


6-23-2006

# Establishing a Functional Analysis Protocol for Examining Behavioral Deficits using Social Withdrawal as an Exemplar

Melissa Penaranda Walters  
*University of South Florida*

Follow this and additional works at: <http://scholarcommons.usf.edu/etd>

 Part of the [American Studies Commons](#), and the [Social and Behavioral Sciences Commons](#)

---

## Scholar Commons Citation

Walters, Melissa Penaranda, "Establishing a Functional Analysis Protocol for Examining Behavioral Deficits using Social Withdrawal as an Exemplar" (2006). *Graduate Theses and Dissertations*.  
<http://scholarcommons.usf.edu/etd/3807>

This Thesis is brought to you for free and open access by the Graduate School at Scholar Commons. It has been accepted for inclusion in Graduate Theses and Dissertations by an authorized administrator of Scholar Commons. For more information, please contact [scholarcommons@usf.edu](mailto:scholarcommons@usf.edu).

Establishing a Functional Analysis Protocol for Examining Behavioral Deficits using  
Social Withdrawal as an Exemplar

by

Melissa Penaranda Walters

A thesis submitted in partial fulfillment  
of the requirements for the degree of  
Master of Arts in Applied Behavior Analysis  
College of Graduate School  
University of South Florida

Major Professor: Jennifer Austin, Ph.D.  
Trevor Stokes, Ph.D.  
Maria dePerczel Goodwin, Ph.D.

Date of Approval:  
June 23, 2006

Keywords: maintaining variables, social anxiety, elementary school students, school  
refusal, social interaction

© Copyright 2006, Melissa Penaranda Walters

## Table of Contents

List of Tables .....	ii
List of Figures .....	iii
Abstract .....	iv
Chapter 1 Introduction .....	1
Chapter 2 Method .....	14
Chapter 3 Results .....	22
Chapter 4 Discussion .....	25
List of References .....	30
Appendices .....	32
Appendix A: Comprehensive list of all functional analytic articles reviewed .....	33
Appendix B: Data Sheet .....	49
Appendix C: Level of anxiety questionnaire .....	50
Appendix D: Teacher Training form .....	51
Appendix E: Teacher “cheat sheets” .....	56

List of Tables

Table 1 Level of anxiety questionnaire mean scores .....24

## List of Figures

Figure 1.	Functional analytic results for Robert .....	22
Figure 2.	Functional analytic results for Marc.....	23

Establishing a Functional Analysis Protocol for Examining Behavioral Deficits using  
Social Withdrawal as an Exemplar

Melissa Penaranda Walters

ABSTRACT

The purpose of this study was to establish a functional analysis protocol for examining behavioral deficits, using social withdrawal as an exemplar. A review of the Journal of Applied Behavior Analysis over the past 10 years found that although the current behavior analytic literature contains extensive studies that functionally analyze behavioral excesses, there is a limited amount of studies that analyze deficits. The rationale behind this study was the notion that although behavioral deficits are rarely studied, the fact that the participant is capable of the behavior yet fails to engage in it leads to the idea that certain events are functionally maintaining this failure. The method used involved examining two male students identified as socially withdrawn. The approach for functionally analyzing their behavior(s) was based on the conditions described in Iwata et al. (1982/1994). Specifically this study had the following conditions *attention*, *demand/escape*, and *unstructured play*, otherwise known as the control condition. The procedures of this study were predicated on the hypothesis that behavioral deficits respond to social contingencies in a manner similar to many behavioral excesses. Based on the findings of this study, the deficit collectively referred

to as “social withdrawal” was responsive to such contingencies. Specifically, social withdrawal appeared to be maintained by adult attention for both participants.

## Chapter One

### Introduction

Functional analysis refers to any of a variety of methods used to help identify both the antecedent and consequence environmental events that contribute to certain behaviors. By directly observing and systematically manipulating the variables in a person's environment, the relationship between the person's behavior and their environment often can be determined. Skinner (1953) described functional analysis as an empirical demonstration of cause and effect between environment and behavior.

Knowledge of the specific functional relations between behavior and the environment is necessary in determining strategies for successful behavior change (Cooper, Heron, & Heward, 1987). According to Iwata, Kahng, Wallace, & Lindberg (2000), identifying the function of behaviors improves treatment programs in at least four ways. First, it helps to identify and alter antecedent conditions that evoke behavior, which may in turn help decrease the frequency of behavior. Second, it can determine the reinforcement contingencies operating on behavior, which may allow one to eliminate or minimize reinforcers and subsequently decrease behavior. Third, functional analysis helps to identify reinforcers that may be used to establish alternate behaviors. And lastly, functional analysis results help single out relevant reinforcers and/or treatment components.



Conducting a functional assessment or analysis prior to selecting behavior change strategies is considered best practice in applied behavior analysis (Miltenberger, 2004). Functional assessment involves indirect data collection strategies (e.g., questionnaires and interviews) or direct observation (e.g., observing and recording the antecedents and consequences) of a behavior, whereas functional analysis strategies involve the experimental manipulation of the antecedents or consequences to establish a functional relationship. Because functional analyses methodologies are considered the more stringent of the two approaches and therefore yield the most convincing data, these types of investigations tend to be more prevalent in the literature. Within this literature, however, it appears that problems involving behavioral excesses are more likely to be analyzed than problems involving behavioral deficits. Appendix A provides a comprehensive list of all articles reviewed for the present study. This list represents all articles published in the last ten years of the *Journal of Applied Behavior Analysis* and met the following criteria: (a) publication as a full research article or research report between 1994-2004, (b) presentation of data (in the form of a graph/table) of a functional analysis, and (c) inclusion of at least two conditions that involved environmental manipulation as a strategy for determining behavioral function. Of the 162 articles reviewed, 96% measured behavioral excesses, 4% measured both behavioral excesses and behavioral deficits, and none of the articles solely measured a behavioral deficit. Some examples of behavioral excesses include self-injurious behavior (SIB) (e.g., Iwata, Dorsey, Slifer, & Bauman, 1982/1994; Mace, Shapiro, & Mace, 1998; Borrero, Vollmer, Wright, Lerman, & Kelley, 2002), aggression (e.g., Lalli, Casey, & Kates, 1995;

O'Reilly, 1995; Thompson, Fisher, Paizza, & Kunh, 1998), disruptive behavior (e.g., Hagiopan, Fisher, & Legacy, 1994; Richman, Wacker, Asmus, & Casey, 1998; Jones, Drew, & Weber, 2000), inappropriate language/utterances (e.g., Pace, Ivancic, & Jefferson, 1994; Dixon, Benedict, & Larson, 2001; Lancaster, LeBlanc, Carr, Brenske, Peet, & Culver, 2004)), destructive behavior (e.g., Bowman, Fisher, Thompson, & Piazza, 1997; Piazza, Bowman, Contrucci, Delia, Adelinis, & Goh, 1999; McComas, Hoch, Paone, & El-Roy, 2000), eye poking (Kennedy & Souza, 1995; Lalli, Livezey, & Kates, 1996), breath holding (Kern, Mauk, Marder, & Mace, 1995; Richman, Lindauer, Crosland, McKerchar, & Morse, 2001), pica (Piazza, Hanley, & Fisher, 1996; Piazza, Fisher, Hanley, LeBlanc, Worsdell, Lindauer, & Keeney, 1998), off-task behavior (Meyer, 1999; Flood, Wilder, Flood, & Masuda, 2002), hand mouthing (Goh, Iwata, Shore, & DeLeon, 1995), inappropriate sexual behavior (Fyffe, Kahng, Fittro, & Russell, 2004), elopement (Piazza, Hanley, Bowman, Ruyter, Lindauer, & Saiontz, 1997), and hair pulling (Rapp, Miltenberger, Galensky, Ellingson, & Long, 1999). Of those articles that included analysis of behavioral deficits, targeted behaviors included use of alternative mands (Day, Horne, & O'Neill, 1994; Peck, Wacker, Berg, & Cooper, 1996; Brown, Wacker, Derby, Peck, Richman, Sasso, Knutson, & Harding, 2000; Winborn, Wacker, Richman, Asmus, & Geier, 2002), appropriate/on-task behavior (Harding, Wacker, Cooper, & Millard, 1994), use of switch activation (Ringdahl, Winborn, Andelman, & Kitsukawa, 2002), and engagement (Moore & Edwards, 2003).

Perhaps one reason why studies have focused predominantly on behavioral excesses is that it is more difficult to functionally analyze a behavior that rarely, if ever,

occurs. However, the effectiveness of differential reinforcement of other behavior (DRO) procedures demonstrates convincingly that the absence of behavior can be affected by reinforcement contingencies. Although a “naturally occurring” DRO (i.e., unprogrammed absence of behavior) might be difficult to analyze, it seems that if the person is capable of performing the behavior, yet isn’t doing so, it would be possible to analyze the environmental variables that suppress the occurrence of that behavior. In fact, Iwata et al. (2000) state that although low frequency behaviors are usually not seen, effective treatment may require identification of their controlling variables. The authors suggest that these analyses might involve examination of response classes, repeated functional analyses under varying environmental conditions, or the combination of descriptive and functional analyses.

Another potential reason for relative paucity of analyses targeting behavioral deficits is that the procedures described by Iwata et al. (1982/1994), which are most frequently cited in describing functional analysis procedures, were focused on the analysis of self injurious behavior (SIB). Using past studies as a framework, the authors focused on creating well defined, analogue conditions to directly and repeatedly observe the occurrence of SIB. Further, the authors did not imply that the procedures would generalize to other response topographies, although subsequent research has clearly applied the procedures effectively to other aberrant behaviors. However, although these procedures were not initially intended to measure deficits, it is interesting to note that over the past 20 years, functional analysis procedures have not evolved to include a wider range of behavior problems, especially with regard to behavioral deficits. If the

procedures have evolved, it is difficult to find evidence of it in the literature. Hanley, Iwata, & McCord (2003) conducted a literature review of 277 functional analytic empirical studies from various journals and subsequently identified the five most prevalent behavior topographies targeted in the studies reviewed. Their findings indicated that SIB was targeted most frequently (64.6% of studies), followed by aggression (40.8%), disruption (19.1%), vocalizations (12.6%), and property destruction (10.5%). The only behavior topography identified by the authors that could be regarded as a behavioral deficit was noncompliance (i.e., failure to comply), which was examined in a mere 12 studies (or 4.3%).

Miltenberger (2004) stated that a behavioral deficit can be thought of as a failure to engage in a desirable behavior. The behavior is deemed desirable because of the positive impact it would have on the person's life in the future; in other words, it is a behavior that would assist the person in accessing reinforcers. There are many examples of behaviors whose lack of occurrence negatively influence the person's quality of life. Social anxiety is one such example. Social anxiety disorder (SAD), also termed social phobia, is characterized by excessive fears of social or performance situations and avoidance of these feared situations. The avoidance and fear are severe enough to interfere with the person's academic or occupational functioning, relationships, or social activities (*DSM IV-TR*, 2000). It appears that much of the research on SAD has centered on adults, even though many children, particularly adolescents, also suffer from the disorder (Kashdan & Herbert, 2001). Anxiety disorders are possibly the most common of

childhood and adolescent disorders (Bernstein & Borchardt, 1991), with an estimated prevalence rate of 5 to 15% of the adolescents in the United States (Kashdan & Herbert, 2001).

