the effect of peer attention, teacher attention, and time-out on disruptive classroom behavior. It was found that for each of the participants, differentiation was found between the experimental conditions.
that were presented, and one condition, peer attention, was associated with a higher average level of disruptive classroom behaviors for 4 of 5 participants. This data provides further evidence that conducting functional analyses in regular education settings during ongoing class instruction can be a valuable assessment strategy.

**Question 2**

What is the treatment utility of functional analysis for decreasing disruptive classroom behaviors and increasing appropriate alternative behaviors? It was hypothesized that functional analyses results could be used to develop effective interventions for developmentally normal students in classroom settings. An intervention strategy that was based on the results of the functional analysis was conducted with each participant. When peer attention was withheld following disruptive behavior and delivered contingent upon appropriate classroom behavior, decreases in disruptive behavior were observed early in the intervention phase for all participants, in support of this hypothesis. These results suggest that information obtained from functional analyses can have substantial value for developing effective interventions to address disruptive behavior in regular education settings.

**Question 3**

To what extent will intervention strategies derived from functional analyses lead to effective outcomes in classroom environments over time?
It was hypothesized that intervention strategies developed to address disruptive classroom behaviors would be effective as they were repeated for the remainder of the school year. Data collected during this study provided support for this hypothesis. The study considered the generalization of treatment effects over time, as sessions were conducted weekly or biweekly for each participant until the end of the school year. No increases in disruptive behavior were observed as intervention procedures were conducted and modified over time. The corresponding increases in attention to task that were observed were also maintained over the length of the intervention. This data provides support for the utility of these intervention strategies to address behavior over time, and indicates that there may be some stability of reinforcers over time as well.

**Question 4**

To what extent are items identified as maintaining problem behaviors through functional analysis also identified as preferred by individuals through reinforcer assessment? It was hypothesized that a high level of agreement would be found between the results of the functional analysis and the reinforcer assessment. A reinforcer assessment and functional analysis was conducted with each participant, with the same categories of reinforcers being presented in each assessment. Verbal procedures that included a reinforcer assessment survey and a verbal stimulus choice procedure were conducted with each participant as well.
The results of this study generally support this hypothesis. The highest level of agreement among methods of assessment (.80) was found between the functional analysis and reinforcer assessment, the two methods during which the subjects had to perform some activity in order to obtain a reinforcer. The reinforcing variable in the functional analysis was peer attention, and according to the reinforcer assessment, this same variable was most preferred by four of the five participants.

The results of this study indicate low and variable rates of agreement for the Reinforcer Assessment Survey and the Verbal Stimulus Choice procedure. The Reinforcer Assessment Survey was found to agree with the functional analysis for three participants (60%), but to agree with the reinforcer assessment and the Verbal Stimulus Choice for only two participants (40% for each, respectively). The Verbal Stimulus Choice was found to agree with all other methods for only two participants (40%). These results indicate that the highest level of agreement was between the empirically based reinforcer assessment and functional analysis procedures.

**General Discussion**

The results of this study indicate that it is feasible to conduct functional analyses in educational settings with normally developing children, and that intervention strategies that are based on functional analyses can lead to effective outcomes in educational settings. Data from this study indicate that variables associated with disruptive classroom
behavior that were identified during a functional assessment can be successfully used to develop effective and efficient classroom interventions. For each participant, peer attention was the functional analysis condition associated with the highest rate of behavior.

These findings suggest that identifying variables that are associated with disruptive classroom behavior is a valuable assessment strategy. Manipulation of the variable identified through functional analysis led to the development of an effective strategy for decreasing disruptive behavior and increasing attention to task for all participants. In addition, integrity data were collected across all assessment and intervention sessions, which indicated that teachers, peers, and experimenters were able to withhold and provide attention as required across all experimental conditions. These data demonstrates that it is possible to implement these procedures in natural settings.

Another outcome of this study was the demonstration of the effects of the differential reinforcement intervention on students' behavior over time, and the ability to progressively fade treatment while maintaining effectiveness. Although often discussed, there have been few empirical demonstrations of the successful fading on interventions based on differential reinforcement. As intervention sessions were repeated, the amount of time without disruptive behavior required to earn token reinforcers progressively increased, and the length of the sessions
increased as well. Despite these changes, students’ target behaviors remained near zero. This effect was replicated for all five participants.

