

THE IMPACT OF CHILD AND FAMILY CHARACTERISTICS AND CAREGIVER
BEHAVIOR ON THE DEVELOPMENT OF BEHAVIORAL PROBLEMS IN
CHILDREN WITH DEVELOPMENTAL DELAY

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Title: The Impact of Child and Family Characteristics and Caregiver Behavior on the Development of Behavioral Problems in Children with Developmental Delay

Children with developmental delays (DD) are significantly more likely to develop behavioral and psychiatric problems than children with typical development (Baker, Blacher, Crnic, & Edelbrock, 2002; Baker, McIntyre, Blacher, Crnic, Edelbrock, & Low, 2003). Raising a child with DD presents unique parenting demands related to their child's needs (e.g. behavioral regulation, language, cognition, adaptive skills, etc.).

Consequently, caregivers of children with DD are more likely than caregivers of children without DD to experience mental and physical health problems (Baker et al., 2003; Hastings, Daly, Burns, & Beck, 2006; Eisenhower, Baker, & Blacher, 2009). While a significant amount of literature has addressed the effects of parenting behaviors on the development of problem behaviors in typically developing children, less is known about how parenting behaviors affect the development of problem behaviors in children with DD. Furthermore, few of these studies have included both reported and observed measures of problem behavior in children.

The present study examined parenting behaviors of 180 caregivers and their children with DD during a 15-minute observation with their children. Multiple regression analyses were conducted with various dimensions of caregiver's parenting behaviors, in addition to both child and family characteristics to determine their associations between

both observed and reported challenging behavior in children with DD. Results indicated that caregiver's parenting behaviors are associated with observed challenging behavior in children, but not reported challenging behavior. The severity of problem behaviors was not found to moderate the relationship between parenting behaviors and children's challenging behavior and when controlling for child problem behavior, caregiver's stress and depression did predict parenting behaviors. The significance and limitations of these findings are discussed, as well as recommendations for future research and implications for practitioners who are supporting caregivers' parenting behavior with children with challenging behavior.

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CHAPTER 1

INTRODUCTION

Children with developmental delays (DD) are more likely to experience behavioral and psychiatric problems than children without DD (Baker, Blacher, Crnic, & Edelbrock, 2002; Baker, McIntyre, Blacher, Crnic, Edelbrock, & Low, 2003). Reports have suggested that children with DD are as much as seven times more likely to be diagnosed with a psychiatric condition than children without DD (Emerson, 2003). Eapen (2014) suggested that between 40%-50% of children with DD may experience problems later in life such as anxiety, anger, depression, substance abuse, self-control difficulties, and disruption. The pathways to various developmental outcomes are complex and influenced by myriad child, family, and contextual risk factors (e.g., Sameroff, 2010).

The presence of a developmental delay may indeed be a risk factor for the development of behavioral problems, yet developmental delays are heterogeneous and often represent a range of functioning. The Individuals with Disabilities Education Act (2004) defines developmental delay as a delay in at least one of the five functional areas of development (i.e., cognition, communication, social/emotional, motor, and adaptive). The prognosis of children with DD can take different courses of action, which may include children's development improving to a level commensurate with their peers, or significant developmental disabilities may become evident. Baker et al. (2002) described dual diagnoses as the presence of both a developmental disability and a comorbid mental health diagnosis. Significantly more research is available on dual diagnoses in adolescence and adulthood than in early childhood. However, some research has

indicated that developmental trajectories of behavioral problems in early childhood remain constant over time (Caspi, Moffitt, Newman, & Silva, 1996; Mesman & Koot, 2000; Shaw, Lacourse, & Nagin, 2005; Pihlakoski, Sourander, Aromaa, Rautava, Helenius, & Sillanpää, 2006). For example, Pihlakoski et al. (2006) found that within a population-based sample of children, externalizing problems at age three significantly predicted internalizing and externalizing behavior problems at age 12 in both boys and girls. The continuity of aggression and destructive behaviors, specifically, were associated with the most consistent levels across time.

The presence of significant behavioral challenges in individuals with DD can present families, social services, and schools with unique challenges in supporting their behavioral and mental health needs. For example, Bruininks, Hill, and Morreau (1988) reviewed 50 years of research and determined that throughout the continuum of ages, significant behavioral problems in individuals with dual diagnoses restricted their ability to fully integrate into educational, residential, and employment settings and can also be associated with more restricted placements (McIntyre, Blacher, & Baker, 2002). These behavioral challenges can contribute to elevated levels of mental health problems in caregivers with differential effects, depending on the area(s) of delay.

The parenting demands of raising a child with DD and behavior problems presents unique challenges for caregivers. Research has detailed the significant impact that behavior problems in children with DD has on their caregivers, with special attention to the focus of caregiver's mental health. Baker et al. (2002) found that the presence of behavioral problems in children with DD accounted for more stress reported by parents

than did the presence or extent of intellectual disabilities in children. Stated differently, the behavior problem, more than the intellectual or developmental delay per se, can pose significant stress and burden on caregivers. Hastings, Daly, Burns, and Beck (2006) found a bidirectional relationship between behavioral problems in children with intellectual disabilities on maternal depression and emotional expression. The impacts of child behavior problems on caregiver's mental health can be cumulative and can increase over time, due to many factors, such as increased intensity of behavioral problems as children get older. Mothers of children and adolescents with intellectual disabilities were significantly more distressed and reported more difficulties handling feelings of anger with their children than when compared to mothers of individuals without intellectual disabilities (Cummings, Bayley, & Rie, 1966). Cummings (1976) found similar patterns with fathers of children with intellectual disabilities. A 2009 study by Eisenhower, Baker, and Blacher examined the impact of behavior problems in children with DD on mother's perceived health. Eisenhower et al. found that stress associated with parenting moderated the relationship between behavior problems in children and perceived maternal-perceived physical health. Furthermore, these effects were mediated by maternal depressive symptoms. These results suggest that parents of children with DD and behavioral problems are at-risk for heightened mental health problems and present as a vulnerable population in need of support to offset developmental trajectories for both caregivers and children. The adverse effects of behavior problems in children with DD on caregiver's mental and physical health suggests the need for early intervention supports to target the

early development of behavior problems and offset developmental trajectories and outcomes for children.

Parenting Strategies and Problem Behavior

Caregivers of children with problem behavior are presented with unique challenges to addressing and managing behavioral challenges in children. Children's behavioral problems may tax a caregiver's abilities to manage problem behaviors and these management strategies may look very different across families. The interactions between children and their parents are an integral part of a child's development and can play a vital role in the developmental trajectories for problem behavior. Loeber and Dishion (1983) conducted a systematic review of predictors of delinquency in typically developing males and found that some of the most robust predictors included family management and strategies used by parents. As much research has focused on children without DD, less is known about the developmental outcomes of children with DD. However, certain parenting practices emerge as predictors of the development of behavior problems in many children.

Lindahl (1998) described coercive parenting as "attempt [for parents] to influence the child through the use of force, physical manipulation, or harsh, repetitive commands" (p. 421). These parenting practices may include the use of aggression (e.g. hitting) to change a child's behavior. These coercive parenting strategies may occur following feelings of frustration or anger by caregivers, following problem behaviors in their children. Scaramella and Leve (2004) suggested that caregivers engaged in more coercive, harsh, and controlling behaviors with children who exhibited more behavioral

problems. These coercive patterns are thought to develop over time and through mutual reinforcement between parent and child interactions. Inconsistent and punitive parenting behaviors have been linked to the development of conduct problems in children (Stormshak, Bierman, McMahon, & Lengua, 2000). Additionally, Stormshak et al. found that aggressive parenting behavior was associated with aggressive behavior in children. Consistency has also been a focal point of research in predicting problem behavior in children. Consistent discipline strategies have been found to positively correlate with compliance (Lytton, 1977). Gardner (1989) observed interactions between parents and their preschool-aged children and found that parents were more inconsistent in their follow-through of instructions for children with problem behavior than children without problem behavior. Fagot and Gauvain (1997) examined parenting strategies of caregivers with toddlers during a problem-solving task and found that caregivers provided more directives and feedback to children who exhibited higher levels of problem behavior than children with lower levels of problem behavior.

Caregiver Factors and Problem Behavior

In addition to parenting practices, caregiver factors have also been found to predict problem behavior in children and more specifically, caregiver mental health. Crnic, Gaze, and Hoffman (2005) found that caregiver stress predicted child behavior problems and also is an important characteristic that affects a caregiver's ability to implement effective parenting strategies (Crnic & Low, 2002; Deter-Deckard, 1998). Deter-Deckard (1998) suggested that parenting stress should be viewed as a unique construct that is separate from overall life stress. There are certain stressors that are

associated with parenting a child and therefore, should be accounted for differently than other daily stressors. Parents with higher levels of stress are more likely to take an authoritarian stance and are more likely to be negative and harsh with their parenting. A study by Crnic and Greenberg (1990) attempted to understand associations between parenting daily hassles (i.e., stress) and actual parenting behavior but found no such associations. They hypothesized that this may be due to the observations having been conducted in a laboratory setting rather than a more naturalistic setting, suggesting the need for additional naturalistic observations of parenting behaviors in caregivers. In a longitudinal study of the associations between caregiver stress and depression and problem behavior in children, Stormont (2002) found that children with relatively stable levels of problem behavior over time had caregivers with higher levels of initial stress and depression than did children whose behavior problems improved. These results highlight the important impact of caregiver factors and their influence on children's problem behavior.

Theories of Influences and Development of Behavior

Coercion theory. Patterson (1976) suggested a theoretical model of a cycle of coercive interactions that over time, shape the behavior of both caregivers and children and referred to this as Coercion Theory. Negative reinforcement is a major component of these coercive interactions and involves mutually reinforcing interactions between maladaptive child behaviors resulting in caregivers withdrawing request, avoiding requests, and giving into children's problematic or undesired behavior. This process takes time and occurs over the course of many different child-caregiver interactions. Dishion

and Patterson (2015) suggested that aversive family events occur as often as once every three minutes, while a conflicting event occurs once every 16 minutes. Children's maladaptive behaviors may evoke negative emotions in caregivers and could serve to impact coercive interactions. Patterson originally suggested this theory after observations of preschool-aged children in their homes across a period of a few weeks. Coercion Theory has been used to explain the development of conduct problems in adolescents later in life, following a history of coercive behaviors as children (Dishion & Patterson, 2015).

Coercive interactions have not only been used to explain the development of later behavior problems in children and adolescents, but these coercive behaviors have also been the focus of intervention with attempts to offset developmental trajectories. Within this focus on addressing observed, maladaptive interactions, the social interaction model (Patterson, Reid, & Dishion, 1998) places an emphasis on "changing functional dynamics" (Dishion, Stormshak, & Kavanagh, 2012, p. xiii). Dishion, Patterson, and Kavanagh (1992) used this framework to target coercive behaviors in parent-child interactions and found that reducing coercive parenting practices resulted in decreased conduct problems and other problematic behaviors in adolescents.

Ecological influences. There are many environmental factors that can influence a child's developmental outcomes. For example, larger systems such as an individual's community and culture can influence their development. Economic resources, ethnic status, and religion may influence a child's development. Other systems within schools such as classrooms, playgrounds, and public areas impact a child's development.

