OPTIMISM, PARENT FEELINGS, AND PARENTING BEHAVIOR OVER TIME FOR CHILDREN WITH DEVELOPMENTAL DELAY

by

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DISSERTATION ABSTRACT

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Title: Optimism, Parent Feelings, and Parenting Behavior over Time for Children with Developmental Delay

Young children with intellectual and developmental disabilities are at increased risk of developing persistent mental health and behavior problems. While the link between parenting behavior and the development of problem behavior is well understood in this population, there is a need for examination of key parent factors that affect parenting behavior and child problem behavior over time in families of children with developmental delay (DD). Private events such as parents' feelings about their children and levels of dispositional optimism may impact parenting behavior through a variety of mechanisms, including experiential avoidance and relational schemas. As such, this study proposed to examine relations between parent feelings, optimism, parenting behavior, and child problem behavior for young children with developmental delay in a longitudinal context. Parents' positive and negative feelings about their young children with developmental delay, dispositional optimism, and child problem behavior were assessed at three timepoints in 132 parent-child dyads. In addition, measures of observed effective parenting behavior during parent-child play interactions were collected at each timepoint. Negative feelings about the child significantly predicted child problem behavior across timepoints, with higher negative feelings predicting higher problem behavior. Positive

feelings and optimism did not significantly predict problem behavior in the model including negative feelings, suggesting that correlations between these constructs and reduced problem behavior are primarily explained by reduced negative feelings. Increased negative feelings also significantly predicted a lower rate of praise across timepoints, indicating that parents with high negative feelings about their child with DD engaged in fewer praise statements during parent-child play interactions. These findings suggest that a strong and stable relationship between negative feelings and child problem behavior is present at a very early age for young children with developmental delay and that negative feelings may impact parents' use of effective and positive parenting strategies. Future research should examine interventions designed to address both parent private events and child problem behavior as well as how these constructs develop both earlier and later in life.

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CHAPTER I

INTRODUCTION

Background

Children with intellectual and developmental disabilities are at increased risk of developing persistent mental health and behavior problems as they progress through childhood and adolescence (Einfeld & Tonge, 1996; Emerson et al., 2014). Specifically, mental health problems are 3 to 4 times more prevalent in children and adolescents with intellectual and developmental disabilities than in typically developing young people, with 30-50% of children and adolescents with intellectual and developmental disabilities exhibiting mental health problems (Tonge & Einfeld, 2000; Witwer & Lecavalier 2008). These mental health problems are also likely to persist into adulthood (Einfeld et al., 2006). Increased risk for mental health and behavior problems emerges early in life for individuals with intellectual and developmental disabilities, as preschool children with developmental delay (DD) show heightened problem behavior as compared to their typically developing peers (Baker et al., 2003; Cheng, Palta, Kotelchuck, Poehlmann, & Witt, 2014). DD is defined as an early delay in one or more domains of development, such as language, motor skills, or cognitive skills, that heightens risk for the identification of an intellectual or developmental disability as children age (Baker et al., 2003; Committee on Children with Disabilities, 2001). For young children with DD, significant problem behavior is likely to stabilize or increase as children approach school age, suggesting that early problem behavior may continue to pose challenges over time for children with DD and their families (Cheng et al., 2014). In addition to increasing risk for later problem behavior, elevated problem behavior in this population may contribute to a

variety of maladaptive outcomes for children and families, including increased caregiving costs and parenting stress (Einfeld et al., 2010; Ellingsen, Baker, Blacher, & Crnic, 2014; Neece, Green, & Baker, 2012). Given the heightened risk and potential impact of early problem behavior in young children with DD, there is a need to examine and understand the mechanisms that contribute to the emergence and growth of problem behavior in this population.

Parenting, Problem Behavior, and Private Events

In both typically developing young children and young children with DD, parents' emotions and cognitions about their children have been shown to contribute to the development of problem behavior (Bugental & Johnston, 2000; Mullineaux, Deater-Deckard, Petrill, & Thompson, 2009; Smith, Dishion, Shaw, & Wilson, 2015; Woolfson, Taylor, & Mooney, 2010). In behavior analysis and specifically radical behaviorism, cognitions and emotions are defined as private events, or events that cannot be directly observed but that may influence future observed behavior (Hoffman, Contreras, Clay, & Twohig, 2016). Relational frame theory, which is a behavior analytic theory of private verbal events, provides several explanations for how private events may impact parenting behavior for parents of children with and without disabilities (Hayes, Barnes-Holmes, & Roche, 2001).

When young children engage in challenging or difficult-to-manage behaviors, parents are likely to have a variety of cognitions and emotions in response to those behaviors (Coyne & Wilson, 2004). These thoughts and experiences may be distressing or aversive, such as a physical sensation of anxiety or the thought "I'm an awful parent" (Shea & Coyne, 2011). Unpleasant private events in response to child behavior may lead

parents to engage in experiential avoidance, or active attempts to avoid aversive private events (Shea & Coyne, 2011). Experiential avoidance has been linked to ineffective parenting behavior in parents of young children, indicating that these parents may engage in parenting behaviors that quickly terminate interactions that prompt distressing private events. For example, if a child screaming evokes aversive thoughts or emotions in the parent, the parent may give the child the toy in order to avoid those private events (Brown, Whittingham, & Sofronoff, 2015; Coyne & Wilson, 2004; Shea & Coyne, 2011). Unfortunately, parenting behaviors that quickly terminate aversive child behavior are likely to reinforce problem behavior and may contribute to a coercive cycle of parent-child interactions (Coyne & Wilson, 2004; Shea & Coyne, 2011). Coercion occurs within parent-children interactions when both child problem behavior and ineffective parenting behavior are reinforced by escape from aversive and conflictual parent-child interactions, and this coercive cycle is a significant predictor of early problem behavior and later delinquent behavior in children and adolescents (Patterson, 2002).

Relational frame theory also suggests that private events may influence parenting behavior through the development of negative relational schemas (Bullock and Dishion, 2007; Smith et al., 2015). Relational schemas are defined as internal and unconscious verbal rules that guide how individuals respond to interactions with others (Bullock & Dishion, 2007). Within parenting, relational schemas lead parents to respond to child behavior according to rules about the likelihood of certain responses or contingencies (Bullock & Dishion, 2007). For example, a parent with a negative relational schema about their young child may consciously or unconsciously believe that their child purposefully engages in noncompliance and that there is nothing they can do

to promote compliance (Bullock and Dishion, 2007; Coyne & Wilson, 2004; Smith et al., 2015). Parents engage in rule-governed behavior in response to these negative relational schemas, and as such they are likely to respond to child behavior with consistent patterns of ineffective parenting behavior and are unlikely to implement new parenting strategies (Bullock and Dishion, 2007; Coyne & Wilson, 2004; Smith et al., 2015). Recent findings indicate that negative relational schemas directly impact the trajectory of problem behavior and coercive parent-child interactions, indicating the importance of incorporating parents' private events into developmental models of child problem behavior (Smith et al., 2015).

While research and theory indicate that private events impact parenting behavior through experiential avoidance and the development of relational schemas, less is known about how these processes apply to parents of young children with DD. Overall, parents' general perceptions of their children with DD appear to impact both parent behavior and child problem behavior in this population, which is consistent with relational frame theory and the literature on parents of typically developing children (Armstrong & Dagnan, 2011; Schuiringa, van Nieuwenhuijzen, Orobio de Castro, & Matthys, 2015, Totsika, Hastings, Vagenas, & Emerson, 2014, Woolfson et al., 2011). More specifically, parents of children with an intellectual disability who believe that problem behavior is controllable by their child are more likely to provide aversive consequences than parents who believe their child cannot control their problem behavior, while perceptions that the parent can control child behavior are associated with reductions in problem behavior (Armstrong & Dagnan, 2011; Woolfson et al., 2011). Perceptions of adult and child controllability can be viewed as relational schemas—for example, a parent who attributes

low adult controllability and high child controllability to their child's problem behavior may experience the verbal rules "My child does this on purpose" and "I can't control my child's behavior." Therefore, these attributions may prompt ineffective rule-governed parenting behavior. In addition, thoughts about controllability may function as aversive private events that prompt experiential avoidance (Coyne & Wilson, 2004). While the above findings on attributions of controllability indicate that private events impact parenting behavior and child problem behavior in families of children with DD, significant additional research is needed to understand how private events impact trajectories of problem behavior in this population.

Parent Feelings

One construct that may provide a window into the private events of parents of children with DD is that of parent feelings. In research with typically developing children, parents' positive and negative emotions about their children have been consistently linked to the development of problem behavior over time (Deater-Deckard, Smith, Ivy, & Petril, 2005; Fontaine, McCrory, Boivin, Moffitt, & Viding, 2011; Glover, Mullineaux, Deater-Deckard, & Petrill, 2010; Larsson, Viding, Rijsdijk, & Plomin, 2008; Mullineaux et al., 2009). Not surprisingly, parents report increased negative feelings and decreased positive feelings toward children who display more problem behavior (Deater-Deckard et al., 2005; Glover et al., 2010; Mullineaux et al., 2009). Differences in positive and negative feelings are also seen across siblings in the same family when siblings have different levels of problem behavior, indicating that positive and negative feelings are child-specific (Deater-Deckard et al., 2005). In addition, relations between parent feelings and child problem behavior appear to be bidirectional, with early negative feelings

predicting later conduct problems and vice versa (Fontaine et al., 2011; Larsson et al., 2008). As such, evidence indicates that parent feelings may impact the development of problem behavior over time, which suggests that they may be a target in the prevention of problem behavior for children at risk.

One potential explanation for this relationship is that parents' negative and positive feelings about their children function as aversive (negative) or appetitive (positive) private events. If interactions with or thoughts about a child elicit unpleasant emotions like anxiety or anger, experiential avoidance may prompt parents to avoid parent-child interactions or engage in ineffective parenting behaviors. As discussed earlier, these parenting behaviors may contribute to a coercive interaction cycle and the development of problem behavior (Coyne & Wilson, 2004; Shea & Coyne, 2011). In turn, positive emotions in relation to a child might make parents more likely to engage in behaviors that promote sustained parent-child interactions, such as child directed play or praise (Webster-Stratton, 2001). Positive and negative feelings about a child could also contribute to adaptive or maladaptive relational schemas, e.g. "My child is difficult" or "I enjoy being with my child." While these hypotheses are consistent with a relational frame theory approach to parenting behavior and child problem behavior, potential mechanisms that explain the relationship between parent feelings and child problem behavior have thus far not been sufficiently examined.