A fourth result of this study is that there was some agreement among methods of identifying reinforcers for participants in this study. The greatest level of agreement was found between functional analyses and reinforcer assessments, with very high agreement found for the most preferred category of reinforcement, peer attention. These findings suggest that there may be a high degree of comparability between these measures in identifying variables that can be used in behavioral interventions. However, further research is needed to provide further replication of these results.

The results of this study extend previous research in several ways. First, they provide additional demonstration of the feasibility of conducting functional analyses in regular education classrooms with normally developing students. These results also extend the research conducted by Broussard & Northup (1995) by including the simultaneous manipulation of three important classroom variables for each subject, rather than relying on a single hypothesis developed by descriptive assessment. The results of this study also extend previous research by the demonstration of a successful intervention for disruptive classroom behavior that was based directly on the prior functional assessment.
Another extension of research provided by this study is the use of peer attention as a specific type of positive reinforcement for appropriate behavior. By establishing clear procedures through which this type of reinforcement could be provided, the delivery of peer attention for appropriate behavior was accomplished within the classroom in a timely manner, with minimal disruption to the teacher and other students. These procedures took advantage of a readily available source of reinforcement and led to highly desirable outcomes for all participants.

A final outcome of this study is the comparison of various methods used to identify individualized reinforcers. This study extends the work conducted by Northup, Jones, Broussard & George (1995) by providing additional comparisons between the RAS, the VSC, and the reinforcer assessment. However, this study adds to the current body of literature by providing a comparison of reinforcer assessment and functional analysis with normally developing students.

Study Limitations and Future Directions

Several limitations of this study should be noted. First, the finding of peer attention as the variable associated with the greatest level of target behaviors in the functional analysis does not negate the possibility of other sources of reinforcement of the participants' disruptive classroom behavior. There may be other variables present in the classroom that have an effect on target behaviors that were not considered in this study. In addition it is
possible that the disruptive behaviors of the participants were influenced by multiple sources of reinforcement. Although the peer reversals were effective in reducing target behaviors during the intervention phase, these findings do not indicate that another reinforcer would not have led to similar effects as well.

Another limitation of this study is that the form of peer attention delivered in the two assessment phases may have differed. Specifically, the type of peer attention provided in the reinforcer assessment was positive and interactive. In the functional analysis, peer confederates were instructed to provide a reminder to the target student to return to work, although some peer interactions were observed to be conversation or play (e.g., pull my finger, tapping each other with pencils). These differences are important due to the implications that they may have for future investigations on the comparability of the two assessment procedures. Based on the results of this study, it is not possible to determine whether the nature of the attention that is provided is of importance in conducting these types of assessments.

A third limitation of this study was that the peer attention condition was associated with the lowest level of procedural integrity during the functional analysis. Observed deviations from integrity were most likely to be due to nonresponding of the peer confederate when target behaviors occurred than to the delivery of noncontingent attention. This nonresponse
was observed with new confederates, and as the confederate gained experience, procedural integrity increased. With the exception of one peer attention condition with Jerry, deviations from integrity were still found to be within an acceptable range (i.e., greater than 80%).

There may also be limitations found with the teacher attention variable as it was presented in this study. As with peer attention, positive teacher interaction was provided as teacher attention during the reinforcer assessment, and teacher reprimands were provided during the functional analysis. Although the type of teacher attention differed across these assessment procedures, participant preferences for teacher attention were low for both. These results do not indicate that teacher attention is not a meaningful variable of study, but rather that it was not preferred by these participants in the current classroom contexts.

There is extensive research on the effect of teacher attention, particularly on the form of teacher attention that is provided. Teacher reprimands were used in the functional analysis portion of this study because it is most analogous to previous studies in functional analysis. However, with regular education students, it would be interesting to investigate the different forms of attention as they are provided in an experimental manipulation in future studies.