Relationships with teachers, parents, and peers can impact development in children. These environmental factors interplay with one another and impact children. Urie Bronfenbrenner (1979, 1989) suggested that these systems interact with one another and theorized this as the Ecological Systems Theory. Within this Ecological Systems Theory, Bronfenbrenner suggested that the microsystem, mesosystem, exosystem, macrosystem, and chronosystem play a role in a child's development. While it is important to reference and discuss the various levels of Bronfenbrenner's Ecological Systems Theory, the primary focus of the present study is centered around the microsystem and more specifically, the interactions and relationships between caregivers and their children.

Microsystem. The microsystem is the most proximal layer within the Ecological Systems Theory and represents the immediate environment in which a child lives. Relationships between a child and their parents, teachers, siblings, and peers are the focus of the microsystem. More nurturing environments may lead to more favorable developmental outcomes, while coercive and negative environments may have adverse impacts on a child's development.

Mesosystem. The mesosystem is focused on the interactions and connections within the microsystem. For example, parents interact with teachers and in turn, their relationship or interaction can play a role in a child's development. If there are favorable parent-teacher relationships, this may support appropriate developmental outcomes in children. However, the reverse can be true as well. A negative or toxic parent-teacher relationship may negatively impact developmental outcomes.

Exosystem. The exosystem represents a layer where a child may not directly interact with the people or places, but yet, the systems within this layer impact the child. The neighborhood that a child lives in may affect developmental outcomes. Financial stress and burden of parents getting laid off of work have direct impacts on a child's environment.

Macrosystem. The macrosystem is the largest and furthest removed system within the Ecological Systems Theory and include larger societal factors, such as government, laws, cultural influences, economics, etc. While this layer may be more removed and distal to a child, there is still potential for its influence on development.

Chronosystem. The chronosystem represents transitions and patterns of the environment across the lifespan. For example, divorce between two parents marks a transition and can have definite impacts on a child's development.

Problem Statement

Significant research has examined associations between parenting behavior and problem behavior in children, with less attention on young children with DD. These children represent a particularly vulnerable population that is at heightened risk for mental health and problem behaviors later in life. Furthermore, many of these studies have included parent-reported measures of problem behavior rather than direct samples of behavior. Additional research is needed that incorporates observed behavior in children and how child behaviors are associated with parenting behaviors.

Research Questions

Given the gaps in the literature of the development of behavior problems in young children with DD, the present study seeks to address the following questions:

1. To what extent do caregiver's parenting behavior predict problem behavior in children with DD? And more specifically,
 - a. Does caregiver's parenting behavior predict noncompliance in children with DD?
 - b. Does caregiver's parenting behavior predict observed problem behavior in children with DD?
 - c. Does caregiver's parenting behavior predict reported problem behavior in children with DD?
2. To what extent are caregiver's parenting behaviors moderated by the severity of reported problem behavior in children with DD?
3. What contextual factors predict caregiver's parenting behavior above and beyond problem behavior in children with DD?

CHAPTER II

METHOD

Participants

Participants were 180 preschool-aged children with DD and their primary caregivers who served as participants in the Oregon Parent Project (R01 HD059838; McIntyre, PI), a randomized controlled trial investigating the effects of a parenting intervention on child and family functioning. Children were required to have a DD, as reported by their primary caregiver. No criteria were required for the presence of behavioral problems. The sample was collected cross-sectionally and represented the 180 participants at Time 1 (i.e. study entry). At study entry, children were approximately three-years-old (M age = 36.96 months; SD = 4.66 months) and approximately 75% male. Primary caregivers were approximately 32 years old (M age = 32.37 years; SD = 7.20) and 92% female. Both children and caregivers were predominantly White (91.70% and 88.30%, respectively). Detailed demographic information is reported in Table 1.

Measures

Demographic survey. Parents provided demographic information via an in-person interview with research assistants. The present study included demographics such as child age, child race/ethnicity, child sex, parent age, parent sex, parent race/ethnicity, annual household income, and parent education level.

Child behavior problems. Information regarding child behavior problems were collected both by parent-report and during 15-minute observations interacting with their caregivers, as described above.

Table 1

Demographic Information for Caregivers and Children (N = 180)

Caregiver		Children	
Characteristic	M or % (SD)	Characteristic	M or % (SD)
Age (years)	32.37 (7.20)	Age (months)	36.96 (4.66)
% Female	92.20	% Male	75.60
% White	88.30	% White	91.70
% Hispanic	11.70	% Hispanic	15.00
% Employed full-time	18.90	% Communication delay	53.30
Annual income (in \$)	39,281.25 (33,226.53)	% Developmental delay	15.00
% below poverty	43.89	% Autism spectrum disorder	13.30
% with college degree	23.90	CBCL total score	59.46 (12.12)
PSI/SF	85.45 (20.61)	CBCL ext. problems	58.52 (12.90)
CES-D	11.93 (9.88)	Vineland-II	81.58 (11.92)

Note. CBCL = Child Behavior Checklist, PSI/SF = Parenting Stress Index/Short Form,

CES-D = Center for Epidemiological Studies Depression Scale, Vineland-II = Vineland

Adaptive Behavior Scales, 2nd edition.

Parent-reported child behavior problems. The *Child Behavior Checklist for Ages 1 ½ - 5* (CBCL; Achenbach & Rescorla, 2000) is a 99-item, norm-referenced checklist that examines a variety of social and behavioral problems in young children. The CBCL can be completed between 15 to 20 minutes and by respondents with at least a fifth-grade reading level. The CBCL was completed by primary caregivers in the present study.

Scores on the CBCL are reported as *T*-scores ($M = 50, SD = 10$), with higher scores indicating more significant behavioral problems. *T*-scores below 60 fall within the Normal range, *T*-scores of 60 to 63 fall within the Borderline range, and *T*-scores above 63 fall within the Clinical range. The Total Problems score includes all items and is comprised of scores from both the Internalizing Problems and Externalizing Problems. Scores on the Externalizing Problems scale were used in the present study. Research has found that the test-retest reliability for Externalizing Problems scale on the CBCL is high ($\alpha = .87$; Achenbach & Rescorla, 2000). The CBCL has been used extensively in populations of children with developmental delays (Baker, McIntyre, Blacher, Crnic, Edelbrock, & Low, 2003; Pandolfi, Magyar, & Dill, 2009). The alpha reliability for the CBCL Externalizing Problems scale in the present sample was high ($\alpha = .93$).

Observed child and caregiver behaviors. The *Parent Child Behavior Observation System* (PCBOS; Phaneuf & McIntyre, 2007) was used to code observed behavior problems in parents and their children (see Appendix A). The proportion of 30-second intervals that included the target behaviors were calculated using a partial interval recording method. Target behaviors included inappropriate behaviors for both children and their parents.

For children, target behaviors included negative verbalizations, which were defined as any instance of inappropriate vocalizations by children in irritation (e.g. whining, screaming, swearing, threats, yelling, growling, etc.) and noncompliance, which was defined as not following or attempting to follow a command by a caregiver within five seconds. For caregivers, Target behaviors included inappropriate commands (i.e.,

commands that are ambiguous, phrased as a question, or repeated more than twice), lack of follow through (i.e., providing escape following the delivery of a demand or missed opportunity for praise following compliance), positive consequences for inappropriate behavior (i.e., delivery of either vocal attention or a tangible object following inappropriate child behavior), aggression (i.e. any yelling, irate tone of voice, or striking child with open or closed hand), and criticism (i.e. verbal expression of disapproval of the child, or their activities or choices).

Inter-rater reliability was calculated for 24% of sessions by two independent observers using an overall reliability of proportion of intervals with target behavior. Data were originally coded for compliance. Noncompliance was calculated by taking the inverse of the compliance ratio. For example, if the proportion of compliance was .53, then the calculated proportion of noncompliance was .47. Reliability for compliance was calculated with a +/- .10 proportion of error. In other words, intervals were deemed reliable if two coders coded the proportion of compliance within .10 of one another. Reliability for child noncompliance was 65%. Percent reliability for caregivers' behaviors are as follows: number of commands 33%, inappropriate commands 80%, lack of follow through 73%, positive consequences for inappropriate behavior 95%, aggression 99%, and criticism 99%. Overall interobserver agreement for all variables from the PCBOS in the current sample was high, with percentage agreement of 87%.

Parenting stress. The *Parenting Stress Index, Third Edition Short Form* (PSI/SF; Abidin, 1995) is a 36-item, norm-referenced tool that was used to measure parent-reported stress over the last 12 months. Parents answered questions on the PSI/SF as a

questionnaire through a five-point likert-type scale from Strongly Disagree to Strongly Agree. The PSI/SF takes approximately 10 minutes to complete and yields scores across three scales (Parental Distress, Parent-Child Dysfunctional Interaction, and Difficult Child) that comprise the Total Stress score. The raw score for the Total Stress score on the PSI/SF will be used in the present study. Raw scores above 90 on the Total Stress score indicate significant levels of parental stress. Internal consistency of the PSI/SF was found to be high ($\alpha = .95$). Test-retest reliability is highest between 1-3 months ($\alpha = .88 - .96$) and decreases after one year ($\alpha = .65$; Abidin, 1995). The alpha reliability coefficient for the current sample was high ($\alpha = .92$) for the Total Stress Index.

Parenting depressive symptoms. The *Center for Epidemiologic Studies-Depression* (CES-D; Radloff, 1977) is a 20-item, norm-reference tool that is used to assess depressive symptomatology within adults in the general population. Parents completed the CES-D to gather information regarding self-reported depressive symptoms over the last seven days. The CES-D can be completed in less than 10 minutes with respondents using a four-point likert-type scale ranging from 0 (Rarely or none of the time, less than once per day) to 3 (All of the time, 5-7 days). Raw scores from the CES-D will be used with the present study with higher scores indicating the presence of more depressive symptoms. Raw scores of 16 or greater fall above the cutoff range and are indicative of individuals with significant depressive symptoms. The CES-D has been found to have high internal consistency ($\alpha = .82 - .90$; Radloff, 1977; Lewinsohn, Seeley, Roberts, & Allen, 1997). Alpha reliability coefficient in the current sample was high ($\alpha = .91$).

Dependent measures.

Child dependent measures. Dependent measures for children in the current study included both observed and reported problem behavior. For reported problem behavior, the dependent variable was children's *T*-scores on the Externalizing Problems score of the CBCL. The Externalizing Problems score is a continuous, quantitative variable. For observed problem behavior, the dependent variables were noncompliance and negative verbalizations. Negative verbalizations were defined as any instance of inappropriate vocalizations by children in irritation (e.g. whining, screaming, swearing, threats, yelling, growling, etc.) and were calculated using a 30-second partial interval recording method. In other words, the observation was split into 30-second intervals and intervals were marked if the dependent measure was observed at any point in the interval. The values for negative vocalizations were reported as a proportion of intervals with the presence of the target behavior. Noncompliance was defined as not following or attempting to follow a command by a caregiver within five seconds. A proportion of noncompliance to commands was used in the present study.

