

Stony Brook University



OFFICIAL COPY

The official electronic file of this thesis or dissertation is maintained by the University Libraries on behalf of The Graduate School at Stony Brook University.

© All Rights Reserved by Author.

Temperament Intervention for Problem Behavior in Children with Autism Spectrum
Disorders

A Dissertation Presented

by

Lauren Adamek

in Partial Fulfillment of the

Requirements

for the Degree of

Doctor of Philosophy

in

Clinical Psychology

August 2011

Stony Brook University

The Graduate School

Lauren Adamek

We, the dissertation committee for the above candidate for the
Doctor of Philosophy degree, hereby recommend acceptance of this dissertation.

Dr. Daniel Klein – Dissertation Advisor
Professor, Department of Psychology

Dr. Joanne Davila – Chairperson of Defense
Professor, Department of Psychology

Dr. Everett Waters
Professor, Department of Psychology

Dr. Shana Nichols
Clinical Director and Researcher, Fay J. Lindner Center for Autism and
Developmental Disabilities

This dissertation is accepted by the Graduate School

Lawrence Martin
Dean of the Graduate School

Abstract of the Dissertation

Temperament Intervention for Problem Behavior in Children with Autism Spectrum

Disorders

by

Lauren Adamek

Doctor of Philosophy

Clinical Psychology

Stony Brook University

2011

Problem behavior is a major barrier to good quality of life for families who have children with Autism Spectrum Disorders (ASD). The concept of modifying the environment to produce a better match with a child's temperament is commonly used to inform interventions in the child development field. However, temperament has not yet been integrated into problem behavior interventions for children with ASD, nor have temperament-based strategies been evaluated in a systematic way. The purpose of the present study was to employ temperament-based interventions to modify problematic environmental contexts so that they are a better fit for the temperament styles of highly extraverted children and to evaluate these interventions to determine whether they result in a reduction of problem behavior and an increase in quality of life. Six highly extraverted children with ASD who display problem behavior participated. Assessments of problem behavior, extraversion, and quality of life were conducted and parents were taught to mitigate challenging situations to make them a better fit for their child's temperament. A multiple baseline experimental design was used to evaluate intervention

effects for specific high priority contexts. Results indicated that modifying the environment to better fit a child's temperament was associated with decreased problem behavior and increased percentage of task steps completed correctly. Subsequent to the experimental demonstration, a clinical extension of the intervention methodology was applied for each child to an additional problem context in order to further enhance intervention benefits. T-test results of ancillary pre and post intervention measures indicate that intervention was associated with a decrease in overall problem behavior. This research highlights the importance of understanding temperament when assessing and treating problem behavior in children with ASD.

Dedication

This dissertation is dedicated to Dr. Edward (Ted) Carr. Ted was a brilliant thinker and researcher, whose work forever changed the lives of those with autism and their families. Ted always thought ahead of the field by questioning the status quo and diligently seeking to understand fields outside of autism, in order to more fully solve problems related directly to autism. It was with Ted's guidance that I sought to understand temperament and its relationship to problem behavior in children with ASD. Ted taught me to think broadly, write clearly, and do work that will make a positive impact on others. I hope that this dissertation, and work to come, will be a tribute to the life of Ted Carr.

Table of Contents

| | |
|---|------|
| List of Tables..... | viii |
| List of Figures..... | ix |
| Acknowledgements..... | x |
| I. Introduction..... | 1 |
| Overview of the Temperament Construct..... | 2 |
| Extraversion/Surgency and Externalizing Problem Behavior in Neurotypical Youth..... | 3 |
| Extraversion/Surgency in Youth with ASD..... | 4 |
| Extraversion/Surgency and Externalizing Behavior in Youth with ASD..... | 5 |
| Intervention for Problem Behavior: Temperament Perspectives..... | 6 |
| Specific Components of Temperament-Based Intervention..... | 8 |
| The Present Study..... | 10 |
| II. Method..... | 11 |
| Participants..... | 11 |
| Procedure..... | 13 |
| Completion of Pre-Intervention Measures..... | 13 |
| Identification of Intervention Contexts..... | 14 |
| Baseline for Experimental Contexts..... | 17 |
| Psychoeducation about Temperament..... | 19 |
| Overview of Intervention for Experimental Contexts..... | 19 |
| Clinical Extensions..... | 25 |
| Completion of Post-Intervention Measures..... | 28 |
| III. Results..... | 29 |
| Experimental Contexts..... | 29 |
| Clinical Contexts..... | 30 |
| Interrater Reliability..... | 31 |
| Ancillary Measures..... | 31 |
| IV. Discussion..... | 33 |
| Intervention Efficacy..... | 33 |
| Conceptual Issues..... | 35 |
| Ecological Validity..... | 36 |
| Future Directions..... | 37 |
| Tables..... | 38 |

| | |
|-----------------|----|
| Figures..... | 44 |
| References..... | 49 |
| Appendix | 58 |

List of Tables

| | | |
|---------|--|----|
| Table 1 | Participant Characteristics at Baseline..... | 38 |
| Table 2 | Task Analyses of Experimental Contexts. | 39 |
| Table 3 | Intervention Fidelity Checklists for Experimental Contexts..... | 41 |
| Table 4 | Differences between Pre-Intervention and Post-Intervention Measures...43 | |

List of Figures

| | | |
|----------|--|----|
| Figure 1 | The percent of activity steps completed and latency to session termination for the first three participants (group 1) during baseline and intervention..... | 45 |
| Figure 2 | The percent of activity steps completed and latency to session termination for the second three participants (group 2) during baseline and intervention..... | 46 |
| Figure 3 | The percent of activity steps completed for all six participants (group 1 and 2)..... | 47 |
| Figure 4 | The latency to session termination for all six participants (group 1 and 2) during clinical contexts..... | 48 |

Acknowledgements

I wish to acknowledge the following people, without whom, the successful completion of this project would not have been possible.

A mentor and friend, *Ted Carr* taught me how to be a scientist, and inspired me to use science to improve the lives of those with disabilities and their families. Countless hours of excited conversation about temperament-based intervention led to this project.

Shana Nichols. When I needed guidance with this project, Shana stepped in without hesitation. Shana is truly rare in that she is an expert researcher and clinician, and therefore, her feedback throughout the study was expansive and invaluable. Further, Shana was not just a mentor for this project, but provided me with career development advice, and was a supportive figure both professionally and personally.

Dan Klein. I have always admired Dan for his expansive knowledge, well-articulated feedback, and kindness. It was my pleasure to work more closely with him on this dissertation, and his comments on this project, and previous temperament projects, made them better.

Joanne Davila. Joanne has supported my growth and development through coursework, clinical supervision, and now by providing feedback on my research. Her insight was extremely beneficial.

Everett Waters. Everett has provided feedback on several temperament projects, and his comments reflect immense thought and prompt me to think more deeply about the constructs.

Caitlin Walsh. Caitlin provided intervention to a family in this study. She was an excellent therapist, worked diligently, and always strived to provide top quality care and research integrity. Caitlin provided several intervention ideas for other families during our lengthy, weekly talks.

Samara Tetenbaum. Samara and I became a “dissertation team” and both motivated one another to continue to strive for excellence. Samara has incredible creative ability when designing high-intensity interventions or visual aids. These contributions made the intervention strategies more desirable to the children in the study.

Lauren Moskowitz. My consultations with Lauren when first planning this intervention study were imperative to maintaining research integrity while also achieving efficiency. Further, Lauren is more familiar with the past and current autism literature that anyone I know and she alerted me to relevant studies.

Sarah Barber-Guest, Sara Bufferd, Carey Dowling, and Jen Tomlinson. These women were with me every step of the way, encouraging me to keep persevering: from stats exams to first clients to committee meetings, and so much more. The unconditional love and support given to me by these great friends has allowed me to become a more confident researcher, a better advocate for my clients, and a more balanced individual.

Sam Cook. For this project, my fiancé, Sam, played the role of statistics consultant and patiently discussed statistics implications with me. More importantly, Sam considers my clinical and research goals equal to his own career goals, and has provided the utmost support for any new endeavors.

Mitch and Linda Adamek. My parents have taught me the importance of education, hard work, and kindness; three ideals that were necessary for my graduate career.

The Families. Six special families welcomed me in their homes and inspired me with their dedication and love for their children. These families, and the families in the two previous temperament and ASD studies, have contributed to the body of knowledge that will hopefully help to improve the quality of life of many children with autism and their families.

I. Introduction

Problem behaviors, such as aggression, tantrums, self-injury, and property destruction are commonly displayed by people with developmental disabilities (Emerson et al., 2001). Such behavior can negatively impact education, socialization, community inclusion and employment (Bruininks, Hill, & Morreau, 1988; Koegel, Koegel, & Dunlap, 1996). Because of its deleterious effects on quality of life, problem behavior has been a major focus of research and intervention. The reduction of problem behavior is essential for individuals with developmental disabilities to achieve valued outcomes and a high quality of life.

An emerging model of intervention for problem behavior in the disabilities field focuses on enhancing contextual fit. Contextual fit refers to the degree of match between an individual's competency and the performance requirements of the environment (Carr, Carlson, Langdon, Magito McLaughlin, & Yarbrough, 1998). Poor contextual fit results when an individual's skills do not match the demands of the environment. As a result, the individual may be more likely to display problem behavior. This model of contextual fit is useful because it suggests that one can intervene either with respect to the individual (competency building) or with respect to the environment (environmental modification).

A concept similar to contextual fit, referred to as goodness-of-fit, is discussed in the developmental literature. Goodness-of-fit is defined by the degree of match between a child's temperament and the performance requirements of the environment (Chess & Thomas, 1991). When the child's temperament is a poor fit with the environment, problem behavior is more likely to occur. Since temperament is moderately stable throughout childhood (Novosad & Thoman, 1999; Roberts & DelVecchio, 2000), it is

quite plausible that temperament may be relatively resistant to change. Thus, intervention efforts might focus more profitably on environmental modification that creates a better match between the child's temperament and his/her environment. To date, temperament-based interventions have not been systematically applied to children who have ASD. This study attempts to address this gap by investigating the impact of temperament-based intervention strategies on problem behavior and quality of life of children who have ASD.

Overview of the Temperament Construct

Temperament is a major focus of the literature on child development. Currently, theorists view temperament as individual differences in a child's response to various situations in his or her self-regulation of attention, emotion, and activity (Rothbart & Bates, 2006). A central tenet in the study of temperament is that genetic influences greatly impact the expression of temperament traits. In the field of behavior genetics, heritability estimates are used to express the proportion of the observed temperament trait that is due to genetic factors. One large study of twins found the overall heritability of temperament to be about .50, with individual temperament traits ranging from a heritability of .18 to .77 (Oniszczenko, Zawadzki, Strelau, Riemann, Angleitner, & Spinath, 2002). Another crucial finding in the study of temperament is the moderate stability of temperament throughout early childhood. A recent meta-analysis yielded cross-time correlations of .52 from 3 to 5.9 years of age (Roberts & DeVecchio, 2000).

Temperament can be defined in terms of three factors: negative affectivity, extraversion/surgency, and effortful control (Rothbart, Ahadi, Hershey, & Fisher, 2001). Negative affectivity/emotionality is defined as the likelihood that an individual will react

to situations with negative emotional states. Effortful control is defined as “the efficiency of executive attention, including the ability to inhibit a dominant response and/or to activate a subdominant response, to plan, and to detect errors” (Rothbart & Bates, 2006, p. 136). Extraversion/surgency refers to a given individual’s tendency to be more active, enjoy higher intensity activities, be more impulsive, and act less shy than his/her peers (Rothbart, et al., 2001). Efficacy of temperament based-interventions has not yet been evaluated with children who have ASD; therefore, it is important and clinically meaningful to investigate the efficacy of such interventions with respect to one or more temperament dimensions. This study focuses on the temperament dimension of extraversion/surgency.

Extraversion/Surgency and Externalizing Problem Behavior in Neurotypical Youth

The factor of extraversion/surgency, as well as individual subscales that contribute to this factor, have been found to predict problem behavior (e.g., aggression, delinquent behavior) in neurotypical youth. In one study, aggression was positively related to high extraversion in children ages 3-7 years old (Rothbart et. al., 2001). In a group of male and female college students, greater extraversion predicted a greater likelihood of assaulting others (Edmunds, 1977). In addition, female college students who were more extraverted were more likely to engage in verbal and indirect aggression, and display irritability. Several specific constructs associated with extraversion/surgency are predictive of externalizing problem behavior. In one sample of children, high impulsivity predicted externalizing problem behavior (Eisenberg et al., 2005). In another sample, children who preferred higher intensity activities were more likely to engage in externalizing problem behavior (Ormel et al., 2005). Additionally, in families with

parental psychopathology, children with a high activity level were more likely to show behavior problems (Mun, Fitzgerald, Von Eye, Puttler, & Zucker, 2001). Lastly, in a recent large sample of preschoolers, high extraversion/surgency was strongly associated with scores on the Attention Deficit Hyperactivity scale and the Oppositional Defiant Problems scale on the Child Behavior Checklist (DePauw, Mervielde, & Van Leeuwen, 2009).

Extraversion/Surgency in Youth with ASD

Much of the focus of research thus far in the field of autism has been on group differences, namely, identifying how temperament differs between neurotypical children and those with disabilities. The research is inconclusive regarding whether group differences exist in extraversion/surgency between children with autism and neurotypical children. In a longitudinal study of infants, children with an autism diagnosis at 24 months old had been previously rated by their parents at 6 months as demonstrating lower activity level than children without an autism diagnosis (Zwaigenbaum, Bryson, Rogers, Roberts, Brian, & Szatmari, 2005). In contrast, a study of 42 children from ages 3 to 10 years old found no differences in extraversion/surgency when comparing children with ASD to those without (Konstantareas & Stewart, 2006). This similarity in activity level between children with ASD and neurotypical children was also found in another study involving 3 to 8 year olds (Bailey, Hatton, Mesibov, & Ament, 2000). Other research has shown that children with ASD have higher extraversion/surgency, and in particular, higher activity level than neurotypical children (Hepburn & Stone, 2006; Garon, Bryson, Zwaigenbaum, Smith, Brian, Roberts, et al., 2009).