Another way in which the effect of teacher attention on disruptive behavior might be evaluated is by its presentation as an antecedent rather
than a consequence. Gunter, Shores, Jack, Denny, & DePaepe (1994) surmise that teacher mands occurring prior to behavior may have an effect on subsequent academic productivity. If this teacher attention is aversive, disruptive behavior may result. If this teacher attention is a constructive, explanation of the task requirements, low disruptive behavior may result. Van Houten & Doleys (1983); Pfiffner & O’Leary (1987) provide consistent results that the use of reprimands in combination with positive attention is most effective in increasing academic behavior and decreasing inappropriate behavior, particularly when new behaviors are learned. It is probable that the effects are idiosyncratic across various subjects and populations. The exact nature of teacher attention that will be reinforcing for students in functional analysis is an empirical question that would be of interest in further studies. Also, the rate of naturally occurring peer and teacher attention may be essential. That is, if relatively high amounts of teacher attention are available noncontingently, teacher attention would be expected to be of less value as a reinforcer (and vice versa).

In consideration of the teacher attention variable as it was delivered in this study, it is important to note that teacher attention was largely provided by the experimenter, and there may be differences in how a participant will behave when interacting with an experimenter rather than with his or her regular classroom teacher. Various researchers in functional analysis have trained teachers and parents to implement both assessment
and intervention in classroom settings (Cooper, et al., 1992; Northup, et al., 1994), although this was not done in this study. One major limitation of this study was in not systematically training the teachers to implement the intervention strategies. Therefore, it is unknown whether, through simple observation, the teachers developed any skills that may be used to address similar problems in the future.

A limitation associated with the time-out (or escape) variable is that participants in this study have probably had varying experiences with time-out. Although the nature of the time-out procedures that would be used were explained to the participants, each had little opportunity to come into contact with this event due to the low levels of behavior observed in time-out conditions. In addition, the work that was given to students was probably much more difficult than typical work given to them in their classrooms. However, students were observed to remain somewhat on task without observable disruptive behaviors that would have led to the use of time-out. The current procedures also raise questions regarding time-out (and reprimands) as punishment or negative reinforcement (escape). Although the current procedures are typically described as punishment, their actual function can only be determined empirically.

Another limitation of this study is that some attention to the subject within the classroom was perceived by the other students. Efforts were made to minimize these effects by conducting baseline observations that
allowed all students to become accustomed to the presence of the experimenter and observers. In addition, business with classroom teachers was conducted outside of class to avoid additional attention to the target student in the presence of others. In general, teachers did not interrupt their lessons upon arrival and departure of persons involved with the study. One teacher remarked on the general positive effect of reduced disruptive behavior of all students and increased attention to task that is often found when visitors are in a classroom, and for that reason, was glad to have the experiment conducted in her classroom.

There are numerous areas for further research that would extend our knowledge about the treatment utility of the assessment procedures used in this study. Of particular interest would be the comparison of a functional analysis based intervention with an intervention using a reinforcer identified through some other form of assessment, such as reinforcer assessment that included other types of reinforcers (e.g., edibles, tangibles). This type of comparison is needed to confirm the treatment utility of functional analysis as an assessment procedure that can identify variables that actually maintain inappropriate behavior, as opposed to the identification of a generic reinforcer. It is quite possible that the classroom contingencies that maintain inappropriate behavior such as disruption are different than consequences that would maintain appropriate behavior such as work completion.
Another area for further research would be to consider the ranking of reinforcers as separate reinforcer assessments are conducted. Generally, a discrete number of reinforcers are presented in any reinforcer assessment. It would be interesting to compare one reinforcer that was identified in an initial assessment to different items in a subsequent assessment, in order to determine to what degree that first preference would remain most preferred. For example, it was noted that the classroom teachers in this study frequently provided tangible items (stickers, erasers) and edible items (candy). It would have been interesting to conduct a second reinforcer assessment to compare peer attention (which students preferred according to the current reinforcer assessment) with edibles, and tangibles. A related question for further research is the degree to which these comparisons may have changed over time, due to the repeated exposure that the participants had with peer attention.

Further research is needed in the area of intervention development, and in the area of modifying intervention strategies as well. In the intervention phase of this study, one model for a gradual fading of treatment over time is presented. It is not known what the best strategy might be to modify such an intervention. That is, there is no set rule for the determining how many minutes of appropriate behavior need to be exhibited before a reinforcer is delivered to begin with, and further experimentation is needed to direct fading procedures. In addition, another
meaningful criterion for reinforcement could have been chosen, such as number of problems worked or words read correctly. Further investigation is needed in order to draw conclusions about procedures that would be most effective; however, this study may provide an initial step in that direction.