In addition, very little is known about how positive and negative feelings impact parenting behavior and child problem behavior in families of children with DD. However, the available literature has identified a relationship between these constructs and parent-child relationship quality, which may function as a proxy for parent feelings

(Schuiringa et al., 2015; Totsika et al., 2014). Parents' self-reported relationship quality is associated with both parenting behavior and problem behavior for parents of children with intellectual and developmental disabilities, with higher relationship quality predicting reduced externalizing problem behavior, reduced ineffective parenting behavior, and increased positive parenting behavior (Schuiringa et al., 2015, Totsika et al., 2014). These findings suggest that parents with more positive affect directed toward their child are more likely to engage in parenting behaviors that promote appropriate child behavior. Parent feelings have also been found to mediate relations between parent attributions and parenting behavior in this population, with anger mediating the relation between child controllability attribution and punitive parenting behavior for parents of children with an intellectual or developmental disability (Armstrong & Dagnan, 2011). This finding is consistent with the hypothesis that aversive private events such as anger directed at a child may contribute to harsh or ineffective parenting behaviors, and it also indicates a potential association between negative parent feelings and negative relational schemas such as child controllability attributions. Overall, the literature on both typically developing children and children with DD indicates that the relation between parent feelings, parenting behavior, and child problem behavior is worthy of exploration for young children with DD.

Optimism

Dispositional optimism is another key construct that may impact private events and parenting behavior for parents of children with DD. Optimism is conceptualized as a global and stable dimension of personality that represents individuals' expectancies about the future and the outcome of future events (Carver & Scheier, 2014). Dispositional

optimism is distinct from situational or contextualized optimism. While contextualized optimism refers to expectancies about specific events, like a grade on a test, dispositional optimism is applied to a variety of situations and is generally stable over time (Carver & Scheier, 2014). Optimism is associated with a wide variety of positive life outcomes, including increased task persistence, goal attainment, and physical health. Because optimists expect that success will occur, they are more likely to persist in efforts toward the attainment of important personal goals (Carver & Scheier, 2014). Given the wide-ranging positive effects of optimism, it is reasonable to assume that optimism would also impact important developmental outcomes for young children and their parents.

Indeed, optimism has been found to predict positive parenting behavior in a wide variety of samples (Ellingsen, Baker, Blacher, & Crnic, 2014; Jones, Forehand, Brody, & Armistead, 2002; Taylor, Larsen-Rife, Conger, Widaman, & Cutrona, 2010; Taylor et al., 2012). Optimism appears to have a specific protective effect in at-risk populations, including parents experiencing poverty and single parent families (Jones et al., 2002; Taylor et al., 2010; Taylor et al., 2012). This association also extends to parents of children with DD (Ellingsen et al., 2014). In addition to predicting effective or positive parenting behavior, optimism also appears to predict reduced problem behavior for both typically developing children and children with DD (Heinonin et al., 2006; Paczkowski & Baker, 2008). Finally, high parental optimism is associated with a reduced likelihood that children with DD will develop severe problem behavior, indicating that optimistic parents may be more likely to implement effective parenting strategies and interventions with their children with DD (Durand, Heineman, Clarke, & Zona, 2009).

The above findings suggest that optimism promotes positive parenting when parents are faced with heightened levels of environmental risk, including DD. Optimistic parents may be more optimistic about their ability to affect or control their child's behavior, resulting in increased self-efficacy and positivity (Durand et al., 2009). These parents may develop more positive relational schemas as a result of their optimism, e.g. "I can manage my child's behavior." Optimism also predicts observed positive affect during parent-child interactions, particularly when children exhibit high levels of anger or difficult temperament (Koenig, Barry, & Kochanska, 2010). This finding suggests that optimism may prompt more positive thoughts and emotions in response to child behavior, which could lead to more effective behavior management and a reduced need for experiential avoidance. In addition, for parents of children with DD, optimism has been consistently found to predict lowered parenting stress and greater overall wellbeing (Baker, Blacher, & Olsson, 2005; Ekas, Lickenbrock, & Whitman, 2010; Paczkowski & Baker, 2008). Therefore, optimism may also prompt effective parenting behavior and reduce child problem behavior by improving parents' mental health and overall wellbeing, which may in turn reduce the likelihood that parents of children with DD will experience aversive emotions or cognitions that impact parenting behavior (Coyne & Wilson, 2004). However, while relations between optimism, parenting behavior, and child problem behavior appear to exist for children, these associations have yet to be explored in a fully specified longitudinal model that can evaluate causal and developmental dynamics.

Summary

Early problem behavior in young children with DD represents a serious risk factor for the development of later conduct and mental health problems. While the link between parenting behavior and the development of problem behavior is well understood in this population, there is a need for additional examination of key parent factors that affect parenting behavior and child problem behavior over time in families of children with DD. Private events such as parents' thoughts and feelings about their children may impact parenting behavior through a variety of mechanisms, including experiential avoidance and relational schemas. Parent feelings and optimism are two constructs that reflect parents' private events and have been established as affecting parenting behavior and child problem behavior in typically developing populations, but additional information is needed as to how these constructs function for children with DD and their parents. As such, this study proposes to examine relations between parent feelings, optimism, parenting behavior, and child problem behavior in a longitudinal, developmental context. Three time points are included: Time 1 (baseline), Time 2 (3 months after baseline), and Time 3 (9 months after baseline). Figure 1 depicts the hypothesized relations among study variables.

Research Questions

This study aims to address the following research questions:

1. *Is there a transactional relation between parent feelings (positive or negative) and child problem behavior over time for parents of preschool-aged children with DD?* In typically developing populations, a transactional relation exists between parent feelings and child problem behavior in which both constructs influence each other

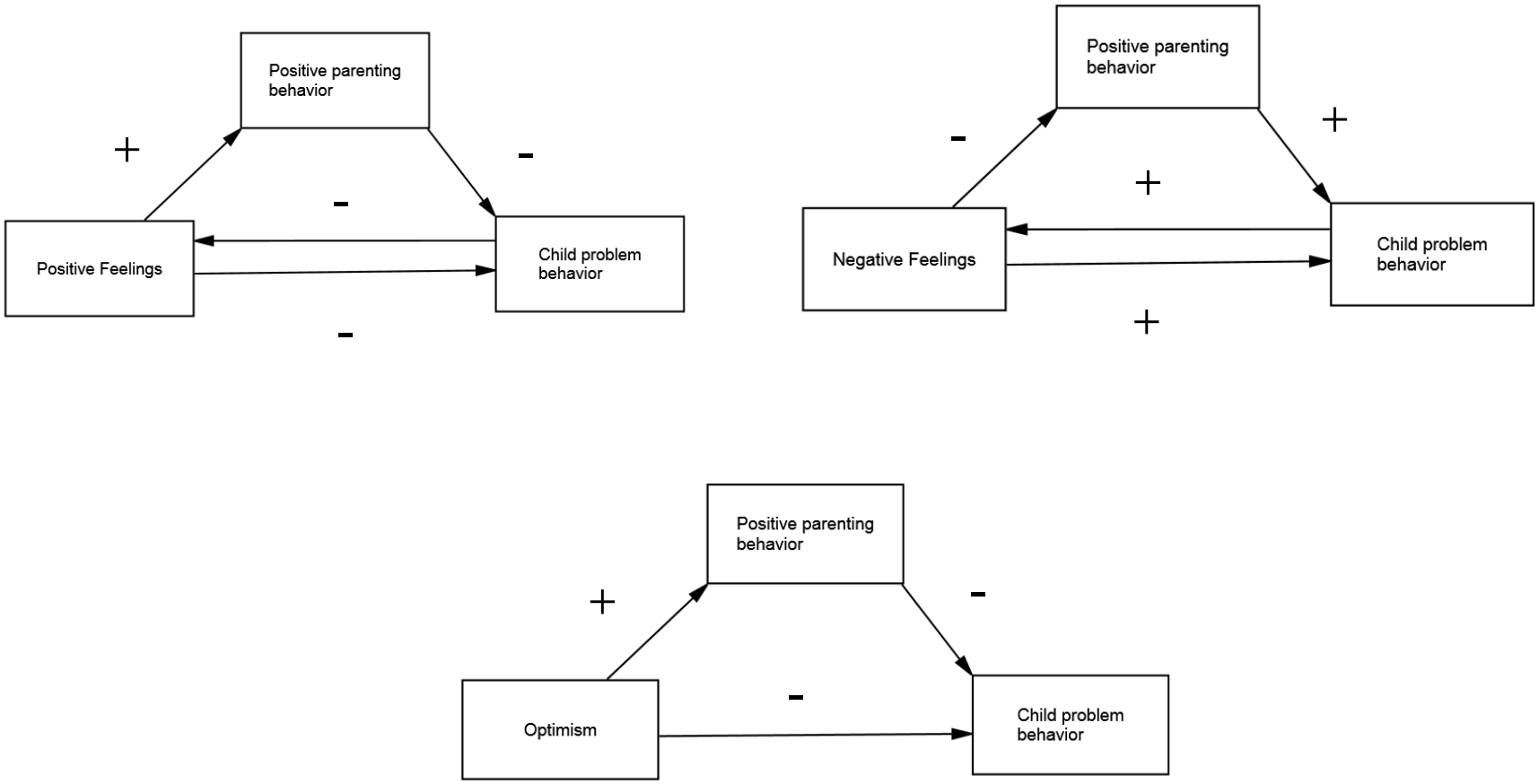

Figure 1. Simplified relations among study variables.

over time (Fontaine et al., 2011; Larsson et al., 2008). Similar transactional relations have been observed between child problem behavior and other parent factors for children with DD (e.g. Woodman, Mawdsley, & Hauser-Cram, 2015). As such, a transactional relation between parent feelings and child problem behavior is proposed in this study.

It is hypothesized that decreased positive feelings and increased negative feelings will be associated with increased problem behavior at baseline. It is hypothesized that increases in positive feelings will predict decreases in child problem behavior over time and that decreases in problem behavior will predict increases in positive feelings over time. It is also predicted that increases in negative feelings will predict increases in child problem behavior over time and that decreases in problem behavior will predict decreases in negative feelings over time.

2. *Does optimism predict child problem behavior over time for parents of children with DD?* Unlike parent feelings, dispositional optimism is conceptualized as a stable personality characteristic that experiences minimal change over time (Carver & Scheier, 2014). As such, it is not predicted that the relation between optimism and child problem behavior will be transactional. It is hypothesized that increased optimism will predict decreased problem behavior at baseline and decreased growth in problem behavior over time.

3. *Are these relationships mediated by observed parenting behavior?* Parenting behavior is proposed as the mechanism by which private events such as parenting feelings and optimism affect child problem behavior. As such, it is predicted that observed positive parenting behavior, during a parent-child interaction task, will mediate

the relations predicting problem behavior from positive feelings, negative feelings, and optimism.