SAD can have significant effects on the emotional, social, and academic functioning of children (Biedel, Turner & Morris, 2000). Regrettably, socially anxious children and adolescents are often overlooked and not referred to treatment by teachers and parents, primarily because they may not recognize the need for professional attention for extreme shyness (Masia, Klein, Storch & Corda, 2001). Kashdan & Herbert (2001) assert that without treatment, SAD follows a chronic, unrelenting course. Adults with SAD have been shown to have significantly lower levels of achievement in work, education, romantic relationships, and subjective well being. Masia et al. (2001) point out that the detrimental effects of untreated SAD highlight the importance of early detection and intervention.

As part of early detection, it is essential to understand the behaviors associated with SAD. The *DSM IV-TR* (2000) describes that crying, clinging or staying close to someone familiar, freezing, and inhibited interaction to the point of mutism, may be observed in children with SAD. They may also appear markedly timid in social settings, refuse to take part in group activities, or stay on the outside of social play times. Social withdrawal is a defining feature of the disorder, and although some children might not meet the full diagnostic criteria for SAD, it is reasonable to assume that they might encounter many of the problems associated with the disorder if they become markedly withdrawn from social interactions with adults or peers. These deficits might be

particularly likely to occur in school settings, where demands for group interactions with people with whom the child is unfamiliar or uncomfortable are common. One factor that makes SAD particularly problematic for children is their inability to avoid these social situations (e.g., it is mandatory for them to go to school). Therefore, SAD can cause poor school performance, avoidance of appropriate social activities, or school refusal (*DSM IV-TR*, 2000).

School refusal is a behavior commonly associated with emotional distress, especially anxiety and depression (King & Bernstein, 2001). Several recent publications have suggested the use of functional assessment methods (i.e., interview) to help determine the maintaining variables of school refusal (e.g. Kearney & Silverman, 1990; Chorpita, Albano, Heimberg, & Barlow, 1996; King, Heyne, Tonge, Gullone, & Ollendick, 2001). Kearney & Silverman (1990) evaluated seven children and adolescents with difficulties attending school using the School Refusal Assessment Scales (SRAS). The SRAS is a questionnaire designed to identify potential maintaining variables and functional relationships of school refusal behavior. The specific variables that make up the conditions are fearfulness/general over-anxiousness, escape from aversive social stimuli, attention-getting or separation anxious behavior, and tangible reinforcement (e.g., being able to stay at home and play video games). The SRAS consists of 16 questions, 4 per maintaining condition. Each question is rated on a 7-point Lickert-type scale from 0 (*never*) to 6 (*always*). Whenever possible, the SRAS is completed by the child, the parent, and the teacher, with each informant having a separate version of the questionnaire (SRAS-C, SRAS-P, and SRAS-T). In this study, all the available SRAS responses of the

children, parents, and teachers were tallied and the highest mean score of the four categories/conditions was considered to be the primary maintaining variable of the school refusal. The strength of the remaining conditions was also factored into the construction of an appropriate treatment plan. Prescriptive treatment was assigned in accordance with the hypothesized maintaining variable and included systematic desensitization/relaxation training, modeling and cognitive restructuring, shaping and differential reinforcement of other behavior (DRO), and contingency contracting. The children, parents, and teachers were also given a series of other self-report measures (questionnaires) before, during, and after treatment to measure the efficacy of the SRAS. Results indicated improvement of school attendance in 6 out of the 7 participants. The questionnaire and daily ratings results were mixed, though this may have more to do with the fact that not all the questionnaires and ratings were pertinent to each functional category. The results regarding school attendance, pre- and post treatment questionnaire data, and child and parent daily ratings indicated that four motivating factors of school refusal behavior could be identified and modified, thus enabling an effective assessment and treatment planning for this behavior.

Chorpita et al. (1996) also examined the efficacy of functional assessment in identifying effective treatments for school refusal. In this study, “prescriptive treatment” was defined as empirically-based interventions differentially applied to specific behavior problems or syndromes as an outcome of functional assessment (Burke & Silverman; 1987). The participant was a 10 year old girl who was highly resistant to attending school. At the onset of the study she was clinically diagnosed with Separation Anxiety

Disorder and Social Phobia based on separate, structured, clinical interviews with the parents and child. Each of them also completed a version of the SRAS, which suggested that “attention getting/separation anxious” was the primary factor and therefore the principal function of school refusal. A prescriptive treatment plan involving shaping and differential reinforcement was subsequently developed. Results found that problem behaviors such as complaints, anger, tantrums, and tears greatly reduced following treatment. The post-treatment diagnostic evaluations found full remission of Separation Anxiety Disorder and Social Phobia. The authors concluded that in cases of school refusal in children with Separation Anxiety Disorder or Social Phobia, a functional, prescriptive approach specifically targeting the refusal behavior may be the most practical strategy.

In an effort to expand on previous findings, King et al. (2001) provided a case illustration to support an approach which incorporates diagnostic interviewing, functional assessment, self-report measures, parent/teacher checklists, and a review of school attendance records. The case involved a 9 year old girl who had not attended school for 10 weeks. She and her parents were diagnostically interviewed and, based on the results, the child met the criteria for a diagnosis of Separation Anxiety. The child was also given the SRAS and her responses suggested that her behavior served both attention seeking and tangible reinforcement functions. In addition to these assessments, the therapist also visited the school and was shown attendance records and samples of the student’s work. Her written work and drawings illustrated difficulties in coping with separation from her mother. Based on these multi-informant clinical assessments, the authors hypothesized



that the school refusal behavior was functionally related to separation anxiety and a highly reinforcing home environment. The intervention program involved graduated school return and parent training in behavior management skills. The program resulted in voluntary school attendance by the student. The authors concluded that the most effective way to handle school refusal is to collect data from multi-informant sources, (diagnostic interviewing, functional assessment, self-report measures, parent/teacher checklists and review of school attendance), and develop a functionally-based treatment plan based on these findings.

These studies (Kearney & Silverman, 1990; Chorpita et al., 1996; King et al., 2001) provide support for the importance of identifying maintaining variables prior to selecting treatment options. It is important to note that all the authors claimed to have conducted a functional analysis, although the primary data collection instrument for determining behavioral function was the SRAS. The SRAS, being a questionnaire, is by definition an indirect assessment of behavior. As such, its usefulness is limited to formulating hypotheses about variables affecting behavior as opposed to identifying direct cause and effect relationships between behaviors and the environment. This is significant because in order to provide the most effective treatment, that can produce generalized results, one must make evident the effect the behavior has on the environment. The best way to do this is to empirically prove a causal relationship instead of simply providing a hypothesis based on an indirect measure. However, the SRAS appears to be an effective tool in helping to identify the maintaining variables that are to be manipulated and/or observed in the functional analysis.

Several other studies have shown that the manipulation of environmental factors can affect children's abilities to engage in important social interactions other than attending school. In an early study, Strain, Shores, and Timm (1977) illustrated the importance of setting events in studying social behavior. The study focused on six children with behavioral handicaps who exhibited social deficits, defined as seldom engaging in positive interactions with their peers. As part of the study, some of the peers were instructed to initiate social interactions with the children who displayed the social deficits. The authors found that 5 out of the 6 children who were prompted not only responded more, but also initiated more social interactions. The authors also concluded that since one of the children did not respond the same as the others, treating social deficits requires individualized assessment and interventions.

Chandler, Fowler, & Lubeck (1992) also investigated the role of setting events in social interaction, using as participants seven preschool children enrolled in programs for language delays or at-risk developmental delays. The students were referred by their teachers because of their social interaction problems, described as infrequent or aggressive interactions with peers. Four environmental variables that had been identified as strong determinants of preschool children's peer interaction (i.e., presence of adults in the setting, available toys and materials, peer groupings, and amount of available space) were manipulated to discern differential effects on social behavior; the primary dependent variables were initiations and responses. In Study 1, the status of the teacher (presence and behavior), peer groupings, and materials provided varied across the conditions. In Study 2, the status of the teacher (presence and behavior) and materials

provided varied across conditions, while group compositions and space remained constant. Although combinations of the four settings produced differing rates of social behavior, the most favorable combination for encouraging peer interaction and minimizing teacher-child interaction included teacher absence during the activity, limiting materials, and pairing the child with a socially skilled partner. This study demonstrates the influence of setting events on the social interactions of young children and provides a framework for analyzing antecedents that may set the occasion for appropriate behavior.

In another analysis, Kennedy (1994) focused on three students with severe disabilities who exhibited problem behaviors and social skills deficits. Specifically, the children showed an absence of positive social affect, which included smiling, laughing, nodding “yes,” and positive verbalizations. Using a multielement design to analyze antecedent conditions (phase one), the authors illustrated that task demands served as antecedents for problem behavior and social comments correlated with increased levels of positive social affect. These results were then experimentally manipulated with the instructor emitting high rates of social comments and gradually fading in task demands across sessions. The results of this second phase showed reductions in problem behaviors and high levels of positive social affect for all students, with task demands being increased at or above baseline levels for two of the students. A third phase replicated the first phase. This study demonstrated that by manipulating antecedent conditions concerning task demands and social comments, positive improvements in behavior and increases in social affect were found.

It appears that experimental analyses of social deficits are more likely to focus on the role of antecedent variables in promoting social interactions. Experimental examination of the role of consequences, outside the evaluation of treatment packages, appears less prevalent. Many studies that have included examination of the function of social deficits have largely focused on indirect measures (e.g., the SRAS). Moreover, with the exception of school refusal studies, a large percentage of behavioral studies investigating social skills deficits focus on children with developmental disabilities or severe behavior disorders. This finding is consistent within the behavioral literature; in fact, Hanley et al. (2003) found that only 9% of the functional analytic studies they reviewed examined typical persons without disabilities.

The current study seeks to expand upon the literature by conducting functional analyses to identify the maintaining (i.e., consequence) variables of social deficits. The effects of consequences on social deficits seems particularly important, especially in light of assessment data indicating that reinforcement contingencies may be highly salient in maintaining these behaviors (e.g., King et al., 2001). The purpose of the present study is twofold. First, we will examine the environmental variables associated with the social interaction deficits of several young typically developed children. Second, we will attempt to establish a functional analysis protocol for examining behavioral deficits, using social withdrawal as an exemplar.

## Chapter Two

### Method

#### *Participants & Settings*

Two boys in two separate elementary schools participated in the study. Robert was in the second grade and was 8 years, 7 months old. Marc was in the third grade and had just turned 9 years old. Marc and Robert were selected for participation in the study because their teachers identified them as being less socially active than their peers. Marc also was identified as periodically engaging in crying during social situations and was receiving ongoing therapy from a clinical psychologist for social anxiety. Robert had been selectively mute until the end of the previous school year (approximately 10 months prior to the study). Although he was no longer selectively mute at the time of the study, he continued to display episodes of selective silence. Neither child was taking any medications and both were reported to be performing at grade-level academically. All tasks used in the study were ones with which the children had shown success throughout the school year. All sessions were conducted in the students' classrooms or on the playground during recess.

### *Institutional and School District Review*

Prior to data collection, all experimental procedures were reviewed by the university's Institutional Review Board and the school district(s). The children and their parents signed consent forms prior to being included as participants in the study.