In summary, the present investigation demonstrated that functional analyses can be conducted in regular education classrooms, and that interventions based upon functional analyses can provide for effective outcomes over time. In addition, this study also demonstrates that reinforcer assessments, as well as functional analyses, are meaningful assessment tools that can be used to identify variables related to disruptive classroom behavior that can subsequently be used to develop effective interventions that can be successfully faded over time.
REFERENCES


APPENDIX A

PARENT CONSENT FOR RESEARCH PARTICIPATION

PURPOSE: Thank you for allowing your child to participate in this important project. In working with your child's teacher, we hope to provide some assistance to the teacher in developing some effective strategies for helping your child succeed in school.

PROCEDURE: As a participant in this project, your child's teacher will be asked to: complete questionnaires, participate in two interviews, and to collect information about your child's behavior during class. In addition, we would like to conduct some observations of your child in his or her class setting on 3-5 days each week, with observations lasting about one hour each day. These activities will be conducted to develop intervention recommendations. These recommendations will be shared with the classroom teacher, and we will observe your child and the teacher as they are used in the classroom. Your child's involvement in this project will last up to six weeks, with follow-up observations lasting six months.

Potential risks to my child by participating in this study include the possibility of an increase in problem behaviors upon exposure to experimental conditions. I understand that any condition in which potentially harmful levels of behavior occur will be terminated immediately. The benefits of this study are the potential of developing effective strategies for use in the classroom that will help my child increase appropriate classroom behavior.

All information will be coded and the identity of individuals participating will remain confidential throughout the study. Your child's name will not be placed on any material or records. Once the teacher terminates involvement, he or she will be provided a summary of any information which might assist your child in the classroom.

PARENT'S RIGHTS: Your agreement to allow your child to participate in this project is voluntary. You have the right to withdraw your child from this project at any time, and you may do so by contacting the experimenters named below. The researcher and other members of the team will be available throughout the study to answer any questions concerning the procedures and to ensure they are fully understood. There will be no cost for participation in this study.

I HAVE READ AND UNDERSTAND THE PURPOSE OF THE PROJECT, THE PROCEDURES INVOLVED, AND MY RIGHTS AS A PARTICIPANT. I AGREE TO PARTICIPATE IN THIS PROJECT.

________________________________________  ________________  ______________
Signature                                           Date                                Subject Number
APPENDIX B

TEACHER CONSENT FOR RESEARCH PARTICIPATION

PURPOSE: Thank you for cooperating in this important project on classroom interventions. Teachers who participate in this project will be providing valuable information about the instructional environment in the classroom as well as information about how interventions can be used to address the needs of children who are experiencing behavioral difficulties in the classroom. This information is important for future development of services for children and for teacher training as well. In addition, we hope to provide you with some assistance with a student in your class.

PROCEDURE: As a participant in this project, you will also be asked to provide some simple background information about yourself, complete two questionnaires about the identified student, participate in two meetings with the experimenter, and collect information about the student’s behavior in your classroom using a specially designed form. In addition, you will be asked to allow classroom observations for the purpose of obtaining information pertaining to the classroom ecology. Permission will be obtained from the student’s parent(s) to observe the student both within your classroom and in an alternative classroom setting for assessment purposes. Following assessment, you will be asked to implement intervention recommendations, and to allow observation of this so that we may observe the effects of our recommendations on the student’s behavior. You will be provided with a summary of any information which might assist you in the classroom. In addition, we wish to make ourselves available for additional consultation concerning this child at your request.

In order to maintain individual confidentiality, all information will be coded and the identity of all students and teachers participating will remain confidential.

TEACHER’S RIGHTS: Your agreement to participate in this project is voluntary. You have the right to withdraw from this project at any time. The researcher and other members of the team will be available throughout the study to answer any questions concerning the procedures and to ensure they are fully understood. Following completion of the study, the researcher will be available for discussion and will provide any requested details regarding study procedures.

I HAVE READ AND UNDERSTAND THE PURPOSE OF THE PROJECT, THE PROCEDURES INVOLVED, AND MY RIGHTS AS A PARTICIPANT. I AGREE TO PARTICIPATE IN THIS PROJECT.