CHAPTER II

METHODS

Participants

This study is part of a larger investigation of an early family-based intervention for caregivers of preschool-aged children with DD (Oregon Parent Project; R01 HD059838, McIntyre, PI) that has been approved by the University of Oregon Institutional Review Board. Data for this study were collected from 132 caregivers of preschool children with DD. Participants were recruited from agencies serving children eligible for early intervention and early childhood special education in the Eugene, Oregon area. Parents were then screened over the phone to determine whether their children met the following inclusionary criteria: 1) age 2.5 – 3.5 years, 2) current eligibility for an individual family service plan indicating a developmental delay or disability, and 3) live with primary caregiver/legal guardian for a minimum of 1 year. Due to the nature of the parent-child interaction tasks, children were excluded from the sample if they were nonambulatory, deaf, or blind. Key demographic characteristics for the sample of parents and children are provided in Table 1.

Consent procedures. All study procedures were approved by the Institutional Review Board at the University of Oregon. Caregivers provided verbal consent prior to eligibility phone screening, and once determined eligible, parents were provided with a written informed consent describing the study procedures in detail. Caregivers reviewed these materials and had the opportunity to ask questions prior to study participation.

Table 1

Child and Caregiver Demographic Variables (N = 132)

Demographic	Mean (SD)	n (%)
Child		
Age in months	36.69 (4.86)	
No. female		30 (22.7)
No. White/Caucasian		87 (65.9)
No. with siblings in home		94 (71.2)
Primary diagnosis of speech/language delay		77 (58.3)
Primary diagnosis of developmental delay		16 (12.1)
Primary diagnosis of autism spectrum disorder		14 (10.6)
Other primary diagnosis		25 (18.9)
Adaptive behavior composite	83.40 (12.43)	
Caregiver		
Age in years	32.42 (7.11)	
No. female		112 (92.4)
No. biological mother		105 (79.5)
No. living with a partner		94 (71.2)
No. White/Caucasian		102 (77.3)
No. working full or part-time		55 (41.6)
No. bachelor's degree		35 (26.6)
Annual family income in USD	40,157.96 (33,282.59)	

Study Procedures

After the caregiver provided consent to participate, the Vineland Adaptive Behavior Assessment-II (VABS-II; Sparrow, Cicchetti & Balla, 2005) was administered over the phone by a research assistant. Following this assessment, caregivers participated in 3 in-home assessments at Time 1 (baseline), Time 2 (3 months after baseline), and Time 3 (9 months after baseline). At each in-home assessment, parents completed a written packet of questionnaires and participated in a filmed parent-child interaction task. Each in-home assessment was conducted by two trained research assistants. Participants received honoraria of $100 for the Time 1 and Time 2 assessments and $125 for the Time 3 assessment.

Measures

Adaptive behavior. The VABS-II (Sparrow et al., 2005) is a norm-referenced structured interview used to gain information about four domains of adaptive behavior: Communication, Daily Living Skills, Socialization, and Motor Skills. Scores on these domains are combined to make up the Adaptive Behavior Composite standard score (M = 100; SD = 15), which provides an overall characterization of adaptive behavior skills. Test-retest and split-half reliability coefficients for subscales range from .83 to .94, and interrater reliability for subscales ranges from .62 to .78 (Kanne et al., 2011). The mean Adaptive Behavior Composite score is reported to characterize the sample.

Parent feelings. Parents' positive and negative feelings toward their child with DD were measured using the *Parent Feelings Questionnaire* (PFQ; Deater-Deckard, 2000). This measure was selected to provide separate indicators of parents' positive and negative feelings and a focused and specific measure of these constructs. The PFQ

consists of two scales containing items measuring both positive and negative feelings toward a specific child: A Likert-type scale and a 1-10 scale. On the Likert-type scale, parents were asked to rate the degree to which 24 statements such as "Sometimes I find it difficult to be around my child" and "I enjoy being my child's parent" are true or untrue for them on a 1-5 scale (1 = definitely untrue for me; 3 = not really true for me; 5 = definitely true for me). On the 1-10 scale, parents were asked to rate how frequently they experience emotions such as "joyful" and "frustrated" when they are with their child with DD on a scale where 1 = never and 10 = always. Scoring the PFQ results in four scales: A positive feelings Likert-type scale, a negative feelings Likert-type scale, a positive feelings 1-10 scale, and a negative feelings 1-10 scale. Scores on the positive feelings scales and scores on the negative feelings scales are converted to Z-scores, summed, and reconverted to Z-scores to create an overall Positive Feelings composite and an overall Negative Feelings composite. The PFQ has good reliability across studies in typically developing populations and correlates substantially with other measures of parental affect (Deater-Deckard, 2000). In the current sample internal consistency alpha reliability coefficients were: Positive Feelings Likert-type scale $\alpha = .74$; Positive Feelings 1-10 scale $\alpha = .77$; Negative Feelings Likert-type scale $\alpha = .93$; and Negative Feelings 1-10 scale $\alpha = .85$. These values indicate adequate reliability (Tavakol & Dennick, 2011).

Optimism. The *Revised Life Orientation Test* (LOT-R; Scheier, Carver, & Bridges, 1994) was used to measure parents' generalized optimism about life events. The LOT-R asks parents to rate the degree to which they agree with 10 statements such as "In uncertain times, I usually expect the best" on a 0-4 Likert-type scale. A higher score on the LOT-R indicates higher global optimism. This measure is commonly used across

studies as an indicator of dispositional trait optimism and has satisfactory psychometric properties overall (Glaesmer et al., 2012). The LOT-R has been used repeatedly with parents of children with DD, with these studies finding acceptable reliability and validity with this population (e.g. Baker et al, 2003; Ellingsen et al., 2014). In the current study, Time 1 internal consistency reliability was $\alpha = .84$, indicating good reliability (Tavakol & Dennick, 2011).

Child problem behavior. Caregivers completed the Child Behavior Checklist for Ages 1 ½ - 5 (CBCL; Achenbach, 2000), a 99 item norm referenced checklist that indicates child problem behavior across several domains. The child's parent specifies whether each item is "not true" (0), "somewhat or sometimes true" (1), or "very true or often true" (2), now or within the past two months. The CBCL yields a total problem score, broad-band externalizing and internalizing scores, and narrow-band scales. The total problem *T* score was used as an indicator of the presence and severity of overall child problem behavior. The CBCL has been used extensively with young children with DD and has excellent reliability and validity with this population (e.g., Baker et al., 2003; Baker et al., 2005; Ellingsen et al., 2014). Time 1 internal consistency reliability was $\alpha = .96$, indicating very high reliability (Tavakol & Dennick, 2011).

Parenting behavior. Videotaped direct observations of parent-child interactions were completed in the home at all time points. These observations consisted of a free play task (10 min), a cleanup task (2 min), and a structured activity task (3 min). First, parents and children were provided with a bin containing a standardized set of age-appropriate toys and were instructed to play with the toys as they normally would. After ten minutes of free play, the parent-child dyads were instructed to put the toys back into the bin. After

the two-minute cleanup task was completed, parent-child dyads were provided with a bag of structured activities (e.g., puzzles, shape sorter, ring stacker) and instructed to choose and work on an activity. The observation concluded after the three-minute structured activity task, with the total observation period lasting 15 minutes.

In this study, positive parenting variables of interest included proactive parenting, limit setting, and praise. All parent-child interaction videos were coded by trained coders. The proactive parenting and limit setting variables are composite scores from the Coder Impression Inventory (Dishion, Hogansen, Winter, & Jabson, 2004). The proactive parenting construct reflects the coder's general impressions about the parent's use of an effective and sensitive communication style during parent-child interactions, while the limit setting variable reflects impressions as to whether the caregiver set appropriate limits and boundaries during the interaction. Each composite consists of multiple Likert-type items where 1 = not at all, 5 = somewhat, and 9 = very much. The praise variable represents the number of praise statements made per 30 second interval during the interaction task. Praise was operationally defined as reinforcing a child behavior through attention, a hug, a smile, verbal praise, or excitement (Phaneuf & McIntyre, 2007). Positive facial expressions were only included if the child was attending to the expression and the expression was clear and overt. At least 30% of all videos were coded by two observers. Inter-observer agreement for the Coder Impression Inventory was .87 at Wave 1, .87 at Wave 2, and .89 at Wave 3. Inter-observer agreement for the coding system containing the praise variable was .85 at Wave 1, .87 at Wave 2, and .86 at Wave 3. These values are all at or above .85, indicating strong interrater reliability (Landis & Koch, 1977).

CHAPTER III

ANALYSIS PLAN

Prior to data analysis, all data were organized and reviewed for errors in SPSS. The first step of data analysis was to examine the distribution of variables to determine whether they were normally distributed across intervention groups and whether there are any significant outliers. Parents participating in the study were randomly assigned to a condition where they were invited to participate in a group-based parent training program or to a treatment-as-usual control condition. If parents participated in the parent training program, the intervention was delivered between the Time 1 and Time 2 assessment points. Due to random assignment, intervention groups were not expected to differ at Time 1 but were expected to possibly differ at Time 2 or Time 3 due to intervention participation. To assess whether these variables were normally distributed, histograms of the baseline data for each intervention group were created and reviewed in SPSS. Skewness and kurtosis values were calculated. It was predicted that all variables would be normally distributed with the exception of positive and negative feelings, which were predicted to have significant skew. The sample size, mean, and standard deviation for each variable at each time point as well as bivariate correlations between all study variables are presented in tables. After examining the distribution of data, a series of *t* tests were conducted to determine whether participants who received the intervention significantly differed from participants who did not receive the intervention on any study variables. *T* tests compared treatment versus control participants on all study variables. If participants significantly differed on any of these variables, participant condition (treatment vs. control) was added to the full model as a covariate.

All subsequent analyses were completed in R (R Core Team, 2016) and SPSS Amos 23 (Arbuckle, 2014). Given the longitudinal design, it was expected that there would be some missing data due to participant attrition. As such, prior to fitting the proposed model, data were analyzed using Little's missing completely at random (MCAR; Little, 1988) test in order to evaluate whether missing data in the sample occurred at random. This test was completed using the Baylor Ed Psych package in R (Beaujean, 2012). It was predicted that missing data will be minimal and missing completely at random. All models were evaluated using structural equation modeling (SEM) and will be fitted in Amos. The estimation method for each model was selected based on sample distribution and the presence of missing data.