Extraversion/Surgency and Externalizing Behavior in Youth with ASD

Given the breadth of literature on temperament in developmental psychology, and the growing literature on group temperament differences in ASD, one might presume that the link between temperament and problem behavior has also been examined in the disabilities field, however, little research on these potential links has been conducted. One recent study examining the relationship between temperament and problem behavior found that effortful control and negative affectivity, but not extraversion/surgency predicted externalizing problem behavior in children between 8 and 16 years of age with high-functioning autism, as measured by the Behavior Assessment Scale for Children (Schwartz et al., 2009). In another study, greater extraversion/surgency was found to predict problem behavior in children between 3 and 7 years of age who had ASD (Adamek, Nichols, Tetenbaum, Bregman, Ponzio, & Carr, 2010). In addition, children with a higher activity level, as well as children who preferred high intensity pleasure activities, were more likely to show problem behavior. An observational study also found that children ages 3 to 7 years showed problem behavior when asked to participate in low intensity situations (Adamek & Carr, 2010). Specifically, two children low in extraversion and two children high in extraversion were observed when asked to participate in low intensity activities (e.g., book, puzzle, board game) or high intensity activities (e.g., basketball, bike riding, trampoline). The children with low extraversion temperament styles did not show problem behavior in either situation. The children with high extraversion temperament styles did not engage in problem behavior in the high intensity situations but displayed outbursts of problem behavior within 5 minutes of being asked to engage in the low intensity activity. The differing results of these studies

indicate that links between extraversion/surgency and externalizing behavior need to be examined further.

Intervention for Problem Behavior: Temperament Perspectives

In the developmental literature, there are three critical concepts central to understanding children's temperament and applying this knowledge to assessment and intervention. Specifically, the concepts of set point, goodness-of-fit, and niche picking create a framework for analyzing the interplay between individual temperament characteristics and the contexts in which children must function.

Set point is "a personal baseline that remains constant over time" (Fujita & Diener, 2005). Applied to temperament, set point can be understood as a child's average way of behaving based on his/her genetic predisposition to various temperament characteristics. To illustrate, in the study of body weight regulation, various interventions (e.g., restricting food intake or consuming particular nutrients) can alter weight within a small range around the set point but, over time, body weight tends to be stable around that set point (Harris, 1990). Similarly, in the study of children's temperament, various medical, behavioral, and educational interventions might plausibly alter undesirable temperament characteristics within a small range around the set point but would not drastically shift temperament characteristics far from the set point. For example, consider a child whom we will call Roger, who is impulsive, full of energy and prefers activities such as shooting a basketball or playing tag. Roger has a high set point for surgency/extraversion. Behavioral procedures and/or medication may somewhat decrease Roger's extraversion, but, compared to other children, Roger's level of extraversion will still be higher than average.

As previously noted, goodness-of-fit refers to how well a child's temperament matches the situation in which he/she has to cope (Chess & Thomas, 1991). If activities or situations are a poor fit with a child's temperament, problem behavior will likely occur. Consider our example of a highly extraverted child, Roger. To teach Roger to identify his colors, his parents and teachers ask him to sit at a table, prompt him to name the correct colors (red, blue, green), and reward him when he chooses correctly. In response to this sedentary activity, Roger throws tantrums and hits his parents and teachers when they sit him down to learn colors. The situation does not allow Roger to be extraverted, and therefore, constitutes a poor fit with Roger's temperament. As expected, Roger engages in high levels of problem behavior in the situation that is incongruent with his temperament.

Niche picking is defined as choosing a situation that best fits an individual's temperament (Super & Harkness, 1994). Typical children often niche pick to choose situations that are the best fit for their temperament. For example, a child could choose to join a football team or a chess team, based on his/her temperament traits. Children with autism, however, are often unable to select their own niche due to demands placed on them by parents and teachers and because of difficulties communicating their wants and needs. Thus, niche-picking interventions for children with autism require parents and staff to assess a child's temperament and then choose niches that are likely to be a good fit for the child and structure academic and home demands to be congruent with this niche. To illustrate niche picking, consider Roger again. In order to niche pick, a parent or teacher must alter the environment in order to allow Roger to be more extraverted within a given situation. This strategy works with Roger's temperament, rather than

against it. Thus, a parent or teacher could, for example, tape red, blue, and green squares to a wall and ask Roger to “run to red,” “run to blue,” etc. This situation would represent a good niche because Roger could engage in high intensity activity while learning colors at the same time.

Specific Components of Temperament-Based Intervention

One clinical trial has tested the effectiveness of temperament-based intervention. In this clinical trial, groups of mothers of 3-5 year old neurotypical children with difficult temperament characteristics (e.g. negative mood, high-intensity emotionality, or high activity level) received a temperament parent training program. This included psycho-education about temperament, identification of their child’s temperament profile, explanations of how to make their demands more similar to their child’s temperament characteristics, and behavior management techniques (Sheeber & Johnson, 1994). The mothers who received this intervention reported fewer child behavior problems, increased satisfaction in their relationship with their child, and greater perceived parental competence as compared to the mothers in the waitlist control group. There are also qualitative reports of the outcomes of temperament-based interventions. For instance, in the New York Longitudinal Study (NYLS), Chess and Thomas met with parents for an average of 2-3 sessions to provide them with goodness-of-fit suggestions based on their children’s temperament (1986). Approximately 50% of cases were considered successful based on clinical judgment of parental change and improvement in the child’s behavior. In another temperament intervention program, temperament was assessed, strategies for strengthening the parent-child relationship were introduced, and specific parenting advice using goodness-of-fit principles were delivered (Smith, 1994). After completing this

program, 79% of parents indicated that they were helped “much or very much by the program”.

Most temperament-based intervention programs contain three elements: (1) general educational discussions with parents to increase their awareness and understanding of the concept of temperament, (2) identification of the particular child’s temperament profile to provide a more organized and objective picture, (3) interventions that influence the temperament – environment interaction by improving goodness-of-fit (Carey, 1994).

General educational discussions about temperament should include defining individual differences, explaining various types of temperament differences, giving parents an understanding of why it is better to work *with* rather than *against* a child’s temperament, and advising parents that different strategies work with different temperament styles (Chess & Thomas, 1986). These discussion points can alleviate parents’ guilt about their children’s behavior and can shift parents’ cognitive or motivational explanations to a temperament-based explanation (Keogh, 1994).

To identify and teach parents about a child’s *temperament profile*, one can employ various assessment methods. One commonly used assessment method is parent questionnaires (Rothbart et al., 2001). Parents/caregivers spend a large amount of time with their children, and therefore, have a broad knowledge of their child’s temperament that can be reported through questionnaires. In addition, it can be helpful to observe the child, either informally or with a temperament rating system, in order to assess temperament (Majadandzic & van den Boom, 2006). Regardless of which method is used, it is important to assess the child’s behavior in a wide range of situations in order to

identify their temperament style (Chess & Thomas, 1986). The child's temperament profile should then be explained thoroughly to the parents.

When *improving the goodness-of-fit* between the child's temperament and his/her environment, temperament intervention researchers suggest that clinicians begin by choosing only one or two situations to improve (Chess & Thomas, 1986). Then, clinicians should counsel parents on the specific details of the environment that will be modified, as well as what outcome to expect as a result of the intervention. For example, for a child with a high activity level, temperament interventionists suggest seeking after school programs that emphasize active play, not expecting the child to sit during an entire dinner or a lengthy car ride, and giving the child errands to run during school to get a reprieve from sitting at a desk (Chess & Thomas, 1991).

The Present Study

The present study investigated the effectiveness of temperament-based intervention for highly extraverted/surgent children with ASD in reducing problem behavior and improving family quality of life.

II. Method

Participants

Participants in this study were six children diagnosed with an autism spectrum disorder. The inclusion criteria for this study were as follows: (1) individuals must have been diagnosed with ASD; (2) individuals must have been between the ages of 3-7; (3) individuals must have had a history of problem behavior (score >16.5 on the Irritability Scale of the Aberrant Behavior Checklist; see below for discussion); and (4) individuals must have had highly extroverted temperament styles (score >5.31 on the extraversion/surgency factor of the Child Behavior Questionnaire; see below for discussion). Diagnosis of ASD was verified through home or school records and was based on either a prior evaluation by a psychologist or psychiatrist through use of the Autism Diagnostic Observation Schedule (ADOS; Lord, Rutter, DiLavore, & Risi, 2001) or based on DSM-IV criteria (American Psychiatric Association, 1994).

History of problem behavior was verified through parent report on the Irritability Scale of the Aberrant Behavior Checklist (ABC; Aman & Singh, 1986; Appendix A). The ABC is frequently used to assess problem behavior in people with developmental disabilities. The irritability subscale is a 15 item measure that assesses severe problem behaviors; for example, items include “injures self on purpose” and “aggressive to other children or adults”. Each item is scored on a 0-3 Likert scale ranging from “not at all a problem” to “the problem is severe in degree.” The scale has good internal consistency demonstrated by a coefficient alpha of .92 (Aman, Singh, Stewart, & Field, 1985). Interrater reliability of the subscale, using Spearman correlation coefficients, ranges from .39 to .70, dependent on rater pairings. Test-retest reliability of the irritability subscale

using a Spearman correlation has been found to be .98 (Aman, Singh, Stewart, & Field, 1985). The researchers previously gathered scores on the ABC from a sample of 113 children with ASD, ages 2 to 9 years of age (Adamek et al., 2010). From this previous sample, a 75th percentile cutoff score for problem behavior of 16.5 was determined.

Extraversion was verified through parent reports on the Activity Level, Impulsivity, High Intensity Pleasure, and Shyness subscales that contribute to the extraversion/surgency factor of the Child Behavior Questionnaire (CBQ-short form; Putnam & Rothbart, 2006, see Appendix B). This Likert-type scale for assessing temperament in children ages 3-7 years has 25 items. The subscales of the extraversion/surgency factor of the CBQ-short have good internal consistency, with coefficient alphas over .74 for the four subscales (Rothbart et al., 2001). Interrater reliability coefficients of mothers and fathers range from .51 to .79 for the 4 subscales. The researchers previously gathered scores on the CBQ from a sample of 113 children with ASD (Adamek et al., 2010). From this previous sample, a 75th percentile cutoff score for extraversion of 5.31 was determined.

Participant characteristics are reported in Table 1. These characteristics include: name of child (all names have been changed for confidentiality), age, gender, diagnosis, full scale IQ, score on the Aberrant Behavior Checklist, and score on the extraversion scales of the Child Behavior Questionnaire. Participants ranged in age from 3.10 to 7.2 years. Five children were male, and one child was female. All children had an autism spectrum diagnosis. Full scale IQ scores ranged from 40 to 112. One family was unable to provide IQ score information because their child was unable to engage in any test items during two separate evaluations attempts. All six children's scores on the Aberrant

Behavior Checklist were above the 75th percentile cutoff of 16.5 and ranged from 18 to 35. All six children's scores on the Extraversion subscales of the Child Behavior Questionnaire were above the 75th percentile cutoff of 5.31 and ranged from 5.33 to 6.28.

Procedure

Completion of Pre-Intervention Measures

Families were recruited for this study by letters distributed to local agencies and schools for children with ASD, and through advertisements on autism listserves. During the initial meeting, parents signed consent forms and completed a battery of questionnaires. Parents completed the Irritability Scale of the Aberrant Behavior Checklist (ABC) as well as the Activity Level, Impulsivity, High Intensity Pleasure, and Shyness subscales of the Child Behavior Questionnaire (CBQ). In addition, families completed a battery of pre-intervention ancillary quality of life measures. The Parenting Stress Inventory – Short Form (PSI/SF; Abidin, 1997; Appendix C) measures the amount of stress parents encounter on a daily basis. The scale contains 36 parent-report items that produce three factors: Parental Distress (PD), Parent-Child Dysfunctional Interaction (PCDI), and Difficult Child (DC). Test-retest reliability has been computed between scores at 1 year apart ($r = .75, p < .001$; Haskett, Ahern, Ward, & Allaire, 2006). The Home Situations Questionnaire (HSQ; Barkley, 1981; Appendix D) measures how much the child's problem behavior disrupts home situations such as mealtime or bathtime. It contains 16 parent-report items that are scored on a 0-9 likert scale ranging from "absent" to "severe". The scale has good internal consistency demonstrated by a coefficient alpha of .93, and good test-retest reliability (Spearman Correlation 91; DuPaul & Barkley, 1992). The Parental Locus of Control Scale (PLCS; Campis, Lyman, & Prentice-Dunn,

1986; Appendix E) measures how much parents feel in control of their children. It contains items that are scored on a 1-5 Likert scale ranging from “strongly disagree” to “strongly agree”. In previous work, items were shown to be internally consistent, with an alpha coefficient of .81 and have good test-retest reliability, with a reliability coefficient of .83 (Roberts, Joe, & Rowe-Hallbert, 1992).

Identification of Intervention Contexts

Each family participated in a follow up assessment to identify intervention contexts. The researcher (a PhD student in clinical psychology) gave examples of what constitutes a low intensity situation, such as those found in Appendix F. Through a discussion with parents, low intensity activities that were typically problematic for their child and typically yielded high instances of problem behavior were identified. Parents were then asked to identify one top priority context as the experimental context, while the other contexts were considered for later clinical extensions. The intervention in the experimental context employed temperament intervention strategies and included extensive data collection.

Identification of Intervention Contexts: Michael. Michael was a 5-year-old boy diagnosed with Autistic Disorder (AD) who attended a special education class and lived at home with his mother, father, twin brother, and two older brothers. He communicated through the use of single words and gestures as well as limited use of a Picture Exchange Communication System (PECS; Bondy & Frost, 1994). When presented with a list of low intensity activities, his parents identified playing a game as a context they were concerned about; therefore, it was selected as the experimental context. Specifically, Michael’s parents reported that Michael engaged in problem behavior (e.g., tantrums,

aggression, self-injury, and noncompliance) when playing board games. Typically, Michael would throw the game pieces, bang his head, or run away when asked to play.