Negative verbalizations were chosen, rather than other observed child problem behaviors (e.g. aggression, disruption, etc.), because negative verbalizations were the most common observed problem behavior for children. Disruption and aggression occurred very infrequently within the current sample. Additionally, this choice also matches with a developmental perspective of the changes in severity and topography of antisocial behavior in young children (Patterson, 1992; Shaw & Winslow, 1997).

Caregiver dependent measures. Dependent measures for caregivers in the present study included a variety of negative, or undesired, parenting behaviors. Depending on the research questions, these parenting behaviors either served as predictors, or dependent measures. These parenting behaviors included the following: inappropriate commands (i.e., commands that are ambiguous, phrased as a question, or repeated more than twice), lack of follow through (i.e., providing escape following the delivery of a demand or missed opportunity for praise following compliance), positive consequences for inappropriate behavior (i.e., delivery of either vocal attention or a tangible object following inappropriate child behavior), aggression (i.e. any yelling, irate tone of voice, or striking child with open or closed hand), and criticism (i.e. verbal expression of disapproval of the child, or their activities or choices), as described in Phaneuf and McIntyre (2008).

Independent measures. Independent variables for the current study included instances of undesired, negative parenting behaviors described above, as well as self-reported variables by caregivers. For observed parenting behaviors, the percentage of 30-sec intervals with observed target behavior was used. The variables of interest for observed parenting behaviors included the following and are defined the same above: inappropriate commands (i.e., commands that are ambiguous, phrased as a question, or repeated more than twice), lack of follow through (i.e., providing escape following the delivery of a demand or missed opportunity for praise following compliance), positive consequences for inappropriate behavior (i.e., delivery of either vocal attention or a tangible object following inappropriate child behavior), aggression (i.e. any yelling, irate

tone of voice, or striking child with open or closed hand), and criticism (i.e. verbal expression of disapproval of the child, or their activities or choices). Two separate negative parenting composites were created for the present study. The first composite addressed parenting commands and included the proportion of intervals with any instances of inappropriate commands and/or lack of follow-through with commands. The second composite addressed harsh or coercive parenting behaviors and included the proportion of intervals with any instances of positive consequences for inappropriate child behavior, aggression, and/or criticism. Self-reported independent measures included stress (as indicated by the Total Stress Index score on the PSI/SF) and depressive symptoms (as indicated by the raw score on the CES-D).

Poverty level was used within the present study and was determined from the U.S. Department of Health and Human Services (DHHS, 2015). Thresholds were calculated using the 2015 poverty guidelines (when the original study was conducted), based on reported household income and total number of people in the household. This information was used to determine whether families fell below the 100% poverty level threshold, or at/or above the 100% poverty level threshold.

Caregiver education level was calculated, based on self-reported levels of education by primary caregivers. Education level was split to examine differences between two groups. One group included primary caregivers who reported having at least a four-year college degree, while the other group included primary caregivers who had less than a four-year college degree.

Research Design

The present study analyzed previously collected data from the Oregon Parent Project (OPP). The OPP was a randomized controlled trial that examined the effects of a parent-training intervention on children's problem behavior and parent-child interactions. Caregivers completed questionnaires and participated in short, 15-minute video-taped interactions with their children in naturalistic home settings.

Procedures

Because the study used previously collected data, caregivers have previously completed all questionnaires and video-taped observations of parent-child interactions have already been conducted. The procedure for the observed parent-child interactions included 10-minutes of free play, a two-minute clean up task, and a three-minute structured activity task with the caregiver and their child (see Appendix B), described in more detail below. Prompts were included before the end of each activity and prior to transitioning to the next activity. These prompts are also described in more detail below.

Free play. Parent-child dyads participated in a 10-minute free play period with a standardized set of toys. Participants were told to play with the materials available and were provided with a one-minute warning, prior to the end of the 10-minute period.

Clean-up. Following the 10-minute free play task, participants were instructed to clean up the materials and return all materials to their original location in the box.

Structured activity. The observation period concluded with a three-minute structured activity, whereby participants were provided with three standardized activities

and were instructed to choose one to work on. A one-minute warning was provided to participants prior to the end of the observation period.

Data Analysis

IBM SPSS Statistics 25 was used to analyze the data for the current study. The results of the descriptive statistics are displayed in Table 1. Several variables exceeded skew values for normal distribution, indicating significant skew. These variables included CES-D scores, number of commands delivered by caregivers, child noncompliance, and caregiver's use of positive consequences for inappropriate behavior/aggression/and/or criticism.

Research question #1. To what extent do caregiver's parenting behavior predict problem behavior in children with DD? It was hypothesized that higher use of caregiver's inappropriate parenting behavior will significantly result in greater problem behaviors in children.

Research Question #1a. Does caregiver's parenting behavior predict noncompliance in children with DD? It was hypothesized that higher use of caregiver's inappropriate parenting behavior will result in higher rates of noncompliance in children with DD.

Analysis. A linear regression was used with separate predictor variables of (1) inappropriate commands and/or lack of follow through, (2) number of commands, (3) child diagnosis, (4) caregiver education, and (5) poverty level predicting noncompliance in children.

Research Question #1b. Does caregiver's parenting behavior predict observed problem behavior in children with DD? It was hypothesized that higher use of caregiver's inappropriate parenting behavior will result in more observed problem behavior in children with DD.

Analysis. A linear regression will be used with the predictor variables of (1) combined positive consequences for inappropriate behavior, criticism, and/or physical aggression, (2) child diagnosis, (3) caregiver education, and (4) poverty level predicting negative vocalizations.

Research Question #1c. Does caregiver's parenting behavior predict reported problem behavior in children with DD? It was hypothesized that higher use of caregiver's inappropriate parenting behavior will result in more observed problem behavior in children with DD.

Analysis. A linear regression was used with predictor variables of (1) combined positive attention for inappropriate behavior, criticism, and/or physical aggression, (2) child diagnosis, (3) caregiver education, and (4) poverty level predicting reported child problem behavior (i.e. externalizing problems on CBLC).

Research Question #2. To what extent are the effects of caregiver's parenting behaviors on observed child problem behaviors moderated by the severity of reported problem behavior in children with DD? It was hypothesized that the severity of reported problem behavior in children will moderate the use of both observed inappropriate parenting strategies by caregivers (use of inappropriate commands and/or lack of follow through as well as positive consequences for inappropriate behavior, aggression, and/or

criticism), in that more severe problem behaviors in children will result in higher use of inappropriate parenting strategies by caregivers.

Analysis. To explore the moderation of severity of problem behavior on the effect of caregiver's parenting behavior on child problem behavior, two hierarchical linear regressions were used. For each model, Block 1 included the predictor of inappropriate parenting behavior (either combined inappropriate commands and/or lack of follow through, or positive consequences for inappropriate behavior, criticism, and/or aggression) from the PCBOS. Block 2 will include the predictor of the categorical variable for the severity of problem behavior. Severity will be dummy coded, whereby a 0 equals a *T*-score of 59 or less on the Externalizing Problems score of the CBCL and a 1 equals a *T*-score of 60 or above on the Externalizing Problems score of the CBCL. Block 3 will include an interaction term of parenting behavior X externalizing behavior. The outcome variable will be the combined inappropriate child behavior composite (e.g. aggression, disruption, and negative vocalization)

Research Question #3. What contextual factors predict caregiver's parenting behavior above and beyond problem behavior in children with DD? It is hypothesized that when controlling for reported problem behaviors in children, depression and stress will predict greater use of observed inappropriate parenting strategies by caregivers.

Analysis. To explore the effects of depression and stress on caregiver's parenting behavior above and beyond reported problem behaviors, a hierarchical linear regression was used. Block 1 included the predictor of reported child problem behavior through the *T*-score on the Externalizing Problems score of the CBCL. Block 2 included the

predictors of the Total Score raw scores from the PSI/SF and the raw score from the CES-D. The outcome variable for the hierarchical linear regression will be a combined inappropriate parenting behavior index from the PCBOS.

Power Analysis

A power analysis using G*Power 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009) was conducted to determine whether or not sufficient power would be present to detect effect sizes (Cohen, 1988). With regards to bivariate correlations, given a sample size of 180 and a two-tailed probability for a p value of .05, there was sufficient power (0.81) to detect a small-to-moderate effect size of 0.21. With regards to multiple regression analyses, given a sample size of 180, and a p value of .05, there was sufficient power (0.89) to detect a small-to-moderate effect size of $f^2 = 0.1$. When testing for moderation, the plan was to probe for the conditional nature of the relationship if a moderator was significant.

CHAPTER III

RESULTS

Preliminary Analyses

Preliminary analyses were conducted to examine a variety of factors, including base rates of parenting behaviors within the current sample, as well as group differences in those parenting behaviors by child primary diagnosis.

Descriptive statistics for parenting behaviors. Descriptive statistics were used to examine the basic structure of parenting behaviors (e.g. inappropriate commands and/or lack of follow through; number of commands delivered; and positive consequences for inappropriate behavior, aggression, and/or criticism) both across all three tasks (i.e. play activity, clean-up, and structured activity), as well as separated out by specific parenting behavior during each specific task. These results are displayed below in Table 2.

Number of commands. The total number of commands was calculated only during the clean-up task. Within this task, caregivers delivered an average of 18 commands to their children ($M = 18.04$, $SD = 11.00$). It is relevant to note that the clean-up task has a duration of two minutes. In other words, caregivers delivered commands at an average rate of nine per minute. The number of commands ranged from 0-62 during the two-minute clean-up task.

Inappropriate commands and/or lack of follow through. Overall, caregivers engaged in inappropriate commands and/or lack of follow through in approximately 41% of intervals across all three tasks ($M = 0.41$, $SD = 0.18$). Inappropriate commands and/or

lack of follow through were most prevalent during the clean-up task ($M = 0.78$, $SD = 0.27$), compared to the play activity ($M = 0.33$, $SD = 0.20$) or structured activity ($M = 0.45$, $SD = 0.29$). In other words, caregivers engaged in inappropriate commands and/or lack of follow through in 78% of intervals during the clean-up task, 33% of intervals during the play activity, and 45% of intervals during the structured activity.

Table 2

Proportion of Intervals with Caregivers' Target Behavior (N = 180)

Characteristic	<i>M</i>	<i>SD</i>
# of commands	18.04	11.00
IC/LOFT	.41	.18
Play task	.33	.20
Clean-up task	.78	.27
Structured activity task	.45	.29
PCIBAC	.03	.05
Play task	.01	.04
Clean-up task	.09	.21
Structured activity task	.04	.13

Note. IC/LOFT = Inappropriate commands and/or lack of follow-through. PCIBAC =

Positive consequences for inappropriate behavior, aggression, and/or criticism.

Positive consequences for inappropriate behavior, aggression, and/or criticism.

Overall, caregivers engaged in positive consequences for inappropriate behavior, aggression, and/or criticism in approximately 3% of intervals across all three tasks ($M = 0.03$, $SD = 0.05$). Positive consequences for inappropriate behavior, aggression, and/or

criticism were again, most prevalent during the clean-up task ($M = 0.09$, $SD = 0.21$), compared to the play activity ($M = 0.01$, $SD = 0.04$) or structured activity ($M = 0.04$, $SD = 0.13$). In other words, caregivers engaged in positive consequences for inappropriate behavior, aggression, and/or criticism in 9% of intervals during the clean-up task, 1% of intervals during the play activity, and 4% of intervals during the structured activity.