Research Question 1: ***Is there a transactional relation between parent feelings (positive or negative) and child problem behavior over time for parents of children with DD?***

Research Question 2: ***Does optimism predict child problem behavior over time for parents of children with DD?***

Research questions 1 and 2 were answered via structural equation modeling using a latent growth model (LGM) approach (Muthén & Carran, 1997). LGM allows for the examination of developmental growth over time by nesting repeated measures outcomes across timepoints within individuals (DeGarmo & Forgatch, 2012). Specifically, LGM provides latent estimates of initial status (intercept) and linear growth over time (slope). A sequential set of latent growth models were specified and compared to establish the best possible model fit. First, each independent variable (positive feelings, negative feelings, and optimism) as well as the dependent variable (child problem behavior) were

analyzed in separate LGMs to establish whether significant increase or variability in growth was present across the three timepoints. If significant growth or variance in growth was present, the LGM was included in the final model as is. If scores were highly stable across the three timepoints, the variable was represented using a univariate random intercepts model that did not include a latent growth term. The next analytic step will be to determine whether the independent variables are distinct constructs that can be represented separately within the final model. This examination will be conducted using confirmatory factor analysis and review of multicollinearity statistics. Finally, a full model examining the differential impact of all three dependent variables on child problem behavior was calculated.

Research Question 3: ***Are these relations mediated by observed parenting behavior?***

This research question was answered by adding mediation terms to the final full model evaluated for Research Questions 1 and 2. As a preliminary step, a confirmatory factor analysis was conducted to determine whether the parenting behavior measures (proactive parenting, limit setting, and praise) should be represented as one, two, or three latent constructs. Next, the identified latent constructs were analyzed in separate LGMs to establish whether significant growth or variability in growth was present across the three timepoints. Finally, the parenting constructs were added to the model and assessed as mediators of all significant paths between dependent variables and problem behavior established within the full model.

CHAPTER IV

RESULTS

Means, standard deviations, and sample size for positive and negative feelings, optimism, and problem behavior at all timepoints are presented in Table 2. The positive and negative feelings composites are z-scores centered at 0 with a standard deviation of 1. Means and standard deviations for optimism and problem behavior are generally stable across time points. Sample sizes represent attrition of ten participants between Time 1 and Time 2 and of three participants between Time 2 and Time 3. Bivariate correlations between these variables are presented in Table 3. All variables are significantly correlated across timepoints. Positive and negative feelings are significantly negatively correlated. Positive feelings are positively associated with optimism and negatively associated with problem behavior. Negative feelings are negatively associated with optimism and positively associated with problem behavior. Optimism is significantly negatively associated with problem behavior. These correlations are consistent with study hypotheses and expectations.

As the next analytic step, a series of two-tailed independent samples *t* tests were conducted to determine whether participants who received the intervention significantly differed from participants who did not receive the intervention on any study variables. The only significant difference between intervention and control groups occurred at Time 1, with the control group ($M = 16.48$, $SD = 4.39$) demonstrating higher optimism than the intervention group ($M = 14.55$, $SD = 4.47$), $t\ (117) = 2.50$, $p = .01$. This difference was no longer significant at Timepoints 2 or 3. As this difference is present prior to intervention engagement or participation, the difference in optimism between these two groups is

Table 2

Means, Standard Deviations, and Sample Sizes for Parent and Child Variables of Interest

Variables	*M*	*SD*	*N*
1. Positive feelings, T1	0.00	1.00	132
2. Positive feelings, T2	0.00	1.00	122
3. Positive feelings, T3	0.04	1.00	119
4. Negative feelings, T1	0.00	1.00	132
5. Negative feelings, T2	0.00	1.00	122
6. Negative feelings, T3	-0.05	1.00	119
7. Optimism, T1	15.50	4.52	132
8. Optimism, T2	15.77	4.46	122
9. Optimism, T3	15.30	4.49	119
10. Problem Behavior, T1	58.05	12.05	132
11. Problem Behavior, T2	56.53	12.50	122
12. Problem Behavior, T3	57.22	12.12	119

Table 3

Bivariate Correlations for Parent and Child Variables of Interest

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Positive feelings, T1	–											
2. Positive feelings, T2	.72***	–										
3. Positive feelings, T3	.64***	.80***	–									
4. Negative feelings, T1	-.61***	-.47***	-.37***	–								
5. Negative feelings, T2	-.59***	-.69***	-.61***	.81***	–							
6. Negative feelings, T3	-.53***	-.59***	-.62***	.80***	.84***	–						
7. Optimism, T1	.34***	.31**	.30**	-.41***	-.48***	-.36***	–					
8. Optimism, T2	.24**	.37***	.35***	-.25**	-.47***	-.23**	.62***	–				
9. Optimism, T3	.30**	.38***	.43***	-.30**	-.46***	-.45***	.72***	.70***	–			
10. Problem Behavior, T1	-.34***	-.35***	-.23*	.53***	.57***	.49***	-.36***	-.34***	-.28**	–		
11. Problem Behavior, T2	-.29**	-.37***	-.31**	.40***	.56***	.49***	-.29**	-.37***	-.25**	.82***	–	
12. Problem Behavior, T3	-.29**	-.40***	-.35***	.44***	.54***	.56***	-.29**	-.30**	-.33***	.83***	.82***	–

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

presumed to be due to random assignment as opposed to intervention effects. However, group assignment will be added to the final model as a covariate to determine whether the inclusion of this variable significantly alters the results.

Skewness and kurtosis analyses were conducted and histograms were examined to determine whether study variables were normally distributed. Skewness analyses and histograms indicated that while positive and negative feelings are slightly skewed, no skewness or kurtosis values were in the problematic range (above 3 or below -3 for skewness, above 8 for kurtosis). Next, Mardia's test of multivariate skewness and kurtosis was conducted in AMOS. Mardia's coefficient was calculated at 18.86 with a critical ratio of 5.25. This value indicates that the dataset as a whole may not be multivariate normal.

Prior to fitting the proposed models, data were analyzed using Little's missing completely at random (MCAR; Little, 1988) test in order to evaluate whether missing data in the sample occurred at random. This test was completed using the Baylor Ed Psych package in R (Beaujean, 2012). The result of this test was nonsignificant, X^2 (238) = 221.44, p = .77. This finding indicates that missing data in this sample is MCAR. As missing data is MCAR and study variables are normally distributed, full information maximum likelihood estimation (FIML) was used for all subsequent analyses.

Research Questions 1 and 2: ***Do parent feelings (positive or negative) and optimism predict child problem behavior over time for parents of children with DD?***

The first analytic step was to determine whether growth in parent feelings, optimism, or child problem behavior occurred over time via a series of LGMs. Results of these LGMs are presented in Tables 4-7. The mean and variance for growth in child

problem behavior were both non-significant, indicating stability in problem behavior across the three timepoints. As cross-lag paths cannot be evaluated when growth or change does not occur within a construct, this stability prevents the transactional relation hypothesized in Research Question 1 from being evaluated with this data. However, within the LGM framework it is possible to assess whether change or level within another variable predicts problem behavior across timepoints. Growth means and variances for negative feelings and optimism were also non-significant, suggesting that levels of these constructs are also stable across these timepoints. However, the LGM including positive feelings resulted in significant variance in growth, indicating that change in positive feelings across the three timepoints varies between participants. Due to this significant result, positive feelings were represented as an LGM in the final model, while the other factors (negative feelings, optimism, and problem behavior) were represented as random intercept models with no growth terms.

The next analytic step was to examine collinearity statistics to determine whether positive feelings, negative feelings, and optimism could be entered into the full model separately without significant concerns about multicollinearity. To examine these statistics, a multiple regression analysis predicting mean child problem behavior across Waves 1-3 was conducted where mean optimism across waves was added as the first step, mean positive feelings across waves were added as the second step, and mean negative feelings across waves were added as the third step. All VIF statistics were between 1 and 2, all tolerance statistics were greater than .2, and all condition indices were less than 15, suggesting that significant multicollinearity was not present between these variables. Next, two separate confirmatory factor analyses were conducted and

Table 4

Latent Variable Means, Variances, and Standard Errors for Growth Model of Child Problem Behavior (N = 132)

Parameter Estimate	*Mean*	*Standard Error*	*Variance*	*Standard Error*
Problem behavior average level intercept	57.99***	1.05	133.43***	1.05
Problem behavior linear growth slope	-0.22	0.32	5.93	7.18

Note: $\chi^2(1) = 0.85$, $p > .05$; RMSEA = .00, CFI = 1.00

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

Table 5

Latent Variable Means, Variances, and Standard Errors for Growth Model of Positive Feelings (N = 132)

Parameter Estimate	*Mean*	*Standard Error*	*Variance*	*Standard Error*
Positive feelings average level intercept	0.00	0.09	0.78***	0.14
Positive feelings linear growth slope	0.02	0.04	0.11*	0.05

Note: $\chi^2(1) = 0.02$, $p > .05$; RMSEA = .00; CFI = 1.00

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

Table 6

Latent Variable Means, Variances, and Standard Errors for Growth Model of Negative Feelings (N = 132)

Parameter Estimate	*Mean*	*Standard Error*	*Variance*	*Standard Error*
Negative feelings average level intercept	0.01	0.09	0.74***	0.13
Negative feelings linear growth slope	-0.02	0.03	-0.01	0.05

Note: $\chi^2(1) = 0.25$, $p > .05$; RMSEA = .00; CFI = 1.00

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

Table 7

Latent Variable Means, Variances, and Standard Errors for Growth Model of Optimism (N = 113)

Parameter Estimate	*Mean*	*Standard Error*	*Variance*	*Standard Error*
Optimism average level intercept	15.64***	0.37	9.89***	2.82
Optimism linear growth slope	-0.16	0.15	-1.70	1.38

Note: $\chi^2(1) = 1.22$, $p > .05$; RMSEA = .04; CFI = .99

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

compared to determine whether positive and negative feelings should be represented as two separate constructs or a single parent feelings construct. These models are presented in Figures 2 and 3. For the model with 2 factors (Figure 2), $\chi^2(8) = 87.19$, $p < .05$; RMSEA = .28, CFI = .88, AIC = 125.191. For the model with 1 factor (Figure 3), $\chi^2(9) = 176.41$, $p < .05$; RMSEA = .38, CFI = .74, AIC = 212.41. Comparison of these CFI and AIC statistics indicates that a two-factor model of parent feelings was a better fit for the data than a one-factor model.

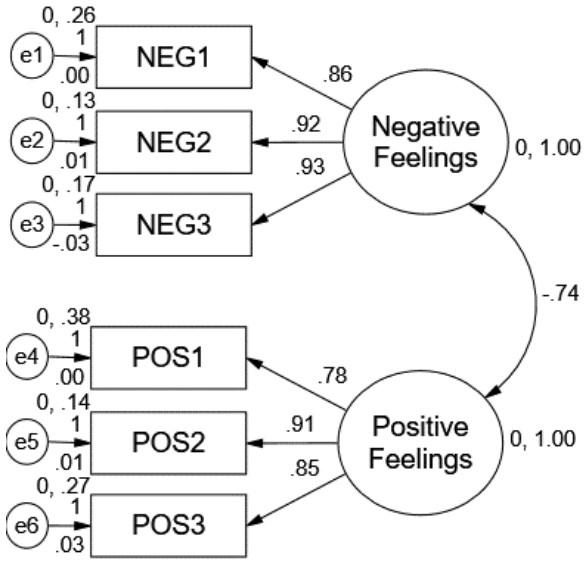

Figure 2. Two-factor path model of positive and negative feelings with standardized estimates.