### *Response Definition and Measurement*

Dependent variables included any socially significant behaviors that appeared to prevent the child from interacting appropriately with peers or the teacher. These behaviors were individually defined for each boy based on interviews with their teachers. Robert's target behaviors included shrinking (defined as sinking into his seat and cowering), putting his head down and covering it with his hands and or jacket, refusal to answer a question by ignoring the request, and inaudible speech. Marc's target behaviors included covering his face with his hands or hair, refusal to answer a question by ignoring the request, inaudible speech, and crying. Each particular target behavior was specifically identified and recorded during the sessions. All targeted behaviors were measured during 10 minute observations using a partial-interval recording procedure (15 second observe, and a 5 second record). Observers were cued to record with a cassette recorder with attached ear phone that gives an audible prompt as to when to observe and record. A copy of the data sheet is included in Appendix B.

### *Observer Training*

Three observers were trained to collect data for the study using instruction and modeling (Appendix B). The observers were given a list of target behaviors for each child, shown how to identify the behaviors (through role play), asked to practice

recording with the auditory cue and data sheet, and given feedback on their performance by the researcher. Once the observers obtain a score of 90% reliability with the researcher across three consecutive practice sessions, they were ready to collect data for the study. All three observers achieved an average of 95% reliability within the first three sessions.

#### *Interobserver Agreement*

Thirty three percent of Robert's sessions and 60% of Marc's sessions were scored by two observers to obtain a measure interobserver agreement (IOA). IOA observations were spaced across the course of the study and were calculated by dividing the number of agreements by the number of agreements plus disagreements, and multiplying by 100. IOA for Robert averaged 98% (range, 92.5% to 100 %). IOA for Marc averaged 98% (range, 92.5% to 100 %).

#### *Adjunctive Measures*

In addition to direct observation data collection, each teacher periodically was asked to complete questionnaires regarding their perceptions of their student's level of anxiety throughout the procedures. A copy of the questionnaire is included in Appendix C.

#### *Procedures*

A functional analysis based on Iwata et al. (1982/1994) was used to help identify potential maintaining variables of targeted behaviors. All participants were exposed to each of three different conditions in a multi-element experimental design. So that contingencies could be assessed as naturalistically as possible, teachers were trained to

implement each condition using the procedures described below. For all three conditions, discussions with the teacher were conducted prior to establishing experimental protocols to help identify which academic, social, and unstructured play assignments were appropriate for each child based on his age, skill level, and classroom routine.

Since the teachers were comfortable with alternating between the attention and escape conditions, but less so with the unstructured play condition, we chose to observe the unstructured play condition during times in which the teacher allowed the children to select preferred activities and did not place demands, such as recess or classroom breaks. The order of presentation for the remaining conditions (attention and escape) was determined by flipping a coin. Specifically, the attention was designated as “heads” and escape was designated “tails.” The coin was flipped by the primary observer prior to each session to determine the order of conditions, with the first result (heads or tails) determining the first condition for the session. Each session lasted approximately 10 minutes, with a minimum of 5 minutes between sessions. When task demands were required for a condition, those tasks remained constant across conditions, more specifically if they were in math class and required to answer questions about problems on the board, those and or similar problems were required from the participant when called on across the escape and attention conditions alike.

#### *Experimental conditions*

*Attention.* To provide a context for social interaction, the teacher directed the child to engage in either an academic task with his/her peers or participate in a social activity with his/her peers. Some examples of academic tasks included requiring the



student to read aloud to the class, answer a question that required more than a one word response, or making a making a small presentation. This condition also included a social activity in addition to, or in place of, the academic demand. Examples of social activities included, but were not limited to, participation in an interactive game or requiring the child to discuss a favorite hobby, vacation, or television show with the class. Teachers were cued to place academic or social demands on the target child at least every three minutes using a Motivaider timing device. The Motivaider is a discrete, electronic device that clips to a belt or waistband and sends a private, pulsating vibration. If the child engaged in any of the target behaviors, the teacher was instructed to attend to the student. Attention included coming within two feet of the student and providing a redirection to continue the task. The redirection was mainly encouragement to complete engage in the task, such as “Come on, I know you know the answer.” Brief physical contact (e.g., hand on the shoulder) was also included in most redirections. If the child complied with the request the teacher gave them a short praise such as “Good job,” then moved on to the next student. They would then call on the child again about 3 to four minutes later. With the exception of brief praise after compliance and scheduled commands, teachers were specifically instructed not to attend to the children when they were *not* engaged in social withdrawal.

*Academic/Social demand.* This condition included similar academic and social activities as the attention condition. After placing the demand, the teacher allowed an appropriate amount of time for the child to initiate the task (i.e., between 5 and 10 seconds). If the child did not initiate a response, the teacher prompted him to do so by

repeating the instruction. If the child engaged in any of the target behaviors after the prompt, the teacher withdrew the assignment and allowed the child to “calm down and take a quick break” for about 3 minutes. The teacher then called on another student and allowed the participant to remain quietly seated at their desk. The teacher kept track of the 3-min break using the Motivaider. Once the time was up, the teacher placed the same demand again. If the child failed to initiate a response or engaged in any of the target behaviors, the teacher provided one additional prompt (e.g., “Robert, would you like to give the question one last shot?”). Failure to initiate a response following the last prompt resulted in the teacher calling on another student and allowing the withdrawn student to sit quietly for the rest of the session.

*Unstructured play.* Most unstructured play sessions took place during recess on the playground, where no specific task demands were placed on the children. Unlike Iwata et al.’s original protocol, we did not include noncontingent attention to the target children. This modification was due to the fact that no other students were receiving attention during these times, and the teachers felt it may make the children uncomfortable to be singled out. On a few occasions, the unstructured play condition was conducted in the classroom. During these times, children were allowed to engage in preferred activities during “free time” sessions. Preferred activities for Marc included coloring and talking quietly with one other classmate. For Robert, preferred activities included drawing, reading comic books, and coloring. If the child wanted to sit and do nothing, it was acceptable. Participants remained in the classroom, yet were not be required to perform any specific tasks.

### *Termination criterion*

If at any point during the attention or escape conditions the child was distressed to the point of crying, the session was terminated. This occurred only once for Marc during an escape condition.

### *Teacher Training*

The teachers were given a brief overview of the purpose of the study, along with a description of the conditions to be tested. Since the teachers had the input as to which assignments the students were given, they were already familiar with the stimulus conditions and did not need training to implement them. With regard to providing an appropriate consequence (and if appropriate, prompt), teachers were provided with a written outline as to how to implement each session (Appendix D). Next, the researcher conducted role plays with each teacher until the teacher reported feeling comfortable with the task. Each teacher had two role playing sessions per condition (a total of 4 role plays per teacher). Once the sessions began, the teachers were given a written prompt (i.e. a “cheat sheet”) to remind them of how each condition would best be implemented (Appendix E). Two teachers were trained to implement Marc’s sessions because half of his day was spent with one teacher and the other half with another.

### *Procedural integrity*

The primary researcher was present during each experimental condition and provided reminders to the teachers about how to conduct the conditions. Since the teachers had “cheat sheets” to prompt appropriate responding during experimental conditions and were using techniques that were familiar to them (i.e., “get close and

encourage” or “stay back and give break”), there were no instances where the teachers did not respond appropriately to the child’s behavior.

### Chapter Three Results

The results for Robert across the three conditions are displayed in Figure 1. In the attention condition, Robert engaged in social withdrawal a mean average of 9% (range, 0 to 18%). During the escape condition, social withdrawal was displayed a mean average of 4% of the time (range, 0-15%). Robert engaged in zero social withdrawal during the unstructured play condition. Responding during the attention condition was relatively stable, with the exception of a temporary drop to 0% for two consecutive sessions. During the escape condition, the data were again relatively steady with the exception of two consecutive data points at the beginning of data collection. Data indicated higher overall rates of responding during the attention condition, suggesting the maintaining consequence of the target behavior for Robert was adult attention.

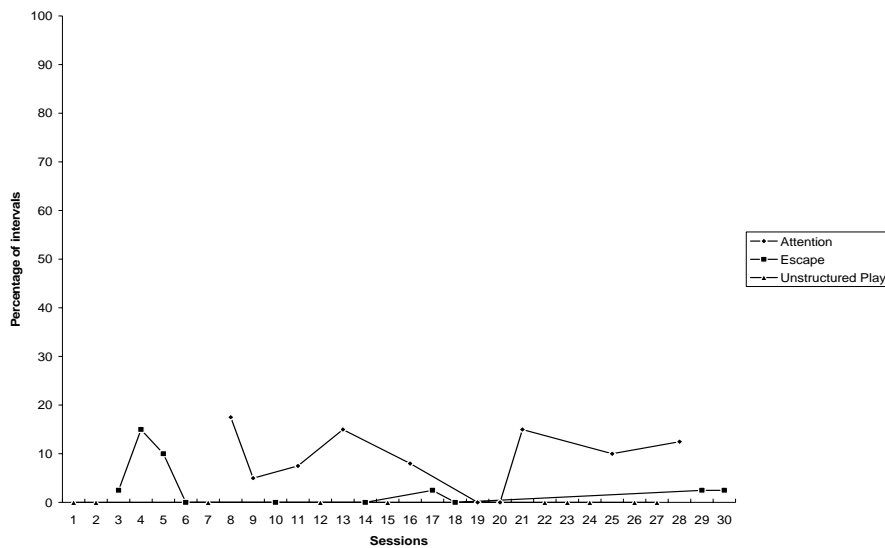


Figure 1: Functional analysis results for Robert across the three conditions of attention, escape, and unstructured play.

The results for Marc across the three conditions are displayed in Figure 2. During the attention condition, Marc socially withdrew an average of 70% of the observation sessions (range 23 to 100%). He engaged in the target behaviors a mean average of 10% (range 0 to 30%) during the escape condition. He displayed no social withdrawal during the unstructured play condition. Responding during the attention condition was relatively stable. With the exception of a few data points that fell below 40%, the rest of the data were at or above 98%. The data during the escape condition also were stable; only one data point fell above 25% and the majority of the data were below 15%. The relative magnitude of responding was clearly differentiated for Marc, with the highest levels of responding occurring during the attention condition. These data suggest that the target behavior was maintained by adult attention.

