TRAJECTORIES OF INTERNALIZING DISORDERS: ASSOCIATIONS WITH TEMPERAMENT AND PARENTING

by

Stephanie Davis

Bachelor of Arts, Colgate University, 2004

Submitted to the Graduate Faculty of

the School of Arts & Sciences in partial fulfillment

of the requirements for the degree of

Masters of Science

University of Pittsburgh

2009

UNIVERSITY OF PITTSBURGH

School of Arts & Sciences

This thesis was presented

by

Stephanie Davis

It was defended on

June 23, 2009

and approved by

Elizabeth Votruba-Drzal, Ph.D., Assistant Professor of Psychology

Susan B. Campbell, Ph.D., Professor of Psychology

Daniel S. Shaw, Ph.D., Professor of Psychology

Jennifer S. Silk, Ph.D., Assistant Professor of Psychiatry

Thesis Director: Elizabeth Votruba-Drzal, Ph.D., Assistant Professor of Psychology

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Stephanie Davis, M.S.

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Despite the great number of children affected by anxiety and depression, developmental trajectories of internalizing disorders are not well understood**.** This study examines associations between negative emotionality, parenting, and the *development* of internalizing behaviors using data from the NICHD SECCYD (n = 1,063). A four group model best characterized trajectories of internalizing disorders. Interestingly, children with high negative emotionality and high maternal warmth were more likely to belong to groups with elevated levels of internalizing symptoms. Additionally, higher levels of maternal hostility increased the likelihood of belonging to the Moderate Increasing group over the Moderate Stable group at a trend level. Findings highlight the importance of studying interactions between temperament and parenting when examining trajectories of internalizing symptoms in childhood.

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1.0 INTRODUCTION

Anxiety and depression are common disorders in childhood (Cartwright-Hatton, McNicol, & Doubleday, 2006; Cicchetti & Toth, 1998; Zahn-Waxler, Klimes-Dougan, & Slattery, 2000). These internalizing disorders commonly co-occur and often extend into adolescence and adulthood (Angold & Costello, 1993; Bayer, Sanson, & Hemphill, 2006; Cartwright-Hatton et al., 2006; Eley & Stevenson, 1999). Moreover, symptoms of internalizing disorders are frequently found at subclinical levels in non-referred children (e.g., Berstein, Borchartdt, & Perwien, 1996). Despite the pervasiveness of internalizing disorders and symptoms, their developmental trajectories are not well understood.

Two factors that seem to be important in the development of internalizing problems are temperament and parenting. While researchers have looked at the associations between internalizing problems and both temperament and parenting, fewer studies have focused on how these factors additively and/or interactively relate to the development of internalizing problems across childhood (Leve, Kim, & Pears, 2005). Yet, theoretical perspectives such as those emphasized by Thomas and Chess (1977) and Sameroff and Chandler (1975) underscore the necessity of studying child development in context in ways that account for ongoing interactive effects in the development of child problem behavior. Given the potential for child outcomes to be influenced by *both* attributes of the child and behaviors of the parent, it is important to

incorporate this complexity into the study of the development of internalizing symptomatology in childhood. Without taking into account aspects of the child's environment, it is difficult to determine whether or not certain child characteristics are risk factors for maladjustment. Thus, it is important to study potential moderators of the relationship between temperament and internalizing behaviors, such as parenting. To address this need, this study examined the joint contributions of temperament and parenting to the development of internalizing symptomatology from early to middle childhood.

It is important to note that while this study focused on internalizing *symptoms* in a non-clinical sample, this study was motivated in part by the extant literature on anxiety and depressive *disorders*. Notably, while differences exist between children who meet diagnostic criteria for disorders and those who have subclinical presentations, the study of a non-clinical population may shed light on the developmental psychopathology of anxiety and depression. With this backdrop in mind, this study examined the interplay between temperament and parenting on the development of internalizing symptoms in childhood.

1.1 EXAMINING THE DEVELOPMENT OF INTERNALIZING SYMPTOMS

There is a long history of research examining childhood anxiety and depression. These studies have documented correlates of current symptoms, risk factors for disorder, and differential outcomes based on child diagnosis. However, we have limited insight regarding the *development* of internalizing symptoms over childhood. It has been well-established that on average rates of anxiety and depression are low in early childhood and increase in middle childhood, especially

rates of depression in girls (Ge, Lorenz, Conger, Elder, & Simons, 1994; Zahn-Waxler et al., 2000). However, recent research suggests the importance of examining the heterogeneity of children's trajectories of internalizing symptoms, an area that has been previously understudied (Brendgen, Wanner, Morin, & Vitaro, 2005; Côté et al., 2009; Feng, Silk, & Shaw, 2008; Sterba, Prinstein, & Cox, 2007).