Group differences by poverty, education level, and child primary diagnosis.

Group differences for a variety of outcomes were preliminarily analyzed to determine differences on numerous parenting behaviors and child variables. These differences were examined by familial poverty level, primary caregiver education level, and primary child diagnosis (according to the conventions described above). Child primary diagnoses were mutually exclusive, and dummy coded for autism spectrum disorder (ASD), communication delay (CD), and global developmental delay (DD). Group differences were examined for the following outcomes: child problem behavior; child noncompliance; number of commands delivered by caregivers; proportion of intervals with caregiver's use of inappropriate commands and/or lack of follow through; and proportion of intervals with caregiver's use of positive consequences for inappropriate behavior, aggression, and/or criticism. Group differences for child and caregivers' behaviors are displayed in Table 3 and Table 4 for diagnosis and poverty/education level, respectively.

Child problem behavior. To examine differences in children's problem behavior, multiple Welch's t' tests for independent observations were used. The dependent variable was child problem behavior (reported as a T -score on the Externalizing Problems scale of

the CBCL). Independent variables included poverty level (at/or above poverty threshold versus below poverty threshold), primary caregiver education level (attained at least a four-year college degree versus not having at least a four-year college degree), and child primary diagnosis (ASD versus not ASD, DD versus not DD, and CD versus not CD).

Table 3 shows the group differences by diagnosis for child and parenting behaviors. For the primary diagnosis of ASD, children with a primary diagnosis of ASD ($M = 63.67, SD = 10.92$) had significantly higher problem behavior scores than children who did not have a primary diagnosis of ASD ($M = 57.72, SD = 13.03$), $t(33) = 2.42, p = .021$. For the primary diagnosis of DD, children with a primary diagnosis of DD ($M = 63.37, SD = 11.73$) had significantly higher problem behavior scores than children who did not have a primary diagnosis of DD ($M = 57.66, SD = 12.94$), $t(38) = 2.30, p = .027$. For the primary diagnosis of CD, children with a primary diagnosis of CD ($M = 56.44, SD = 60.89$) had significantly lower problem behavior scores than children who did not have a primary diagnosis of CD ($M = 60.89, SD = 12.64$), $t(175) = -2.34, p = .020$.

Table 4 shows group differences by level of poverty and education for child and parenting behaviors. For the level of poverty, no significant difference in child problem behavior was found between children from families who fell below the poverty threshold ($M = 60.03, SD = 12.71$) and those who fell at/or above the poverty threshold ($M = 57.34, SD = 13.00$), $t(131) = 1.40, p = .165$. For the level of education, children from families whose caregivers had less than a four-year college degree ($M = 60.03, SD = 12.83$) had significantly higher problem behavior scores than children whose caregivers had at least a four-year college degree ($M = 53.70, SD = 12.07$), $t(74) = 2.86, p = .004$.

Table 3

Group Differences by Diagnosis for Child and Parenting Behaviors

Variable	<i>ASD</i>	<i>Non-ASD</i>	<i>T-Test</i>	<i>CD</i>	<i>Non-CD</i>	<i>T-Test</i>	<i>DD</i>	<i>Non-DD</i>	<i>T-Test</i>
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)		<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)		<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	
CBCL ext. prob.	63.67 (10.91)	57.72 (13.03)	2.42*	56.44 (12.84)	60.89 (12.64)	-2.34*	63.37 (11.73)	57.66 (12.95)	2.23*
Noncompliance	.81 (.18)	.64 (.28)	3.77**	.62 (.30)	.72 (.24)	-2.53*	.63 (.25)	.67 (.28)	-0.72
# of commands	23.08 (11.62)	17.27 (10.72)	2.31*	16.84 (11.18)	19.40 (10.68)	-1.57	16.37 (9.76)	18.34 (11.20)	-0.95
IC/LOFT	.45 (.15)	.40 (.19)	1.41	.39 (.18)	.43 (.19)	-1.38	.39 (.20)	.42 (.18)	-0.71
PCIBAC	.04 (.07)	.02 (.04)	1.32	.03 (.05)	.03 (.05)	-0.21	.01 (.03)	.03 (.05)	-2.05*

Note. $p < .05^*$, $p < .01^{**}$. CBCL = Child Behavior Checklist. IC/LOFT = Inappropriate commands and/or lack of follow

through, PCIBAC = Positive consequences for inappropriate behavior, aggression, and/or criticism.

Table 4

Group Differences by Poverty and Education for Child and Parenting Behaviors

Variable	Poverty Level			Education Level		
	Below	At/Above	<i>T-Test</i>	At Least Bachelors	Less than Bachelors	<i>T-Test</i>
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)		<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	
CBCL ext. prob.	60.03 (12.71)	57.34 (12.99)	1.36	53.70 (12.07)	60.03 (12.83)	2.96**
Noncompliance	.66 (.30)	.67 (.26)	-0.14	.62 (.28)	.68 (.27)	1.19
# of commands	16.39 (9.77)	19.35 (11.76)	-1.84	15.07 (8.13)	18.96 (11.61)	2.43*
IC/LOFT	.39 (.18)	.43 (.18)	-1.30	.36 (.16)	.43 (.19)	2.23*
PCIBAC	.03 (.05)	.02 (.05)	0.44	.01 (.03)	.03 (.05)	2.86**

Note. $p < .05^*$, $p < .01^{**}$. CBCL = Child Behavior Checklist. IC/LOFT = Inappropriate commands and/or lack of follow through, PCIBAC = Positive consequences for inappropriate behavior, aggression, and/or criticism.

Child noncompliance. To examine differences in children's noncompliance, multiple Welch's *t*' tests for independent observations were used. The dependent variable was child noncompliance. Independent variables included poverty level (at/or above poverty threshold versus below poverty threshold), primary caregiver education level (attained at least a four-year college degree versus not having at least a four-year college degree), and child primary diagnosis (ASD versus not ASD, DD versus not DD, and CD versus not CD).

Table 3 shows the group differences by diagnosis for child and parenting behaviors. For the primary diagnosis of ASD, children with a primary diagnosis of ASD ($M = .80, SD = .18$) had significantly more noncompliance than children who did not have a primary diagnosis of ASD ($M = .64, SD = .28$), $t(42) = 3.77, p < .001$. For the primary diagnosis of DD, children with a primary diagnosis of DD ($M = .63, SD = .25$) did not significantly differ on noncompliance than children who did not have a primary diagnosis of DD ($M = .67, SD = .28$), $t(38) = -0.72, p = .473$. For the primary diagnosis of CD, children with a primary diagnosis of CD ($M = .62, SD = .30$) had significantly less noncompliance than children who did not have a primary diagnosis of CD ($M = .72, SD = .24$), $t(174) = -2.53, p = .012$.

Table 4 shows group differences by level of poverty and education for child and parenting behaviors. For the level of poverty, there was no difference in the proportion of noncompliance for children from families who fell below the poverty threshold ($M = .66,$

$SD = .30$) versus those who fell at/or above the poverty threshold ($M = .67, SD = .26$), $t(153) = -0.14, p = .886$. For the level of education, there again was no difference in adaptive scores for children with caregivers who had at least a four-year college degree ($M = .62, SD = .28$) versus those who did not ($M = .68, SD = .27$), $t(66) = 2.19, p = .237$.

Number of Commands. To examine differences in the number of commands delivered by caregivers, multiple Welch's t ' tests for independent observations were used. The dependent variable was number of commands. Independent variables included poverty level (at/or above poverty threshold versus below poverty threshold), primary caregiver education level (attained at least a four-year college degree versus not having at least a four-year college degree), and child primary diagnosis (ASD versus not ASD, DD versus not DD, and CD versus not CD).

Table 3 shows the group differences by diagnosis for child and parenting behaviors. For the primary diagnosis of ASD, caregivers of children with a primary diagnosis of ASD ($M = 23.08, SD = 11.62$) delivered significantly more commands than children who did not have a primary diagnosis of ASD ($M = 17.26, SD = 10.72$), $t(29) = 2.31, p = .028$. For the primary diagnosis of DD, caregivers of children with a primary diagnosis of DD ($M = 16.37, SD = 9.76$) did not significantly differ in the total number of commands delivered from caregivers of children who did not have a primary diagnosis of DD ($M = 18.34, SD = 11.20$), $t(39) = -0.95, p = .350$. For the primary diagnosis of CD, caregivers of children with a primary diagnosis of CD ($M = 16.84, SD = 11.18$) did not significantly differ in the total number of commands delivered from caregivers of

children who did not have a primary diagnosis of CD ($M = 19.40$, $SD = 10.68$), $t(175) = -1.57$, $p = .119$.

Table 4 shows group differences by level of poverty and education for child and parenting behaviors. For the level of poverty, there was no difference in the number of commands delivered by caregivers whose families fell below the poverty threshold ($M = 16.39$, $SD = 9.77$) versus those who fell at/or above the poverty threshold ($M = 19.35$, $SD = 11.76$), $t(176) = -1.84$, $p = .068$. For the level of education, caregivers with less than a four-year college degree ($M = 18.96$, $SD = 11.61$) delivered significantly more demands than caregivers with at least a four-year college degree ($M = 15.07$, $SD = 8.13$), $t(96) = 2.43$, $p = .017$.

Inappropriate commands and/or lack of follow through. To examine differences in the inappropriate commands and/or lack of follow through by caregivers, multiple Welch's t' tests for independent observations were used. The dependent variable was the proportion of intervals with instances of inappropriate commands and/or lack of follow through by caregivers. Independent variables included poverty level (at/or above poverty threshold versus below poverty threshold), primary caregiver education level (attained at least a four-year college degree versus not having at least a four-year college degree), and child primary diagnosis (ASD versus not ASD, DD versus not DD, and CD versus not CD).

Table 3 shows the group differences by diagnosis for child and parenting behaviors. For the primary diagnosis of ASD, caregivers of children with a primary diagnosis of ASD ($M = .45$, $SD = .15$) did not significantly differ in the proportion of

intervals with inappropriate commands and/or lack of follow through than caregivers of children with who did not have a primary diagnosis of ASD ($M = .40, SD = .19$), $t(35) = 1.41, p = .166$. For the primary diagnosis of DD, caregivers of children with a primary diagnosis of DD ($M = .39, SD = .20$) did not significantly differ in the proportion of intervals with inappropriate commands and/or lack of follow through than caregivers of children who did not have a primary diagnosis of DD ($M = .42, SD = .18$), $t(34) = -0.71, p = .481$. For the primary diagnosis of CD, caregivers of children with a primary diagnosis of CD ($M = .39, SD = .18$) did not significantly differ in the proportion of intervals with inappropriate commands and/or lack of follow through than caregivers of children who did not have a primary diagnosis of CD ($M = .43, SD = .19$), $t(173) = -1.38, p = .169$.