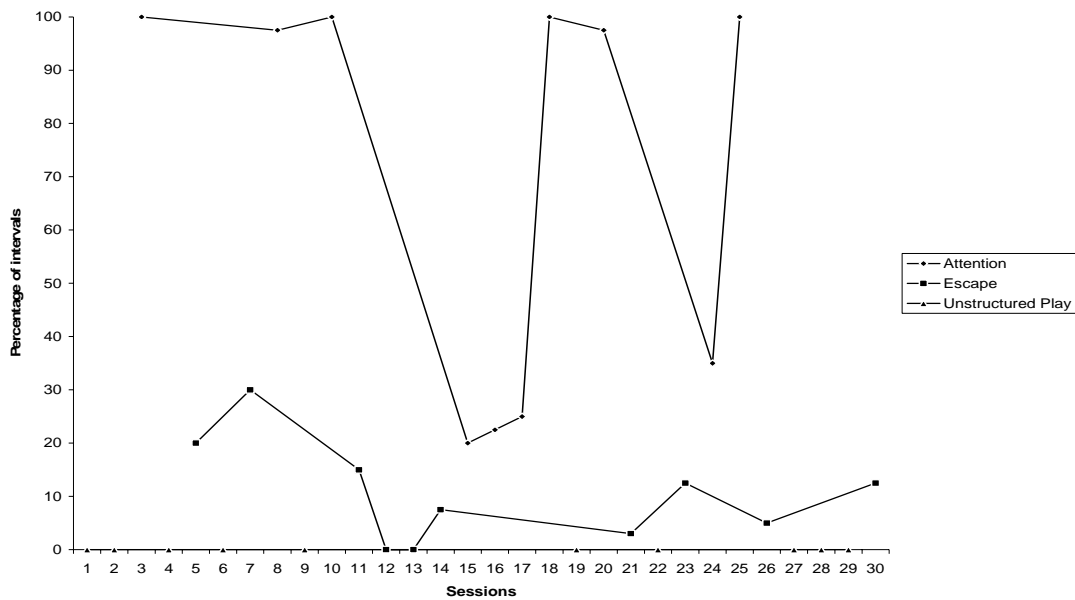


Figure 2: Functional analysis results for Marc across the three conditions of attention, escape, and unstructured play.

The results for the anxiety questionnaires are displayed in Table 1. Robert's teacher completed the questionnaire for one of the ten attention conditions and three of the ten escape conditions. On a scale of 1-4 (one being relaxed and four being really scared or nervous), Robert's teacher rated his behavior during the attention condition a mean of 2.0 as to how he felt right now; 2.0 as to how he felt during the last activity, and 3.0 as to how he seemed to feel prior to the last activity. During the escape condition he was reported a mean of 3.0 as to how he was feeling right now, 3.0 as to how he felt during the last activity, and 2.6 as to how he seemed to feel prior to the last activity. Marc's teachers completed the questionnaire for four of the ten attention conditions and five of the ten escape conditions. In the attention condition Marc was reported to be at a mean of 3.8 as to how he felt right now; 3.8 as to how he felt during the last activity, and 1.3 as to how he seemed to feel prior to the last activity. During the escape condition he was reported a mean of 1.8 as to how he was feeling right now, 1.6 as to how he felt during the last activity, and 1.1 as to how he seemed to feel prior to the last activity. There was no teacher scale given following unstructured play, because the responding during those conditions was zero.

Table 1

*Mean Anxiety Scores Across Conditions (teacher provided)*

Participant	<u>Attention</u>			<u>Escape</u>		
	Pre	During	Post	Pre	During	Post
Robert	3.0	2.0	2.0	2.6	3.0	3.0
Marc	1.3	3.8	3.8	1.1	1.6	1.8

## Chapter Four

### Discussion

The goal of this study was to establish a functional analysis protocol for examining behavioral deficits, using social withdrawal as an exemplar. The procedures of this study were predicated on the hypothesis that behavioral deficits respond to social contingencies in a manner similar to many behavioral excesses. Based on the findings of this study, the deficit collectively referred to as “social withdrawal” was responsive to such contingencies. Specifically, social withdrawal appeared to be maintained by adult attention for both participants. However, the effects were more noticeable for Marc, who displayed substantially more social withdrawal during the attention sessions than in the other conditions.

It is interesting to note that neither boy exhibited target behaviors during the unstructured play (mostly recess) condition, where the context tended to be purely social. The boys were both active participants in any games their peers were playing, including such activities as kickball, softball, dodge ball, etc. The fact that social interaction was expected, but not mandated, may help to explain these results. The boys could choose to either participate or not, and did not suffer any overt ramifications for choosing not to take part in the games. And when they did participate, rarely were they the sole focus of the group. Since the activities usually involved many students, they were only required to be focused on by their peers when it was their turn (such as batting during softball or



kicking during kickball). One additional explanation may be that the teachers were fairly removed from the games. Most times the adults kept supervision from a considerable distance and only intervened if the students had confrontations. Since both of the participants' social withdrawal appeared to be maintained by adult attention, the fact that the teachers were not within close proximity could explain the absence of social withdrawal behavior.

One might also have expected an increase in social withdrawal when target behaviors produced escape from social demands; however, neither participant engaged in consistently high responding during the escape condition. Although both boys showed some signs of withdrawal during this condition, it was minimal. This finding is particularly interesting given that the teachers for both boys stated on different occasions that they believed the boys' withdrawal was stimulated by being "put on the spot" either socially or academically.

An interesting finding with regard to the anxiety questionnaires is that the teachers' assessments of the boys' anxiety levels did not correspond to the observers' measures of the dependent variables. For example, Robert's teacher rated his mood to be worse after the escape condition, even though direct observations indicated greater social withdrawal during the attention conditions. Such inconsistencies may be due to the fact that the teachers were not able to fill out the anxiety questionnaires following every session. Perhaps if they had, the mean anxiety score would have been more consistent with the observational findings.

Adapting Iwata et al.'s (1982/1994) protocol to accommodate an analysis of potential maintaining variables for behavior deficits required some modifications to the original procedures. The most notable difference is the fact that demands were placed in both the attention and escape conditions (normally this solely occurs in the escape condition). The rationale for placing demands in both conditions was to first evoke the behaviors, and then systematically apply the consequences. Had no demands been placed in the attention condition, the target behaviors probably would not have occurred. Another modification was the omission of praise during the unstructured play condition. As previously mentioned, this departure from standard functional analysis protocol was based on the teachers' preferences. Future researchers should discern whether non-contingent attention is a necessary component of control conditions for analyses of social withdrawal.

The modified functional analysis used in the current study could be beneficial to future researchers focused on studying social withdrawal. The protocol was effective in helping to identify probable maintaining variables of social withdrawal, but could be improved on by adding a component of peer attention to see what effects, if any, peers have on the maintenance of social withdrawal.

One criticism that might be raised toward the current study is that some of the behaviors analyzed were not truly deficits, but rather behavioral excesses that are commonly labeled as a deficit. In other words, a child who engages in crying, "shrinking", and face-covering in the context of social situations might be labeled as socially withdrawn, even though the specific behaviors in which the child engages are

clearly excesses. However, in the current study, the behaviors that were most often displayed were the “deficit” behaviors (e.g., ignoring requests) rather than the “excess” behaviors (e.g., crying). Moreover, the behavioral excesses never occurred in the absence of the deficits. From the teachers’ perspectives, failure to comply with social and academic requests was more problematic than the corresponding excesses. This may have been due to the teachers’ frustrations with the constant need for “hand holding” or encouragement to participate in tasks that the participants were academically and socially able to do. The teachers described feeling “drained” and at times ready to just give up and not call on the children who participated in the study. Although both participants’ teachers were compassionate and wanted to help, they felt frustrated with their abilities to do so.

Another limitation of the study is the number of participants. While this is a common limitation in single-subject design studies, it may be especially prevalent with this particular population. In short, is extremely difficult to recruit socially withdrawn students. This may be primarily based on the fact that students who are withdrawn are labeled “shy” and usually pose few problems for teachers. Rather, teachers may tend to focus on the disruptive students in their classrooms. Even when equipped with the knowledge of the negative effects that a socially withdrawn student may suffer, most teachers still have difficulty in identifying such students (Masia et al., 2001). Future researchers may more successfully recruit these types of participants by alerting the teachers to the negative consequences a student like this may face in the future, allowing

the teacher time to informally assess students who may be at risk for these problems, then contacting after a brief time to see if they were able to identify such students.

In addition to assessing a greater number of participants, the present study would have been strengthened by selecting participants who had been clinically diagnosed as suffering from social anxiety using standardized instruments as opposed to teacher reports. This would help to ensure that the participants' behaviors were evoked by social anxiety/withdrawal and not by other factors, such as academic deficits (i.e., they could not perform the task as opposed to purposefully refusing to engage in the task). Since this study was based on teacher report, the generality of the findings to clinical populations is somewhat limited. Nevertheless, the participants' problems were significant enough for their teachers to notice them. Consistent with the core dimensions of behavior analysis (Baer, Wolf, & Risley, 1968), which posit that socially significant behaviors that limit one's access to reinforcers are of great importance, these students' problems at school were significant enough to study regardless of whether they had a particular clinical diagnostic label or not.

Although convincing conclusions about behavior function could be reasonably drawn from the results of this study, it is important to note that no treatments were designed based on the analyses. This was due to the fact that the goal of this particular study was to attempt to modify the Iwata et al. (1982/1994) protocol to assess a different response class. Future researchers should examine how functional analysis results using the protocol of the existing study could be used to design effective treatments.

## References

- American Psychiatric Association (2000). *Diagnostic and Statistical Manual of Mental Disorders-Text Revisions (4<sup>th</sup> Ed.)*. Washington, D.C: American Psychiatric Association.
- Baer, D. M., Wolf, M. M., & Risley, T. (1968). Current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis, 1*, 91-97.
- Beidel, D. C., Turner, S. M., & Morgan, T. L. (2000). Behavioral treatment of childhood social phobia. *Journal of Consulting and Clinical Psychology, 68*, 1072-1080.
- Bernstein, G. A. & Borchardt, C. M. (1991). Anxiety disorders of childhood and adolescence: A critical review. *Journal of the American Academy of Child and Adolescent Psychiatry, 30* (4), 519-532.
- Burke, A. E. & Silverman, W. K. (1987). The prescriptive treatment of school refusal. *Clinical Psychology Review, 7*, 353-362.
- Chandler, L. K., Fowler, S. A., & Lubeck, R. C. (1992). An analysis of the effects of multiple setting events on the social behavior of preschool children with special needs. *Journal of Applied Behavior Analysis, 25*, 249-263.
- Chorpita, B. F., Albano, A. M., Heimberg, R. G., & Barlow, D. H. (1996). A systematic replication of the prescriptive treatment of school refusal behavior in a single subject. *Journal of Behavior Therapy & Experimental Psychiatry, 27* (3), 281-290.
- Cooper, J. O., Heron, T. E., & Heward, W. L. (1987). *Applied Behavior Analysis*. Columbus, OH: Merrill.
- Hanley, G. P., Iwata, B. A., & McCord, B. E. (2003). Functional analysis of problem behavior: A review. *Journal of Applied Behavior Analysis, 36*. 147-185.
- Iwata, B. A., Dorsey, M. F., Slifer, K. J., Bauman, K. E., & Richman, G. S. (1994). Toward a functional analysis of self-injury. *Journal of Applied Behavior Analysis, 27*, 197-209.

Iwata, B. A., Kahng, S. W., Wallace, M. D., & Lindberg, J. S. (2000). The functional analysis model of behavioral assessment. *Handbook of Applied Behavior Analysis*. Reno, NV: Context Press.

Kashdan, T. B. & Herbert, J. D. (2001). Social anxiety disorder in childhood and adolescence: Current status and future directions. *Clinical Child and Family Psychology Review*, 4 (1), 37-61.

Kearney, C. A. & Silverman, W. K. (1990). A preliminary analysis of a functional model of assessment and treatment for school refusal behavior. *Behavior Modification*, 14 (3), 340-366.

Kennedy, C. H. (1994). Manipulating antecedent conditions to alter the stimulus control of problem behavior. *Journal of Applied Behavior Analysis*, 27, 161-170.