Identification of Intervention Contexts: Robbie. Robbie was a 7-year-old boy diagnosed with AD who attended a special education class and lived at home with his mother, father and younger brother. He was nonverbal and communicated through the use of gestures as well as limited use of PECS. When discussing low intensity contexts with the researcher, his mother identified coloring as a primary context she was concerned about. Specifically, Robbie's mother reported that Robbie engaged in problem behavior (e.g., tantrums, aggression, self-injury, and noncompliance) when instructed to color. Typically, Robbie would refuse to color at all, and when prompted to color, he would tantrum, bang his head, or hit his mother or brother.

Identification of Intervention Contexts: Danny. Danny was a 5-year-old boy diagnosed with Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS) who attended a special education class and lived at home with his mother, father, younger brother, and younger sister. He communicated through the use of complete, short sentences. His parents identified dinnertime as the most problematic low intensity context for their family. Specifically, Danny's parents reported that he engaged in problem behavior (e.g., tantrums, noncompliance) when instructed to eat his dinner at the table. Danny's parents would try to redirect him to the table, but most often Danny would continue to tantrum or run away.

Identification of Intervention Contexts: Elijah. Elijah was a 3-year-old boy diagnosed with PDD-NOS who attended a typical preschool and received after school early intervention services through a local agency for children with developmental

disabilities. He lived at home with his mother and father and communicated through the use of simple words and gestures. When presented with a list of low intensity activities, his parents identified coloring as an important context that was difficult for Elijah. Specifically, Elijah's parents reported that Elijah engaged in problem behavior (e.g., tantrums and noncompliance) when asked to color. Typically, Elijah would refuse to begin coloring, run away from the coloring materials, or throw a tantrum.

Identification of Intervention Contexts: Felicia. Felicia was a 6-year-old girl diagnosed with AD who attended a special education class and lived at home with her mother, father, and older sister. She communicated through the use of complete, short sentences. During discussions with the researcher, Felicia's mother identified reading a book as a problematic, low intensity context that was important to their family. Specifically, Felicia's mother reported that she engaged in problem behavior (e.g., tantrums and noncompliance) when instructed to listen to a book being read to her. Typically, Felicia would refuse to even begin listening to a story being read, and if her mother further prompted her to sit and listen, Felicia would throw a long, intense tantrum.

Identification of Intervention Contexts: Connor. Connor was a 4-year-old boy diagnosed with PDD-NOS who received early intervention services through a local agency for children with developmental disabilities and lived at home with his mother, father, and younger sister. He was fully verbal and communicated through the use of complete, complex language. When presented with a list of low intensity activities, his mother identified playing a board game with others as an important, problematic context. Specifically, Connor's mother reported that Connor engaged in problem behavior (e.g., tantrums, aggression, and noncompliance) when playing games. Typically, Connor would

successfully begin a game, but in the middle of the game would refuse to play, throw a tantrum, or hit his mother or sister.

Baseline for Experimental Contexts

A multiple baseline design was used across participants (Hersen & Barlow, 1976). The six participants were randomly assigned to be in group 1 or group 2, and were assigned to have the researcher complete 3, 4, or 5 baseline observations. In single subject research, replication is often achieved through the use of a reversal design by alternating baseline and treatment periods; however, due to ethical concerns about withdrawing the treatment as well as worries about carryover effects, a multiple baseline design was employed (Morgan & Morgan, 2001). The staggered introduction of intervention strategies aims to improve internal validity by showing that behavior change occurs at various time-points (Kazdin, 2003). Past researchers have established that a minimum of two baseline sessions per participant is necessary, therefore we chose 3-5 baseline sessions (Hersen & Barlow, 1976). Multiple baseline designs are commonly implemented across three participants. Two groups of three participants were used to more quickly deliver intervention to families and to replicate the findings across groups.

Multiple baseline observations were conducted in the top priority, experimental context identified by the researcher and parents. Parents were asked to complete two 1-7 Likert scale items assessing the frequency and intensity of their child's problem behavior during this context in the past month. The scale for the first item ranges from "infrequent" to "extremely frequent" and the second item ranges from "not intense" to "extremely intense". These items can be found in Appendix G. Baseline observations in the low intensity context assessed latency to problem behavior and percent of the task

completed. For latency to problem behavior, observers recorded the amount of time from the beginning of the task to the onset of problem behavior (Carr & Carlson, 1993).

Typical problem behaviors are tantrums, noncompliance, or disruptive behavior. If these occurred during baseline, the low intensity activity was stopped and parents were asked to carry out the natural procedures that they typically use when their child engages in problem behavior.

If no problem behavior occurred, the researcher recorded the amount of time from the beginning of the task to the completion of the task. For task completion, the researcher developed a task analysis for each experimental task that broke down the task into its component steps. All task analyses are outlined in Table 2. For some tasks, such as coloring, there was no clear end point. Therefore, task components spanning a certain amount of time (e.g., color for 1 minute) were created. These time increments were chosen with parent input so that the total duration of time was approximately twice as long as the child had ever been able to spend doing that particular activity. During baseline, the researcher recorded the number of steps the participant successfully completed without problem behavior. At the conclusion of the task, the researcher divided the number of steps successfully completed by the total number of steps in the task to derive the percent of task completed. The investigator and a parent collected reliability data on the relevant study variables during one baseline session. A binary reliability index was used to assess agreement on percentage of task steps completed and latency to session termination. Thus, for each session, reliability was scored as either perfect agreement or no agreement. Agreement was defined as both observers recording

the same number of task steps completed and latency measures that were within 5 seconds of one another.

Psychoeducation about Temperament

Directly following baseline, the researcher met with the parents to teach them about temperament, and temperament-based intervention. A temperament curriculum (Appendix H) was used as a guide during this session. This curriculum was supplemented by a variety of examples presented to parents, as well as detailed discussion to ensure parents' understanding.

Overview of Intervention for Experimental Contexts

Strategies to improve the fit between the experimental context and the child's extroverted temperament were developed with the help of the parents during a problem solving session (D'Zurilla & Nezu, 2001; Stiebel, 1999). During this session, parents and the researcher worked their way, systematically, through a problem-solving template (Appendix I) applied to the context of interest. Parents were knowledgeable about which strategies were most feasible within their family, which can be an important asset in developing a treatment plan (Lucyshyn, Albin, & Nixon, 1997; Vaughn et al., 1997).

Following a problem solving session that yielded temperament intervention strategies, parents were trained to implement the intervention in 1-2 sessions. Then, parents completed the intervention independently of the researcher while the researcher observed. An intervention decision tree (Appendix J) was used to determine when the family needed additional training, when to move on to clinical extension interventions, and when intervention was complete. Throughout the intervention, integrity checks were performed; that is, intervention fidelity checklists were developed based on the

intervention components for each participant. The investigator and parent recorded checkmarks whenever a specific component of the intervention was implemented by the parent. Just as in baseline observations, both the parent/s and researcher assessed latency to problem behavior and percent of the task completed each time the intervention was used. Also similar to baseline, the investigator and a parent collected reliability data on the relevant study variables during 25% (3 of 12 intervention sessions). A binary reliability index was used to assess agreement on intervention fidelity, percentage of task steps completed, and latency to session termination. After the intervention in the experimental context was complete, parents rated the overall frequency and intensity of their child's problem behavior during the past month using the Likert scale item previously used during baseline. A summary of the intervention fidelity checklists can be found in Table 3 and more detailed descriptions of the intervention strategies can be found below.

Intervention Strategies for a Game: Michael. Michael's parents chose the game "Snails, Pace, Race" as the experimental context. This game is typically played by rolling a small, colored, dice and moving a snail with the corresponding color one space. This is a poor match for a child with a surgent temperament because the game is sedentary, typically played sitting at a table, does not involve physical activity, and requires fine motor skills rather than gross motor movements. One intervention strategy was to replace the small dice provided with the game with a 6 inch colored dice that could be tossed in the air. This encouraged standing, throwing and gross motor play. In addition, Michael's parents helped him hold a snail after he threw the dice, and exclaim, "(color) snail, - _____ snail, _____ snail, bounce!" while jumping with Michael. This made the game

more interactive, and allowed Michael to move around. Michael's parents provided him with surgent praise (e.g., hugs, high fives, pats on the back, tickles). This gave Michael positive, physically active interactions with his parents. Lastly, intervention included singing a song about snails a few times throughout the game. Michael's parents sang this song to him while swinging him back and forth. This engaged Michael in energetic activity at various times throughout the game.

Intervention Strategies for Coloring: Robbie. Robbie's mother chose coloring as the experimental context. Coloring, as it is typically presented, is a poor match for a child with a surgent temperament because it is done while sitting and requires little gross movements or high-intensity actions. The intervention was established so that Robbie alternated between two coloring stations. His mother chased him between these stations. This allowed Robbie to take short breaks from the low-intensity activity of coloring during the time he was being chased. One coloring station included a rubber disc filled with air to sit on and a vibrating pen to color with. Robbie bounced on the disc in his seat while coloring with the vibrating pen. The other station included large white paper taped to the wall and large, triangular crayons. With these materials Robbie could run the length of the wall while coloring with crayons that were easier to manipulate than typical crayons.

Intervention Strategies for Dinnertime: Danny. Danny's parents chose eating dinner at the table as the experimental context. Eating dinner is a poor match for a child with a surgent temperament because it is typically done while sitting and does not involve any high-intensity activity. The intervention included the use of a surgent visual schedule. It should be noted that during baseline, Danny's parents used a visual schedule, therefore,

this behavioral strategy was enhanced within a temperament framework by making the visual schedule a better fit for a surgent child. The visual schedule consisted of pictures of one-fourth, one-half, three-fourths, and all of the food on a plate eaten. Next to these pictures were musical greeting cards. When Danny ate a fourth of his food, he was allowed to stand up from his seat, walk to the visual schedule, open a greeting card, and dance to the 10-20 second clip of music. He then was required to return to his seat and eat the next fourth of food before getting up again. These scheduled, controlled bursts of surgent activity helped Danny to be able to sit while eating his dinner. In addition, Danny's parents provided him with surgent praise (e.g., hugs, high fives, pats on the back, tickles) when he returned to his seat. This gave Danny positive, physically active interactions with his parents. Lastly, the intervention strategies included replacing the edible reinforcer that Danny's parents previously gave him with a more active reinforcer. We chose activities such as playing with a toy steering wheel that made racing noises, and jumping on a trampoline as positive reinforcement for Danny eating his entire dinner without any problem behavior.

Intervention Strategies for Coloring: Elijah. Elijah's parents chose coloring as the experimental context. Coloring, as it is typically presented, is a poor match for a child with a surgent temperament because it is done while sitting and requires little gross movements or high-intensity actions. One of the main elements of the intervention was the use of a "color me a song" board. This toy has buttons that make sounds when pressed, and when colored on, it plays music to the pace of the coloring. Elijah was asked to push a colored button and color with the same colored crayon as the button. Small crayons were replaced with large, triangular crayons. Elijah was encouraged to color as

quickly as possible. The use of this board allowed coloring to be more active than when done with typical paper and crayons. During baseline, Elijah's parents often used a monotone tone of voice when giving instructions or praise. During intervention, they were taught to use an enthusiastic tone of voice to be more engaging and intense for Elijah. Lastly, Elijah's parents provided him with surgent praise (e.g., hugs, high fives, pats on the back, tickles) when he was coloring. This gave Elijah positive, physically active interactions with his parents.

Intervention Strategies for Reading: Felicia. Felicia's mother chose listening to a book being read as the experimental context. Listening to a book is a poor match for a child with a surgent temperament because it is typically a sedentary activity done while sitting and requires very little action or input from the child. During intervention Felicia was instructed to choose from three interactive books. These books were about cars, trains, and princesses, and included sound buttons to push, flaps to move, or puzzles to complete. By using books that required Felicia to do something, rather than to only sit and listen, it became a more surgent activity. Felicia's mother learned to ask Felicia questions about characters in the books, to ask her to make noises or movements about characters in the book, and to ask her to push buttons, move flaps, or do puzzles. In addition, Felicia's mother prompted Felicia to get a toy that went along with the book (e.g., car, train, princess wand). She then asked Felicia to play with the toy when appropriate in the context of the story (e.g., "Move Thomas the train quickly across the table! He has to get to Percy the train!"). Lastly, Felicia's mother would say, "1-2-3, turn the page!" and prompt Felicia to turn the page. Encouraging Felicia to turn the pages,

play with a toy, and interact with the book made listening to a book a higher energy activity.

Intervention Strategies for a Game: Connor. Connor's mother chose board games as the experimental context. We decided to use "Spiderman Chutes and Ladders" and "Dora the Explorer Candy Land" as the board games for intervention. These games are a poor match for a child with a surgent temperament because they are sedentary, typically played sitting at a table, do not involve physical activity, and require fine motor skills. One intervention strategy was to encourage Connor to wear a king hat and pretend to be the "king of the game" and explain the rules to everyone playing. This made the beginning of the game more interactive. When playing Chutes and Ladders, Connor's mother encouraged him to tell and act out stories about the super hero characters in the game. The spinner in the game was replaced with a 6 inch foam dice that could be thrown in the air. When Connor landed on a ladder, he climbed on a stepstool that we pretended was a ladder. When Connor landed on a chute, he rolled on the ground to pretend that he was going down the chute. When playing Candy Land, Connor's mother encouraged him to tell and act out stories about Dora the Explorer characters. The cards in the game were put into a large fishbowl, rather than a small pile. Laminated color squares were placed around the room and when Connor drew a colored card he would move his character and go jump on the corresponding colored square himself. When playing either game, Connor was prompted to say, "3-2-1, blast off!" (one of his favorite sayings), and jump in the air when taking a turn. All of these intervention strategies helped to include rowdy, active, and imaginative play in the context of the board games.