Table 4 shows group differences by level of poverty and education for child and parenting behaviors. For the level of poverty, there was no difference in the proportion of intervals with inappropriate commands and/or lack of follow through by caregivers whose families fell below the poverty threshold ($M = .39, SD = .18$) versus those who fell at/or above the poverty threshold ($M = .43, SD = .18$), $t(166) = -1.30, p = .196$. For the level of education, caregivers with less than a four-year college ($M = .43, SD = .19$) had significantly higher proportions of intervals with inappropriate commands and/or lack of follow through than caregivers with at least a four-year college degree ($M = .36, SD = .16$), $t(76) = 2.29, p = .03$.

Positive consequences for inappropriate behavior, aggression, and/or criticism.

To examine differences in positive consequences for inappropriate behavior, aggression,

and/or criticism by caregivers, multiple Welch's t' tests for independent observations were used. The dependent variable was the proportion of intervals with instances of positive consequences for inappropriate behavior, aggression, and/or criticism by caregivers. Independent variables included poverty level (at/or above poverty threshold versus below poverty threshold), primary caregiver education level (attained at least a four-year college degree versus not having at least a four-year college degree), and child primary diagnosis (ASD versus not ASD, DD versus not DD, and CD versus not CD).

Table 3 shows the group differences by diagnosis for child and parenting behaviors. For the primary diagnosis of ASD, caregivers of children with a primary diagnosis of ASD ($M = .04$, $SD = .07$) did not significantly differ in the proportion of intervals with positive consequences for inappropriate behavior, aggression, and/or criticism than caregivers of children with who did not have a primary diagnosis of ASD ($M = .02$, $SD = .04$), $t(57) = 1.32$, $p = .20$. For the primary diagnosis of DD, caregivers of children with a primary diagnosis of DD ($M = .01$, $SD = .03$) had significantly lower proportion of intervals with positive consequences for inappropriate behavior, aggression, and/or criticism than caregivers of children who did not have a primary diagnosis of DD ($M = .03$, $SD = .05$), $t(57) = -2.05$, $p < .05$. For the primary diagnosis of CD, caregivers of children with a primary diagnosis of CD ($M = .03$, $SD = .05$) did not significantly differ the proportion of intervals with positive consequences for inappropriate behavior, aggression, and/or criticism than caregivers of children who did not have a primary diagnosis of CD ($M = .03$, $SD = .05$), $t(175) = -0.21$, $p = .83$.

Table 4 shows group differences by level of poverty and education for child and parenting behaviors. For the level of poverty, there was no difference in the proportion of intervals with inappropriate commands and/or lack of follow through by caregivers whose families fell below the poverty threshold ($M = .03$, $SD = .05$) versus those who fell at/or above the poverty threshold ($M = .02$, $SD = .05$), $t(159) = 0.44$ $p = .664$. For the level of education, caregivers with less than a four-year college ($M = .03$, $SD = .05$) had significantly higher proportions of intervals with positive consequences for inappropriate behavior, aggression, and/or criticism than caregivers with at least a four-year college degree ($M = .01$, $SD = .03$), $t(123) = 2.86$, $p = .005$.

Main Analyses

Descriptive statistics and bivariate correlations for continuous variables used in the present study are displayed in Table 5.

To examine research question #1 (to what extent do caregiver's parenting behavior predict problem behavior in children with DD?), multiple analyses were conducted to examine the extent that different parenting behaviors by caregivers predict various child behaviors.

Table 5

Bivariate Correlations and Descriptive Statistics for Family, Child, and Parenting Behavior Variables (N = 178)

Variable	<i>M</i>	<i>SD</i>	S-W	1	2	3	4	5	6	7	8
1. CBCL ext. prob.	58.52	12.90	.99	-							
2. PSI S/F	85.45	20.61	.99	.67***	-						
3. CES-D	11.93	9.88	.90***	.34***	.55***	-					
4. # of commands	18.04	11.00	.92***	.07	-.07	-.11	-				
5. IC/LOFT	.41	.18	.99	.09	-.04	.03	.56***	-			
6. PCIBAC	.03	.05	.61***	.12	.05	.04	.20**	.18*	-		
7. Prop. of noncompliance	.67	.28	.93***	.06	.03	.01	.45***	.30***	.19**	-	
8. Child negative vocal.	.11	.13	.74***	.09	.14	.08	.11	.20**	.29***	.31***	-

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. S-W = Shapiro-Wilk statistic. IC/LOFT = Inappropriate commands and/or lack of

follow through, PCIBAC = Positive consequences for inappropriate behavior, aggression, and/or criticism

Child noncompliance. To address research question 1a (does caregiver's parenting behavior predict noncompliance in children with DD?), a multiple regression analysis was conducted to examine the amount of variance in child noncompliance that was accounted for by primary child diagnosis, caregiver education, poverty level, number of commands delivered by caregivers, and the proportion of intervals with caregiver's use of inappropriate commands and/or lack of follow through. Child primary diagnosis was dummy coded, such that 1 = presence of a speech/language delay and 0 = all other diagnoses, including DD and ASD. Caregiver education was dummy coded, such that 0 = caregivers with less than a four-year college degree and 1 = caregivers with at least a four-year college degree or higher. Poverty level was determined based on the guidelines discussed above and was dummy coded, such that 0 = at or above the poverty threshold and 1 = below the poverty threshold.

Table 6 presents results of the multiple regression analysis accounting for observed child noncompliance. The model was statistically significant, $F(5, 177) = 9.90$, $p < .001$, and accounted for 22% of the variance in child noncompliance ($R^2 = .22$). Of the predictors, the number of commands delivered by caregivers was the strongest and solely significant predictor, ($\beta = 0.40$, $p < .001$). The relationship between the number of commands delivered by caregivers and child noncompliance was positive, indicating more commands delivered by caregivers resulted in higher proportions of noncompliance in children. The presence of a speech/language delay, caregiver education, poverty level, and the proportion of intervals with caregiver's use of inappropriate commands and/or lack of follow through were not significant.

Table 6

Multiple Regression for Noncompliance in Children with DD (N = 178)

Variable	<i>B</i>	<i>SE B</i>	β
Constant	0.48	0.06	
Communication delay	-0.07	0.04	-0.13
Caregiver college degree	-0.001	0.05	-0.002
Poverty level	0.02	0.04	0.04
# of commands	0.01	0.002	0.40***
Inappropriate commands/lack of follow through	0.09	0.12	0.06
<i>R</i> ²		.22	
<i>F</i>		9.90***	

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

Observed problem behavior. To address research question 1b (Does caregiver's parenting behavior predict observed problem behavior in children with DD?), another multiple linear regression analysis was conducted to determine the amount of variance in observed child problem behavior (indicated by the proportion of intervals with negative vocalizations by children across all tasks) that was accounted for by the presence of a primary child diagnosis; caregiver education; poverty level; and the proportion of intervals with caregiver's use of aggression, criticism, and/or positive consequences for inappropriate behaviors. Primary child diagnosis, caregiver education, and poverty level were dummy coded using the same conventions discussed above for child noncompliance.

Table 7 presents results of the multiple regression analysis accounting for observed child problem behavior. The model was significant, $F(4, 178) = 4.13, p = .003$, and accounted for approximately 9% of the variance in children’s observed problem behavior ($R^2 = .09$). Within the model, the proportion of intervals with caregiver’s use of positive consequences for inappropriate behavior, criticism, and/or aggression was significant ($\beta = 0.28, p < .001$). This relationship was positive, indicating that greater proportions of intervals with caregivers engaging in positive consequences for inappropriate behavior, criticism, and/or aggression resulted in greater instances of observed child problem behavior. Child primary diagnosis, caregiver education, and poverty level were not significant predictors.

Table 7

Multiple Regression for Observed Problem Behavior in Children with DD (N = 179)

Variable	<i>B</i>	<i>SE B</i>	β
Constant	0.10	0.12	
Communication delay	-0.01	0.02	-0.05
Caregiver college degree	-0.01	0.02	-0.03
Poverty level	0.003	0.02	0.01
Positive consequences, aggression, and/or criticism	0.74	0.20	0.28***
R^2		.09	
F		4.13***	

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

Reported problem behavior. To address research question 1c (Does caregiver’s parenting behavior predict reported problem behavior in children with DD?), a multiple

regression analysis was conducted to determine the amount of variance in reported child problem behavior (indicated by *T*-scores on the Externalizing Problems scale of the CBCL) that was accounted for by the presence of a primary child diagnosis; caregiver education; poverty level; and the proportion of intervals with caregiver's use of aggression, criticism, and/or positive consequences for inappropriate behaviors. Primary child diagnosis, caregiver education, and poverty level were dummy coded using the same conventions discussed above for child noncompliance.

Table 8 presents results of the multiple regression analysis accounting for caregiver reported child problem behavior. The model was significant, $F(4, 178) = 3.62$, $p = .007$, and accounted for approximately 8% of the variance in children's externalizing behavior scores ($R^2 = .08$). Within the model, child and family characteristics, such as the presence of a speech/language delay ($\beta = -0.16$, $p < .05$) and caregiver education ($\beta = -0.17$, $p < .05$) were significant predictors. The relationship between child primary diagnosis and caregiver education and child behavior problems was negative, suggesting that children with a speech/language delay (compared to children with other DDs) and caregivers with at least a four-year college degree were associated with lower levels of problem behavior, as exhibited by greater *T*-scores on the CBCL Externalizing Problems scale. Alternatively, caregiver's use of aggression, criticism, and positive consequences for inappropriate behavior and poverty level were not significant.

Table 8

Multiple Regression for Reported Problem Behavior in Children with DD (N = 179)

Variable	<i>B</i>	<i>SE B</i>	β
Constant	60.76	1.88	
Communication delay	-4.06	1.89	-0.16*
Caregiver college degree	-5.12	2.32	-0.17*
Poverty level	1.21	1.95	0.05
Positive consequences, aggression, and/or criticism	24.98	19.77	0.09
<i>R</i> ²		.08	
<i>F</i>		3.62**	

Note. * $p < .05$, ** $p < .01$.

Moderating effects of child problem behavior on parenting behavior. To address research question #2 (to what extent are the effects of caregiver's parenting behaviors on observed child problem behaviors moderated by the severity of reported problem behavior in children with DD?), two separate hierarchical regression analyses were conducted. Child diagnosis, caregiver education, and poverty level were calculated using the same conventions mentioned above.

Inappropriate commands and/or lack of follow through. Model 1 included child and family demographics (e.g. child diagnosis, caregiver education, and poverty), child problem behavior (i.e. *T*-score on the CBCL Externalizing Problems scale) and caregiver's parenting behavior (i.e. the proportion of intervals with caregiver's use of inappropriate commands and/or lack of follow through). Model 2 included the interaction term for child problem behavior by caregiver's parenting behavior. The dependent

measure was observed child problem behavior (i.e. proportion of intervals with negative vocalization).

Table 9 presents results of the hierarchical regression analysis examining the extent to which child problem behaviors moderate the effect of caregiver's use of inappropriate commands and/or lack of follow through on observed child behavior. The interaction between child behavior and caregiver's use of inappropriate commands and/or lack of follow through was not significant, $F(6, 178) = 1.48, p = .187$ ($\Delta R^2 = .004, p = .369$), indicating that reported child problem behavior does not moderate the effect of caregiver's parenting behavior on observed child problem behavior. Within the overall model (i.e. model 2), the only significant predictor was caregiver's use of inappropriate commands and/or lack of follow through ($\beta = .25, p = .014$). All other predictors, including the moderator of child problem behaviors and the interaction term, were not significant.