King, N. J., Heyne, D., Tonge, B., Guloone, E., & Ollendick, T. H. (2001). School refusal: Categorical diagnoses, functional analysis and treatment planning. *Clinical Psychology and Psychotherapy*, 8, 352-360.

King, N. J. & Bernstein, G. A. (2001). School refusal in children and adolescents: A review of the past 10 years. *Journal of the American Academy of Child and Adolescent Psychiatry*, 40 (2), 197-205.

Masia, C. L., Klein, R. G., Storch, E. A., & Corda, B. (2001). School-based behavioral treatment for social anxiety disorder in adolescents: Results of a pilot study. *Journal of the American Academy of Child and Adolescent Psychiatry*, 40 (7), 780-786.

Miltenberger, R. G. (2004). *Behavior modification: Principles and procedures (3<sup>rd</sup> Ed.)*. Belmont, CA: Thomson/Wadsworth Learning.

Skinner, B. F. (1953). *Science and human behavior*. NY:MacMillan.

Strain, P. S., Shores, R. E., & Timm, M. A. (1977). Effects of peer social initiations on the behavior of withdrawn preschool children. *Journal of Applied Behavior Analysis*, 10, 289-298.

## Appendices

## Appendix A: Comprehensive List of all Functional Analytic Articles Reviewed

Adelinis, J. D. & Hagopian, L. P. (1999). The use of symmetrical "do" and "don't" requests to interrupt ongoing activities. *Journal of Applied Behavior Analysis*, 32, 519-523.

Anderson, C. M. & Long, E. S. (2002). Use of a structured descriptive assessment methodology to identify variables affecting problem behavior. *Journal of Applied Behavior Analysis*, 35, 137-154.

Asmus, J. M., Wacker, D. P., Harding, J. Berg, W. K. Derby, K. M., & Kocis, E. (1999). Evaluation of antecedent stimulus parameters for the treatment of escape-maintained aberrant behavior. *Journal of Applied Behavior Analysis*, 32, 495-513.

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

Berg, W. K., Peck, S., Wacker, D. P., Harding, J., McComas, J., Richman, D., & Brown, K. (2000). The effects of pre-session exposure to attention on the results of assessments of attention as a reinforcer. *Journal of Applied Behavior Analysis*, 33, 463-477.

Borrero, J. C. & Vollmer, T. R. (2002). An application of the matching law to severe problem behavior. *Journal of Applied Behavior Analysis*, 35, 13-27.

Borrero, J. C., Vollmer, T. R., & Wright, C. S. (2002). An evaluation of contingency strength and response suppression. *Journal of Applied Behavior Analysis*, 35, 337-347.

Borrero, J. C., Vollmer, T. R., Wright, C. S., Lerman, D. C., & Kelley, M. E. (2002). Further evaluation of the role of protective equipment in the functional analysis of self-injurious behavior. *Journal of Applied Behavior Analysis*, 35, 69-72.

Bowman, L. G., Fisher, W. W., Thompson, R. H., & Piazza, C. C. (1997). On the relation of mands and the function of destructive behavior. *Journal of Applied Behavior Analysis*, 30, 251-265.

Brown, K. A., Wacker, D. P., Derby, K. M., Peck, S. M., Richman, D. M., Sasso, G. M., Knutson, C. L., & Harding, J. W. (2000). Evaluating the effects of functional communication training in the presence and absence of establishing operations. *Journal of Applied Behavior Analysis*, 33, 53-71.



## Appendix A (Continued)

Buchanan, J. A. & Fisher, J. E. (2002). Functional assessment and noncontingent reinforcement in the treatment of disruptive vocalization in elderly dementia patients. *Journal of Applied Behavior Analysis*, 35, 99-103.

Carr, E. G., Yarbrough, S. C., & Langdon, N. A. (1997). Effects of idiosyncratic stimulus variables on functional analysis outcomes. *Journal of Applied Behavior Analysis*, 30, 673-686.

Connors, J., Iwata, B. A., Kahng, S., Hanley, G. P., Worsdell, A. S., & Thompson, R. H. (2000). Differential responding in the presence and absence of discriminative stimuli during multielement functional analyses. *Journal of Applied Behavior Analysis*, 33, 299-308.

Day, H. M., Horner, R. H., & O'Neill, R. E. (1994). Multiple functions of problem behaviors: Assessment and intervention. *Journal of Applied Behavior Analysis*, 27, 279-289.

Deaver, C. M., Miltenberger, R. G., & Stricker, J. M. (2001). Functional analysis and treatment of hair twirling in a young child. *Journal of Applied Behavior Analysis*, 34, 535-538.

DeLeon, I. G., Arnold, K. L., Rodriguez-Catter, V., & Uy, M. L. (2003). Covariation between bizarre and nonbizarre speech as a function of the content of verbal attention. *Journal of Applied Behavior Analysis*, 36, 101-104.

Derby, K. M., Hagopian, L., Fisher, W. W., Richman, D., Augustine, M., Fahs, A., & Thompson, R. (2000). Functional analysis of aberrant behavior through measurement of separate response topographies. *Journal of Applied Behavior Analysis*, 33, 113-117.

Derby, K. M., Wacker, D. P., Berg, W., DeRaad, A., Ulrich, S., Asmus, J., Harding, J., Prouty, A., Laffey, P., & Stoner, E. A. (1997) The long-term effects of functional communication training in home settings. *Journal of Applied Behavior Analysis*, 30, 507-531.

Derby, K. M., Wacker, D. P., Peck, S., Sasso, G., DeRaad, A., Berg, W., Asmus, J., & Ulrich, S. (1994). Functional analysis of separate topographies of aberrant behavior. *Journal of Applied Behavior Analysis*, 27, 267-278.

Dixon, M. R., Benedict, H., & Larson, T. (2001). Functional analysis and treatment of inappropriate verbal behavior. *Journal of Applied Behavior Analysis*, 34, 361-363.

## Appendix A (Continued)

Durand, V. M. (1999). Functional communication training using assistive devices: Recruiting natural communities of reinforcement. *Journal of Applied Behavior Analysis, 32*, 247-267.

Ebanks, M. E. & Fisher, W. W. (2003). Altering the timing of academic prompts to treat destructive behavior maintained by escape. *Journal of Applied Behavior Analysis, 36*, 355-359.

Ellingson, S. A., Miltenberger, R. G., Stricker, J. M., Garlinghouse, M. A., Roberts, J., Galensky, T. L., & Rapp, J. T. (2000). Analysis and treatment of finger sucking. *Journal of Applied Behavior Analysis, 33*, 41-52.

Fischer, S. M., Iwata, B. A., & Mazaleski, J. L. (1997). Noncontingent delivery of arbitrary reinforcers as treatment for self-injurious behavior. *Journal of Applied Behavior Analysis, 30*, 239-249.

Fischer, S. M., Iwata, B. A., & Worsdell, A. S. (1997). Attention as an establishing operation and as reinforcement during functional analyses. *Journal of Applied Behavior Analysis, 30*, 335-338.

Fisher, W. W., Adelinis, J. D., Thompson, R. H., Worsdell, A. S., & Zarcone, J. R. (1998). Functional analysis and treatment of destructive behavior maintained by termination of "don't" (and symmetrical "do" requests). *Journal of Applied Behavior Analysis, 31*, 339-356.

Fisher, W. W., Kuhn, D. E., & Thompson, R. H. (1998). Establishing discriminative control of responding using functional and alternative reinforcers during functional communication training. *Journal of Applied Behavior Analysis, 31*, 543-560.

Fisher, W. W., Ninness, H. A., Piazza, C. C., & Owen-DeSchryver, J. S. (1996). On the reinforcing effects of the content of verbal attention. *Journal of Applied Behavior Analysis, 29*, 235-238.

Fisher, W. W., O'Connor, J. T., Kurtz, P. F., DeLeon, I. G., & Gotjen, D. L. (2000). The effects of noncontingent delivery of high- and low-preference stimuli on attention-maintained destructive behavior. *Journal of Applied Behavior Analysis, 33*, 79-83.

Fisher, W. W., Piazza, C. C., & Chiang, C. L. (1996). Effects of equal and unequal reinforcer duration during functional analysis. *Journal of Applied Behavior Analysis, 29*, 117-120.

## Appendix A (Continued)

- Fisher, W. W., DeLeon, I. G., Rodriguez-Catter, V., & Keeney K. M. (2004). Enhancing the effects of extinction on attention-maintained behavior through noncontingent delivery of attention or stimuli identified via a competing stimulus assessment. *Journal of Applied Behavior Analysis*, 37, 171-184.
- Flood, W. A., Wilder, D. A., Flood, A. L., & Masuda, A. (2002). Peer-mediated reinforcement plus prompting as treatment for off-task behavior in children with attention deficit hyperactivity disorder. *Journal of Applied Behavior Analysis*, 35, 199-204.
- Frea, W. D. & Hughes, C. (1997). Functional analysis and treatment of social-communicative behavior of adolescents with developmental disabilities. *Journal of Applied Behavior Analysis*, 30, 701-704.
- Fyffe, C. E., Kahng, S., Fittro, E., & Russell, D. (2004). Functional analysis and treatment of inappropriate sexual behavior. *Journal of Applied Behavior Analysis*, 37, 401-404.
- Goh, H., Iwata, B. A., & DeLeon, I. G. (2000). Competition between noncontingent and contingent reinforcement schedules during response acquisition. *Journal of Applied Behavior Analysis*, 33, 195-205.
- Goh, H., Iwata, B. A., Shore, B. A., DeLeon, I. G., Lerman, D. C., Ulrich, S. M., & Smith, R. G. (1995). An analysis of the reinforcing properties of hand mouthing. *Journal of Applied Behavior Analysis*, 28, 269-283.
- Hagopian, L. P., Fisher, W. W., & Legacy, S. M. (1994). Schedule effects of noncontingent reinforcement on attention-maintained destructive behavior in identical quadruplets. *Journal of Applied Behavior Analysis*, 27, 317-325.
- Hagopian, L. P., Fisher, W. W., Sullivan, M. T., Acquisto, J., & LeBlanc, L. A. (1998). Effectiveness of functional communication training with and without extinction and punishment: A summary of 21 inpatient cases. *Journal of Applied Behavior Analysis*, 31, 211-235.
- Hagopian, L. P., Wilson, D. M., & Wilder, D. A. (2001). Assessment and treatment of problem behavior maintained by escape from attention and access to tangible items. *Journal of Applied Behavior Analysis*, 34, 229-232.
- Hagopian, L. P., Toole, L. M., Long, E. S., Bowman, L. G., & Lieving, G. A. (2004). A comparison of dense-to-lean and fixed-lean schedules of alternative reinforcement and extinction. *Journal of Applied Behavior Analysis*, 37, 323-338.

## Appendix A (Continued)

Hanley, G. P., Iwata, B. A., & Thompson, R. H. (2001). Reinforcement schedule thinning following treatment with functional communication training. *Journal of Applied Behavior Analysis, 34*, 17-38.

Hanley, G. P., Iwata, B. A., Thompson, R. H., & Lindberg, J. S. (2000). A component analysis of "stereotypy as reinforcement" for alternative behavior. *Journal of Applied Behavior Analysis, 33*, 285-297.