Indeed, several recent studies have shown that the developmental course of children's internalizing symptoms can follow a few discrete trajectories, underscoring that children are all not changing at the same rate. For example, Leve, Kim, and Pears (2005) utilized latent growth curve modeling to study internalizing and externalizing behaviors from ages 5 to 17; this method allows the distinction between predicting initial levels of symptoms (i.e., age 5) and change in symptoms over time (i.e., from age 5 to 17). Their results indicated that, on average, boys' levels of internalizing symptoms were stable from age 5 to 17, while girls' levels increased over time. Others have utilized Nagin's (2005) developmental trajectories approach to examine development of internalizing symptoms (Brendgen et al., 2005, Côté et al., 2009; Feng et al., 2008; Sterba et al., 2007). While modeling trajectories at different ages, with different reporters, and sometimes modeling separately by sex, this method resulted in either three (Côté et al., 2009; Sterba et al., 2007) or four (Brendgen et al., 2005; Feng et al., 2008) distinct trajectory groups. Generally, findings include a low stable group, a low to moderate increasing group, and a high stable or increasing group, indicating variability in the developmental patterns of internalizing symptoms over childhood. As only a handful of studies have examined trajectories of internalizing symptoms in childhood, more research is warranted to continue investigating whether these patterns are consistent across samples. Additionally, it is important to utilize this methodology to explore the contributions of parenting and temperament in the development of

internalizing symptoms (e.g., Brendgen et al., 2005; Leve et al., 2005). Utilizing a trajectory approach will allow us to determine whether similar predictors (e.g., temperament and parenting) are associated with belonging to one trajectory group over another.

1.2 TEMPERAMENT AND INTERNALIZING SYMPTOMS

Child temperament is a known risk factor for developmental psychopathology (Rothbart & Bates, 1998; Shiner & Caspi, 2004), including internalizing problems such as anxiety and depression, (Lengua, 2006; Lonigan, Vasey, Phillips, & Hazen, 2004; Windle et al., 1986). Temperament is conceptualized as individual differences in personality dispositions, including differences in the propensity to experience positive and negative emotions and to regulate such emotions and behavior (Rothbart, 1981; Rothbart & Bates, 1998). Temperament remains moderately stable over time, moreso after early childhood, and comprises a part of a broader set of personality traits in adults (Caspi, 2000; Rothbart & Bates, 1998; Shiner & Caspi, 2003).

Over the last few decades, research has begun to unravel the associations between more specific temperament traits, including negative emotionality, and child development. Negative emotionality, or negative affect, includes differences in the way children experience and display negative emotions, such as anger, fear, anxiety, and guilt (Kochanska, Murray, & Coy, 1997; Lengua & Long, 2002; Shiner & Caspi, 2003). Negative emotionality is positively associated with concurrent levels of anxiety and depression in middle childhood and adolescence (Anthony, Lonigan, Hooe, & Phillips, 2002). Similarly, negative emotionality in early childhood positively relates to internalizing problems in later childhood (Eisenberg et al., 2001, 2005; Lengua, 2006;

Rende, 1993). Specifically, preschool- and school-age children who are anxious or fearful when exposed to unfamiliar situations exhibit higher rates of anxiety and depression in both childhood and adulthood (Caspi, 2000; Rothbart & Bates, 1998; Shiner & Caspi, 2003).

1.3 POSITIVE PARENTING AND INTERNALIZING SYMPTOMS

Along with temperament, positive dimensions of parenting have been negatively linked to the development of psychopathology in children (Davidov & Grusec, 2006; Hoffman, Crnic, & Baker, 2006; McLeod, Wood, & Weisz, 2007; Pettit, Laird, Dodge, Bates, & Criss, 2001; Rapee, 1997). Positive parenting includes proactive parenting, scaffolding, positive reinforcement, and involvement, all of which represent the parent's interest in and attention towards encouraging favorable behaviors in the child (Hoffman et al., 2006; Pettit et al., 2001). Parents who demonstrate such responsive involvement may foster a sense of control in the child, and in turn, reduce anxiety (e.g., Chorpita &, Barlow, 1998).