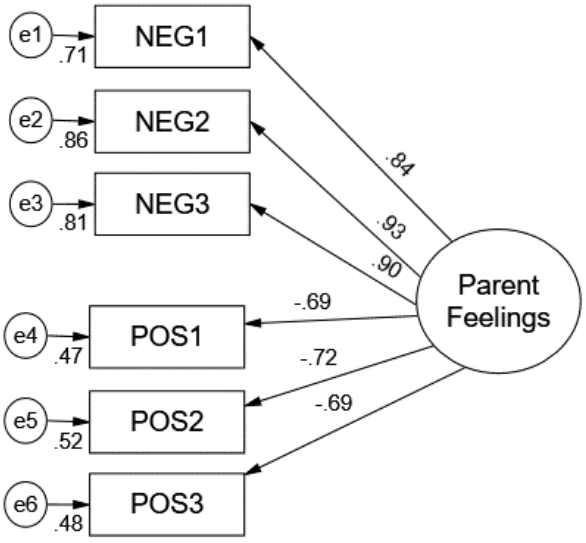

Figure 3. One-factor path model of positive and negative feelings with standardized estimates.

Given these results and the results of the multicollinearity diagnostics, positive feelings, negative feelings, and optimism were represented in the full model as three separate constructs. This model is presented in Figure 4. For this model, $\chi^2(58) = 170.97$, $p < .001$, which indicates that the model may not be a strong fit for the data. Other fit statistics indicate that the model approaches but does not reach good fit (RMSEA = .12, CFI = .91). Negative feelings were a significant predictor of problem behavior ($\beta = .66$, $p < .001$), while optimism ($\beta = -.15$, $p > .05$), positive feelings growth ($\beta = .03$, $p > .05$), and positive feelings intercept ($\beta = .14$, $p > .05$) did not significantly predict problem behavior. This finding indicates that negative feelings, as opposed to positive feelings or optimism, were specifically predictive of child problem behavior within this sample. Finally, in order to determine whether intervention condition impacted these results, the model was re-computed with intervention condition added as a covariate. The

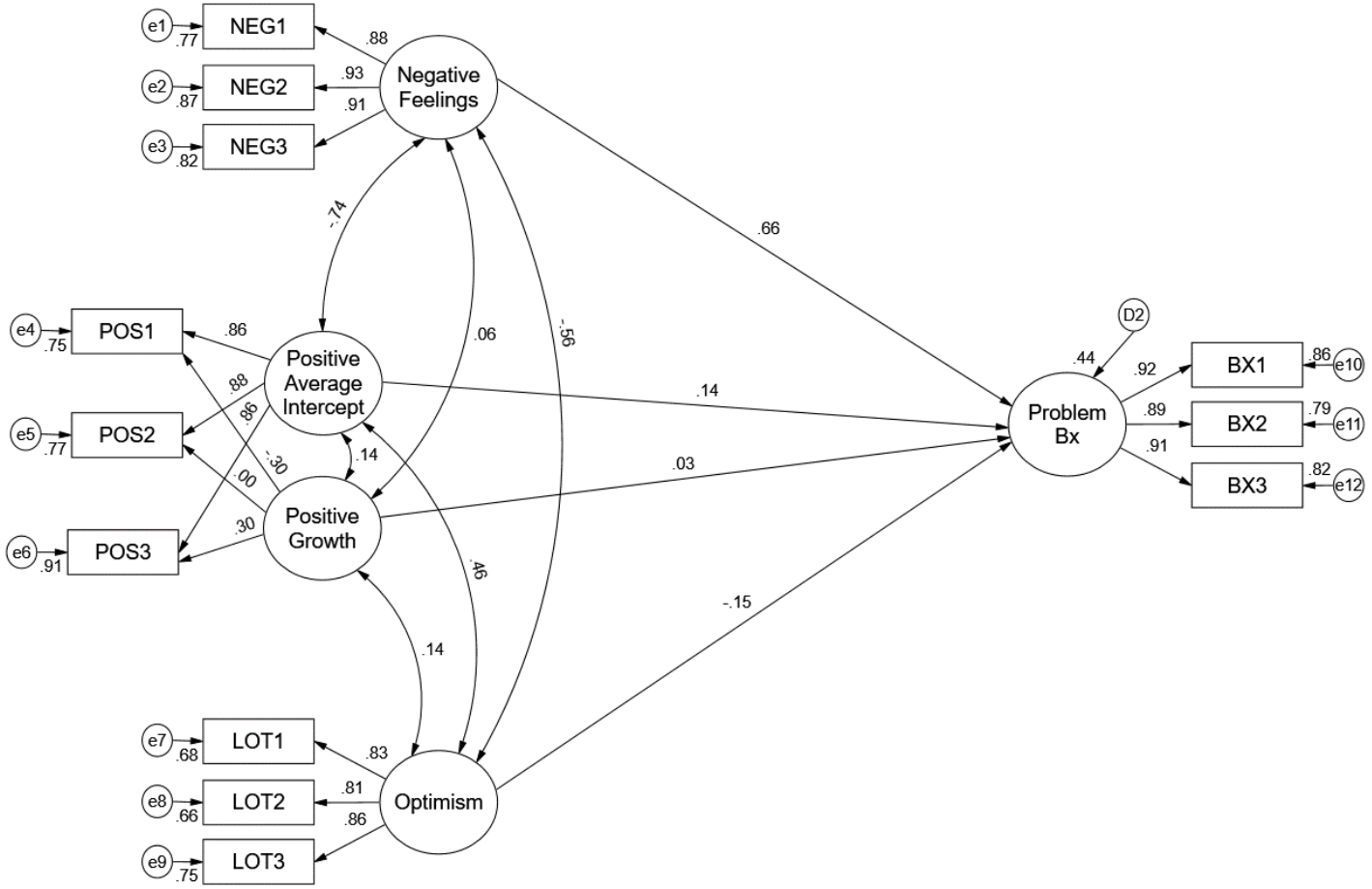

Figure 4. Full model predicting problem behavior with standardized estimates.

intervention condition term was not significant (β = -.02, $p > .05$) and did not affect the significance level of other terms or improve overall model fit. As such, the intervention condition term was removed from future models.

Research Question 3: ***Are these relations mediated by observed parenting behavior?***

Prior to conducting mediation analyses, bivariate correlations between proactive parenting, limit setting, and praise were examined to evaluate whether the proposed latent construct of parenting behavior is an appropriate fit for the data. Means and standard deviations for these variables are presented in Table 8, and correlations are presented in Table 9. Bivariate correlations revealed that praise and limit setting were not significantly associated at any timepoint. In addition, praise and proactive parenting were not significantly associated at Time 2. The lack of significant associations between praise and other parenting variables indicates that the proposed latent construct may not accurately represent the relations between these variables. Next, a series of CFAs were completed to determine whether parenting behavior should be represented by one, two, or three latent constructs. These models are presented in Figures 5-7. For the model with 1 factor (Figure 5), $\chi^2(27) = 164.51$, $p < .05$; RMSEA = .20, CFI = .38, AIC = 218.51. For the model with 2 factors (Figure 6), $\chi^2(26) = 107.28$, $p < .05$; RMSEA = .15, CFI = .63, AIC = 163.28. For the model with 3 factors (Figure 7), $\chi^2(24) = 97.95$ $p < .05$; RMSEA = .15, CFI = .66, AIC = 157.95. Comparison of standardized estimates, CFI, and AIC values indicates that parenting behavior is best represented by three separate factors.

As a next step, 3 separate LGMs were conducted to determine whether growth or change in parenting behavior occurred across the three timepoints. Results of these models are presented in Tables 10-12. Growth slopes indicate a significant mean

increase in proactive parenting across timepoints, a significant mean decrease in limit setting across timepoints, and no significant growth in praise. Growth variances were non-significant, indicating that significant individual differences in growth trajectories were not present. Proactive parenting and limit setting were represented as LGMs in the final models in order to account for significant mean growth, while praise was represented as a random intercepts model with no growth term.

Table 8

Means, Standard Deviations, and Sample Sizes for Observed Parenting Behaviors

Variables	*M*	*SD*	*N*
1. Proactive parenting, T1	6.30	1.12	131
2. Proactive parenting, T2	6.61	0.92	121
3. Proactive parenting, T3	6.63	0.86	115
4. Limit setting, T1	7.85	0.89	131
5. Limit setting, T2	7.80	0.89	121
6. Limit setting, T3	7.66	0.82	115
7. Praise, T1	7.20	6.86	132
8. Praise, T2	8.06	6.34	122
9. Praise, T3	6.78	5.93	115

Table 9

Bivariate Correlations for Observed Parenting Behaviors

Variables	1	2	3	4	5	6	7	8	9
1. Limit setting, T1	–								
2. Limit setting, T2	.21*	–							
3. Limit setting, T3	.12	.31**	–						
4. Proactive parenting, T1	.57***	.08	.16	–					
5. Proactive parenting, T2	.13	.68***	.29**	.05	–				
6. Proactive parenting, T3	.15	.15	.45***	.25**	.21*	–			
7. Praise, T1	.13	-.06	.10	.31***	-.03	.26**	–		
8. Praise, T2	-.01	.03	-.01	.17	.10	.17	.42***	–	
9. Praise, T3	.12	.07	.13	.16	.14	.33***	.30***	.47***	–

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

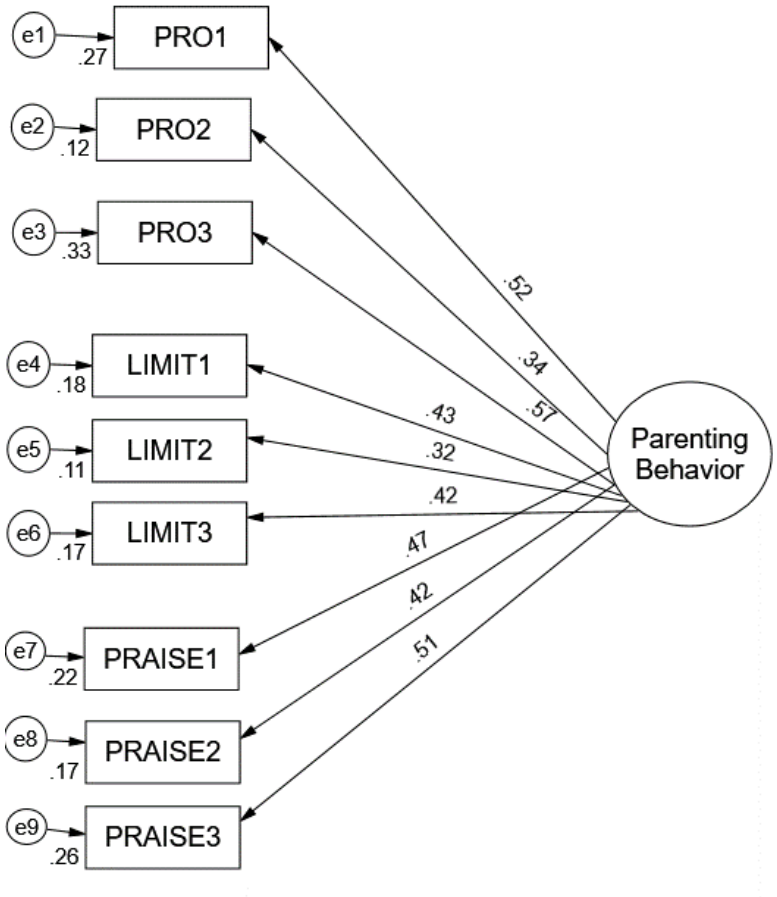

Figure 5. One-factor path model of parenting behavior with standardized estimates.