Hanley, G. P., Piazza, C. C., & Fisher, W. W. (1997). Noncontingent presentation of attention and alternative stimuli in the treatment of attention-maintained destructive behavior. *Journal of Applied Behavior Analysis, 30*, 229-237.

Hanley, G. P., Piazza, C. C., Fisher, W. W., Contrucci, S. A., & Maglieri, K. A. (1997). Evaluation of client preference for function-based treatment packages. *Journal of Applied Behavior Analysis, 30*, 459-473.

Harding, J. W., Wacker, D. P., Berg, W. K., Barretto, A., Winborn, L., & Gardner, A. (2001). Analysis of response class hierarchies with attention-maintained problem behaviors. *Journal of Applied Behavior Analysis, 34*, 61-64.

Harding, J., Wacker, D. P., Cooper, L. J., Millard, T., & Jensen-Kovalan, P. (1994). Brief hierarchical assessment of potential treatment components with children in an outpatient clinic. *Journal of Applied Behavior Analysis, 27*, 291-300.

Horner, R. H., Day, H. M., & Day, J. R. (1997). Using neutralizing routines to reduce problem behaviors. *Journal of Applied Behavior Analysis, 30*, 601-614.

Iwata, B. A., Dorsey, M. F., Slifer, K. J., Bauman, K. E., & Richman, G. S. (1994). Toward a functional analysis of self-injury. *Journal of Applied Behavior Analysis, 27*, 197-209.

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

Iwata, B. A., Pace, G. M., Dorsey, M. F., Zarcone, J. R., Vollmer, T. R., Smith, R. G., Rodgers, T. A., Lerman, D. C., Shore, B. A., Mazaleski, J. L., Goh, H.L., Cowdery, G. E., Kalsher, M. J., McCosh, K. C., & Willis, K. D. (1994) The functions of self-injurious behavior: An experimental-epidemiological analysis. *Journal of Applied Behavior Analysis, 27*, 215-240.

## Appendix A (Continued)

Jones, K. M., Drew, H. A., & Weber, N. L. (2000). Noncontingent peer attention as treatment for disruptive classroom behavior. *Journal of Applied Behavior Analysis*, 33, 343-346.

Kahng, S. & Iwata, B. A. (1998). Play versus alone conditions as controls during functional analyses of self-injurious escape behavior. *Journal of Applied Behavior Analysis*, 31, 669-672.

Kahng, S. & Iwata, B. A. (1999). Correspondence between outcomes of brief and extended functional analyses. *Journal of Applied Behavior Analysis*, 32, 149-159.

Kahng, S., Abt, K. A., & Schonbachler, H. E. (2001). Assessment and treatment of low-rate high-intensity problem behavior. *Journal of Applied Behavior Analysis*, 34, 225-228.

Kahng, S., Hendrickson, D. J., & Vu, C. P. (2000). Comparison of single and multiple functional communication training responses for the treatment of problem behavior. *Journal of Applied Behavior Analysis*, 33, 321-324.

Kahng, S., Iwata, B. A., DeLeon, I. G., & Wallace, M. D. (2000). A comparison of procedures for programming noncontingent reinforcement schedules. *Journal of Applied Behavior Analysis*, 33, 223-231.

Kahng, S., Iwata, B. A., DeLeon, I. G., & Worsdell, A. S. (1997). Evaluation of the "control over reinforcement" component in functional communication training. *Journal of Applied Behavior Analysis*, 30, 267-277.

Kahng, S., Iwata, B. A., Thompson, R. H., & Hanley, G. P. (2000). A method for identifying satiation versus extinction effects under noncontingent reinforcement schedules. *Journal of Applied Behavior Analysis*, 33, 419-432.

Keeney, K. M., Fisher, W. W., Adelinis, J. D., & Wilder, D. A. (2000). The effects of response cost in the treatment of aberrant behavior maintained by negative reinforcement. *Journal of Applied Behavior Analysis*, 33, 255-258.

Kelley, M. E., Lerman, D. C., & Van Camp, C. M. (2002). The effects of competing reinforcement schedules on the acquisition of functional communication. *Journal of Applied Behavior Analysis*, 35, 59-63.

Kennedy, C. H. & Meyer, K. A. (1996). Sleep deprivation, allergy symptoms, and negatively reinforced problem behavior. *Journal of Applied Behavior Analysis*, 29, 133-135.

## Appendix A (Continued)

Kennedy, C. H. & Souza, G. (1995). Functional analysis and treatment of eye poking. *Journal of Applied Behavior Analysis*, 28, 27-37.

Kennedy, C. H., Meyer, K. A., Knowles, T., & Shukla, S. (2000). Analyzing the multiple functions of stereotypical behavior for students with autism: Implications for assessment and treatment. *Journal of Applied Behavior Analysis*, 33, 559-571.

Kern, L., Mauk, J. E., Marder, T. J., & Mace, F. C. (1995). Functional analysis and intervention for breath holding. *Journal of Applied Behavior Analysis*, 28, 339-340.

Kodak, T., Grow, L., & Northup, J. (2004). Functional analysis and treatment of elopement for a child with attention deficit hyperactivity disorder. *Journal of Applied Behavior Analysis*, 37, 229-232.

Kuhn, D.E., DeLeon, I.G., Fisher, W.W., & Wilke, A.E. (1999). Clarifying an ambiguous functional analysis with matched and mismatched extinction procedures. *Journal of Applied Behavior Analysis*, 32, 99-102.

Kurtz, P. F., Chin, M. D., Huete, J. M., Tarbox, R. S. F., O'Connor, J. T., Paclawskyj, T. R., & Rush, K. S. (2003). Functional analysis and treatment of self-injurious behavior in young children: A summary of 30 cases. *Journal of Applied Behavior Analysis*, 36, 205-219.

Lalli, J. S. & Casey, S. D. (1996). Treatment of multiply controlled problem behavior. *Journal of Applied Behavior Analysis*, 29, 391-396.

Lalli, J. S. & Kates, K. (1998). The effect of reinforcer preference on functional analysis outcomes. *Journal of Applied Behavior Analysis*, 31, 79-90.

Lalli, J. S., Casey, S., & Kates, K. (1995). Reducing escape behavior and increasing task completion with functional communication training, extinction, and response chaining. *Journal of Applied Behavior Analysis*, 28, 261-268.

Lalli, J. S., Casey, S. D., & Kates, K. (1997). Noncontingent reinforcement as treatment for severe problem behavior: Some procedural variations. *Journal of Applied Behavior Analysis*, 30, 127-137.

Lalli, J. S., Casey, S., Goh, H., & Merlino, J. (1994). Treatment of escape-maintained aberrant behavior with escape extinction and predictable routines. *Journal of Applied Behavior Analysis*, 27, 705-714.

## Appendix A (Continued)

Lalli, J. S., Livezey, K., & Kates, K. (1996). Functional analysis and treatment of eye poking with response blocking. *Journal of Applied Behavior Analysis*, 29, 129-132.

Lalli, J. S., Mace, F. C., Wohn, T., & Livezy, K. (1995). Identification and modification of a response-class hierarchy. *Journal of Applied Behavior Analysis*, 28, 551-559.

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

Lancaster, B. M., LeBlanc, L. A., Carr, J. E., Brenske, S, Peet, M. M., & Culver S. J., (2004). Functional analysis and treatment of the bizarre speech of dually diagnosed adults. *Journal of Applied Behavior Analysis*, 37, 395-399.

Lerman, D. C. Iwata, B. A. Shore, B. A., & DeLeon, I. G. (1997). Effects of intermittent punishment on self-injurious behavior: An evaluation of schedule thinning. *Journal of Applied Behavior Analysis*, 30, 187-201.

Lerman, D. C., Iwata, B. A., Shore, B. A., & Kahng, S. (1996). Responding maintained by intermittent reinforcement: Implications for the use of extinction with problem behavior in clinical settings. *Journal of Applied Behavior Analysis*, 29, 153-171.

Lerman, D. C., Iwata, B. A., Smith, R. G., Zarcone, J. R., & Vollmer, T. R. (1994). Transfer of behavioral function as a contributing factor in treatment relapse. *Journal of Applied Behavior Analysis*, 27, 357-370.

Lerman, D. C., Kelley, M. E., Van Camp, C. M., & Roane, H. S. (1999). Effects of reinforcement magnitude on spontaneous recovery. *Journal of Applied Behavior Analysis*, 32, 197-200.

Lerman, D. C., Kelley, M. E., Vorndran, C. M., Kuhn, S. A. C., & LaRue, R. H. Jr. (2002). Reinforcement magnitude and responding during treatment with differential reinforcement. *Journal of Applied Behavior Analysis*, 35, 29-48.

Lindauer, S. E., Zarcone, J. R., Richman, D. M., & Schroeder, S. R. (2002). A comparison of multiple reinforcer assessments to identify the function of maladaptive behavior. *Journal of Applied Behavior Analysis*, 35, 299-303.

## Appendix A (Continued)

Lindberg, J. S., Iwata, B. A., Kahng, S., & DeLeon, I. G. (1999). DRO contingencies: An analysis of variable-momentary schedules. *Journal of Applied Behavior Analysis*, 32, 123-136.

Lindberg, J. S., Iwata, B. A., Roscoe, E. M., Worsdell, A. S., & Hanley, G. P. (2003). Treatment efficacy of noncontingent reinforcement during brief and extended application. *Journal of Applied Behavior Analysis*, 36, 1-19.

Lindberg, J. S., Iwata, B. A., & Kahng, S. (1999). On the relation between object manipulation and stereotypic self-injurious behavior. *Journal of Applied Behavior Analysis*, 32, 51-62.

Mace, A. B., Shapiro, E. S., & Mace, F. C. (1998). Effects of warning stimuli for reinforcer withdrawal and task onset on self-injury. *Journal of Applied Behavior Analysis*, 31, 679-682.

Magee, S. K. & Ellis, J. (2000). Extinction effects during the assessment of multiple problem behaviors. *Journal of Applied Behavior Analysis*, 33, 313-316.

Magee, S. K. & Ellis, J. (2001). The detrimental effects of physical restraint as a consequence for inappropriate classroom behavior. *Journal of Applied Behavior Analysis*, 34, 501-504.

Mazaleski, J. L., Iwata, B. A., Rodgers, T. A., Vollmer, T. R., & Zarcone, J. R. (1994). Protective equipment as treatment for stereotypic hand mouthing: Sensory extinction or punishment effects? *Journal of Applied Behavior Analysis*, 27, 345-355.

McComas, J., Hoch, H., Paone, D., & El-Roy, D. (2000). Escape behavior during academic tasks: A preliminary analysis of idiosyncratic establishing operations. *Journal of Applied Behavior Analysis*, 33, 479-493.

McComas, J. J., Thompson, A., & Johnson, L. (2003). The effects of pre-session attention on problem behavior maintained by different reinforcers. *Journal of Applied Behavior Analysis*, 36, 297-307.

McCord, B. E., Iwata, B. A., Galensky, T. L., Ellingson, S. A., & Thomson, R. J. (2001). Functional analysis and treatment of problem behavior evoked by noise. *Journal of Applied Behavior Analysis*, 34, 447-462.