The current study focuses on maternal warmth and sensitivity. Warmth, denoted by being affectionate and demonstrating positive affect towards the child, has frequently been conceptualized as one of the most salient components of parenting (Davidov & Grusec, 2006; McLeod, Wood, & Weisz, 2007; Rapee, 1997). Operational definitions of parental warmth vary by study, where warmth is sometimes defined as acceptance or lack of rejection (Lengua, 2006; Lengua & Kovacs, 2005).

Another important aspect of positive parenting is maternal sensitivity, which describes qualities of the mother's involvement when interacting with her child. Specifically, sensitivity

includes “the behaviors mothers engage in that are contingent on and appropriate to the infant’s current context and state” (Crockenberg & Leerkes, 2006, p. 24). High levels of sensitivity and warmth are linked to the development of security (Barnard & Solchany, 2002) and may reduce children’s risk of developing internalizing and externalizing problems.

The relationship between maternal warmth and child internalizing behaviors has been well-studied, although this area of research merits further study. Both cross-sectional and longitudinal studies suggest that low levels of warmth and supportive parenting are associated with higher levels of internalizing symptoms (Barrett, Fox, & Farrell, 2005; Bayer et al., 2006; Dallaire et al., 2006; DiBartolo & Helt, 2007; Hudson & Rapee, 2001, Lengua, 2006; McLeod, Wood, & Weisz, 2007; Zahn-Waxler et al., 2000). However, several studies failed to find support for this relationship (e.g., DiBartolo & Helt, 2007; Galambos, Barker, & Almeida, 2003; Gruner, Muris, & Merckelbach, 1999; Stams, Juffer, & van Ijzendoorn, 2002). Additionally, a majority of studies have relied solely on maternal report for both measures of parenting and internalizing problems (for exceptions see Barrett et al., 2005; Hudson & Rapee, 2001, Stams et al., 2002), raising questions of shared method variance. These issues underscore the need to continue to study the associations of a lack of positive parenting in the development of internalizing symptomatology. For the purposes of this paper, maternal warmth and sensitivity were combined into a composite measure of positive parenting.

1.4 NEGATIVE PARENTING AND INTERNALIZING SYMPTOMS

Along with positive parenting, dimensions of negative parenting have also been associated with internalizing problems in children; however, the research in this area is less well developed. Important aspects of negative parenting include intrusiveness, hostility, and harsh discipline. Intrusiveness, or parental control, includes overprotection and extreme management of the child's behaviors, thoughts and feelings (Wood, McLeod, Sigman, Hwang, & Chu, 2003). Such behavior can increase the child's dependence on the parents (McLeod, Wood, & Weisz, 2007). Parental overprotection also reduces the child's sense of control in the environment (Chorpita & Barlow, 1998), and is positively linked to child anxiety (Chorpita & Barlow, 1998; Feng et al., 2008; McLeod, Wood, & Weisz, 2007, Wood et al., 2003).

The current study focuses on associations between hostility, harsh discipline, and internalizing behaviors. Hostility can be considered an expression of parental rejection, including expressions of negative feelings towards the child, such as excessive disapproval or criticism (McLeod, Weisz, & Wood, 2007; Rapee, 1997). While hostility can be considered the opposite extreme of warmth, research indicates that they differentially relate to the emergence of anxious symptoms in children (McLeod, Wood, & Weisz, 2007), thus suggesting the importance of simultaneously studying both hostility and warmth. For example, Muris, Schmidt, Lambrichs, and Meesters (2001) argue that the combination of low warmth and high hostility may lead children to feel helpless, which in turn could be associated with increased internalizing symptoms.

Harsh control, a component of authoritarian parenting, is another aspect of negative parenting that encompasses "yelling, frequent negative commands, name calling, overt

expressions of anger, and physical threats and aggression" (Chang, Schwartz, Dodge, & McBride-Change, 2003, p. 599). Parenting characterized by harsh discipline and hostility may increase children's negative views about themselves and their futures (Ge et al., 1994), thus heightening their risk for developing depressive symptoms.