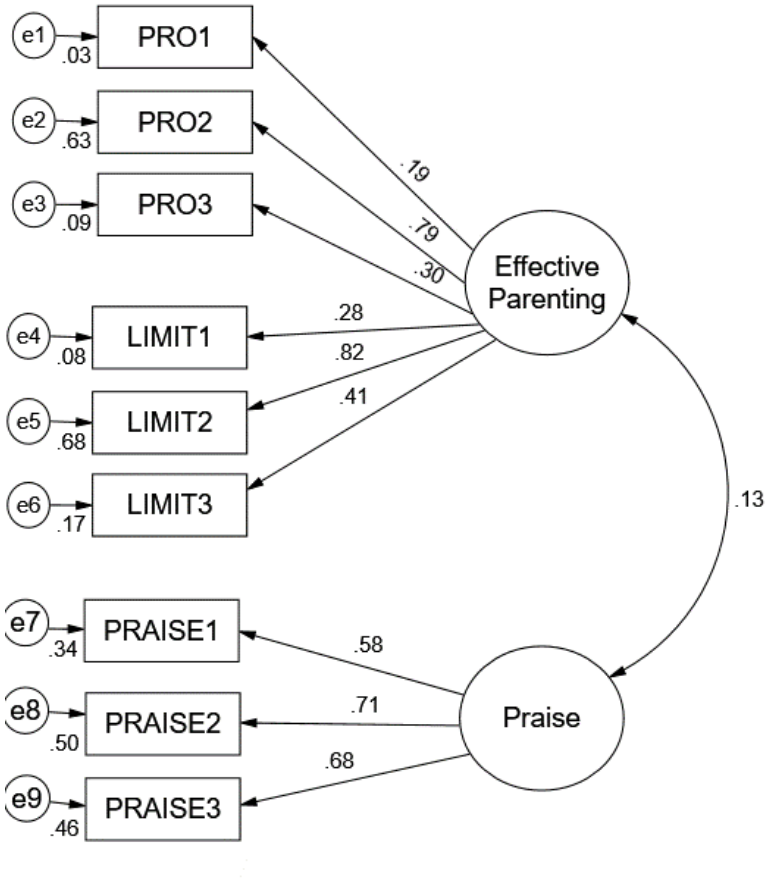

Figure 6. Two-factor path model of parenting behavior with standardized estimates.

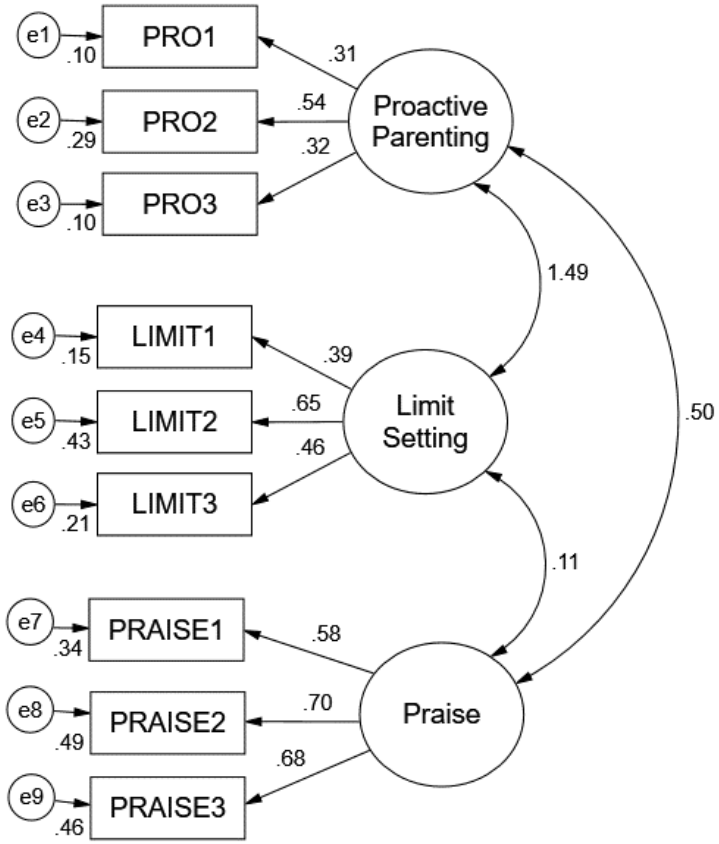

Figure 7. Three-factor path model of parenting behavior with standardized estimates.

Table 10

Latent Variable Means, Variances, and Standard Errors for Growth Model of Proactive Parenting (N = 132)

Parameter Estimate	*Mean*	*Standard Error*	*Variance*	*Standard Error*
Proactive parenting average level intercept	6.38***	0.08	-0.14	0.20
Proactive parenting linear growth slope	0.14**	0.05	-0.13	0.10

Note: $\chi^2(1) = 2.19$, $p > .05$; RMSEA = .10; CFI = .80

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

Table 11

Latent Variable Means, Variances, and Standard Errors for Growth Model of Limit Setting (N = 132)

Parameter Estimate	*Mean*	*Standard Error*	*Variance*	*Standard Error*
Limit setting average level intercept	7.86***	0.07	0.27	0.14
Limit setting linear growth slope	-0.10*	0.05	0.11	0.07

Note: $\chi^2(1) = 0.20$, $p > .05$; RMSEA = .00; CFI = 1.00

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

Table 12

Latent Variable Means, Variances, and Standard Errors for Growth Model of Praise (N = 132)

Parameter Estimate	*Mean*	*Standard Error*	*Variance*	*Standard Error*
Praise average level intercept	7.58***	0.56	19.16**	7.23
Praise linear growth slope	-0.33	0.32	1.43	3.45

Note: $\chi^2(1) = 3.67$, $p > .05$; RMSEA = .14; CFI = .95

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

Final analyses consisted of evaluating whether change in parenting behavior or mean levels of parenting behavior mediated the significant relationship between negative feelings and child problem behavior. While the growth and intercept terms for proactive parenting were initially added to the full model presented in Figure 4, the model would not converge when these terms and paths were added. Therefore, positive feelings and optimism were removed from the model, and the final model evaluating proactive parenting as a mediator is presented in Figure 8. For this model, $\chi^2(32) = 52.95$, $p < .01$, which indicates that the model may not be a strong fit for the data. However, other fit statistics indicate that the model fits the data well (RMSEA = .07, CFI = .97). Neither average level of proactive parenting nor growth in proactive parenting significantly mediated the relationship between negative feelings and problem behavior, as no mediation paths were significant and the path between negative feelings and problem behavior remained significant ($\beta = .63$, $p < .001$).

The full model including growth and intercept terms for limit setting is presented in Figure 9. For this model, $\chi^2(92) = 211.77$ $p < .001$, which indicates that the model may not be a strong fit for the data. Other fit statistics indicate that the model approaches but does not reach good fit (RMSEA = .10, CFI = .90). The path predicting growth in limit setting from negative feelings approaches significance, $\beta = -.26$, $p = .09$. This relationship would indicate that increased negative feelings are associated with a decrease in effective limit setting over time. Other mediation paths were not significant, and the path between negative feelings and problem behavior remained significant ($\beta = .63$, $p < .001$). As such, limit setting also did not emerge as a mediator of this relationship.

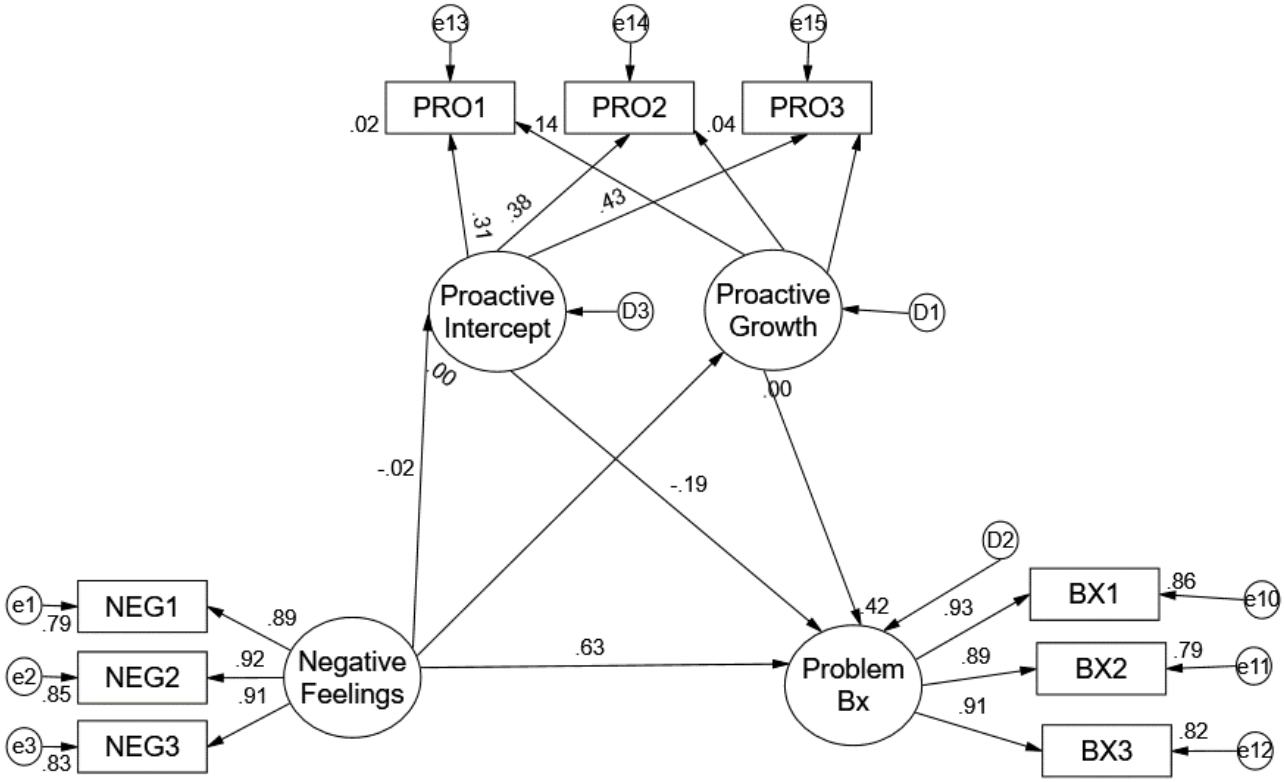

Figure 8. Mediation model of proactive parenting with standardized estimates.