McCord, B. E., Thomson, R. J., & Iwata, B. A. (2001). Functional analysis and treatment of self-injury associated with transitions. *Journal of Applied Behavior Analysis*, 34, 195-210.



## Appendix A (Continued)

Meyer, K. A. (1999). Functional analysis and treatment of problem behavior exhibited by elementary school children. *Journal of Applied Behavior Analysis*, 32, 229-232.

Moore, J. W. & Edwards, R. P. (2003). An analysis of aversive stimuli in classroom demand contexts. *Journal of Applied Behavior Analysis*, 36, 339-348.

Moore, J. W., Mueller, M. M., Dubard, M., Roberts, D. S., & Sterling-Turner, H. E. (2002). The influence of therapist attention on self-injury during a tangible condition. *Journal of Applied Behavior Analysis*, 35, 283-286.

Moore, J. W., Fisher, W. W., & Pennington, A. (2004). Systematic application and removal of protective equipment in the assessment of multiple topographies of self-injury. *Journal of Applied Behavior Analysis*, 37, 73-77.

Mueller, M. M., Wilczynski, S. M., Moore, J. W., Fusilier, I., & Trahan, D. (2001). Antecedent manipulations in a tangible condition: The effects of stimulus preference on aggression. *Journal of Applied Behavior Analysis*, 34, 237-240.

Mueller, M. M., Edwards, R. P., & Trahan, D. (2003). Translating multiple assessment techniques into an intervention selection model for classrooms. *Journal of Applied Behavior Analysis*, 36, 563-573.

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

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

Northup, J., Fusilier, I., Swanson, V., Huete, J., Bruce, T., Freeland, J., Gulley, V., & Edwards, S. (1999). Further analysis of the separate and interactive effects of methylphenidate and common classroom contingencies. *Journal of Applied Behavior Analysis*, 32, 35-50.

Northup, J., Wacker, D. P., Berg, W. K., Kelly, L., Sasso, G., & DeRaad, A. (1994). The treatment of severe behavior problems in school settings using a technical assistance model. *Journal of Applied Behavior Analysis*, 27, 33-48.

## Appendix A (Continued)

Northup, J., Kodak, T., Lee, J., & Coyne, A. (2004). Instructional influences on analogue functional analysis outcomes. *Journal of Applied Behavior Analysis*, 37, 509-512.

O'Reilly, M. F. & Carey, Y. (1996). A preliminary analysis of the effects of prior classroom conditions on performance under analogue analysis conditions. *Journal of Applied Behavior Analysis*, 29, 581-584.

O'Reilly, M. F. (1995). Functional analysis and treatment of escape-maintained aggression correlated with sleep deprivation. *Journal of Applied Behavior Analysis*, 28, 225-226.

O'Reilly, M. F. (1997). Functional analysis of episodic self-injury correlated with recurrent otitis media. *Journal of Applied Behavior Analysis*, 30, 165-167.

O'Reilly, M. F. (1999). Effects of pre-session attention on the frequency of attention-maintained behavior. *Journal of Applied Behavior Analysis*, 32, 371-374.

O'Reilly, M. F., Lacey, C., & Lancioni, G. E. (2000). Assessment of the influence of background noise on escape-maintained problem behavior and pain behavior in a child with Williams syndrome. *Journal of Applied Behavior Analysis*, 33, 511-514.

O'Reilly, M. F., Lancioni, G. E., King, L., Lally, G., & Dhomhnaill, O. N. (2000). Using brief assessments to evaluate aberrant behavior maintained by attention. *Journal of Applied Behavior Analysis*, 33, 109-112.

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

Peck, S. M., Wacker, D. P., Berg, W. K., Cooper, L. J., Brown, K. A., Richman, D., McComas, J. J., Frischmeyer, P., & Millard, T. (1996). Choice-making treatment of young children's severe behavior problems. *Journal of Applied Behavior Analysis*, 29, 263-290.

Perry, A. C. & Fisher, W. W. (2001). Behavioral economic influences on treatments designed to decrease destructive behavior. *Journal of Applied Behavior Analysis*, 34, 211-215.

## Appendix A (Continued)

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

Piazza, C. C., Bowman, L. G., Contrucci, S. A., Delia, M. D., Adelinis, J. D., & Goh, H. (1999). An evaluation of the properties of attention as reinforcement for destructive and appropriate behavior. *Journal of Applied Behavior Analysis*, 32, 437-449.

Piazza, C. C., Fisher, W. W., Brown, K. A., Shore, B. A., Patel, M. R., Katz, R. M., Sevin, B. M., Gulotta, C. S., & Blakely-Smith, A. (2003). Functional analysis of inappropriate mealtime behaviors. *Journal of Applied Behavior Analysis*, 36, 187-204.

Piazza, C. C., Fisher, W. W., Hanley, G. P., LeBlanc, L. A., Worsdell, A. S., Lindauer, S. E., & Keeney, K. M. (1998). Treatment of pica through multiple analyses of its reinforcing functions. *Journal of Applied Behavior Analysis*, 31, 165-189.

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

Piazza, C. C., Hanley, G. P., & Fisher, W. W. (1996). Functional analysis and treatment of cigarette pica. *Journal of Applied Behavior Analysis*, 29, 437-449.

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

Piazza, C. C., Moes, D. R., & Fisher, W. W. (1996). Differential reinforcement of alternative behavior and demand fading in the treatment of escape-maintained destructive behavior. *Journal of Applied Behavior Analysis*, 29, 569-572.

Rapp, J. T., Miltenberger, R. G., Galensky, T. L., Ellingson, S. A., & Long, E. S. (1999). A functional analysis of hair pulling. *Journal of Applied Behavior Analysis*, 32, 329-337.

Rehfeldt, R. A. & Chambers, M. R. (2003). Functional analysis and treatment of verbal perseverations displayed by an adult with autism. *Journal of Applied Behavior Analysis*, 36, 259-261.

## Appendix A (Continued)

Richman, D. M., Lindauer, S. E., Crosland, K. A., McKerchar, T. L., & Morse, P. S. (2001). Functional analysis and treatment of breath holding maintained by nonsocial reinforcement. *Journal of Applied Behavior Analysis*, 34, 531-534.

Richman, D. M., Wacker, D. P., & Winborn, L. (2001). Response efficiency during functional communication training: Effects of effort on response allocation. *Journal of Applied Behavior Analysis*, 34, 73-76.

Richman, D. M., Wacker, D. P., Asmus, J. M., & Casey, S. D. (1998). Functional analysis and extinction of different behavior problems exhibited by the same individual. *Journal of Applied Behavior Analysis*, 31, 475-478.

Richman, D. M., Wacker, D. P., Asmus, J. M., Casey, S. D., & Andelman, M. (1999). Further analysis of problem behavior in response class hierarchies. *Journal of Applied Behavior Analysis*, 32, 269-283.

Ringdahl, J. E. & Sellers, J. A. (2000). The effects of different adults as therapists during functional analyses. *Journal of Applied Behavior Analysis*, 33, 247-250.

Ringdahl, J. E., Vollmer, T. R., Marcus, B. A., & Roane, H. S. (1997). An analogue evaluation of environmental enrichment: The role of stimulus preference. *Journal of Applied Behavior Analysis*, 30, 203-216.

Ringdahl, J. E., Winborn, L. C., Andelman, M. S., & Kitsukawa, K. (2002). The effects of noncontingently available alternative stimuli on functional analysis outcomes. *Journal of Applied Behavior Analysis*, 35, 407-410.

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

Roscoe, E. M., Iwata, B. A., & Goh, H. (1998). A comparison of noncontingent reinforcement and sensory extinction as treatments for self-injurious behavior. *Journal of Applied Behavior Analysis*, 31, 635-646.

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

## Appendix A (Continued)

Shirley, M. J., Iwata, B. A., Kahng, S., Mazaleski, J. L., & Lerman, D. C. (1997). Does functional communication training compete with ongoing contingencies of reinforcement? An analysis during response acquisition and maintenance. *Journal of Applied Behavior Analysis*, 30, 93-104.

Shore, B. A., Iwata, B. A., Lerman, D. C., & Shirley, M. J. (1994). Assessing and programming generalized behavioral reduction across multiple stimulus parameters. *Journal of Applied Behavior Analysis*, 27, 371-384.

Shore, B. A., Iwata, B. A., Vollmer, T. R., Lerman, D. C., & Zarcone, J. R. (1995). Pyramidal staff training in the extension of treatment for severe behavior disorders. *Journal of Applied Behavior Analysis*, 28, 323-332.

Shukla, S. & Albin, R. W. (1996). Effects of extinction alone and extinction plus functional communication training on covariation of problem behaviors. *Journal of Applied Behavior Analysis*, 29, 565-568.

Smith, R. G. & Churchill, R. M. (2002). Identification of environmental determinants of behavior disorders through functional analysis of precursor behaviors. *Journal of Applied Behavior Analysis*, 35, 125-136.

Smith, R. G., Iwata, B. A., Goh, H., & Shore, B. A. (1995). Analysis of establishing operations for self-injury maintained by escape. *Journal of Applied Behavior Analysis*, 28, 515-535.

Tang, J., Kennedy, C. H., Koppekin, A., & Caruso, M. (2002). Functional analysis of stereotypical ear covering in a child with autism. *Journal of Applied Behavior Analysis*, 35, 95-98.

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

Taylor, J. C. & Romanczyk, R. G. (1994). Generating hypotheses about the function of student problem behavior by observing teacher behavior. *Journal of Applied Behavior Analysis*, 27, 251-265.

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

## Appendix A (Continued)

Valdovinos, M. G., Roberts, C., & Kennedy, C. H. (2004). Analogue functional analysis of movements associated with tardive dyskinesia. *Journal of Applied Behavior Analysis*, 37, 391-393.

Van Camp, C. M., Lerman, D. C., Kelley, M. E., Roane, H. S., Contrucci, S. A., & Vorndran, C. M. (2000). Further analysis of idiosyncratic antecedent influences during the assessment and treatment of problem behavior. *Journal of Applied Behavior Analysis*, 33, 207-221.

Van Camp, C. M., Lerman, D. C., Kelley, M. E., Contrucci, S. A., & Vorndran, C. M. (2000). Variable-time reinforcement schedules in the treatment of socially maintained problem behavior. *Journal of Applied Behavior Analysis*, 33, 545-557.

Vollmer, T. R. & Vorndran, C. M. (1998). Assessment of self-injurious behavior maintained by access to self-restraint materials. *Journal of Applied Behavior Analysis*, 31, 647-650.

Vollmer, T. R., Borrero, J. C., Lalli, J. S., & Daniel, D. (1999). Evaluating self-control and impulsivity in children with severe behavior disorders. *Journal of Applied Behavior Analysis*, 32, 451-466.

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

Vollmer, T. R., Marcus, B. A., Ringdahl, J. E., & Roane, H. S. (1995). Progressing from brief assessments to extended experimental analyses in the evaluation of aberrant behavior. *Journal of Applied Behavior Analysis*, 28, 561-576.

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

Vollmer, T. R., Progar, P. R., Lalli, J. S., Van Camp, C. M., Sierp, B. J., Wright, C. S., Nastasi, J., & Eisenschink, K. J. (1998) Fixed-time schedules attenuate extinction-induced phenomena in the treatment of severe aberrant behavior. *Journal of Applied Behavior Analysis*, 31, 529-542.