Aspects of negative parenting have been positively linked to internalizing problems. Retrospective reports of parenting indicate that currently anxious or depressed adolescents and adults had parents who they perceived to be high in rejection (Burbach & Borduin, 1986; Lieb et al., 2000; Rapee, 1997). Parental rejection is also positively associated with both depressive (Muris et al., 2001) and anxious symptoms (Gruner et al., 1999) in nonclinical populations. Similarly, cross-sectional research shows that harsh-negative parenting, including harsh discipline and hostility, is positively associated with depressive symptoms in children (Dallaire et al., 2006; Ge et al., 1994; Kim et al., 2003).

Overall, however, the evidence regarding the association between harsh discipline and internalizing problems is mixed. For example, Colder, Lochman, and Wells (1997) found a positive relationship between harsh discipline and depressive symptoms in fourth and fifth grade boys, although this was only true for boys who were characterized by high levels of fear. Research by Gilliom and Shaw (2004) demonstrated identical findings when predicting internalizing symptoms in 2 year old boys. However, Bayer et al. (2006) did not find an association between power-assertive/punitive parenting and internalizing difficulties at ages 2 and 4. Thus, while research suggests that negative parenting relates to the development of internalizing symptoms, future research is needed to clarify whether certain aspects of negative parenting are more salient than others. For the purposes of this paper, the dimensions of hostility

and harsh discipline were analyzed separately to assess patterns of negative parenting in early childhood.

1.5 COMBINED EFFECTS OF TEMPERAMENT AND PARENTING

While there are several studies of the relationship between internalizing problems and both temperament and parenting, fewer studies have examined how interactions between temperament and parenting relate to internalizing problems in children (e.g., anxiety; Wood et al., 2003). Yet, several theoretical models of development emphasize the importance of understanding the child in context, as associations between early dimensions of temperament and later child outcomes have been found to be moderated by the quality of the caregiving environment (Goldsmith, Buss, & Lemery, 1997; Rothbart, 1981; Rothbart, Ahadi, Hershey & Fisher, 2001). Thomas and Chess' concept of "goodness-of-fit" (1977) suggests that child characteristics are more adaptive in some circumstances than in others and that certain combinations of child temperament and the caregiving environment lead to more positive adjustment. Similarly, Sameroff and Chandler's (1975) transactional model of development highlights the dynamic interplay between children and their environments on child outcomes.

Indeed, there is evidence that the relationship between temperament and adjustment problems varies as a function of parenting (e.g., Lengua, Wolchick, Sandler, & West, 2000). Several studies have found interactions between temperament and parenting with respect to *externalizing* behaviors in children. These studies suggest that negative parenting may be more

salient for children who are higher on levels of negative emotionality than for children with lower levels (Bates, Pettit, Dodge, & Ridge, 1998; Belsky, Hsieh, & Crnic, 1998).

Fewer studies have explored the additive and interactive effects of temperament and parenting on internalizing behaviors (for exceptions see Brendgen, Wanner, Morrin, & Vitaro, 2005; Crockenberg & Leerkes, 2006; Leve et al., 2005; Morris et al., 2002). Of the studies that have examined interactions between temperament and parenting, some found significant independent influences of temperament and parenting while not finding support for interactions between these constructs (e.g., Brendgen et al. 2005, Leve et al., 2005). Still, others suggest that children with higher levels of negative emotionality are more susceptible to the effects of parenting on the development of internalizing behaviors (Colder et al., 1997; Oldehinkel, Veenstra, Ormel, de Winter, & Verhulst, 2006; Morris et al., 2002). For example, Crockenberg and Leerkes (2006) found that infants who were high on reactivity were more likely to exhibit anxious symptoms two years later, but only when their mothers exhibited low levels of sensitivity. Thus, the combined effects of negative emotionality and parenting on internalizing symptoms merit further study.

1.6 METHODOLOGICAL LIMITATIONS OF PRIOR RESEARCH

Most prior studies that have examined relations between temperament and/or parenting and internalizing problems have taken a variable-centered approach, such as OLS regression or hierarchical linear modeling, which compares associations between different variables across individuals. Such an approach limits our understanding by analyzing average associations

between two variables, while holding other related variables constant (Zahn-Waxler et al., 2000). In contrast, a person-centered approach identifies clusters of individuals who share certain combinations of traits (Nagin, 2005). Person-centered approaches, such as growth mixture models and trajectory analysis (as previously discussed), add to our understanding of psychopathology by identifying the types of individuals that typically develop internalizing problems. In doing so, this type of analysis aids in our understanding of development in context, both by modeling patterns of behavior over time and by allowing us to simultaneously consider the effects of the child and his or her environment.