Positive consequences for inappropriate behavior, aggression, and/or criticism.

Model 1 included child and family demographics (e.g. child diagnosis, caregiver education, and poverty), child problem behavior (i.e. *T*-score on the CBCL Externalizing Problems scale) and caregiver's parenting behavior (i.e. the proportion of intervals with caregiver's use of positive consequences for inappropriate behavior, aggression, and/or criticism). Model 2 included the interaction term for child problem behavior X caregiver's parenting behavior. The dependent measure was observed child problem behavior (i.e. proportion of intervals with negative vocalization).

Table 9

Hierarchical Regression Examining Child Problem Behaviors Moderating Caregiver's Use of Commands and Follow Through on Observed Behavior Problems for Children with DD (N = 179)

Variable	Model 1			Model 2		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Constant	0.06	0.03		0.04	0.04	
Communication delay	-0.01	0.02	-0.04	-0.01	0.02	-0.03
Caregiver college degree	-0.01	0.02	-0.04	-0.01	0.02	-0.03
Poverty level	0.01	0.02	0.04	0.01	0.02	0.05
Severity of PB	-0.003	0.02	-0.01	0.04	0.05	0.14
IC/LOFT	0.13	0.05	0.19*	0.17	0.07	0.25*
Severity of PB X IC/LOFT				-0.10	0.11	-0.18
<i>F</i>		1.62			1.48	
<i>R</i> ²		.05			.05	
ΔR^2					<.01	

Note. * $p < .05$. PB = Problem Behavior, IC/LOFT = Inappropriate Commands and/or Lack of Follow Through.

Table 10 presents results of the hierarchical regression analysis examining the extent to which child problem behaviors moderate the effect of caregiver's use of positive consequences for inappropriate behavior, aggression, and/or criticism on observed child behavior. The overall model was significant, $F(6, 178) = 2.91$, $p = .010$, however, the interaction between child behavior and caregiver's use of positive consequences for inappropriate behavior, aggression, and/or criticism was not significant, ($\Delta R^2 = .006$, $p =$

.308), indicating that reported child problem behavior does not moderate the effect of caregiver’s parenting behavior on observed child problem behavior. Within the overall model (i.e., model 2), the only significant predictor was caregiver’s behavior, through the use of positive consequences for inappropriate behavior, aggression, and/or criticism ($\beta = .36, p < .001$). All other predictors, including the moderator of child problem behaviors and the interaction term, were not significant.

Table 10

Hierarchical Regression Examining Child Problem Behaviors Moderating Caregiver’s Use of Coercive Behaviors on Observed Behavior Problems for Children with DD (N = 179)

Variable	Model 1			Model 2		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Constant	0.10	0.02		0.09	0.02	
Communication delay	-0.01	0.02	-0.06	-0.01	0.02	-0.05
Caregiver college degree	-0.01	0.02	-0.03	-0.01	0.02	-0.03
Poverty level	0.003	0.02	0.01	0.01	0.02	0.02
Severity of PB	-0.002	0.02	-0.01	0.01	0.02	0.03
PCIBAC	0.74	0.20	0.28***	0.94	0.27	0.36***
Severity of PB X PCIBAC				-0.40	0.39	-0.11
<i>F</i>		3.29**			2.91**	
<i>R</i> ²		.06			.06	
ΔR^2					<.01	

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. PB = Problem Behavior, PCIBAC = Positive Consequences for Inappropriate Behavior, Aggression, and/or Criticism.

Effects of caregiver stress and depression on parenting behaviors. To answer research question 3 (What contextual factors predict caregiver's parenting behavior above and beyond problem behavior in children with DD?) several hierarchical regression analyses were conducted. Primary child diagnosis, caregiver education, and poverty level were dummy coded using the same conventions discussed above for child noncompliance.

Inappropriate commands and/or lack of follow through. The first hierarchical regression analysis was conducted to examine the variance accounted for in caregiver's use of inappropriate commands and/or lack of follow through above and beyond child problem behavior. Model 1 included the predictors of child and family demographics (e.g. primary child diagnosis, caregiver education level, and poverty level), as well as child problem behavior (reported as a *T*-score on the CBCL Externalizing Problem scale). Model 2 included the predictors of caregiver stress (reported as the raw score on the Total Stress Index of the PSI-SF) and caregiver depressive symptoms (reported as the raw score on the CES-D). The change in R^2 between Model 1 and Model 2 was examined to determine if a statistically significant change occurred, indicating that caregiver stress and depression accounts for a significant amount of variance in caregiver's use of inappropriate commands and/or lack of follow through, above and beyond child problem behavior.

Table 11 displays the results of the hierarchical regression analysis examining the effect of caregiver depression and stress on their use of inappropriate commands and/or lack of follow through above and beyond child problem behavior. The overall model was statistically significant, $F(6, 178) = 2.20, p = .045$ and accounted for approximately 7%

of the variance in caregiver's use of inappropriate commands and/or lack of follow through ($R^2 = .07$). However, the change in R^2 between Model 1 and Model 2 with the addition of caregiver stress and depression was not significant ($\Delta R^2 = .01, p = .28$). Within the overall model (i.e. Model 2), the only significant predictor of caregiver's use of inappropriate commands and/or lack of follow through was poverty level ($\beta = -0.15, p < .05$). This relationship was negative and indicates that families living at or above the poverty line engaged in more instances of inappropriate commands and/or lack of follow through. Primary child diagnosis, caregiver education, and child problem behavior, as well as the additions of caregiver stress and depression were not statistically significant predictors.

Positive consequences for inappropriate behavior, aggression, and/or criticism.

The second hierarchical regression analysis was conducted to examine the variance accounted for in caregiver's use of positive consequences for inappropriate behavior, aggression, and/or criticism above and beyond child problem behavior. Model 1 included the predictors of child and family demographics (e.g. primary child diagnosis, caregiver education level, and poverty level), as well as child problem behavior (reported as a T -score on the CBCL Externalizing Problem scale). Model 2 included the predictors of caregiver stress (reported as the raw score on the Total Stress Index of the PSI-SF) and caregiver depressive symptoms (reported as the raw score on the CES-D). The change in R^2 between Model 1 and Model 2 was examined to determine if a statistically significant change occurred, indicating that caregiver stress and depression accounted for a significant amount of variance in caregiver's use of positive consequences for

inappropriate behavior, aggression, and/or criticism, above and beyond child problem behavior.

Table 11

Hierarchical Regression Examining the Effects of Caregiver Stress and Depression on Commands and Follow-Through, Controlling for Behavior Severity in Children with DD (N = 179)

Variable	Model 1			Model 2		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Constant	0.43	0.07		0.47	0.07	
Communication delay	-0.03	0.03	-0.09	-0.03	0.03	-0.09
Caregiver college degree	-0.08	0.03	-0.18*	-0.07	0.04	-0.15
Poverty level	0.06	0.03	-0.15*	-0.06	0.03	0.15*
Problem behavior	-0.001	0.001	0.05	0.002	0.001	0.16
Caregiver stress				-0.002	0.001	-0.18
Caregiver depression				0.001	0.002	0.06
<i>F</i>		2.66*			2.20*	
<i>R</i> ²		.04			.04	
ΔR^2					.01	

Note. * $p < .05$. Outcome is the proportion of intervals with caregiver's use of inappropriate commands and/or lack of follow through.

Table 12 displays the results of the hierarchical regression examining the effect of caregiver depression and stress on their use of positive consequences for inappropriate behavior, aggression, and/or criticism above and beyond child problem behavior. The overall model was not statistically significant, $F(6, 178) = 1.05, p = .40$, and accounted

for less than 4% of the variance in caregiver's use of positive consequences for inappropriate behavior, aggression, and/or criticism ($R^2 = .04$). The change in R^2 between Model 1 and Model 2 with the addition of caregiver stress and depression was also not significant ($\Delta R^2 = .001, p = .93$). These results indicate that caregiver stress and depression does not account for a significant amount of variance in caregiver's use of positive consequences for inappropriate behavior, aggression, and/or criticism, above and beyond child problem behavior. Within the overall model (i.e. Model 2), no significant predictors of caregiver's use of positive consequences for inappropriate behavior, aggression, and/or criticism were found, including child primary diagnosis, caregiver education, poverty level, child problem behavior, as well as the additions of caregiver stress and depression were not statistically significant predictors.

Table 12

Hierarchical Regression for the Effects of Caregiver Stress and Depression on Caregivers' Coercive or Harsh Behaviors for Children with DD (N = 179)

Variable	Model 1			Model 2		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Constant	0.01	0.02		0.01	0.02	
Communication delay	0.001	0.01	-0.09	0.001	0.01	0.01
Caregiver college degree	-0.02	0.01	-0.18*	-0.02	0.01	-0.15
Poverty level	-0.001	0.01	-0.15*	-0.001	0.01	-0.01
Problem behavior	0.001	0.001	0.05	0.001	0.001	0.12
Caregiver stress				-3.96 ⁻⁵	0.001	-0.02
Caregiver depression				0.001	0.001	-0.02
<i>F</i>		1.56			1.05	
<i>R</i> ²		.04			.04	
ΔR^2					<.01	

Note. * $p < .05$. Outcome is the proportion of intervals with caregiver's use of positive consequences for inappropriate behavior, aggression, and/or criticism.

CHAPTER IV

DISCUSSION

The present study provides support of some associations between parenting behavior and problem behavior for young children with DD within the present sample. The results suggest that caregiver's use of some specific parenting behaviors is associated with child problem behavior, with some differing effects based on type of parenting behavior and how child problem behavior was measured. The following discussion is best viewed through the lens of the Ecological Systems Theory (Bronfenbrenner, 1979, 1989) and more specifically, the microsystem, representing the most proximal layer, including parent-child interactions. Bronfenbrenner suggests that these interactions can lead to more or less favorable outcomes for children, depending on whether nurturing or coercive parenting strategies are most prevalent. Within this level, parent-child interactions can take on coercive patterns that may increase the likelihood of the development of antisocial, or problem behaviors, in children (Patterson, 1992).

In addition to specific caregiver's parenting behaviors, included in each of the models were also child and family demographic variables including child's diagnosis (presence of a communication delay or not), caregiver education (i.e. having at least a four-year degree or not), and the level of poverty (families living below versus at/above the poverty threshold). Overall, the presence of a communication delay for children can be viewed as a protective factor for problem behavior, when compared to other global developmental delays of ASD. Children with a communication delay presented with significantly fewer reported problem behaviors, observed problem behaviors, and noncompliance than children with other DDs or ASD. It is important that the results of

these differences are taken into context within the realm of the heterogeneity of the categories of developmental delays and ASD. Individual hypotheses for the study's research questions are discussed in more detail below.

Research Question #1: To what extent do caregiver's parenting behavior predict problem behavior in children with DD?

The first primary hypothesis was that parenting behaviors would predict child problem behavior. Within this focus, secondary hypotheses were conducted for a variety of parenting behaviors predicting various dimensions (observed versus reported) of child problem behaviors.