Clinical Extensions

After parents demonstrated intervention mastery for the experimental context (based on experimenter observation and intervention fidelity checklist), the researcher met with the parents to discuss additional low intensity contexts where intervention was needed. The researcher developed temperament-based intervention strategies for these clinical extensions. Clinical extensions are important because they help create multicomponent interventions that promote the use of intervention strategies across a variety of contexts (Carr & Carlson, 1993). Interventions that address multiple contexts are more likely to produce general decreases in problem behavior as well as improvements in overall family quality of life. Frequency and intensity of child problem behavior in each context was assessed before and after the implementation of intervention in the clinical context. Intervention fidelity checklists, based on the intervention components for the additional contexts, were developed to evaluate intervention integrity for these contexts. The researcher observed 1 session of baseline and 2 sessions of intervention for each clinical extension context and completed the intervention fidelity checklist as well as assessed latency to problem behavior and percent of task completed.

Clinical Extension: Michael. Michael's parents had also identified going to a restaurant as a low-intensity, problematic context for Michael. We first employed intervention strategies in a fast food restaurant. Michael's parents were instructed to use a surgent visual schedule that consisted of a magnetic board with pictures of restaurant activities (e.g. wait in line, take our food to a table, sit in a chair, eat), and empty spots for Michael to place magnetic letters on the board when he completed a restaurant activity. While in line, Michael's parents played "Simon says" with him and prompted Michael to

do active movements such as, “jump up and down” or “touch your toes”. When in his seat, Michael sat on an inflatable, rubber disk that he could bounce on. If Michael ate his dinner and did not exhibit any problem behavior, his parents played a surgent activity with him when they returned home (e.g., tag, spin in circles). Eventually, the intervention was extended further to include going to a sit-down family restaurant in addition to fast food restaurants.

Clinical Extension: Robbie. Robbie’s mother identified eating a snack at the table as a second problematic context for Robbie. One intervention strategy was to use food that was shaped like animals, or other characters. Robbie’s mother was taught to prompt Robbie to play games related to the food, such as making a cat noise after eating a cracker shaped like a cat. A counting cookie jar toy was also used to make eating the snack more energetic. After Robbie ate a bite of food, he placed a toy cookie into the cookie jar. In addition, Robbie sat on a vibrating cushion on his chair to provide him with physical input. Lastly, Robbie’s mother was taught to use surgent praise (e.g., hugs, high fives, pats on the back, tickles) when he was sitting in his chair and eating his snack without any problem behavior in order to give him a positive, physically active interaction.

Clinical Extension: Danny. Danny’s parents identified playing “Chutes and Ladders” as another difficult, low intensity context for Danny. This intervention included the same concept of climbing a stepstool when landing on a ladder on the board and rolling on the ground when landing on a chute on the board as was used with Connor. Further, the spinner in the game was replaced with a 6 inch foam dice that could be thrown in the air. In addition, a large turn board was used that was adhered to the wall.

Danny would get up and place a picture of himself, his mother, his father, or his brother on the turn board to show that it was that person's turn. These breaks which included getting up from the table and changing the picture on the turn board allowed Danny to be more lively during the game. Lastly, Danny's parents were encouraged to provide him with surgent praise (e.g., hugs, high fives, pats on the back, tickles).

Clinical Extension: Elijah. Elijah's parents chose tracing letters as another problematic context. One intervention strategy was to allow Elijah to stand, rather than requiring him to sit while tracing letters. In addition, worksheets and small crayons were replaced with large, colorful posterboards and large, triangular crayons. The original worksheets included letters to trace and animals or objects that corresponded with the letter being traced. The poster boards also included these elements, and Elijah was prompted to imitate the animal or object by using noises or movement. Lastly, Elijah's parents provided him with surgent praise (e.g., hugs, high fives, pats on the back, tickles) when he was tracing letters. This gave Elijah positive, physically active interactions with his parents.

Clinical Extension: Felicia. Felicia's mother chose going to the grocery store as another difficult, low intensity context for Felicia. One intervention strategy used during the car ride was for Felicia's mother to play games with her. This included making voices of Disney characters and singing some of Felicia's favorite songs. Once at the store Felicia's mother gave her a book of pictures of grocery store items and had her find items in a particular aisle. This gave Felicia an active task to be engaged with rather than walking through the store with nothing to do. Also, when walking down the aisles, Felicia was encouraged to skip or hop, rather than walk. When Felicia successfully

completed a trip to the grocery store, she was provided a surgent reward (e.g., going to a play space, driving on a bumpy road).

Clinical Extension: Connor. Connor's mother chose completing academic worksheets as a problematic, low intensity context for Connor. During baseline, worksheets were used that required Connor to circle the smallest or largest picture. During intervention, the worksheets targeting smallest were placed on the kitchen table and the worksheets targeting largest were placed on Connor's desk in the living room. When completing the worksheets Connor was asked to act out the pictures on the worksheets (e.g., buzz like a bee, fly like a jet). After completing a worksheet targeting smallest at the kitchen table, Connor was told to race to the middle of the living room and choose the smallest of three balls. Once he correctly picked the smallest ball, he ran to the desk in the living room and completed a worksheet targeting largest. Then, Connor raced to the middle of the living room and chose the largest of three balls. This continued until four of each worksheet was completed. By encouraging Connor to race, move around the room, manipulate objects (balls), and act out pictures from the worksheets, the concepts of smallest and largest were practiced while allowing Connor to be more active.

Completion of Post-Intervention Measures

After the interventions for the experimental context were employed for 12 weeks and the clinical extensions were conducted for at least 2 weeks, a post intervention assessment battery of questionnaires was administered to the parents. These included the Surgency items of the Child Behavior Questionnaire, the Irritability Scale of the Aberrant Behavior Checklist, the Parenting Stress Inventory, the Home Situations Questionnaire, and the Parental Locus of Control Scale.

III. Results

Experimental Contexts

Percent Task Steps Completed. The percentage of activity/routine steps completed for the three participants in group 1 are shown in Figure 1, and for the three participants in group 2 in Figure 2. Michael completed an average of 33.3 % of the steps that constituted playing a board game during baseline. However, during intervention, he completed an average of 95.5% of the steps. Robbie completed a mean of 27.8% of the steps associated with coloring during baseline. However, during intervention, he completed 100% of the steps. During baseline, Danny completed a mean of 35% of the steps involved in eating dinner. However, during intervention, he completed 100% of the steps. Elijah completed 19% of the steps that constituted coloring during baseline. However, he completed 98% of steps during intervention. Felicia completed 25% of the steps involved in being read a book during baseline. However, she completed 100% of the steps during intervention. Connor completed 43 % of steps associated with playing a board game during baseline. However, he completed 99% of the steps during intervention.

Latency to Session Termination. Figure 1 and Figure 2 present data on the amount of time that elapsed before the session was terminated (due to problem behavior or successful completion of the activity) for the six participants. For Michael, the mean latency to problem behavior during baseline was 2 minutes, 10 seconds. During intervention sessions when Michael engaged in problem behavior (3 out of 12 sessions), the mean latency to problem behavior was 11 minutes, 53 seconds. During intervention sessions with no problem behavior (9 out of 12 sessions), successful completion of

playing the board game occurred at 16 minutes and 9 seconds. For Robbie, the mean latency to problem behavior for coloring at baseline was 24 seconds. During intervention, there was no problem behavior and latency to successful completion of coloring was 3 minutes, 27 seconds. For Danny, during baseline, the mean latency to problem behavior during dinnertime was 4 minutes, 2 seconds. During intervention, Danny did not engage in problem behavior and latency to successful completion of eating dinner was 17 minutes, 39 seconds. For Elijah, during baseline, the mean latency to problem behavior for coloring was 20 seconds. During intervention, Elijah did not engage in problem behavior and latency to successful completion of coloring was 7 minutes, 44 seconds. For Felicia, during baseline, the mean latency to problem behavior for reading was 4 minutes, 2 seconds. During intervention, Felicia did not engage in problem behavior and latency to successful completion of being read a book was 9 minutes, 54 seconds. For Connor, the mean latency to problem behavior at baseline was 2 minutes, 10 seconds. During intervention sessions when Connor engaged in problem behavior (1 out of 12 sessions), the latency to problem behavior was 14 minutes, 9 seconds. During intervention sessions with no problem behavior (11 out of 12 sessions), successful completion of playing the board game occurred at a mean of 20 minutes and 48 seconds.

Clinical Contexts

Percent Task Steps Completed. The percent of activity/routine steps completed during clinical contexts for all six participants (group 1 and 2) is shown in Figure 3. During the baseline session, participants completed between 20-30% of task steps. However, during intervention sessions, participants completed 100% of task steps.

Latency to Session Termination. Latency to session termination during clinical contexts for all six participants (group 1 and 2) is shown in Figure 4. During the baseline session, latency was short, and all six participants engaged in problem behavior. However, during intervention sessions, participants did not engage in any problem behavior, and latency to session termination increased at least 400% across all participants.

Intervention Fidelity. During baseline, a mean of 0% of the intervention components were implemented by each respective parent for all contexts. During intervention, for the experimental contexts, a mean of 100% of the intervention components were implemented by each respective parent. During intervention for the clinical extension contexts, a mean of 100% of the intervention components were implemented by each respective parent.

Interrater Reliability

The investigator and a parent collected reliability data on the relevant study variables during one baseline session and three intervention sessions for the experimental contexts and during one baseline session and one intervention session for the clinical contexts. Agreement on intervention fidelity, percentage of task steps completed, and latency to session termination was noted for 100% of baseline and intervention sessions across all participants.

Ancillary Measures

In addition to outcome measures related to latency to problem behavior/successful completion of routines, data were collected to measure the

differences between pre and post measures of context specific problem behavior, global problem behavior, temperament, parental stress, the child's disruption of home situations, and perceived parental control. Paired sample *t*-tests were performed on all ancillary measures to compare scores during baseline with those following intervention. In addition, effect sizes using Cohen's *d* were calculated incorporating the correlation between measures for each set of variables (Dunlap, Cortina, Vaslow, & Burke, 1996). As can be seen in Table 4, following intervention, there was a significant decrease in the context specific frequency of problem behavior in both experimental and clinical contexts as measured by a Likert type item measuring frequency $t(5) = 8.00, p < .01, d = 3.13$ and $t(5) = 11.62, p < .01, d = 3.21$ respectively. In addition, there was a significant decrease in the context specific intensity of problem behavior in both experimental and clinical contexts as measured by a Likert type item measuring intensity $t(5) = 10.95, p < .01, d = 5.79$ and $t(5) = 6.64, p = .01, d = 2.30$ respectively. Global perception of the level of serious problem behavior as measured by the Irritability subscale of the ABC significantly decreased following intervention, $t(5) = 9.91, p < .01, d = 2.14$. There were no significant differences in temperament between pre and post intervention scores on the surgency/extraversion scale of the CBQ, $t(5) = .07, p = .95, d = .04$. Although all three measures of quality of life (Parenting Stress Inventory, Home Situations Questionnaires, and Parental Locus of Control Scale) improved from pre to post intervention assessment, none of the differences were significant; however, all three had effect sizes $> .65$, indicating that an effect may be present but was not detectable using *t*-tests with such a small sample size.

IV. Discussion

Intervention Efficacy

Within two groups of three children and their families, a temperament-based intervention for problem behavior in children with autism spectrum disorders was implemented and evaluated in home and community settings. Intervention included 1) general educational discussions with parents to increase their awareness and understanding of the concept of temperament, 2) identification and explanation of their child's temperament profile, and, 3) mitigating the environmental demands to improve the goodness-of-fit between the child's temperament and the environment. All six children who participated showed substantial behavioral improvement in contexts identified by their parents as the most problematic. During baseline, latency to problem behavior was short and the percent of task components completed was small. After intervention, problem behavior was greatly reduced in the experimental contexts for all children, and the children were consistently able to complete the task. Additionally, parents rated the frequency and intensity of their child's problem behavior as lower. Similar results including a reduction in problem behavior, improvements in task completion, and decreased parental ratings of frequency and intensity of problem behavior were found for the clinical contexts across participants. Notably, there was also evidence of more global reductions in problem behavior as reflected by the significant difference in scores on the ABC Irritability Scale. Choosing the most difficult contexts for parents, working on multiple contexts, and improving problem behavior by using temperament-based strategies, may generalize to other situations to reduce overall problem behavior.

Improvements in problem behavior and task completion were observed across participants in the current sample. These participants were diverse in gender, age, cognitive ability, and communication skills. To summarize, participants included 5 boys and 1 girl, who were 3 to 7 years of age, with IQ's ranging from 40 to 112, and verbal abilities ranging from non-verbal to conversationally verbal. Temperament-based strategies that target the fit between temperament characteristics and the environment can be flexible in regard to other individual characteristics of the child. So, strategies for an older child with a higher IQ and more advanced verbal abilities can be more complex than those for a younger child with a lower IQ and little verbal skills. Since temperament-based strategies can be applied uniquely for particular children these strategies can be successful in decreasing problem behavior regardless of gender, age, cognitive ability, and verbal skills.

Temperament, as measured by the CBQ, did not change following intervention. This is consistent with previous findings that temperament is moderately stable over time (Roberts & DelVecchio, 2000). It also suggests that the intervention strategies targeted problem behavior by improving the fit between temperament and the environment, rather than targeting temperament itself. Parenting stress, problematic home routines, and perceived parental control did not significantly improve following intervention, however, all three improved from pre to post assessment, and all had effect sizes in the moderate range. Studies with larger sample sizes, and more intensive interventions that target greater than two contexts, as well as intervention strategies that target family difficulties in addition to child problem behavior, may be needed to significantly improve these areas.

Conceptual Issues

This study investigated a temperament-based framework in which to assess and treat problem behavior in children with ASDs. The importance of goodness-of-fit between a child's temperament and the performance requirements of the environment was examined, and intervened upon. For all six children high in surgency/extraversion, problem behavior was consistently present in low intensity situations during baseline observations. When interventions were provided that improved goodness-of-fit by mitigating aspects of the environment, problem behavior was eliminated, or significantly decreased. These data suggest that the concept of goodness-of-fit may be valuable in guiding assessment and intervention of problem behavior in young children with ASD.