In addition to the paucity of research using person-centered approaches, studies of internalizing behaviors have been characterized by several other methodological shortcomings. First, few studies have examined associations between trajectories of internalizing behaviors and early temperament and parenting (for exceptions see Côté et al., 2009; Feng et al., 2008, Sterba et al., 2007). More commonly, studies have estimated cross-sectional associations or short-term associations between temperament, parenting, and internalizing behaviors. Notably, there is a need for more research studying the *development* of internalizing problems over time. Second, most studies have used self-report questionnaires of parenting, rather than observational measures, which limit our ability to objectively assess parenting behaviors and may artificially inflate relations between parenting and temperament, which is also frequently measured via parent-report.

To address these limitations, the present study examined the interplay between negative emotionality and parenting in predicting trajectories of internalizing symptoms. Aspects of both positive (i.e., warmth/sensitivity) and negative parenting (i.e., hostility, harsh discipline) were included to gain a better understanding of how these characteristics are related to anxious and

depressive behaviors in childhood. The longitudinal data include measures from infancy through age 12, utilizing both maternal report and observational ratings, allowing a more complete study of the development of anxious and depressive symptoms in childhood. Most importantly, akin to other recent studies (e.g., Brendgen et al., 2005), Nagin's group-based modeling approach was used to study differences between clusters of individuals, rather than differences between individual variables, which enables a more clinically relevant understanding of the developmental course of anxious and depressive behaviors from early to middle childhood.

1.7 HYPOTHESES

Based on prior research and theory, this study addressed four research questions.

1.7.1 1. Are there distinct developmental trajectories of internalizing symptoms from age 4 ½ to 12?

Based on prior studies utilizing a similar analytical approach, it was anticipated that either a three or four group model would best fit the data, including a low stable group, a low to moderate increasing group, and a high stable or increasing group.

1.7.2 2. What is the association between negative emotionality in early childhood and trajectories of internalizing symptomatology during early and middle childhood?

It was expected that the internalizing trajectories of children who are high on negative emotionality would be stably high or increasing over time.

1.7.3 3. What is the relationship between maternal warmth/sensitivity, hostility, and harsh control in early childhood and trajectories of children's anxious and depressive problems?

Based on prior research, it was anticipated that children who experience higher levels of maternal warmth/sensitivity would exhibit consistently low levels of internalizing symptoms.

Additionally, it was expected that higher levels of hostility and harsh control would be related to consistently high levels of internalizing symptoms in children.

1.7.4 4. Do certain combinations of temperament and parenting predict different trajectories of internalizing symptoms throughout childhood?

It was expected that there would be synergistic interactions between temperament and parenting, such that high levels of negative emotionality would be more strongly linked to internalizing symptoms under conditions of higher levels of hostility and harsh control and lower levels of maternal warmth.

2.0 METHOD

2.1 PARTICIPANTS

This study utilized data from the National Institute of Child Health and Human Development Study of Early Child Care and Youth Development (NICHD SECCYD), a longitudinal, multi-site study of children and their families. The original sample was recruited between 1990 and 1991 from hospital visits at 10 different sites across the United States: Little Rock, AR; Irving, CA; Lawrence, KS; Boston, MA; Philadelphia, PA; Pittsburgh, PA; Charlottesville, VA; Morganton, NC; Seattle, WA; and Madison, WI. All women giving birth during selected 24-hour sampling intervals were screened for study eligibility. Eligibility criteria included that the mother was over 18 years old, English-speaking, did not have a known substance abuse problem, and had no plans to move within the next 3 years; and that the infant was a singleton, did not have a hospital stay of more than 7 days, and did not appear to have any disabilities. Complete details of the recruitment and selection procedures are documented elsewhere (http://secc.rti.org).

Of the 8,986 women who were screened during the sampling intervals, 5,416 (60%) met eligibility criteria and agreed to be contacted in 2 weeks. Fifty six percent of eligible participants (3,015) were conditionally randomly selected based on additional eligibility criteria, and 1,364 became participants in the study by completing an interview when their infant was 1 month old.

At the time of recruitment, 76% were non-Hispanic Caucasian, 13% were African American, 6% were Hispanic, and 5% were other races (e.g., Asian, Multiracial). Almost half (48%) of the infants were female. Eleven percent of mothers had 12 years of education or less and 14% were single mothers. The mean income when the child was 6 months old was $48,720 per year.