Research question #1a: does caregiver's parenting behavior predict noncompliance in children with DD?

The results of the study affirmed the hypothesis that caregiver's use of inappropriate commands and/or lack of follow through and their number of commands significantly accounted for noncompliance in children and fell shy of a large effect size of $R^2 = .25$ ($R^2 = .22$ for the model). While the results demonstrated that in addition to family and child characteristics, parenting behavior significantly predicted child noncompliance, both predictors of caregiver's parenting behavior (i.e., caregiver's use of inappropriate commands and/or lack of follow through, as well as number of commands) had varying levels of association with noncompliance. Observed child noncompliance was most strongly associated with the number of commands delivered by caregivers, while child noncompliance was not associated with caregiver's use of inappropriate commands and/or lack of follow through.

It is understandable that as the number of commands delivered by caregivers increases, the level of child noncompliance increases as well, due to the child not being able to comply with a command prior to another being delivered by their caregiver. In the current sample, caregivers averaged nine commands per minute during the clean-up task, leading to an overall noncompliance proportion of .67 for children. Within this model, instances of inappropriate commands and/or lack of follow through with commands was not a significant predictor. These results suggest that within the current sample, child noncompliance was most strongly accounted for by the number of commands delivered by caregivers, rather than whether or not the types of commands were inappropriate (i.e. undesired) and the commands were not followed through with by the caregiver.

These results are consistent with recommendations within the literature on behavioral parent training models and resources (such as *Parent Management Training – Oregon, Incredible Years, Parent-Child Interaction Therapy, Everyday Parenting*) that address intervening upon noncompliance in children (Dishion, Stormshak, & Kavanagh, 2012; Eyberg, 1988; Forgatch, Bullock, & Patterson, 2004; Webster-Stratton & Reid, 2003). Many of these interventions recommend reducing the number of commands delivered by caregivers and setting appropriate limits by focusing on commands that allow caregivers to follow through with an appropriate consequence. The rationale for reducing the number of commands is that there should be a 1:1 correspondence with a command and a consequence (i.e. reinforcement or follow-through) by a caregiver. Allowing sufficient time for a child to comply with a request by a caregiver can increase rates of compliance (Forehand, Gardner, & Roberts, 1978).

Research question #1b: does caregiver's parenting behavior predict observed problem behavior in children with DD?

Observed child problem behavior was significantly predicted by caregiver's use of positive consequences for inappropriate behavior, aggression, and/or criticism. Within the model presented, which also included various child and family demographics, caregiver's parenting behavior was the only significant predictor. The standardized beta weights suggest that a .28 standard deviation difference in caregiver's use of positive consequences for inappropriate behavior, aggression, and/or criticism was associated with .28 standard deviation difference in observed child problem behavior. Descriptive data revealed that caregiver's use of positive consequences for inappropriate behavior, aggression and/or criticism occurred relatively infrequently (i.e. approximately 3% of all intervals), but occurred most frequently within the clean-up activity (9% of intervals). Despite the relatively infrequent use of these strategies by caregivers, the model still accounted for a significant amount of variance in observed child behavior and represented a medium effect size ($R^2 = .09$).

These results support outlook for intervention efforts. Because children's problem behavior was most significantly accounted for by caregiver's parenting behavior, rather than other child and family demographic variables, these parenting behaviors are most impactful to target for intervention and most amenable to change. Practitioners can intervene upon caregiver's parenting behavior, which in turn, could likely to affect child problem behaviors. However, practitioners are not as easily able to intervene upon a caregiver's level of education, the family's level of poverty, or a child's diagnosis.

These results also follow the results of a meta-analysis with typically developing adolescents by Loeber and Dishion (1983), who found the most robust predictors of adolescent delinquency and problem behavior was parent management strategies. While the population (children with DD) and the behaviors of focus (noncompliance, externalizing behaviors, etc.) of the present study differed from the focal points of Loeber and Dishion, it is critical to highlight situations in which the results of children with DD correspond to children without DD. Additionally, these results may represent a very narrow look into the development of a coercive cycle, described by Patterson (1976). This cycle can disrupt family interactions through an undesired (i.e. problem) behavior by a child leading to an emotional reaction by a caregiver, followed by an escalation in behavior by the child and an increased emotional response by a caregiver. The goals of the clean-up task are for caregivers to have their children clean-up the activity they were working on. Within this task, children often transition from a preferred activity (e.g. play), following a potentially undesired request (e.g. clean-up). The caregiver's command to clean-up, may be followed by a child's emotional responding (and resulting noncompliance), which can be further followed by a caregiver's emotional response to their child's undesired behavior. While these microlevel interactions occur relatively briefly within the context of the present study, it is important to understand how their continued exposure across many different activities and tasks through a child's day and over a period of time can contribute to coercive cycles as a child gets older (Patterson, 1982).

Research question #1c: does caregiver's parenting behavior predict reported problem behavior in children with DD?

Caregiver's use of harsh or coercive parenting strategies such as positive consequences for inappropriate behaviors, aggression, and/or criticism were not significant predictors of reported child problem behavior. The differential results of the impact of caregiver's use of positive consequences for inappropriate behaviors, aggression, and/or criticism on children's observed versus reported behavior may be a product of the type problem behavior observed in children, as well as the scope and sensitivity of reported problem behaviors (using the Externalizing Problems scale of the CBCL), compared to what was observed (e.g. negative vocalizations). The CBCL asks parents to reflect on their child's behavior over the past month and encompasses a wide range of behaviors. This differed from the observed child problem behavior, which focused on a narrow, developmental scope of problem behavior for the young children in the current sample (i.e. negative vocalizations). In addition to the difference in scope between the two outcomes for child behavior, it is possible there is a temporal influence, with caregiver's behavior within the observation most strongly predicting child problem behavior within the observation.

Finally, it is important to highlight the 15-minute observation used within the current study as a snapshot, or glimpse, into the behaviors of caregivers and their children. When assigning ratings of their child's behavior, caregivers are able to draw from many different contexts and situations that influence their responses (Mangelsdorf, Schoppe, & Buur, 2000), which may obscure the results as they relate to observed parenting behaviors during a 15-minute observation. The 15-minute observation

represents a very small window into caregiver's and children's behavior. These factors speak to the need for multi-method assessments of outcomes within studies, given the inherent limitations of reports of behavior or observations alone. Multi-method assessments can capture various, unique aspects of behavior, and are important in determining distinctions and associations between observations and self-report methods.

Research Question #2. To what extent are the effects of caregiver's parenting behaviors on observed child problem behaviors moderated by the severity of reported problem behavior in children with DD?

The second primary hypothesis was that the severity of reported problem behavior in children will moderate the effect of observed inappropriate parenting strategies by caregivers on observed child problem behavior, in that more severe problem behaviors in children will result in higher use of inappropriate parenting strategies by caregivers. Both analyses found that the severity of child problem behavior did not moderate the effect of caregiver's use of parenting behaviors on observed child problem behavior. These analyses sought to examine if harsh parenting strategies are associated with typically developing children's behavioral difficulties (Scaramella & Leve, 2004) were consistent with children with DD. In this case, the similarities were not substantiated, but may reflect limitations in the current sample and measurement characteristics.

Throughout the study, observed parenting behaviors were most associated with observed problem behavior in children. Additionally, the current sample was comprised of children with low levels of CBCL scores. Average *T*-scores for the Total, Internalizing, and Externalizing Problems scales all fell within the Normal range, representing a sub-clinical sample of children with DD. With the cut score of 60 used for

the severity rating of the moderator (representing elevated scores at least in the At-Risk range), two groups were formed for children with low severity of problem behavior (i.e. *T*-scores less than 60 on the CBCL Externalizing Problems scale and children with high severity of problem behavior (i.e. *T*-scores of 60 or above). Within these two groups, the average *T*-score of the low severity group was approximately 50 ($M = 50.84, SD = 9.07$), while the average *T*-score of the high severity group was approximately 63 ($M = 63.06, SD = 8.67$). Even the present split in the groups, the average problem behavior scores for the high severity group fell below the Clinically Significant range.

Additionally, the context of the present study within the larger study is relevant. Data for the present study were collected as part of a larger, randomized controlled prevention trial, which may have affected the focus and inclusion of children with sub-clinical levels of problem behavior. Several longitudinal studies have examined progressions of children's externalizing and antisocial behaviors that begin with toddlers and instances of disobedience and continue into preschool years with instances of temper tantrums and more severely, physical attacks or aggression, due to the coercive cycle between children and caregivers (Patterson, 1992; Shaw & Winslow, 1997). It is possible that given the developmental progression, the severity and topography of children's externalizing behaviors may change and potentially, increase in severity over time.

Research Question #3. What contextual factors predict caregiver's parenting behavior above and beyond problem behavior in children with DD?

The hypothesis that heightened levels of caregiver's depression and stress would predict greater use of observed inappropriate parenting strategies by caregivers, above and beyond child problem behavior was not substantiated. The current study sought to

incorporate and build upon hypotheses from Deter-Deckard (1998) and Hastings (2002) as they relate to parenting stress, parenting behaviors, and problem behaviors in young children with DD. Deter-Deckard suggested that parenting stress should be viewed as a unique construct of stress, one that differs from overall life stress. Hastings (2002) built upon this and proposed a model that suggests associations between parental stress, child behavioral problems, and parenting behaviors. However, the associations proposed by Hastings' theories were not evident within the current sample. Other theories have suggested that factors such as stress and depression in caregivers may diminish or disrupt parenting strategies used by caregivers because attention is taken away from their child and their own parenting behavior, due to depressed or irritable moods (Patterson, 1982).

The results of the present study provide some level of consistency with Crnic and Greenberg (1990), who found no significant associations between stress (i.e. daily parenting hassles) and actual parenting behaviors. However, it should be noted that Crnic and Greenberg examined a wider range of parenting hassles and differentiate these from parenting stress that may be shared with parenting a child with behavioral difficulties (such as within the current study). Alternatively, the results of the present study differed from Webster-Stratton and Hammond (1988), who observed mothers interacting with their children and found that depressed mothers engaged in higher use of critical statements and spankings with their children, than did non-depressed mothers. It should be noted that the sample of children in Webster-Stratton and Hammond's study had an average of approximately five years old and presented with oppositional defiant behaviors, rather than developmental delays.

Implications for Practice

The implications of the present study offer support for intervention efforts for children with DD and behavioral difficulties. One important finding is that of the many different predictors of problem behavior in children that were included, the most salient predictors represent factors that are amenable to change. For example, the number of commands delivered by caregivers was the only significant predictor of child noncompliance, and caregiver's use of positive consequences for inappropriate behavior, aggression, and/or criticism was the only significant predictor of observed problem behavior in children. These significant predictors represent caregiver behaviors that are often the focus of behavioral parent training programs. They are able to be intervened upon and more easily changed than other factors (e.g. parent education, income, etc.), which in turn, may lead to more significant changes in problem behavior for children with DD.