Using standardized assessment instruments to identify general problematic contexts is best practice when targeting problem behavior in children who have ASDs, however, these general assessment tools have typically not included temperament. In order to assess problematic goodness-of-fit between a child's temperament and his/her environment, clinicians, parents, or teachers could complete an assessment of temperament, such as the CBQ. From the temperament profile generated from this assessment, problem contexts could be identified related to the child's temperament, enabling parents to gain a better understanding of why some situations result in problem behavior and others do not. For example, by completing the CBQ, parents may discover that their child has high surgency/extraversion and could better understand why their child has difficulty doing a puzzle, reading a book, or sitting at the dinner table.

From this assessment parents, teachers, and others can choose contexts that best fit with a child's temperament and avoid contexts that are a poor fit in order to decrease

problem behavior. Some contexts cannot be avoided, and for those contexts, interventions can be designed that increase the goodness-of-fit between the child's temperament and the situations in which he/she has to cope. From the present study, general themes and more specific strategies were identified for increasing goodness-of-fit for children high in surgency/extraversion. Activities for children high in this temperament dimension can be engineered to be more energetic and active, include gross motor play and decrease fine motor play, and increase physical interaction (e.g. hugs, high-fives, pats on the back) between children and their parents.

Temperament-based intervention strategies are not intended to replace standard educational or behavioral interventions. Instead, understanding the role of temperament, and increasing goodness-of-fit between a child's temperament and a particular environment or activity may increase the efficacy of educational and behavioral interventions during that activity.

Ecological Validity

The interventions implemented in this study were employed in natural settings (e.g., family homes, restaurants, grocery stores), using natural intervention agents (e.g. parents and grandparents), to modify natural activities and routines (e.g., reading, playing board games, dinner). This stands in direct contrast to many intervention studies that target problem behavior in ASD by utilizing discrete trial methodology in a controlled or laboratory setting (Iwata, Dorsey, Slifer, Bauman, & Richman, 1982). These studies fail to address questions about generalization to natural environments (Carr et al., 2002). By utilizing natural settings, intervention agents, and activities, and through the completion of clinical extensions, the results of the current study demonstrate that temperament-

based strategies are ecologically valid and can be generalized to many real-world situations.

Future Directions

This is the first empirical study of temperament-based intervention for children with ASD. Therefore, additional studies that examine temperament-based interventions are necessary to further investigate the efficacy of this approach. Additional intervention research should include a greater number of participants and children with a greater variability in their characteristics (e.g., age, gender, temperament profile). For example, a randomized clinical trial comparing outcomes of children who receive temperament-based intervention to children on a waitlist would be useful. Among neurotypical children, links have been found between specific temperament profiles and internalizing problems, social difficulties, and poor academic functioning (Muris, Meesters, & Blijlevens, 2007; Spinrad, et al., 2007; Valiente, Lemery-Chalfant Swanson, & Reiser, 2008). Future temperament intervention research should target these outcomes, in addition to problem behavior. Further, temperament interventions could be evaluated within a classroom setting. Lastly, many behavioral intervention strategies have extensive support and are included in multicomponent intervention packages for children with ASDs (Carr & Carlson, 1993). It would be valuable to include temperament-based strategies in these multicomponent packages as a comprehensive approach to behavior change

Table 1

Participant Characteristics at Baseline

| Name | Age | Gender | Diagnosis | Full Scale IQ (M=100, SD=15) | ABC (M=10, SD=10) | CBQ (M= 4.70, SD= .79, from an ASD sample) |
|---------|------|--------|---|------------------------------------|-------------------------|---|
| Michael | 5.0 | Male | Autistic Disorder | Unable to Obtain | 27.00 | 5.64 |
| Robbie | 7.2 | Male | Autistic Disorder | Stanford- Binet: 40 | 30.00 | 6.13 |
| Danny | 5.5 | Male | Pervasive Developmental Disorder, NOS | Stanford- Binet: 70 | 28.00 | 6.28 |
| Elijah | 3.10 | Male | Pervasive Developmental Disorder, NOS | Bayley: 90 | 18.00 | 5.33 |
| Felicia | 6.6 | Female | Autistic Disorder | Stanford- Binet:59 | 24.00 | 5.44 |
| Connor | 4.6 | Male | Pervasive Developmental Disorder, NOS | WPPSI- III: 112 | 35.00 | 5.72 |

**Stanford Binet = Stanford-Binet Intelligence Scale: Fifth Edition*

**WPPSI-III = Wechsler Preschool and Primary Scale of Intelligence – Third Edition*

**Bayley = Bayley Scales of Infant and Toddler Development – Third Edition*

Table 2

Task Analyses of Experimental Contexts

| Name | Task | Task Components |
|---------|------------------------------------|---|
| Michael | Play the game “Snails, Pace, Race” | <ol style="list-style-type: none"> 1. Come to the table in the living room. 2. Put the snails on the starting spots. 3. Roll the dice. 4. Move a snail. 5. Wait while Mom takes a turn. 6. Repeat steps 3-5. 7. Repeat steps 3-5. 8. Repeat steps 3-5. 9. Repeat steps 3-5. 10. Repeat steps 3-5 until a snail wins. 11. Put the game pieces back into the box. |
| Robbie | Coloring | <ol style="list-style-type: none"> 1. Come to the materials at the kitchen table. 2. Pick up a crayon/pen/marker. 3. Color on the paper for 10 seconds. 4. Color on the paper for another 10 seconds. 5. Color on the paper for another 10 seconds. 6. Color on the paper for another 10 seconds. 7. Color on the paper for another 10 seconds. 8. Color on the paper for another 10 seconds. 9. Give the materials to Mom or sign “all done”. |
| Danny | Eating Dinner | <ol style="list-style-type: none"> 1. Put plate on the dining room table. 2. Sit down at the table. 3. Eat ¼ of the food on his plate. 4. Eat another ¼ of food on his plate. 5. Eat another ¼ of food on his plate. 6. Eat last ¼ of food on his plate. 7. Get a reward. 8. Put plate in the kitchen. |
| Elijah | Coloring | <ol style="list-style-type: none"> 1. Come to the table. 2. Pick up crayon. 3. Color on paper for 1 minute. 4. Color on paper for another minute. 5. Color on paper for another minute. 6. Color on paper for another minute. 7. Color on paper for another minute or until he says, “All done”. |
| Felicia | Listening to a book read by her | <ol style="list-style-type: none"> 1. Come to the couch/bed/chair. 2. Choose a book. 3. Sit with Mom while she reads 2 pages. |

| | | |
|--------|----------------------------|--|
| | Mom | <ol style="list-style-type: none"> 4. Turn the page. 5. Repeat steps 3-4. 6. Repeat steps 3-4. 7. Repeat steps 3-4. 8. Repeat steps 3-4 until the book is finished. 9. Put the book away. |
| Connor | Play a board game with Mom | <ol style="list-style-type: none"> 1. Come to the game on the living room floor. 2. Place the game pieces on starting spots. 3. Choose a card, spin the spinner, or roll the dice. 4. Move a game piece. 5. Wait while Mom takes a turn. 6. Repeat steps 3-5. 7. Repeat steps 3-5. 8. Repeat steps 3-5. 9. Repeat steps 3-5. 10. Repeat steps 3-5. 11. Repeat steps 3-5. 12. Repeat steps 3-4 until someone wins the game. 13. Put the game pieces back in the box. |

Table 3

Intervention Fidelity Checklists for Experimental Contexts

| Name | Intervention Components | Completed? |
|---------|--|------------|
| Michael | 1. Use the giant dice. | |
| | 2. Say, “(color) snail, _____ snail, _____ snail, bounce!” and help Michael bounce. | |
| | 3. Use surgent praise (hugs, high fives, pats on the back, tickles). | |
| | 4. Sing the snail song while playing. | |
| Robbie | 1. Use the bouncy seat. | |
| | 2. Use triangular crayons. | |
| | 3. Use the wiggly pen. | |
| | 4. Put large white paper on the wall. | |
| | 5. Chase Robbie from one station to another. | |
| Danny | 1. Show Danny the surgent visual schedule. | |
| | 2. After Danny finishes each fourth of his food, prompt him to open a music card on the surgent visual schedule. | |
| | 3. Use surgent praise (hugs, high fives, pats on the back, tickles). | |
| | 4. When he finishes dinner, present Danny with the racing wheel, trampoline, or other active reinforcer. | |
| Elijah | 1. Use an enthusiastic tone when giving Elijah instructions. | |
| | 2. Use the “Color me a Song” board. | |
| | 3. Instruct Elijah to push the color buttons in between coloring. | |
| | 4. Use large, triangular crayons. | |
| | 3. Use surgent praise (hugs, high fives, pats on the back, tickles). | |

| | | |
|---------|---|--|
| Felicia | 1. Use an interactive book. | |
| | 2. Prompt Felicia to push the sounds/do the puzzle. | |
| | 3. Ask Felicia questions about the book. | |
| | 4. Ask Felicia to make noises/movements to go along with the book. | |
| | 5. Prompt Felicia to pick a prop/doll/toy to go along with the book. | |
| | 6. Say "1-2-3, Turn the page!" in an excited voice and then have Felicia turn the page. | |
| Connor | 1. Have Connor dress up as "king of the game". | |
| | 2. Prompt Connor to tell stories about the characters in the game. | |
| | 3. Make materials larger (large dice, fish bowl). | |
| | 4. Encourage gross motor play (color road, step stool). | |
| | 5. Prompt Connor to say "3-2-1-Blast off!!" before his turn. | |

Table 4

Differences between Pre-Intervention and Post-Intervention Measures

| Measure | Pre-Intervention Mean | Post-Intervention Mean | <i>t</i> - value | Cohen's <i>d</i> |
|--|-----------------------|------------------------|------------------|------------------|
| Frequency of Problem Behavior (Experimental Context) | 6.33 | 1.83 | 8.00** | 3.13 |
| Intensity of Problem Behavior (Experimental Context) | 5.33 | 1.33 | 10.95** | 5.79 |
| Frequency of Problem Behavior (Clinical Context) | 5.83 | 2.83 | 11.62** | 3.21 |
| Intensity of Problem Behavior (Clinical Context) | 5.33 | 2.17 | 6.64** | 2.30 |
| Global Problem Behavior (ABC irritability subscale) | 27.00 | 15.00 | 9.91** | 2.14 |
| Surgency/Extraversion (CBQ) | 5.76 | 5.78 | .07 | .04 |
| Parenting Stress (PSI) | 107.33 | 91.00 | 1.65 | .65 |
| Home Situations (HSC) | 59.33 | 46.83 | 1.80 | .76 |
| Parental Control (PLCS) | 69.50 | 77.50 | 1.15 | .66 |

* $p < .05$ ** $p < .01$

Figure Captions

Figure 1. The percent of activity steps completed and latency to session termination for the first three participants (group 1) during baseline and intervention. The solid black bars denote sessions that included problem behavior. The grey bars denote sessions in which the activity was successfully completed without any problem behavior.

Figure 2. The percent of activity steps completed and latency to session termination for the second three participants (group 2) during baseline and intervention. The solid black bars denote sessions that included problem behavior. The grey bars denote sessions in which the activity was successfully completed without any problem behavior.

Figure 3. The percent of activity steps completed for all six participants (group 1 and 2) during clinical contexts. “A” is the percent of activity steps completed in baseline and “B” is the mean percent of activity steps completed during intervention.

Figure 4. The latency to session termination for all six participants (group 1 and 2) during clinical contexts. The solid black bars denote baseline sessions that included problem behavior. The grey bars denote intervention sessions in which the activity was successfully completed without any problem behavior. It should be noted that Michael and Felicia’s clinical contexts (restaurant and grocery store) take considerable more time than the other clinical contexts (snack, board game, and academic tasks) when successfully completed.