Retention rates have generally been high at each of the time points from 6 months to 12 years of age, although there was selective attrition, with Caucasian families and families with higher levels of income and maternal education more likely to remain in the study over time. The average income-to-needs ratio for families participating when their child was in fifth grade was 3.75, whereas this ratio was 3.32 for families no longer participating ($p = .0567$). Similarly, the average level of maternal education for active participants was 14.44 for participants in the study, while it was 13.53 for families no longer participating ($p < .001$). After approximately 13 years, 1,073 (79%) of the families remained active in the study.

Children with at least three of seven valid scores on the CBCL internalizing scale were included in this analysis. Table 1 contains the descriptive statistics for the sample. Regression analyses were conducted to compare children who did not have valid CBCL internalizing scores at 3 time points ($n = 301$) to the rest of the sample ($n = 1,063$). Results revealed that children who were missing data were more likely to be non-Caucasian, boys, and have higher levels of negative emotionality. Additionally, children with missing data were more likely to come from families where the mother was not consistently married/partnered from 6 to 54 months, and where there were low levels of maternal warmth and high levels of maternal hostility and harsh control in early childhood.

Table 1 Descriptives[a]

	Mean	Standard Deviation
Child characteristics		
Girl (%)	50.05	50.02
Non-caucasian (%)	22.11	41.52
Negative emotionality	2.39	.60
Total externalizing score on CBCL	10.06	6.73
Family characteristics		
Log average income from 6 to 54 months	10.63	.73
Marital status from birth to 54 months (% married)	73.96	43.91
Number of children in the household at 54 mos.	2.26	.96
Average mother's depressive symptoms from birth to 54 months	9.75	6.49
Average maternal warmth sensitivity	.03	.65
Average maternal hostility	-.03	.61
Maternal harsh control at 54 mos.	21.14	3.32
Child CBCL total internalizing scores		
54 months	4.44	4.21
Kindergarten	4.41	4.45
1st grade	4.89	4.41
3rd grade	5.13	5.09
4th grade	4.87	4.97
5th grade	5.25	5.12
6th grade	5.13	5.33

[a] Total sample size varies based on the individual variables. Overall $N = 1{,}063$.

2.2 PROCEDURES

From birth through grade 6, the NICHD study collected multi-method measures of child development and home, child care, and school contexts, using questionnaires, observations, and standardized assessments. Data were collected in the laboratory (ages 15 mos., 2, 3, 4.5, 7, 9, 10, 11, 12 years) and/or at home (ages 1 mo., 6 mos., 15 mos., 2, 3, 4.5, 7, 9, 10, 11, 12 years) and/or child care/school (ages 6 mos., 15 mos., 1, 3, 4.5, 6, 7, 9, 10, 11, 12). During home and lab assessments, parents completed questionnaires regarding sociodemographic characteristics, family issues (e.g., parenting, family member's relationship quality, maternal well-being), and child behavior. In addition, parents and their child were videotaped interacting with one another in age-appropriate tasks at various time points throughout early childhood.

2.3 MEASURES

Measures used in the current study are described below and summarized in Table 2.

Table 2 Summary of Primary Measures Used

Domain	Measure	Child's age	Respondent
Negative Emotionality	Early Infant Temperament Questionnaire (Carey & McDevitt, 1979)	6 months	Mother
Maternal Warmth/Sensitivity	Mother-Child Structured Interaction (NICHD ECCRN 1997 ; 2003)	Age 6, 15, 24, 36, & 54 months	Observer
Maternal Hostility	Mother-Child Structured Interaction (NICHD ECCRN 1997 ; 2003)	Age 6, 15, 24, 36, & 54 months	Observer
Maternal Harsh Control	Raising Children Questionnaire (Greenberger & Goldberg, 1989)	54 months	Mother
Internalizing Behavior	Child Behavior Checklist/4-18 (Achenbach, 1991a)	Age 54 months, 6, 7, 9, 10, 11, & 12 years old	Mother
	Teacher Report Form/4-18 (Achenbach, 1991b)	12 years old	Teacher
	Children's Depression Inventory (Kovacs, 1992)	12 years old	Child

2.3.1 Negative emotionality

Mothers completed the *My Baby Questionnaire* during a home visit when the child was 6 months old. This questionnaire was an adaptation of the *Infant Temperament Questionnaire* (Carey & McDevitt, 1978), including 55 items from the original measure. Mothers rate the child's observed behavior in the past week, such as "My baby's first reaction to any new procedure (first haircut, new medicine, etc.) is objection" on a 6 point Likert scale (1 = almost never, 6 = almost always). For the purposes of this study, a maximum likelihood confirmatory factor analysis (CFA) was conducted with items that measure aspects of negative emotionality, including items that were similar to items in the *Infant Behavior Questionnaire* (Rothbart, 1981). Twenty-one items were included in the final factor ($\alpha = .83$). Table 3 contains the items included in the negative emotionality composite.