Secondly, while associations between caregiver's mental health (i.e. stress and depression) were not associated with their use of certain parenting behaviors in the present study, the same result is not consistent in the larger literature of parenting behaviors for children with behavioral difficulties (Baker McIntyre, Blacher, Crnic, Edelbrock, Low, & Neece, 2003; Neece, Green, & Baker, 2012), possibly due to measuring parenting behaviors differently. Baker et al. focused on global positive behaviors such as warmth, while the current study focused on more microsocial codes of negative or inappropriate behaviors. It is crucial for practitioners to not only focus on supporting caregivers to reduce ineffective, coercive, harsh, or other undesired parenting behaviors, but also increase their positive behaviors, such as warmth, sensitivity,

responsivity, and fostering intellectual stimulation. Furthermore, clinicians should be cognizant of the impact of caregiver's mental health and well-being on both child problem behaviors and their parenting behaviors. As practitioners, we cannot expect to address intervention work with a myopic view of our focus and limit ourselves too narrowly.

Limitations

Despite the significance in some of the findings of the present study and its contributions to literature on the associations between parenting behavior and behavioral problems in children with DD, the present study has several limitations. First, the study is a cross-sectional and was drawn from a larger, longitudinal, randomized controlled trial study. The cross-sectional approach of the current study limits the measurement to associations between variables at a single point in time and lack a causal interpretation. Therefore, it is important to view the results of the present study in terms of associations between variables at a given time, instead of applying causation. Many of the self-reported measure require caregivers to provide responses based on the past few weeks. Therefore, there may be events that serve to either positively or negatively influence their responding during these windows of time. The same limitations hold true for the observations conducted of parent-child interactions and also represent a brief observation at a single point in time. Despite this limitation, the present study does contribute to an understudied area of the relationship between parenting behaviors and the development of problem behaviors in children with DD.

Secondly, predictors and outcomes for both children and caregivers focused on negative, or undesired outcomes (e.g. noncompliance, observed problem behavior,

reported externalizing behavior, undesired parenting behaviors, etc.). The current study did not seek to examine associations between desired parenting behaviors in caregivers and either improvements in challenging behavior or prosocial, desired behaviors in children. Ideally, associations between undesired parenting and child behaviors should be viewed along with associations between desired, positive parenting behaviors and prosocial, or positive child behaviors.

Fourthly, it is relevant to bring attention to the participants within the current sample and to what extent the results are generalizable to the larger population. The current sample was taken from a larger, longitudinal study conducted in the Pacific Northwest. Children were predominantly White (approximately 90%), as were caregivers (approximately 88%). Parenting skill, family relationships, and parenting beliefs differ across cultures. These may relate to use and views related to discipline (Deater-Deckard, Dodge, Bates, & Pettit, 1996), parental warmth and positive parenting or expectations for child behavior (Dishion & Stormshak, 2007). It is important for the results of the present study to be compared with results for families of diverse backgrounds and cultures to examine the impact these differences may have on parenting beliefs and behaviors.

Lastly, several limitations exist within the measurement systems to examine child and caregiver behaviors that have been previously discussed. A strength of the current study is that child behavior was measured both through direct observation and reported by caregivers. However, the sensitivity of using the Externalizing Problems scale of the CBCL may have too broadly examined child behavioral problems to detect significant associations with specific parenting behaviors. The observations of caregivers and their children also represent an extremely short (15-minute) glimpse into their interactions.

With self-report, caregivers are able to incorporate ratings of their child's behavior across multiple settings, contexts, and during different situations.

Future Directions

Future studies could employ a developmental psychopathology perspective by using longitudinal designs to understand the transactional nature between caregiver's parenting behavior and problem behavior in children with DD. Neece, Green, and Baker (2012) examined the transactional nature of parenting stress and child problem behavior over time in both children with DD and children who were typically developing. Their results revealed a bidirectional relationship between child problem behavior and parenting stress over time. A similar approach could be used to understand whether or not there is a transactional relationship between problem behaviors (observed and reported) and parenting behaviors over time.

Given the results that caregiver's use of inappropriate commands and/or lack of follow through was not a significant predictor of child noncompliance, future studies may examine the differential effects that the types of commands have on noncompliance for children with DD. Webster-Stratton (2005) discussed various types of commands caregivers should use, including "do," "start," and clear commands. Future research could explore which types of commands are most associated with noncompliance in children with DD, as well as which are associated with higher compliance. It is important to understand not only undesired parenting behaviors and their effects of undesired behavior, but also to what extent desired, or positive parenting behaviors are associated with positive, or prosocial child behaviors. Furthermore, future research could examine differences in the types and number of commands delivered by caregivers of children

with DD and how these are related to the severity of child problem behavior. Within the context of a problem-solving task, Fagot and Gauvain (1997) examined parenting strategies of caregivers with toddlers and found that children who exhibited higher levels of problem behavior had caregivers who provided more directives and feedback.

Finally, given the limitations associated with measurement in the present study, future studies should employ multiple methods to assess specific domains or outcomes (e.g. behavior, stress, etc.). Many studies have included self-reports of stress to understand the extent to which caregivers reported feeling stressed. Researchers have used cortisol samples to gather more specific, detailed information on stress and depression (Burke, Davis, Otte, & Mohr, 2005; Ruiz-Robledillo, Sarinana-Gonzalez, Perez-Blasco, Gonzalez-Bono, & Moya-Albiol, L, 2014). Galvanic skin response (GSR) could also be used to detect moment-by-moment changes in parent arousal and stress, suggesting an emotional response, and explore the extent that these are associated with child problem behavior. Researchers have used GSR as a measure of the physiological response to aversive stimuli (Hahs, 2013a, b).

Conclusion

Limitations notwithstanding, the present study adds to the extant literature on the associations of parenting behaviors on children's problem behavior. Some of the most salient and robust predictors of problem behavior in children were certain parenting behaviors in caregivers. Noncompliance in children was significantly associated with the number of commands delivered by caregivers and observed problem behaviors in children were significantly associated with caregiver's use of positive consequences for inappropriate behavior, aggression, and/or criticism. These predictors were strongest

within the present models and represent targeted behaviors in caregivers that are readily amenable to intervention and change, instead of more distant factors, such as level of poverty and caregiver education, which are less amenable to change and intervention. While associations between caregiver stress and depression were not found with their use of parenting behaviors on children's problem behaviors, it is important for practitioners to take a step back and view child and parenting behaviors within a larger, ecological system. This system is complex and dependent on the influence of a variety of factors. It is important to understand that psychological distress has been demonstrated to affect caregiver's use of certain parenting behaviors and necessitates a focus for individuals supporting caregiver's parenting behaviors to take these into consideration within the larger ecological system and context for these families.

APPENDIX A

BEHAVIORAL CODES AND DEFINITIONS

Parent Codes

POSITIVE CONSEQUENCES FOR CHILD'S INAPPROPRIATE BEHAVIORS

Inappropriate Delivery of Tangible: Parent provides child with a tangible (e.g. candy, toy) after the child engages in an inappropriate behavior. This is a positive reward in the sense of giving or doing something that is positive when the child is clearly misbehaving. A good determinate of misbehavior is that the child's behavior may fall under aggression, disruption, or negative verbalization on the table of child behaviors. This may not ALWAYS be the case, but rather a guide for to use for an inappropriate behavior.

Delivery of Non-vocal Attention: Parent attends to child during or after the exhibition of an inappropriate behavior. The delivery of attention includes any behavior in which the parent directs his/her attention towards his/her child and gives them something positive in a way that is reinforcing the behavior.

Verbal Attention: Parent reprimands child more than once in response to an inappropriate behavior.

INAPPROPRIATE COMMANDS

Definition of Command: Clear and firm directives for behavior change in the immediate future are considered commands. It must be clear from the content of the directive exactly what behavior change is required.

LACK OF FOLLOW THROUGH

Withdrawing Commands: Parent withdraws parental command after child responds in a negative manner, such as screaming, tantruming, or hitting.

Ignoring Compliance to Commands: Parent gives command without recognizing compliance or non-compliance.

Lack of Praise After Compliance: Parent does not reinforce child after the child complies with a given command (i.e. parent asks child to pick up the toys and child complies, parent offers no praise or recognition that the child followed through with the command).

Child Codes

Category	Examples
Negative Verbalizations/Vocalizations	<ul style="list-style-type: none">- Screaming- Swearing- Saying unkind, threatening words- Whining- Moaning/yelling/growling in irritation
Positive Verbalizations/Vocalizations	<ul style="list-style-type: none">- Neutral or positive statements- Attempts to speak- Echolalia- Babbling or attempting to speak using a consonant/vowel sound

# of Parent Commands	- Instructions, commands, or requests made by the parent directed to the child
# of Times Comply with Parent Commands	- Completing (or attempting) to complete with request within 5 seconds of request

APPENDIX B

VIDEO PLAY TASK SCRIPT

- Talk to parent about
 - Where to set up play task
 - Where you can set your equip (preferably up high like kitchen table)
 - If applicable, trouble shoot about keeping any siblings busy
- Get everything out and ready and set up camera
 - Header
 - Tripod
 - Take Structured Activity bag out & place it somewhere out of reach
- Hold bin with you
- Get timer ready and push record on camera (set timer as stop watch counting up)
 - Film Header
- Say to parent something like “Just so you know I will be reading from a script so it might sound kind of odd. This is just so everyone gets the same instructions.”
- Start reading instructions:

“Next we will be conducting a short, 15 minutes observation of you and your child playing with some toys I brought. It is important that both you and your child stay here together in this room. Please do your best to minimize distractions. So do not make any phone calls or turn the TV on during our 15 minute observation. Do you have questions?”

STANDARDIZED TOYS - FREE PLAY

(10 minutes)

“You and your child will have the chance to play with these toys I brought. Try to pretend like I’m not here and play like you normally would. I’ll let you know when it’s time to clean up.”

- Push Bin to Mom

00:00 Start Timer at “Go”

“GO AHEAD AND PLAY”

09:00 One Minute Warning:

“You have one more minute before it’s time to clean up and get ready for the next activity.”

10:00 Stop Timer

CLEAN UP
(2 minutes)

“It’s time to clean up now. Please put all of toys back into the box.”

10:00 Start Timer at “GO”

“GO AHEAD AND CLEAN UP.”

If child and parent finished cleaning but two minutes are not yet finished, say,

“Wow! That was fast! We have ____ more minutes/seconds until the next activity.”

12:00 Stop Timer

If all of the toys have been picked up after two minutes, say,

“Thank you for cleaning up so quickly! We have one more activity today.”

If all the toys have NOT been picked up, say,

“Thank you for helping clean up. Let me quickly help finish so we can move on to our last activity.”

- Help clean up toys if necessary (You can finish later if needed)
- Move toy bin out of reach

STRUCTURED ACTIVITY
(3 minutes)

“Here are three different activities you can choose from. Please pick something to work on. *”

- Set Structured activity bag down

12:00 Start Timer at “Go”

“GO AHEAD AND GET STARTED”

14:00 One Minute Warning:

“You have one more minute.”

15:00 Stop Timer

“That’s it for our activities. Great work!” (To child say)

- Turn off camera
- Let parent lead finishing the task. Child can finish puzzle, or can finish cleaning up then:
“Thanks for playing today! I brought some stickers with me. Would you like to pick one?”

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