___________________________  _____________  _____________
Signature  Date  Subject Number
APPENDIX C

TEACHER INFORMATION FORM

Sex: Male ________ Female ________

Highest degree earned: ____________________

Number of years employed as a teacher: ____________

<table>
<thead>
<tr>
<th>Grade Levels Taught</th>
<th>Years Taught</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

How long have you taught the identified student? _______________________

Have you received prior training in behavior modification? If so, please describe briefly:

____________________________________________________________________

Please rate your knowledge or expertise in behavior modification (behavior analysis).

Not knowledgeable 1  2  3  4  5  Very knowledgeable

Please list your class schedule, indicating times when the identified student is with you (or provide copy):
APPENDIX D

STRUCTURED TEACHER INTERVIEW

Student with challenging behaviors: __________________ Age: _____
Interviewer: ____________________ Sex: M F
Respondent: ____________________ Grade: _____
Date of Interview: ____________

Purpose of meeting defined: "I'd like to ask you some questions about the child's behavior, and about when and where you've observed (child's name) ______." 

Target behaviors specified in behavioral terms:
"What are the behaviors of concern?"

"Tell me in your own words, what would I see when the student ...(target behavior)?"

*One target behavior identified for intervention (if more than one behavior identified)
"What is the one behavior that is of greatest concern to you? Next, Next,"

*Frequency:
"How often does the behavior occur per class period, day, week, month?"

*Intensity:
"How severe or intense is the behavior? Can you rate the behavior from 1-5 (1 = not severe, 5 = very severe)?"

*Duration:
"How long does the behavior last when it occurs?"

Skills vs. performance deficit (if applicable):
"Does the child know how to perform the task involved? (academics). Or, "Does the student know what an appropriate behavior would be and can he or she do that?"
Antecedent conditions associated with target behavior:
"What is usually going on when the behavior occurs?"

Consequent conditions associated with target behavior:
"What would you say is most likely to happen after the behavior?" (If no answer prompt for teacher attention, peer attention, getting out of something).

Sequential conditions associated with target behavior:
"When are behaviors most likely to occur?"

"In what setting and with whom are behaviors most likely to occur?"

Previous interventions/strategies attempted:
"What have you tried to do about this behavior?" "How has that worked for you?"
"Have you tried anything else?"

Student's reinforcers:
"What are his or her favorite things to eat?"
"What are his or her favorite things to do?"
"What are his or her favorite things to have/get?"
"What are his or her favorite things to get out of?"
"Does he or she like attention from you? from other students?"

"What grades does the student usually earn in your class?"
"Describe the student's work behavior (e.g., hard worker, does he or she pay attention, etc.)"
"What do you think the problem might be?"
"Can this be changed in your classroom?"
APPENDIX E

INTERVENTION RATING PROFILE - 15

The purpose of this questionnaire is to obtain information that will aid in the selection of classroom interventions. Circle the number best describes your agreement or disagreement with each of the following statements.

1. This is an acceptable intervention for the child’s problem behavior.
   Strongly Disagree 1 2 3 4 5 6 Strongly Agree

2. Most teachers would find this intervention appropriate for behavior problems in addition to the one described.
   Strongly Disagree 1 2 3 4 5 6 Strongly Agree

3. This intervention should prove effective in changing the child’s problem behavior.
   Strongly Disagree 1 2 3 4 5 6 Strongly Agree

4. I would suggest the use of this intervention to other teachers.
   Strongly Disagree 1 2 3 4 5 6 Strongly Agree

5. The child’s behavior is severe enough to warrant the use of this intervention.
   Strongly Disagree 1 2 3 4 5 6 Strongly Agree

6. Most teachers would find this intervention suitable for the behavior problem described.
   Strongly Disagree 1 2 3 4 5 6 Strongly Agree

7. I would be willing to use this intervention in the classroom setting.
   Strongly Disagree 1 2 3 4 5 6 Strongly Agree

8. This intervention would not result in negative side-effects for the child.
   Strongly Disagree 1 2 3 4 5 6 Strongly Agree

9. This intervention would be appropriate for a variety of children.
   Strongly Disagree 1 2 3 4 5 6 Strongly Agree

10. This intervention is consistent with those I have used in classroom settings.
    Strongly Disagree 1 2 3 4 5 6 Strongly Agree

11. The intervention was a fair way to handle the child’s problem behavior.
    Strongly Disagree 1 2 3 4 5 6 Strongly Agree