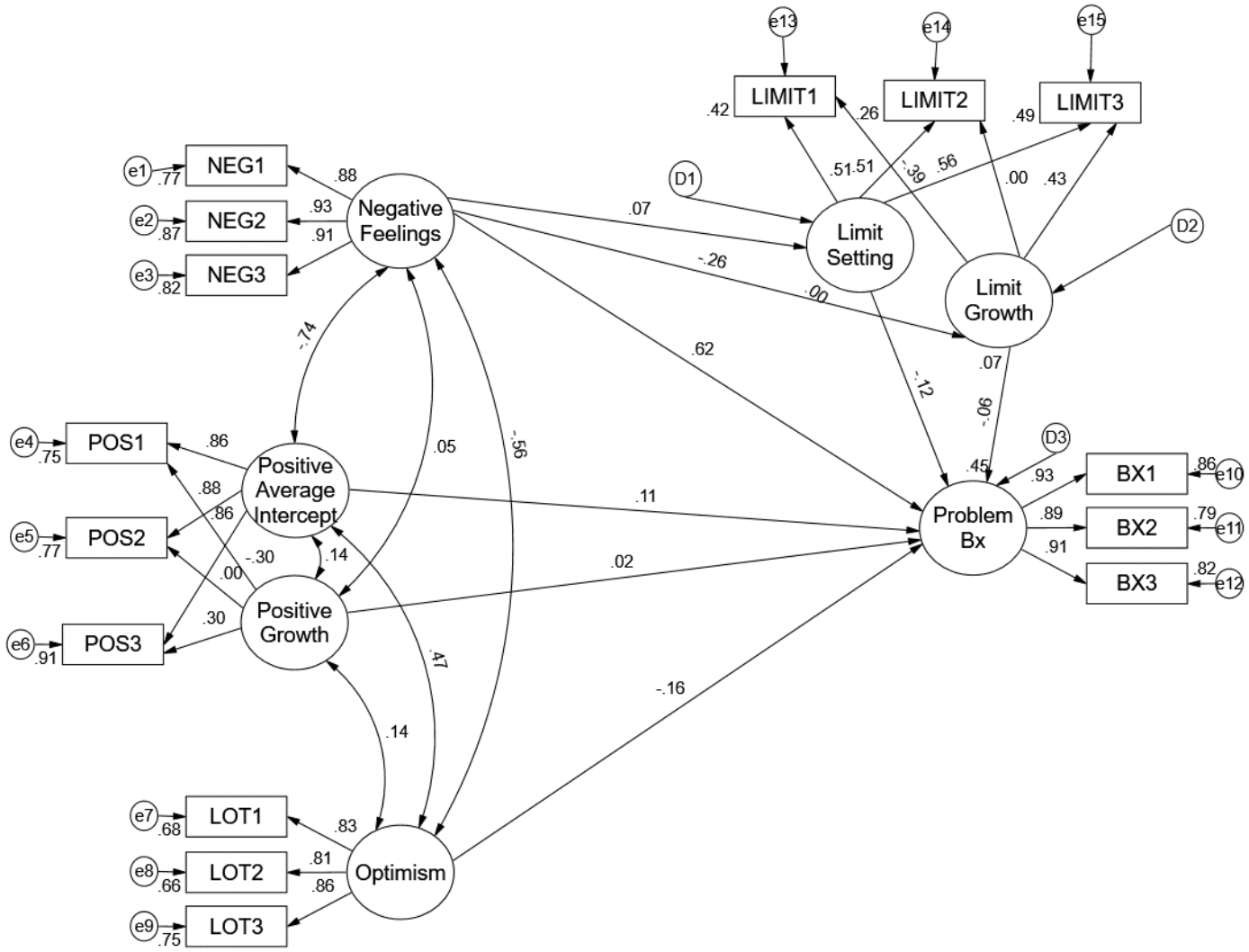

Figure 9. Mediation model of limit setting with standardized estimates.

Praise was represented in the final model via a random intercept model, as significant mean growth or variance in growth was not present for this factor. This model is presented in Figure 10. For this model, $\chi^2(96) = 207.13$, $p < .001$, which indicates that the model may not be a strong fit for the data. Other fit statistics indicate that the model approaches but does not reach good fit (RMSEA = .09, CFI = .91). The path predicting praise from negative feelings is significant, $\beta = -.24$, $p < .05$. This finding suggests that increased negative feelings are associated with a decreased rate of praise during parent-child play interactions. However, other mediation paths were not significant, and the path between negative feelings and problem behavior remained significant ($\beta = .66$, $p < .001$). Therefore, praise also did not emerge as a mediator of this relationship.

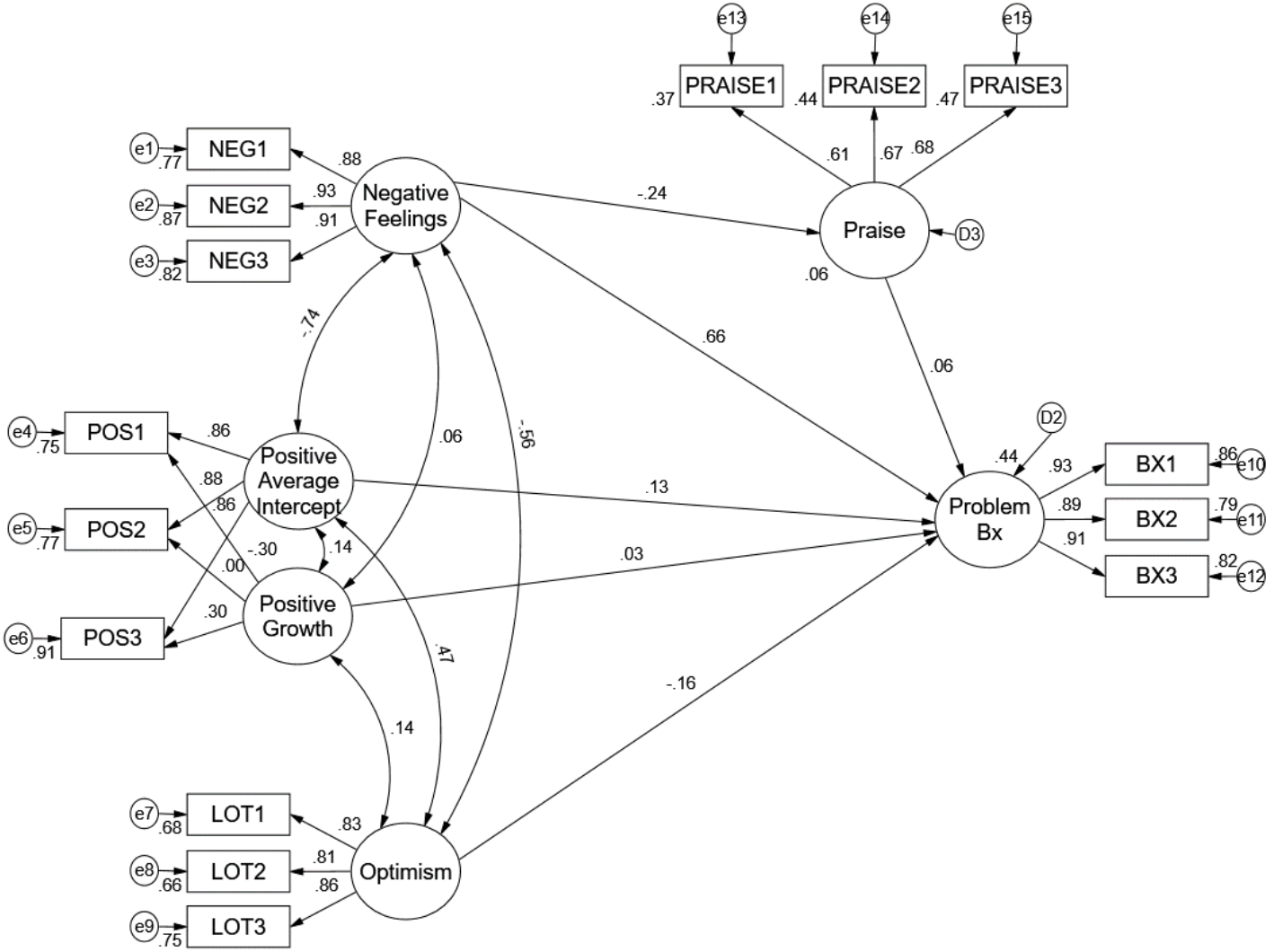

Figure 10. Mediation model of praise with standardized estimates.

CHAPTER V

DISCUSSION

Summary of Results

The purpose of this study was to examine relations between parent positive and negative feelings, dispositional optimism, parenting behavior, and child problem behavior in a longitudinal sample of young children with developmental delay. Initial analyses revealed that child problem behavior, negative feelings, and optimism were highly stable across the three timepoints, while positive feelings exhibited significant variance across the three timepoints. The full model including these constructs found that negative feelings significantly predicted child problem behavior across timepoints, with higher negative feelings predicting higher problem behavior. Positive feelings and optimism did not significantly predict problem behavior in this model, suggesting that correlations between these constructs and reduced problem behavior are primarily explained by reduced negative feelings.

Next, analyses were conducted to determine whether observed effective parenting behaviors mediated the significant relation between negative feelings and child problem behavior. Increased negative feelings significantly predicted a lower rate of praise across timepoints, indicating that parents with high negative feelings about their child with DD engaged in fewer praise statements during parent-child play interactions. The relation between negative feelings and growth in limit setting approached significance, suggesting that negative feelings may contribute to a decline in effective limit setting over time. However, paths predicting child problem behavior from observed parenting behavior

were nonsignificant, so parenting behavior did not emerge as a mediator in these analyses.