Figure 1

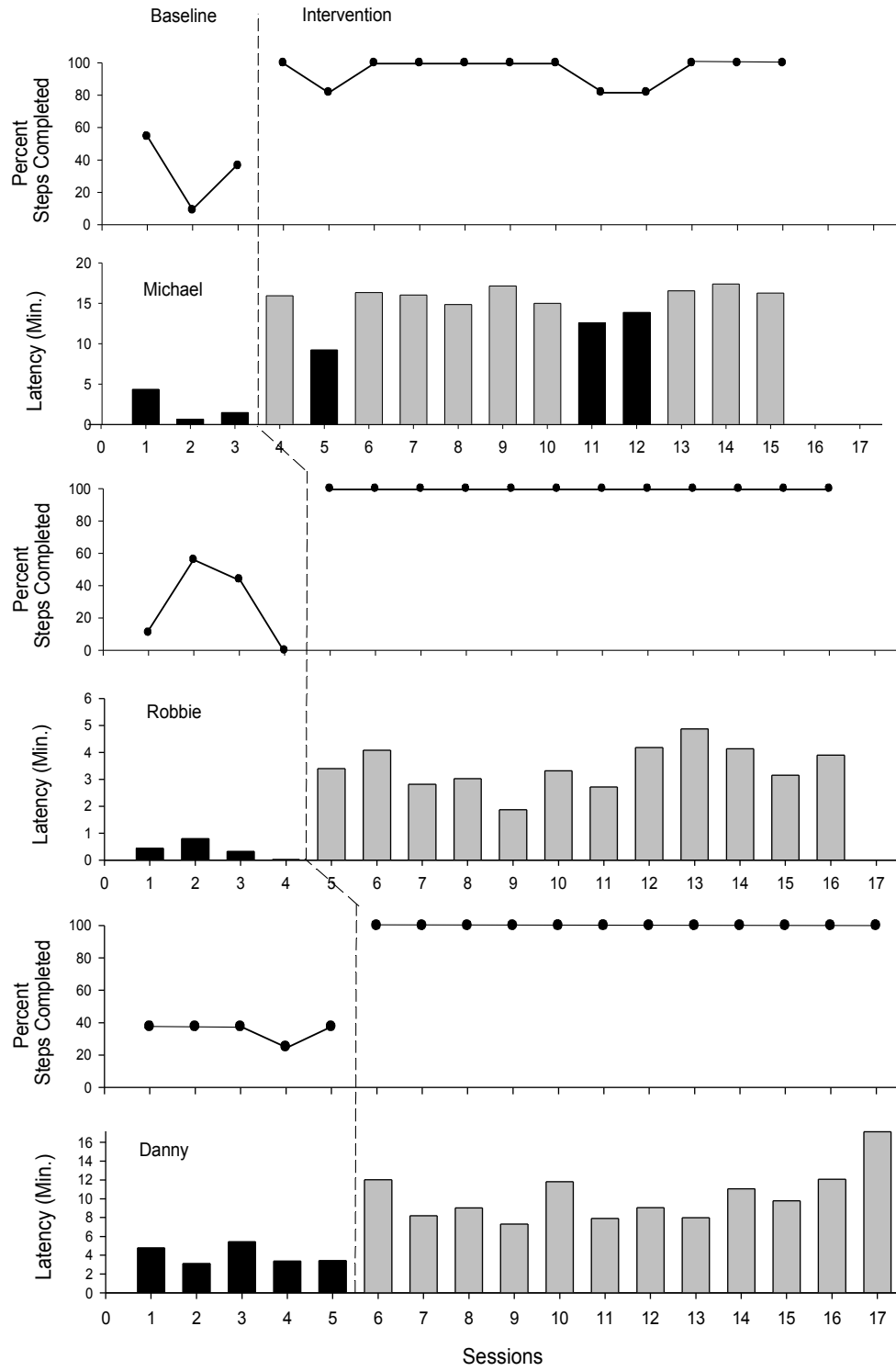


Figure 2

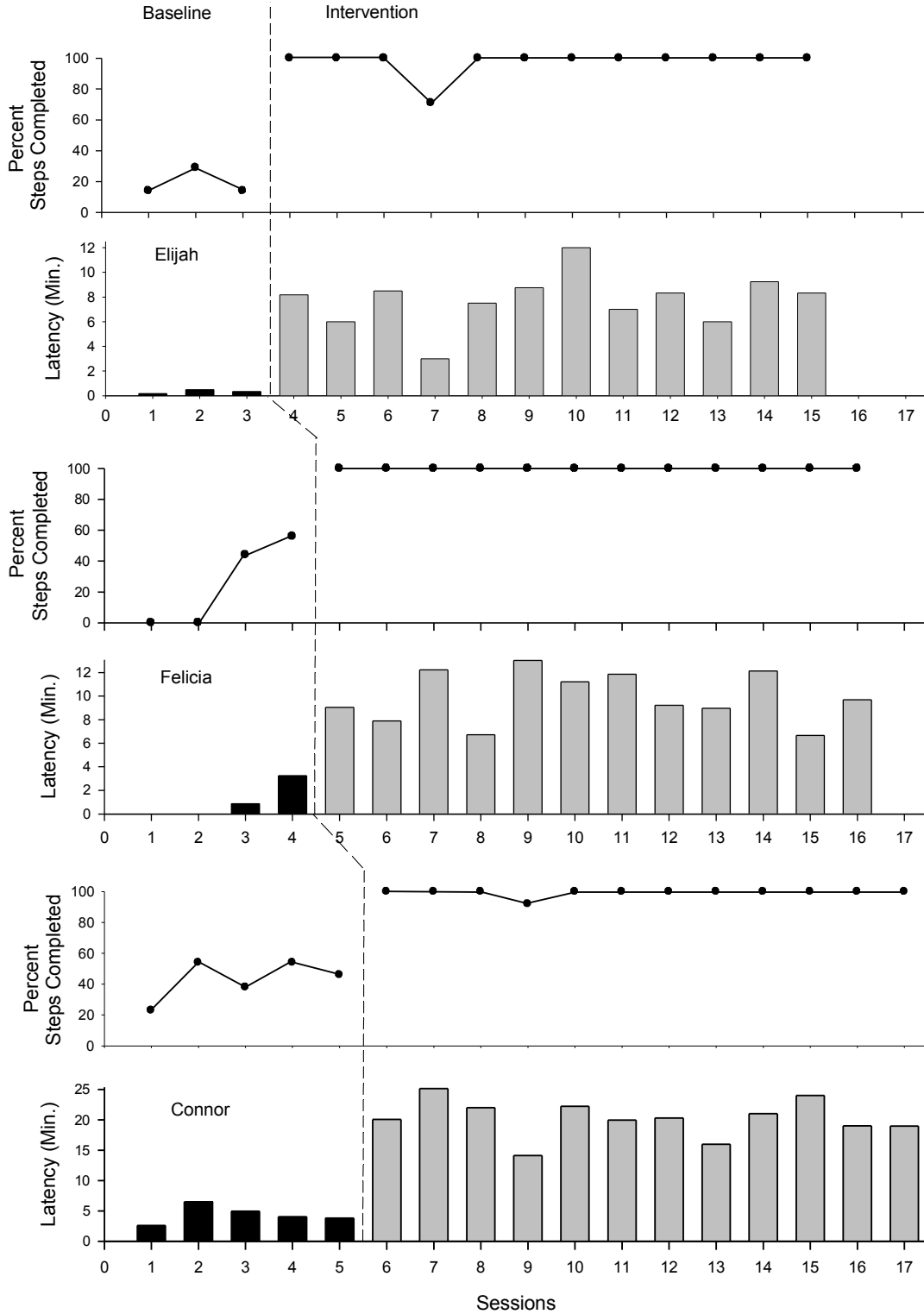


Figure 3

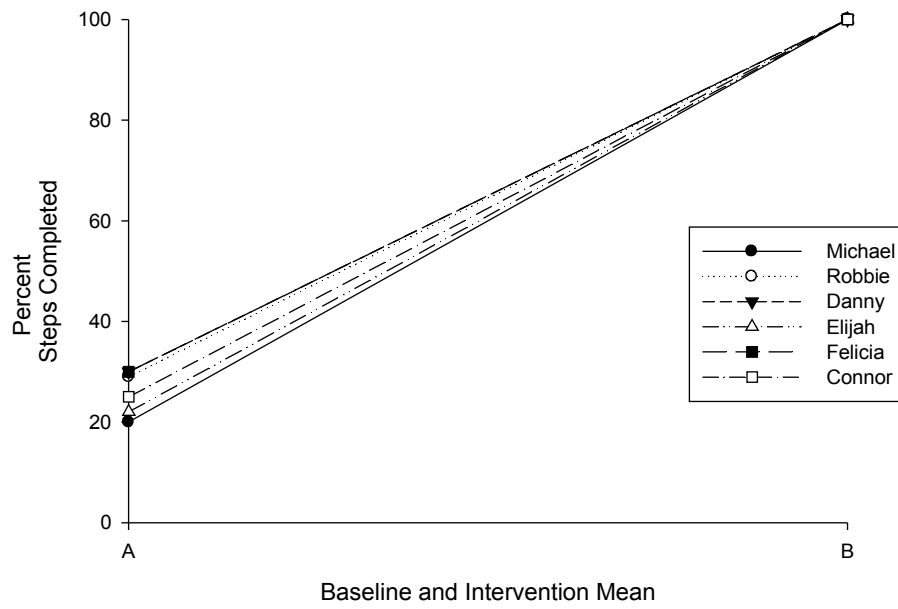
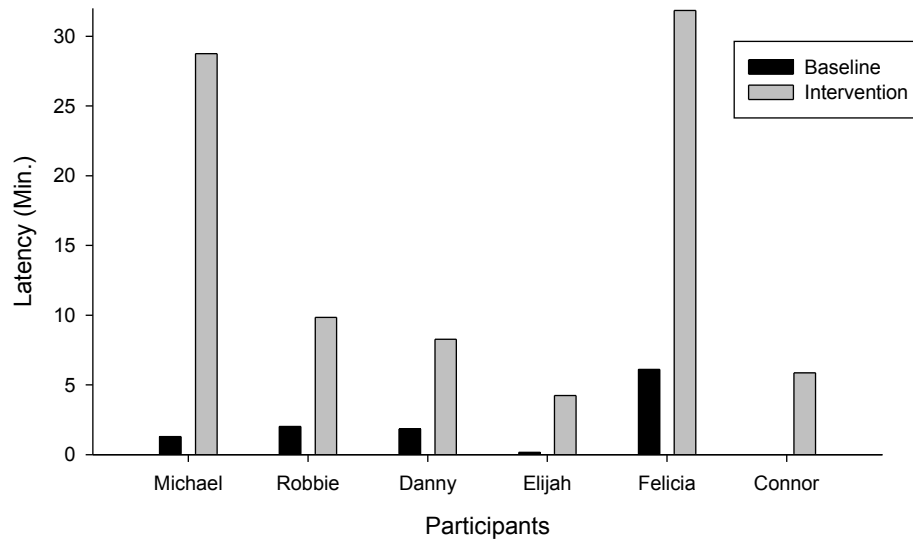


Figure 4



References

- Abidin, R. R. (1997). Parenting Stress Index: A measure of the parent-child system. In C.P., Zalaquett & R. J. Woods (Eds.), *Evaluating stress: A book of resources* (pp. 271 – 291). Lanham, MD: Scarecrow.
- Adamek, L.A. & Carr, E.G. (2010). [Observational assessment of temperament and problem behavior in children with autism spectrum disorders]. Unpublished raw data.
- Adamek, L., Nichols, S., Tetenbaum, S., Bregman, J., Ponzio, C. & Carr, E.G. (2010). Individual temperament and problem behavior in children with autism spectrum disorders. *Under review*.
- Aman, M.G., Singh, N.N., Stewart, A.W., & Field, C.J. (1985). The Aberrant Behavior Checklist: A behavior rating scale for assessment of treatment effects. *American Journal of Mental Deficiency, 89*, 485-491.
- Aman, M. G. & Singh, N.N. (1986). Aberrant behavior checklist: Manual, Slosson Educational Publications, East Aurora, NY.
- Bailey, D.B., Hatton, D.D., Mesibov, G., Ament, N., & Skinner, M. (2000). Early development, temperament, and functional impairment in autism and fragile X syndrome. *Journal of Autism and Developmental Disorders, 30*, 49-59.
- Bambara, L. M., Koger, F., Katzer, T., & Davenport, T. A. (1995). Embedding choice in the context of daily routines: An experimental case study. *Journal of the Association for Persons with Severe Handicaps, 20*, 185-195.
- Barkley, R. A. (1981). *Hyperactive children: A handbook for diagnosis and treatment*. New York: Guilford.

- Bondy, A. S., & Frost, L. A. (1994). The picture exchange communication system. *Focus on Autistic Behavior, 9*, 1-19.
- Bruininks, R. H., Hill, B. K., & Morreau, L. E. (1998). Prevalence and implications of maladaptive behaviors and dual diagnosis in residential and other service programs. In J. Stark, F. J. Menolascino, M. H. Albarelli, & V. C. Gray (Eds.), *Mental retardation and mental health: Classification, diagnosis, treatment, services* (pp.3-24). New York: Springer Verlag.
- Campis, L. K., Lyman, R. D., & Prentice-Dunn, S. (1986). The parental locus of control scale: Development and validation. *Journal of Clinical Child Psychology, 15*, 260-267.
- Carey, W.B. (1994). Specific uses of temperament data in pediatric behavioral interventions. In W.B. Carey & S.C. McDevitt (Eds.). *Prevention and early intervention: Individual differences as risk factors for the mental health of children* (pp. 215-225). New York: Brunner/Mazel.
- Carr, E. G., & Carlson, J. I. (1993). Reduction of severe behavior problems in the community using a multicomponent treatment approach. *Journal of Applied Behavior Analysis, 26*, 157-172.
- Carr, E. G., Carlson, J. L., Langdon, N. A., Magito-McLaughlin, D., & Yarbrough, S. C. (1998). Two perspectives on antecedent control: Molecular and molar. In J. K. Luiselli & M. J.

- Cameron (Eds.). *Antecedent control: Innovative approaches to behavioral support* (pp.3-28). Baltimore: Paul H. Brookes.
- Carr, E. G., Dunlap, G., Horner, R. H., Koegel, R. L., Turnbull, A. P., Sailor, W., et al. (2002). Positive behavior support: Evolution of an applied science. *Journal of Positive Behavior Interventions, 4*, 4-16.
- Carr, E. G., & Durand, V. M. (1985). Reducing behavior problems through functional communication training. *Journal of Applied Behavior Analysis, 18*, 111-126.
- Chess, S. & Thomas, A. (1986). *Temperament in clinical practice*. New York: The Guilford Press.
- Chess, S. & Thomas, A. (1991). Temperament and the concept of goodness of fit. In J. Strelau, & A. Angleitner, (Eds.), *Explorations in temperament: International perspectives on theory and measurement* (15-28). New York: Plenum Press.
- Diagnostic and statistical manual of mental disorders (DSM-IV)*. (1994). Washington, D.C.: American Psychiatric Association.
- Ducharme, J. M., & Worling, D. E. (1994). Behavioral momentum and stimulus fading in the acquisition and maintenance of child compliance in the home. *Journal of Applied Behavior Analysis, 27*, 639-647.
- Dunlap, W.P., Cortina, J.B., Vaslow, J.B., Burke, M.J. (1996). Meta-analysis of experiments with matched groups or repeated measures designs. *Psychological Methods, 2*, 170-177.

- DuPaul, G. J., & Barkley, R. A. (1992). Situational variability of attention problems: psychometric properties of the revised home and school situations questionnaires. *Journal of Clinical Child Psychology, 21*, 178-188.
- De Pauw, S.S.W., Mervielde, I., & Van Leeuwen, K.G. (2009). How are traits related to problem behavior in preschoolers? Similarities and contrasts between temperament and personality. *Journal of Abnormal Child Psychology, 37*, 309-325.
- Dunlap, W.P., Cortina, J.M., Vaslow, J.B., & Burke, M.J. (1996). Meta-analysis of experiments with matched groups or repeated measures designs. *Psychological Methods, 2*, 170-177.
- D’Zurilla, T. J., & Nezu, A. M. (2001). Problem solving therapies. In K. Dobson (Ed.), *Handbook of cognitive-behavioral therapies*. (2nd ed.) (pp. 211-245). New York: Guilford Press.
- Edmunds, G. (1977). Extraversion, neuroticism, and different aspects of self-reported aggression. *Journal of Personality Assessment, 41*, 66-70.
- Eisenberg, N., Zhou, Q., Spinrad, T.L., Valiente, C., Fabes, R.A., & Liew, J. (2005). Relations among positive parenting, children’s effortful control, and externalizing problems: A three-wave longitudinal study. *Child Development, 76*, 1055-1071.
- Emerson, E., Kiernan, C., Alborz, A., Reeves, D., Mason, H., Swarbrick, R., Mason, L., & Hatton, C. (2001). The prevalence of challenging behaviors: A total population study. *Research in Developmental Disabilities, 22*, 77 – 93.
- Fujita, F. & Diener, E. (2005). Life Satisfaction Set Point: Stability and Change. *Journal of Personality and Social Psychology, 88*, 158-164.