Vollmer, T.R., Roane, H.S., Ringdahl, J.E., & Marcus, B.A. (1999). Evaluating treatment challenges with differential reinforcement of alternative behavior. *Journal of Applied Behavior Analysis*, 32, 9-23.

## Appendix A (Continued)

Wacker, D. P., Harding, J., Cooper, L. J., Derby, K. M., Peck, S., Asmus, J., Berg, W. K., & Brown, K. A. (1996). The effects of meal schedule and quantity on problematic behavior. *Journal of Applied Behavior Analysis, 29*, 79-87.

Wallace, M. D. & Iwata, B. A. (1999). Effects of session duration on functional analysis outcomes. *Journal of Applied Behavior Analysis, 32*, 175-183.

Wallace, M. D. & Knights, D. J. (2003). An evaluation of a brief functional analysis format within a vocational setting. *Journal of Applied Behavior Analysis, 36*, 125-128.

Watson, T. S. & Sterling, H. E. (1998). Brief functional analysis and treatment of a vocal tic. *Journal of Applied Behavior Analysis, 31*, 471-474.

Wilder, D. A., Masuda, A., O'Connor, C., & Baham, M. (2001). Brief functional analysis and treatment of bizarre vocalizations in an adult with schizophrenia. *Journal of Applied Behavior Analysis, 34*, 65-68.

Winborn, L., Wacker, D. P., Richman, D. M., Asmus, J., & Geier, D. (2002). Assessment of mand selection for functional communication training packages. *Journal of Applied Behavior Analysis, 35*, 295-298.

Worsdell, A. S., Iwata, B. A., Conners, J., Kahng, S., & Thompson, R. H. (2000). Relative influences of establishing operations and reinforcement contingencies on self-injurious behavior during functional analyses. *Journal of Applied Behavior Analysis, 33*, 451-461.

Worsdell, A. S., Iwata, B. A., Hanley, G. P., Thompson, R. H., & Kahng, S. (2000). Effects of continuous and intermittent reinforcement for problem behavior during functional communication training. *Journal of Applied Behavior Analysis, 33*, 167-179.

Zarcone, J. R., Iwata, B. A., Smith, R. G., Mazaleski, J. L., & Lerman, D. C. (1994). Reemergence and extinction of self-injurious escape behavior during stimulus (instructional) fading. *Journal of Applied Behavior Analysis, 27*, 307-316.

## Appendix B: Data Sheet

Participant: \_\_\_\_\_ Observer: \_\_\_\_\_

Date and Time: \_\_\_\_\_ Condition: \_\_\_\_\_

Academic/Social Task:

---



---

Target Behavior(s):

---



---

Circle the following during the record phase of each interval:

- √ (checkmark) if and when the target behavior(s) occur(s).
- + (plus sign) if and when the participant demonstrates task engagement/participation
- O (zero sign) if and when the child is not required to actively participate in a task and/or is doing what he is supposed to do (ex. sitting at desk while another student is called on)

\*If the target behavior occurs at any point during the interval then the √ should be the only mark circled. The O should only be marked in an interval in which the child is not required to perform any activity and is NOT displaying any of the target behaviors.

Fifteen second interval

	1	2	3	4
1	Student: √ + O	Student: √ + O	Student: √ + O	Student: √ + O
2	Student: √ + O	Student: √ + O	Student: √ + O	Student: √ + O
3	Student: √ + O	Student: √ + O	Student: √ + O	Student: √ + O
4	Student: √ + O	Student: √ + O	Student: √ + O	Student: √ + O
5	Student: √ + O	Student: √ + O	Student: √ + O	Student: √ + O
6	Student: √ + O	Student: √ + O	Student: √ + O	Student: √ + O
7	Student: √ + O	Student: √ + O	Student: √ + O	Student: √ + O
8	Student: √ + O	Student: √ + O	Student: √ + O	Student: √ + O
9	Student: √ + O	Student: √ + O	Student: √ + O	Student: √ + O
10	Student: √ + O	Student: √ + O	Student: √ + O	Student: √ + O

Minutes of Observation



## Appendix C: Level of Anxiety Questionnaire

Answer the following questions on you believe the student was feeling on a scale of 1-4:

(1=relaxed; 2=okay; 3=a little scared or nervous; 4=really scared or nervous)

1. Right now the student seems to be feeling: 1 2 3 4
2. During the last activity, the best overall way to describe how the student seemed to be feeling is: 1 2 3 4
3. Before I assigned the last activity, the student seemed to be feeling: 1 2 3 4

You may include a description about the way you believe the student felt during the last activity:

---

---

---

---

---

---

---

---

## Appendix D: Teacher Training

This is a brief description as to how each condition should go. If you have any questions along the way, please feel free to ask. Also if there are any situations that you believe may work better or are more accurate with this particular student, or the class in general, please discuss it with us and we can make any necessary adjustments. We want this study to flow as smoothly as possible for you and your students. Please feel free to share any concerns or suggestions with us along the way.

Each condition should last a total of 10 minutes; you may use your watch, the classroom clock, or ask for assistance to determine when the 10 minutes are complete. There will be a minimum 5 minute break in between sessions. You will be given an outline as to the order the conditions should take place. You will also be provided a stopwatch that may be used during the conditions. The following describes the 3 different conditions we will be using:

*Attention condition:* This condition will help us determine if the student is withdrawing from tasks or activities as a way of gaining your attention. You will direct the child to complete an academic or social task. You will provide verbal instructions and appropriate materials to complete an academic, group assignment in which the child will be given the duty of “group leader.” As the leader, the child will be required to verbally direct the group in the academic task. If the child shows any signs of distress or deliberate refusal to complete the assignment, you should walk over to him/her and direct them to continue the task. You should come within two feet of the child, and may even provide brief physical contact (i.e., hand on the shoulder) to encourage them to complete

## Appendix D (Continued)

the task. If they still do not complete the task, you can then walk around the class and check on the other students. If after about 3 minutes the child has not done the task, you should again come close to him/her and provide encouragement to complete the task, you may also provide brief physical contact. Continue this process for the remainder of the session. Some alternatives to the academic task may include requiring the student to read aloud to the class, answer a question that requires more than a one word response, or making a making a small presentation. If you ask them to read aloud, answer a question, or make a presentation and they refuse or get distressed, you should walk over to them and maybe provide brief physical contact while you ask them again to comply with your request. If they still refuse, or get upset, you can direct the question to someone else. Afterwards go back to the student and ask them if they like to give it another try, if again they get upset or refuse, you should walk over to them and encourage them one more time. If they still do not comply, then let them know that they can raise their hand at any point when they feel ready to perform answer/read/or perform the task. Wait for them to raise their hand, or simply allow them to sit quietly until the session is over. This condition may also include a social activity in addition to, or in place of, the academic demand. Examples of social activities include, but are not limited to, participation in an interactive game or requiring the child to discuss a favorite hobby, vacation, or television show with the class. The same sequence of providing attention and redirection described above should be implemented.

## Appendix D (Continued)

The following is a “cheat sheet” of the above instructions:

1. Ask the child to do something (read aloud, give an answer, etc.)-they refuse/get upset
2. Get close, ask them again, encourage them—they refuse/get upset
3. Allow about 3 minutes to pass—go to other students
4. Go back to the original student and make another request—they refuse/get upset
5. One more time get close, ask them again, encourage them—they refuse/get upset
6. Tell them to raise hand when they feel ready to complete task

*Social/Academic demand condition:* This condition will look to see if the student’s withdrawn behavior is a way of getting out of certain tasks. You will follow the exact procedures describe above except that when the student refuses to complete the assignment, you will give them the directions again, but provide no extra encouragement or attention. You will not need to move closer to them or place a hand on the shoulder. You will simply give them two chances to follow you directions, if they continue to refuse or get upset you may withdraw the assignment and allow the child to “calm down and take a quick break” for about 3 minutes. Then give your initial request again; if they refuse or get upset, repeat the instructions one final time. If they continue to refuse or get upset, redirect the instructions to another student and allow the withdrawn student to sit

## Appendix D (Continued)

quietly at their desk for the remainder of the condition. If you are doing the group activity you should reassign another member of the group to take over as temporary group leader and allow the participant to sit quietly in the group. Start your timer and allow 3 minutes to pass, once the time is up, ask the child to again take over as leader. If the child refuses to initiate a response, you will prompt him/her one last time. Failure to initiate a response following the last prompt should result in you reassigning the other student to be the leader, and allowing the withdrawn student to sit quietly for the rest of the group task. If at any point the child shows significant distress, he/she should be allowed to leave the group and return to his/her desk.

The following is a “cheat sheet” of the above instructions:

1. Ask the child to do something (read aloud, give an answer, etc.)-they refuse/get upset.
2. Ask them again—they refuse/get upset
3. Give them a 3 minute “break” (sit quietly) & go to another student
4. Go back to the original student and make another request—they refuse/get upset
5. Ask them one final time—they refuse/get upset
6. Allow them to sit quietly at desk for remainder of session

*Unstructured play session:* This session will involve allowing the student to engage in activities that he or she enjoys while observing if their behavior

#### Appendix D (Continued)

differs from the other two conditions. It may also allow us to see if the child will initiate any social or academic activities while not forced to do so. Pleasing activities may include such things as reading a book, playing on the computer, or drawing.

Again if you have any questions, or suggestions to improve the conditions, please feel free to speak with us throughout the study.

## Appendix E: Teacher cheat sheets

The following is a “cheat sheet” of what to do in the **GET CLOSE & ENCOURAGE** phase:

1. **Ask the child to do something** (read aloud, give an answer, etc.)-they refuse/get upset
2. **Get close, ask them again, encourage them**—they refuse/get upset
3. **Allow about 3 minutes to pass**—go to other students
4. **Go back to the original student and make another request**—they refuse/get upset
5. **One more time get close, ask them again, encourage them**—they refuse/get upset
  
6. **Tell them to raise hand when they feel ready to complete task**

*Every 3-4 minutes (around the time the buzzer goes off), try and re-direct your attention to the student.*

*\*\*If child gets extremely upset during the condition (meltdown and/or crying), you can simply ignore the buzzer and tell him to raise hand when he wants to join the activity. \*\**

## Appendix E (Continued)

The following is a “cheat sheet” of what to do in the **STAY BACK AND GIVE BREAK** phase:

1. **Ask the child to do something** (read aloud, give an answer, etc.)-they refuse/get upset.
2. **Ask them again**—they refuse/get upset (**TRY TO NOT GET CLOSE and/or GIVE EXTRA ENCOURAGEMENT**)
3. **Give them a 3 minute “break”** (sit quietly) & go to another student
4. **Go back to the original student and make another request**—they refuse/get upset
5. **Ask them one final time**—they refuse/get upset (**\*AGAIN TRY TO NOT GET CLOSE and/or GIVE EXTRA ENCOURAGEMENT\***)
6. **Allow them to sit quietly at desk for remainder of session**

\*\*Use the timer as a means to visibly check in with student, if engaging in target behavior, simply try to IGNORE him for remainder of session. **BUT**, by all means offer comfort if needed if the child is crying OR having a meltdown. Under these circumstances use your own discretion.