12. This intervention is reasonable for the behavior problem described.
    Strongly Disagree 1 2 3 4 5 6 Strongly Agree
13. I liked the procedures used in this intervention.
   Strongly Disagree  1  2  3  4  5  6  Strongly Agree

14. This intervention was a good way to handle the child's behavior problem.
   Strongly Disagree  1  2  3  4  5  6  Strongly Agree

15. Overall, this intervention would be beneficial for the child.
   Strongly Disagree  1  2  3  4  5  6  Strongly Agree

(Martens, Witt, Elliott, & Darveaux, 1985)
APPENDIX F
REINFORCER ASSESSMENT SURVEY

"Boys and girls like to get good things. I am going to name things that kids sometimes get in school. I want to know how much you like each of these things. After I name each thing, you tell me if you like it "not at all", "a little", or "a lot". For example, if I say "Going to the supermarket" you might say you like it not at all, but if I say "Going to your favorite movie" you might say you like it a lot.

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Not at all</th>
<th>Just a little</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Help a friend with schoolwork.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2. Teacher says &quot;Good job, I like that&quot;.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3. Get out of math.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4. Spend time with a friend at school.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5. Help the teacher</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>6. Get out of recess.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>7. Friend says, &quot;Good job, I like that&quot;.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>8. Teacher says &quot;That's right, that's correct&quot;.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>9. Get out of classroom.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>10. Friend pats you on the back/hugs you.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>11. Teacher says &quot;I'm going to let your parents know you're doing a great job&quot;.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>12. Get out of reading.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>13. Do a project/play a game with a friend.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>14. Teacher pats you on the back/hugs you</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>15. Get out of sitting in your seat.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>16. Talk with a friend at school.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>17. Time with favorite teacher at school.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>18. Get out of skills group.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>19. Friend says &quot;You're doing a good job&quot;.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>20. Teacher helps you with your work.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>21. Get out of school activity.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Do you not like any of these things? Yes No ______________

Which of these is your favorite? ____________________________

Is there anything else you would like? __________________________

How much do you like ____________________________?

Peers (Sum items 2, 8, 14, 20, 26, 32, 38) __________
Teacher Attn (Sum items 5, 11, 17, 23, 29, 35, 41) __________
Escape (Sum items 6, 12, 18, 24, 30, 36, 42) __________

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APPENDIX G

VERBAL STIMULUS CHOICE QUESTIONNAIRE

Directions: I'd like to know what things you might like to earn by doing lots of hard work at school. I am going to read some statements to you. After each statement that I read, choose what you would like by picking up the coupon that goes with it.

WHICH WOULD YOU RATHER GET FOR DOING CODING OR HARD WORK?

Get out of something (like...) OR have a teacher say or do something (like...)?

Have a teacher say or do something (like...) OR have a friend say or do something (like...)?

Have a friend say or do something (like...) OR get out of something (like...)?

Have a teacher say or do something (like...) OR get out of something (like...)?

Have a friend say or do something (like...) OR have a teacher say or do something (like...)?

Get out of something (like...) OR have a friend say or do something (like...)?

RESULTS:

<table>
<thead>
<tr>
<th>Category</th>
<th>Times chosen:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td></td>
</tr>
<tr>
<td>Peer (friend)</td>
<td></td>
</tr>
<tr>
<td>Tangible (have)</td>
<td></td>
</tr>
</tbody>
</table>
VITA

Carmen D. Broussard was born in New Iberia, LA in 1967. She was an honor graduate from New Iberia Senior High School in 1985. She attended the University of Southwestern Louisiana in Lafayette, LA from 1985 to 1991, where she graduated in Psychology in 1989 and continued in post-graduate study. Carmen entered Louisiana State University in 1991, and earned a master’s degree in psychology in 1994 in the area of school psychology. Currently, Carmen is married and works in a rural Louisiana parish as a certified school psychologist.
DOCTORAL EXAMINATION AND DISSERTATION REPORT

Candidate: Carmen D. Broussard

Major Field: Psychology

Title of Dissertation: The Treatment Utility of Functional Analyses for Disruptive Classroom Behavior

Approved:

[Signatures]

Major Professor and Chairman

Dean of the Graduate School

EXAMINING COMMITTEE:

[Signatures]

Date of Examination:

9/17/96