- Garon, N., Bryson, S.E., Zwaigenbaum, L., Smith, I.M., Brian, J., Roberts, W., & Szatmari, P. (2009). Temperament and its relationship to autistic symptoms in a high-risk infant sib cohort. *Journal of Abnormal Child Psychology*, 37, 59-78.
- Harris, R. (1991). Role of set-point theory in regulation of body weight. *The FASEB Journal*, 4, 3310-3318.
- Haskett, M. E., Ahern, L. S., Ward, C. S. & Allaire, J. C. (2006). Factor Structure and Validity of the Parenting Stress Index-Short Form. *Journal of Clinical Child and Adolescent Psychology*, 35, 302-312.
- Hepburn, S.L., & Stone, W.L. (2006). Using Carey Temperament Scales to assess behavioral style in children with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 36, 637-642.
- Hersen, M., & Barlow, D. H. (1976). *Single case experimental designs*. New York: Pergamon.
- Iwata, B. A., Dorsey, M. F., Slifer, K. J., Bauman, K. E., & Richman, G. S. (1982). Toward a functional analysis of self-injury. *Analysis and Intervention in Developmental Disabilities*, 2, 3-20.
- Kazdin, A.E. (2003). *Research design in clinical psychology*. Boston: Allyn and Bacon.
- Koegel, L. K., Koegel, R. L., & Dunlap, G. (Eds.). (1996). *Positive behavior support: Including people with difficult behavior in the community*. Baltimore: Paul H. Brookes.
- Koegh, B.K. (1994). Temperament and teachers' views of teachability. In W.B. Carey & S.C. McDevitt (Eds.). *Prevention and early intervention: Individual differences*

- as risk factors for the mental health of children* (pp. 246-254). New York: Brunner/Mazel.
- Konstantareas, M.M., & Stewart, K. (2006). Affect regulation and temperament in children with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 36*, 143-154.
- Lord, C., Rutter, M., DiLavore, P.D., & Risi, S. (2001). *Autism Diagnostic Observation Schedule*. Los Angeles, CA: Western Psychological Services.
- Lucyshyn, J. M., Albin, R. W., & Nixon, C. D. (1997). Embedding comprehensive behavioral support in family ecology: An experimental, single-case analysis. *Journal of Consulting and Clinical Psychology, 65*, 241-251.
- Majdandzic, M., & van den Boom, D.C. (2006). Multimethod longitudinal assessment of temperament in early childhood. *Journal of Personality, 75*, 121-168.
- Martin, G., & Pear, J. (2003). *Behavior modification: What it is and how to do it*. New Jersey: Prentice Hall.
- Morgan, D.L. & Morgan, R.K. (2001). Single-participant research design. *American Psychologist, 56*, 119-127.
- Mullins, J., & Christian, L. (2001). The effects of progressive relaxation training on the disruptive behavior of a boy with autism. *Research in Developmental Disabilities, 22*, 449-462.
- Mun, E.Y., Fitzgerald, H.E., Von Eye, A., Puttler, L.I., & Zucker, R.A. (2001). Temperamental characteristics as predictors of externalizing and internalizing child behavior problems in the contexts of high and low parental psychopathology. *Infant Mental Health Journal, 22*, 393-415.

- Muris, P., Meesters, C., & Blijlevens, P. (2007). Self-reported reactive and regulative temperament in early adolescence: relations to internalizing and externalizing problem behavior and “big three” personality factors. *Journal of Adolescence, 30*, 1035-1049.
- Novosad, C., & Thoman, E.B. (1999). Stability of temperament over the childhood years. *American Journal of Orthopsychiatry, 69*, 457-464.
- Oniszczenko, W., Zawadzki, B., Strelau, J., Riemann, R., Angleitner, A., & Spinath, F.M. (2002). Genetic and environmental determinants of temperament: A comparative study based on Polish and German samples. *European Journal of Personality, 17*, 207-220.
- Ormel, J., Oldehinkel, A.J., Ferdinand, R.F., Hartman, C.A., DeWinter, A.F., Veenstra, R., Vollenbergh, W., Minderaa, R.B., Buitelaar, J.K., & Verhulst, F.C. (2005). Internalizing and externalizing problems in adolescence: general and dimension-specific effects of family 1 loadings and preadolescent temperament traits. *Psychological Medicine, 35*, 1-11.
- Putman, S.P. & Rothbart, M.K. (2006). Development of the short and very short forms of the children’s behavior questionnaire. *Journal of Personality Assessment, 87*, 102-112.
- Roberts, B.W., & DelVecchio, W.F. (2000). The rank-order consistency of personality traits from childhood to old age: A quantitative review of longitudinal studies. *Psychological Bulletin, 126*, 3-25.
- Roberts, M.W., Joe, V.C., & Row-Hallbert, A. (1992). Oppositional child behavior and parental locus of control. *Journal of Clinical Child Psychology, 21*, 170-177.

- Rothbart, M. K., Ahadi, S. A., Hershey, K. L., & Fisher, P. (2001). Investigations of temperament at 3-7 years: The Children's Behavior Questionnaire. *Child Development, 72*, 1394-1408.
- Rothbart, M. K., & Bates, J. E. (2006). Temperament. In N. Eisenberg, W. Damon, & R. Lerner (Eds.), *Handbook of child psychology, Vol. 3: Social, emotional, and personality development* (pp. 99-166). Hoboken: John Wiley and Sons Inc.
- Schmit, J., Alper, S., Raschke, D., & Ryndak, D. (2000). Effects of using a photographic cueing package during routine school transitions with a child who has autism. *Mental Retardation, 38*, 131-137.
- Schwartz, C.B., Henderson, H.A., Inge, A.P., Zahka, N.E., Coman, D.C., Kojkowski, N.M., Hileman, C.M., & Mundy, P.C. (2009). Temperament as a predictor of symptomatology and adaptive functioning in adolescents with high-functioning autism. *Journal of Autism and Developmental Disorders, 39*, 842-855.
- Sheeber, L.B., & Johnson, J.H. (1994). Evaluation of a temperament-focused, parent-training program. *Journal of Clinical Child Psychology, 23*, 249-259.
- Smith, B. (1994). The temperament program: Community-based prevention of behavior disorders in children. In W.B. Carey & S.C. McDevitt (Eds.). *Prevention and early intervention: Individual differences as risk factors for the mental health of children* (pp. 257-266). New York: Brunner/Mazel.
- Spinrad, T.L., Eisenberg, N., Gaertner, B., Popp, T., Smith, C.L., Kupfer, A., Greiving, K., Liew, J., & Hofer, C. (2007). Relations of maternal socialization and toddlers' effortful control to children's adjustment and social competence. *Developmental Psychology, 43*, 1170-1186.

- Stiebel, D. (1999). Promoting augmentive communication during daily routines: A parent problem-solving intervention. *Journal of Positive Behavior Interventions, 1*, 159-169.
- Super, C. M. & Harkness, S. (1994). Temperament and the developmental niche. In W.B. Carey & S.C. McDevitt (Eds.), *Prevention and early intervention: Individual differences as risk factors for the mental health of children: A festschrift for Stella Chess and Alexander Thomas (pp. 115-125)*. Philadelphia: Brunner/Mazel Inc.
- Thomas, A., Chess, S., & Birch, H.G. (1970). The origin of personality. *Scientific American, 223*, 102-109.
- Valiente, C., Lemery-Chalfant, K., Swanson, J. & Reiser, M. (2008). Prediction of children's academic competence from their effortful control, relationships, and classroom participation. *Journal of Educational Psychology, 100*, 67-77.
- Vaughn, B. J., Dunlap, G., Fox, L., Clarke, S., & Bucy, M. (1997). Parent-professional partnership in behavioral support: A case study of community-based intervention. *Journal of the Association for Persons with Severe Handicaps, 22*, 186-197.
- Zwaigenbaum, L., Bryson, S., Rogers, T., Roberts, W., Brian, J., & Szatmari, P. (2005). Behavioral manifestations of autism in the first year of life. *International Journal of Developmental Neuroscience, 23*, 143-152.

Appendix A

Aberrant Behavior Checklist – Irritability Subscale

Date: _____

Parent Name: _____

This set of questions refers to _____'s behavior over the PAST MONTH.

Please rate your child's behavior for the last four weeks when they're not in school. For each item, decide whether the behavior is a problem and circle the appropriate number:

- 0 = not at all a problem
- 1 = the behavior is a problem but slight in degree
- 2 = the problem is moderately serious
- 3 = the problem is severe in degree

When judging your child's behavior, please keep the following points in mind:

(a) Take the relative *frequency* into account for each behavior specified. For example, if your child averages more temper outbursts than most other children with autism you know, it is probably moderately serious (2) or severe (3) even if these occur only once or twice a week. Other behaviors, such as noncompliance, would probably have to occur more frequently to merit an extreme rating. _____

(b) If you have access to this information, consider the experiences of other adults with this child. If the child has problems with others but not with you, try to take the whole picture into account.

(c) Try to consider whether a given behavior interferes with his/her development, functioning, or relationships. For example, body rocking or social withdrawal may not disrupt other children or adults, but it almost certainly hinders individual development or functioning.

Do not spend too much time on each item – your first reaction is usually the right one.

- | | | | | |
|--|---|---|---|----|
| 1. Injures self on purpose | 0 | 1 | 2 | 3_ |
| 2. Aggressive to other children or adults (verbally or physically) | 0 | 1 | 2 | 3 |
| 3. Screams inappropriately | 0 | 1 | 2 | 3 |
| 4. Temper tantrums/outbursts | 0 | 1 | 2 | 3 |
| 5. Irritable and whiny | 0 | 1 | 2 | 3 |
| 6. Yells at inappropriate times | 0 | 1 | 2 | 3 |
| 7. Depressed mood | 0 | 1 | 2 | 3 |
| 8. Demands must be met immediately | 0 | 1 | 2 | 3 |
| 9. Cries over minor annoyances and hurts | 0 | 1 | 2 | 3 |

| | | | | |
|---|---|---|---|---|
| 10. Mood changes quickly | 0 | 1 | 2 | 3 |
| 11. Cries and screams inappropriately | 0 | 1 | 2 | 3 |
| 12. Stamps feet or bangs objects or slams doors | 0 | 1 | 2 | 3 |
| 13. Deliberately hurts himself/herself | 0 | 1 | 2 | 3 |
| 14. Does physical violence to self | 0 | 1 | 2 | 3 |
| 15. Has temper outbursts or tantrums when he/she does not get own way | 0 | 1 | 2 | 3 |

Appendix B

©2000 Mary K. Rothbart,
University of Oregon
All Rights Reserved

Children's Behavior Questionnaire

Subject No. _____

Date of Child's Birth: _____

Today's Date _____

Age of Child _____

Sex of Child _____

Instructions: Please read carefully before starting:

On the next pages you will see a set of statements that describe children's reactions to a number of situations. We would like you to tell us what your child's reaction is likely to be in those situations. There are of course no "correct" ways of reacting; children differ widely in their reactions, and it is these differences we are trying to learn about. Please read each statement and decide whether it is a "true" or "untrue" description of your child's reaction within the past six months. Use the following scale to indicate how well a statement describes your child:

| Circle # | If the statement is: |
|----------|--------------------------------------|
| 1 | extremely untrue of your child |
| 2 | quite untrue of your child |
| 3 | slightly untrue of your child |
| 4 | neither true nor false of your child |
| 5 | slightly true of your child |
| 6 | quite true of your child |
| 7 | extremely true of your child |

If you cannot answer one of the items because you have never seen the child in that situation, for example, if the statement is about the child's reaction to your singing and you have never sung to your child, then circle NA (not applicable).

Please be sure to circle a number or NA for every item.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
|---------------------|-----------------|--------------------|-------------------------------|------------------|---------------|-------------------|-------------------|
| extremely untrue | quite untrue | slightly untrue | neither true nor untrue | slightly true | quite true | extremely true | not applicable |

My child:

1. Seems always in a big hurry to get from one place to another.

1 2 3 4 5 6 7 NA

2. Likes going down high slides or other adventurous activities.

1 2 3 4 5 6 7 NA

3. Usually rushes into an activity (...without thinking about it).

1 2 3 4 5 6 7 NA

4. Likes to play so wild and recklessly that s/he might get hurt.

1 2 3 4 5 6 7 NA

5. Seems to be at ease with almost any person.

1 2 3 4 5 6 7 NA

6. Tends to run, rather than walk, from room to room.

1 2 3 4 5 6 7 NA

7. When outside, often sits quietly.

1 2 3 4 5 6 7 NA

8. Moves about actively (runs, climbs, jumps) when playing in the house.

1 2 3 4 5 6 7 NA

9. Often rushes into situations.

1 2 3 4 5 6 7 NA

10. Enjoys activities such as being chased, spun around by the arms, etc.

1 2 3 4 5 6 7 NA

11. Takes a long time in approaching situations.
- 1 2 3 4 5 6 7 NA
12. Is sometimes shy even around people s/he has known a long time.
- 1 2 3 4 5 6 7 NA
13. Is slow and unhurried when transitioning from one activity to another.
- 1 2 3 4 5 6 7 NA
14. Sometimes seems nervous when talking to adults s/he has just met.
- 1 2 3 4 5 6 7 NA
15. Prefers quiet activities to energetic activities.
- 1 2 3 4 5 6 7 NA
16. Acts shy around new people.
- 1 2 3 4 5 6 7 NA
17. Is comfortable approaching other children to play.
- 1 2 3 4 5 6 7 NA
18. Rarely gets upset when told s/he has to sit quietly
- 1 2 3 4 5 6 7 NA
19. Likes to go high and fast when pushed on a swing.
- 1 2 3 4 5 6 7 NA
20. Sometimes turns away shyly from new acquaintances.
- 1 2 3 4 5 6 7 NA
21. Dislikes rough and rowdy games.
- 1 2 3 4 5 6 7 NA
22. Is among the last children to try out an activity.
- 1 2 3 4 5 6 7 NA

23. Is full of energy, even in the evening.
- 1 2 3 4 5 6 7 NA
24. Enjoys riding a tricycle or bicycle fast and recklessly.
- 1 2 3 4 5 6 7 NA
25. Likes to sit quietly and watch people do things.
- 1 2 3 4 5 6 7 NA

Please check back to make sure you have completed all the pages of the questionnaire. Thank you very much for your help!