Implications

The primary result of this study suggests that among children with DD, a strong and stable association between child problem behavior and parents' negative feelings about their child is present at a very early age (2.5-3.5 years), even after controlling for the effects of positive feelings and optimism on child problem behavior. Stability in negative feelings is consistent with previous longitudinal research, in which negative feelings were found to be moderately stable between age 4 and age 8 (Larsson et al., 2008). The stability of negative feelings over time suggests that negative feelings in this population may be related to negative relational schemas, which as rule-governed behaviors are difficult to alter and highly stable in response to changes in the environment (Catania, Matthews, & Shimoff, 1982; Smith et al., 2015). This result also suggests that the relationship between negative feelings and child problem behavior identified in previous studies with typically developing samples (e.g. Larsson et al., 2008) may emerge and stabilize when children with DD are very young.

In contrast to negative feelings, trajectories of change in positive feelings varied among participants, indicating that positive feelings may show less stability across time and greater response to environmental contingencies than negative feelings. In addition to these differing trajectories of change, confirmatory factor analyses determined that positive and negative feelings functioned as separate constructs within this sample. This finding suggests that positive and negative feelings may develop differently and should be examined separately in future research with parents of children with DD. The

observed stability in optimism is consistent with the theory that dispositional optimism is a stable trait exhibiting little change across time (Carver & Scheier, 2014). Finally, stability in child problem behavior is consistent with previous research indicating that problem behavior is highly stable among preschoolers with DD (Baker et al., 2003). Additional longitudinal timepoints are likely necessary to uncover variance in problem behavior trajectories within this population.

While positive feelings and optimism were correlated with child problem behavior across timepoints, these factors did not significantly contribute to the prediction of problem behavior when included in a full model with negative feelings. This finding suggests that associations between positive feelings and problem behavior or optimism and problem behavior are explained or mediated by negative feelings. Previous research on parent feelings has not examined the specific impact of positive feelings on child problem behavior, so this finding provides novel information about how positive and negative feelings may function in families of young children with DD. In contrast, many studies have identified relations between dispositional optimism and child problem behavior in both typically developing and DD samples, (e.g. Heinonin et al., 2006; Paczkowski & Baker, 2008), but the mechanisms by which optimism influences problem behavior have generally not been examined. Results of this study are consistent with a theoretical framework in which high optimism affects child problem behavior by reducing parents' negative private events about their child. In addition, parents with low levels of optimism may be more likely to experience negative relational schemas or believe that they are unable to control or change their child's behavior, leading to less effective parenting behavior during parent-child interactions.

This study also identified novel and significant relationships between negative feelings and parenting behavior. Specifically, increased negative feelings were associated with decreased praise during a parent-child free play task, and a relation between increased negative feelings and decrease in effective limit setting over time approached significance. These findings are consistent with a relational frame theory approach to parenting behavior, in which parents' negative or aversive private events impact their ability to use effective parenting behaviors via experiential avoidance or the influence of negative relational schemas. Parents with negative relational schemas about their young children may struggle to identify appropriate behaviors to praise, while parents who engage in experiential avoidance may be less likely to engage in positive behaviors like praise that promote and sustain parent-child interactions. In addition, parents who find interactions with their child aversive or who feel that they are unable to change their child's behavior may avoid limit setting, as setting limits on inappropriate behavior is likely to prompt challenging child behavior in the short term.

While relations between parent reports of negative feelings and observed parenting behavior were present in this sample, use of effective parenting behaviors during parent-child play interactions was not associated with parent reports of child problem behavior. While this result is surprising given the extensive literature on parenting behavior and child problem behavior (e.g. Patterson, 2002), it may be related to the common issue of low convergence between parent-report and observational measures of child behavior and parenting behavior (Hinshaw, Han, Erhardt, & Huber, 1992; Gardner, 2000). Child behavior was measured using the Total Problems score on the Child Behavior Checklist, which is a broad measure of problem behavior across settings.

In contrast, parenting behavior was measured via behavioral rating systems assessing discrete behaviors during a specific activity. As such, the parenting behaviors included in this study may not be associated with the full range of problem behaviors measured on the CBCL. Future research should incorporate more specific measures of child problem behavior, such as aggression or noncompliance, and should examine relations between both observational and parent-report measures of child and parent behavior.

Limitations

The present study has several limitations that should be addressed in future research on these child and family constructs. First, the sample in this study is characterized by a number of risk factors (e.g. low SES and child DD), consists primarily of White/Caucasian mothers, and was drawn from a specific geographic location. As such, results of this study may not generalize to typically developing samples of young children, samples with fewer risk factors, or samples drawn from other regions or racial/ethnic backgrounds. As mentioned earlier, child problem behavior was only measured via parent report, while parenting behavior was only assessed via direct observation. This limitation could be addressed in future studies by including observational measures of child behavior and self-report measures of effective and ineffective parenting behavior. While the study is longitudinal, the three timepoints occurred over only 9 months, which is likely too short of a timespan to capture group or individual change in more stable constructs such as child problem behavior or negative feelings. Because change in these constructs was not present in this study, the hypothesized transactional relationship between parent feelings and child problem behavior could not be evaluated with the available data. Future research should address

this concern by examining a transactional relationship between these constructs across a longer period of time where developmental change is likely to occur, such as a period of multiple years.

Additional limitations of the study are related to the SEM analytic approach. Preliminary analyses indicated that the data used in this study may not be multivariate normal, which in SEM can result in altered parameter estimates and fit statistics when nonnormality is severe (Fan & Wang, 1998). Future analyses could address this concern by using robust maximum likelihood estimation, which provides standard errors that are robust to issues of nonnormality (Chou, Bentler, & Satorra, 1991). In addition, sample size requirements for SEM vary widely based on model structure and variables, and very large samples can sometimes be needed to detect small effects (Wolf, Harrington, Clark, & Miller, 2013). As such, this study's sample size of 132 parent-child dyads may not have been adequate to identify weaker relations between variables as statistically significant. Replicating these results with a larger sample size could identify additional significant relations that are not present in this study.

Future Directions

This study identified an established and stable relationship between negative feelings and problem behavior for preschool children with DD. As such, longitudinal research examining trajectories of parent feelings and problem behavior prior to age 2 is necessary in order to determine when negative feelings emerge and to identify potential causal or transactional mechanisms between parent feelings and child problem behavior. In addition, while negative feelings and child problem behavior were stable across timepoints spanning 9 months, variance may be present across a longer developmental

period. Therefore, longitudinal research should continue to assess change in these constructs and evaluate a potential transactional relationship as children with DD transition to kindergarten or elementary school.

Additional descriptive research is also needed to examine how parent feelings relate to problem behavior for groups of children with specific developmental disabilities. In particular, parents of children with autism spectrum disorder (ASD) have been identified as experiencing elevated rates of psychological distress as compared to parents of children with other developmental disabilities, with increased parenting stress specifically linked to increased problem behavior (Estes et al., 2009; Hayes & Watson, 2013; Lecavalier, Leone, & Wiltz, 2006). As such, it seems plausible that negative feelings may also relate to parental distress and problem behavior in this population. Because only a small proportion of the current sample (10%) has an ASD diagnosis, future research should examine these constructs in a larger sample of children with ASD and their families, considering whether negative feelings are linked to specific challenging behaviors associated with ASD.

As this study indicates that the relation between child problem behavior and parent feelings appears to emerge in infancy or toddlerhood for children with DD, early interventions targeted at very young children and their parents should be considered as mechanisms to prevent both child problem behavior and parental negativity in at-risk samples. Interventions designed to promote responsive parenting, defined as a parenting style characterized by high warmth and affection as well as consistent responses to children's cues and behaviors, may be an appropriate mechanism for influencing both parent and child outcomes for infants and young toddlers (Landry, Smith, Swank, &

Guttentag, 2008; Warren & Brady, 2007). Responsive parenting may be an especially relevant target for parents of children with DD, as children with developmental disabilities may display reduced responsivity to parents' cues or struggle to clearly communicate their needs, making consistent and responsive parenting more difficult (Landry et al., 2008; Warren & Brady, 2007). Brief, behaviorally focused programs such as Playing and Learning Strategies (PALS) and Video-Feedback Intervention to Promote Positive Parenting and Sensitive Discipline (VIPP-SD) show promise in increasing both parental responsivity and child socio-emotional and behavioral outcomes in at-risk samples, including children at developmental risk (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2003; Landry et al., 2008; Van Zeijl et al., 2006). Intervention-related increases in warmth and positive affect could be associated with reductions in negative feelings and related decreases in child problem behavior, but the impact of responsive parenting interventions on negative feelings is currently unknown. Therefore, future research should evaluate whether responsive parenting programs implemented early in life impact the development of negative feelings and child problem behavior for families of young children with DD.

The results of this study also highlight that parents of young children with DD who exhibit high levels of problem behavior may also be coping with negative and aversive child-related private events. In contrast to a prevention approach, this subgroup of parents may benefit from interventions designed to mitigate the impact of maladaptive or unpleasant private events on parenting behavior and/or child outcomes. Built on relational frame theory, Acceptance and Commitment Therapy (ACT) teaches participants to observe and accept maladaptive private events, alter the function of these

events through cognitive defusion strategies, and engage in behavior that is driven by core values as opposed to experiential avoidance (Hayes, Strosahl, & Wilson, 1999). For parents who experience negative feelings about their children with DD, participation in ACT could provide them with strategies to accept and defuse negative schemas and private events while engaging in parenting behavior that is compatible with their values. ACT has been implemented successfully with parents of children with ASD and can be delivered alongside or incorporated into behavioral parent training programs, so it may be a feasible intervention approach for parents of children with DD who also would benefit from behavior support (Blackledge & Hayes, 2006; Brown, Whittingham, Boyd, McKinlay, & Sofronoff, 2014; Coyne & Wilson, 2004). However, significant additional research is needed both to understand how negative feelings and problem behavior develop and how this combination of factors can be effectively prevented or intervened on for parents of children with DD.

Conclusion

The present study identified an early, strong, and stable relationship between parents' negative feelings about their young children with DD and children's problem behavior over time, and this relationship explained associations between positive feelings and problem behavior and between optimism and problem behavior. In addition, parents with high levels of negative feelings were less likely to engage in effective parenting behaviors such as praise, providing a novel finding about relations between observed parenting behavior and parents' cognitions and emotions in this at-risk population. Consistent with a relational frame theory model of parenting, these results suggest that parents' private events are associated with both parenting behavior and child behavior.

Future research should examine how child problem behavior and parent negative feelings emerge and develop both at earlier and later ages in a longitudinal, transactional context. In addition, research should evaluate how interventions designed to impact parent-child relationships and parent private events, such as responsive parenting programs or ACT for parents of children with DD, affect or prevent negative feelings and child problem behavior over time in this population.

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