Appendix C

Parenting Stress Index

| SA = Strongly Agree Disagree | A=Agree | NS=Not Sure | D=Disagree | SD=Strongly |
|--|---------|-------------|------------|-------------|
| 1. I often have the feeling that I cannot handle things very well | SA | A | NS | D SD |
| 2. I find myself giving up more of my life to meet my children's needs than I ever expected | SA | A | NS | D SD |
| 3. I feel trapped by my responsibilities as a parent | SA | A | NS | D SD |
| 4. Since having this child, I have been unable to do new and different things | SA | A | NS | D SD |
| 5. Since having a child, I feel that I am almost never able to do things that I like to do | SA | A | NS | D SD |
| 6. I am unhappy with the last purchase of clothing I made for myself | SA | A | NS | D SD |
| 7. There are quite a few things that bother me about my life | SA | A | NS | D SD |
| 8. Having a child has caused more problems that I expected in my relationship with my spouse (or male/female friend) | SA | A | NS | D SD |
| 9. I feel alone and without friends | SA | A | NS | D SD |
| 10. When I go to a party, I usually expect not to enjoy myself | SA | A | NS | D SD |
| 11. I am not as interested in people as I used to be | SA | A | NS | D SD |
| 12. I don't enjoy things as I used to | SA | A | NS | D SD |
| 13. My child rarely does things for me that make me feel good | SA | A | NS | D SD |
| 14. Sometimes I feel my child doesn't like me and doesn't want to be close to me | SA | A | NS | D SD |
| 15. My child smiles at me much less than I expected | SA | A | NS | D SD |
| 16. When I do things for my child, I get the feeling that my efforts are not appreciated very much | SA | A | NS | D SD |
| 17. When playing, my child doesn't often giggle or laugh | SA | A | NS | D SD |
| 18. My child doesn't seem to learn as quickly as most children | SA | A | NS | D SD |

- | | | | | | |
|---|----|---|----|---|----|
| 19. My child doesn't seem to smile as much as most children | SA | A | NS | D | SD |
| 20. My child is not able to do as much as I expected | SA | A | NS | D | SD |
| 21. It takes a long time and it is very hard for my child to get used to new things | SA | A | NS | D | SD |

For the next statement, choose your response from the choices "1" to "5" below:

- | | | | | | |
|--|----|---|----|---|----|
| 22. I feel that I am: | 1 | 2 | 3 | 4 | 5 |
| 1. not very good at being a parent | | | | | |
| 2. a person who has some trouble being a parent | | | | | |
| 3. an average parent | | | | | |
| 4. a better than average parent | | | | | |
| 5. a very good parent | | | | | |
| 23. I expected to have closer and warmer feelings for my child than I do and this bothers me | SA | A | NS | D | SD |
| 24. Sometimes my child does things that bother me just to be mean | SA | A | NS | D | SD |
| 25. My child seems to cry or fuss more often than most children | SA | A | NS | D | SD |
| 26. My child generally wakes up in a bad mood | SA | A | NS | D | SD |
| 27. I feel that my child is very moody and easily upset | SA | A | NS | D | SD |
| 28. My child does a few things which bother me a great deal | SA | A | NS | D | SD |
| 29. My child reacts very strongly when something happens that my child doesn't like | SA | A | NS | D | SD |
| 30. My child gets upset easily over the smallest thing | SA | A | NS | D | SD |
| 31. My child's sleeping or eating schedule was much harder to establish than I expected | SA | A | NS | D | SD |

For the next statement, choose your response from the choices "1" to "5" below:

- | | | | | | |
|--|---|---|---|---|---|
| 32. I have found that getting my child to do something or stop doing something is: | 1 | 2 | 3 | 4 | 5 |
| 1. much harder than I expected | | | | | |
| 2. somewhat harder than I expected | | | | | |
| 3. about as hard as I expected | | | | | |
| 4. somewhat easier than I expected | | | | | |
| 5. much easier than I expected | | | | | |

For the next statement, choose your response from the choices “10+” to “1-3”

33. Think carefully and count the number of things which your child does that bothers you
- | | 10+ | 8-9 | 6-7 | 4-5 | 1-3 |
|--|-----|-----|-----|-----|-----|
|--|-----|-----|-----|-----|-----|
34. There are some things that my child does that really bother me a lot
- | | SA | A | NS | D | SD |
|--|----|---|----|---|----|
|--|----|---|----|---|----|
35. My child turned out to be more of a problem than I expected
- | | SA | A | NS | D | SD |
|--|----|---|----|---|----|
|--|----|---|----|---|----|
36. My child makes more demands on me than most children
- | | SA | A | NS | D | SD |
|--|----|---|----|---|----|
|--|----|---|----|---|----|

Appendix D

Home Situations Questionnaire

Instructions: Does your child present any problems with compliance to instructions, commands, or rules for you in any of these situations? If so, please circle the word *YES* and then circle a number beside that situation that describes how severe the problem is for you. If your child is not a problem in a situation, circle *NO* and go on to the next situation on the form.

| Situations | Yes/No | N/A | If yes, how severe? | | | | | | | | | |
|--|--------|-----|---------------------|---|---|---|---|---|---|--------|---|---|
| | | | Mild | | | | | | | Severe | | |
| While playing alone | Yes | No | N/A | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| While playing with other children | Yes | No | N/A | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| At mealtimes | Yes | No | N/A | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Getting dressed | Yes | No | N/A | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Washing and bathing | Yes | No | N/A | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| While you are on the telephone | Yes | No | N/A | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| While watching television | Yes | No | N/A | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| When visitors are in your home | Yes | No | N/A | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| When you are visiting someone's home | Yes | No | N/A | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| In public places (restaurants, stores, church, etc.) | Yes | No | N/A | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| When father is home | Yes | No | N/A | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| When asked to do chores | Yes | No | N/A | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| When asked to do homework | Yes | No | N/A | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| At bedtime | Yes | No | N/A | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| While in the car | Yes | No | N/A | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| When with a babysitter | Yes | No | N/A | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Total:

Mean Score:

Appendix E

Parenting Locus of Control Scale

Instructions: Please rate the degree to which you agree/disagree with the following statements.

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|--|----------------------|----------|---------|-------|-------------------|
| 1. What I do has little effect on my child's behavior | 1 | 2 | 3 | 4 | 5 |
| 2. When something goes wrong between me and my child, there is little I can do to correct it | 1 | 2 | 3 | 4 | 5 |
| 3. If your child tantrums no matter what you try, you might as well give up | 1 | 2 | 3 | 4 | 5 |
| 4. My child usually ends up getting his/her way, so why try | 1 | 2 | 3 | 4 | 5 |
| 5. I am often able to predict my child's behavior in situations | 1 | 2 | 3 | 4 | 5 |
| 6. It is not always wise to expect too much from my child because many things turn out to be a matter of good or bad luck anyway | 1 | 2 | 3 | 4 | 5 |
| 7. When my child gets angry, I can usually deal with him/her if I stay calm | 1 | 2 | 3 | 4 | 5 |
| 8. When I set expectations for my child, I am almost certain that I can help him/her meet them | 1 | 2 | 3 | 4 | 5 |
| 9. When my child is well-behaved, it is because he/she is responding to my efforts | 1 | 2 | 3 | 4 | 5 |
| 10. I am responsible for my child's behavior | 1 | 2 | 3 | 4 | 5 |
| 11. My life is chiefly controlled by my child | 1 | 2 | 3 | 4 | 5 |
| 12. My child does not control my life | 1 | 2 | 3 | 4 | 5 |
| 13. My child influences the number of friends I have | 1 | 2 | 3 | 4 | 5 |
| 14. I feel like what happens in my life is mostly determined by my child | 1 | 2 | 3 | 4 | 5 |
| 15. When I make a mistake with my child I am usually able to correct it | 1 | 2 | 3 | 4 | 5 |
| 16. Even if your child has frequent tantrums, a parent should not give up | 1 | 2 | 3 | 4 | 5 |
| 17. I always feel in control when it comes to my child | 1 | 2 | 3 | 4 | 5 |
| 18. My child's behavior is more than I can handle | 1 | 2 | 3 | 4 | 5 |
| 19. Sometimes I feel that my child's behavior is hopeless | 1 | 2 | 3 | 4 | 5 |
| 20. It is often easier to let my child have his/her way than to put up with a tantrum | 1 | 2 | 3 | 4 | 5 |
| 21. I find that sometimes my child can get me to do things I really did not want to do | 1 | 2 | 3 | 4 | 5 |
| 22. My child often behaves in a manner very different from the way I would want him/her to behave | 1 | 2 | 3 | 4 | 5 |
| 23. Sometimes when I'm tired, I let my child do things I normally wouldn't | 1 | 2 | 3 | 4 | 5 |
| 24. Sometimes I feel that I do not have enough control over the direction my child's life is taking | 1 | 2 | 3 | 4 | 5 |
| 25. I allow my child to get away with things | 1 | 2 | 3 | 4 | 5 |

Appendix F
Examples of Low Intensity Activities

| | |
|-------------------------------------|-------------------------------------|
| <u>Home Activities:</u> | |
| Taking baths | Doing homework |
| Reading | Playing computer games |
| Playing a board game | Coloring/drawing |
| Talking with parents | Sitting down at table/eating dinner |
| Preparing for bed | Watching a movie |
| <u>Community Activities:</u> | |
| Movies/museum/library | Restaurants |
| Parents' office/place of work | Doctors' offices |
| Car/train/bus/plane rides | Religious services |

Appendix G

Context Specific Problem Behavior

Please answer the following two items based upon your child's problem behavior, in the identified activity, during the past month.

1. During this activity, my child's problem behavior is:

| | | | | | | |
|------------|---|---|----------------------|---|---|-----------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Infrequent | | | Somewhat Frequent | | | Extremely Frequent |

2. During this activity, my child's problem behavior is:

| | | | | | | |
|----------------|---|---|---------------------|---|---|----------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not Intense | | | Somewhat Intense | | | Extremely Intense |

Appendix H

Crucial Components of a Psychoeducational Temperament Curriculum (Chess & Thomas, 1986)

- (1) Children are born with many individual differences. Just as children look different from one another, they also have different styles of behavior (called temperament) from birth.
- (2) These behavioral differences can be expressed in many ways. They can be seen by the way your child reacts to something difficult, the intensity of your child's emotions, or the type of activities your child enjoys.
- * (3) Your child is active, impulsive, prefers high intensity activities, and is not shy. This type of temperament style is called extroversion, or surgency (Rothbart et al., 2001).
- (4) These differences in temperament are normal.
- (5) Some of these differences may make it easier or harder to manage your child's routines.
- (6) Parents should not focus all of their effort in trying to change their child's temperament. It is unlikely for temperament to change.
- (7) Parents should not expect that there is one set of parenting rules that will work for all children. Children's differences in temperament make it likely that certain strategies will work better for some children than others.
- (8) Most importantly, parents should not feel incompetent if their child has more difficult temperament characteristics than other children. Instead, parents should understand that difficult behaviors are the result of a poor match between the temperament of their child and the environment, not because of parental skill deficits.
- * (9) Parents can modify contexts that are difficult for their children in order to make these contexts more compatible to their temperament, and reduce problem behavior (Chess & Thomas, 1991; Super & Harkness, 1994).

* These items have been added by the researchers from additional sources to supplement the curriculum provided by Chess & Thomas (1986).

Appendix I

Problem Solving Template (from Stiebel, 1999)

1. Identifying the problematic routine.
2. Identifying possible reasons for problem behavior in that routine.
3. Brainstorming solutions.
4. Discussing pros and cons of each solution.
5. Selecting the solution that fits best with the routine of interest.
6. Planning a strategy for implementing the solution.
7. Reviewing key questions relevant to the solution:
 - a. What are the family goals for the routine?
 - b. Do the solutions support your goals for the routine?
 - c. Will the solutions work over an extended period of time (6-12) months?
 - d. Are you comfortable with what you'll be doing?
8. Planning a follow-up meeting to discuss progress and to troubleshoot.

Appendix J
Decision Tree for Intervention Protocol

1. Administer ABC, CBQ and ancillary quality of life measures.
2. Psychoeducational session with family to discuss temperament
3. Problem solving session with family to develop the intervention.
4. Teach family intervention(s) for experimental context; 1-2 sessions of teaching by the experimenter.
5. Family must run 3 intervention sessions independently of researcher. At session 4, has family mastered interventions for experimental context (based on experimenter observation and IV integrity check)?
 - If YES, EXPERIMENTAL POST-TRAINING: provide family with interventions for clinical extension contexts.
 - If NO, provide additional training to family for one session. Repeat Step 3 as needed.
6. After 3 additional weeks, does family report having mastered interventions for clinical contexts?
 - If YES, complete 2 spot checks to confirm application of interventions.
 - If NO, provide additional training to family for one session. Repeat Step 4 as needed.
7. Has family been observed during 2 spot checks to be implementing interventions for clinical extension context?
 - If YES, CLINICAL EXTENSION POST-TRAINING BEGINS. If NO, continue to do spot checks until family has been observed 2 times applying the interventions. Repeat Step 5 as needed.
8. Post training data collection should occur for approximately 12 weeks. During the final week of post intervention data collection, administer the ABC, CBQ, and ancillary quality of life measures.

Note: IV = Independent variable