Table 3 Items included in Negative Emotionality Composite

My baby …
For the first few minutes in a new place or situation (new store or home), my baby is fretful.
Still wary or frightened by strangers after 15 minutes.
Initial reaction at home to approach by strangers is acceptance. (r)
Requires introduction of a new food on 3 or more occasions before he/she will accept (swallow it).
Adjusts within 10 min. to new surroundings (home, store, play area). (r)
Initial reaction to a new babysitter is rejection (crying, clinging to mother, etc.)
Pleasant (smiles, laughs) when first arriving in unfamiliar places (friend's house, store). (r)
Accepts changes in solid food feedings (type, amount, timing) within 1 or 2 tries. (r)
Fussy or cries during the physical examination by the doctor.
Initial reaction to seeing doctor is acceptance (smiles, coos). (r)
Appears bothered (cries, squirms) when first put down in a different sleeping place.
First reaction to any new procedure (first haircut, new medicine, etc.) is objection.
Accepts new foods right away, swallowing them promptly. (r)
Shy (turns away or clings to mother) on meeting another child for the first time.
Cries when left alone to play.
Initial reaction is withdrawal (turns head, spits out) when consistency, flavor, or temperature of solid foods is changed.
Remains pleasant or calm with minor injuries (bumps, pinches). (r)
Resists changes in feeding schedule (1 hour or more) even after two tries.
Cries for less than one minute when given an injection. (r)
Fussy (frowns, cries) on waking up or going to sleep.
Makes happy sounds (coos, smiles, laughs) when being diapered or dressed. (r)

(r) reflected

2.3.2 Maternal warmth/sensitivity and hostility

Maternal warmth/sensitivity and hostility were coded from a structured 15 minute mother-child interaction which took place in the home at 6 and 15 months, and in the lab at 24, 36, and 54 months (NICHD ECCRN 1999; 2003; Campbell, Matestic, von Stauffenberg, Mohan, & Kirchner, 2007). This videotaped semi-structured activity involved the mother and child playing with a set of age-appropriate toys. Tapes were coded at a central location by coders who were blind to the information about the families. At 6, 15, and 24 months tapes, sensitivity to non-distress, positive regard, and negative regard were coded on a 4 point scale (not at all characteristic to highly characteristic). Sensitivity to non-distress includes the mother's responses to the child's actions and expressions. Positive regard assesses the mother's display of warmth and positive feelings towards the child. Negative regard measures expressions of mother's negative affect towards her child (e.g., anger, frustration). Inter-observer reliabilities were high (intraclass correlations 0.83 or greater). At 36 and 54 months, maternal supportive presence and hostility were coded in a similar manner using a 7 point scale (not at all characteristic to highly characteristic). These behaviors were considered age-appropriate equivalents to sensitivity to non-distress and negative regard, respectively. Inter-observer reliabilities were high (intraclass correlations 0.84 or greater) at both ages.

All scores were standardized to account for differences in scaling over time. Standardized scores on the sensitivity to non-distress, positive regard and supportive presence from the 5 time points were averaged into a composite measure of maternal warmth/sensitivity (α = .79).

Standardized scores on the negative regard and hostility scales over the 5 ages were averaged into a composite measure of maternal negative affect (α = .64).

2.3.3 Harsh discipline

Harsh control was measured with a questionnaire about discipline strategies that mothers completed when their child was 54 months old. The assessment included 28 questions that describe feelings about raising children, which were adapted from the Raising Children Checklist (Greenberger & Goldberg, 1989). Mothers responded to the questions using a four point Likert scale (1 = definitely no, 4 = definitely yes). For the purposes of this paper, responses to 8 questions that relate to harsh control (e.g., "do you expect your child to obey you without any questions asked?") were summed into a composite measure of harsh discipline (α = .71).

2.3.4 Internalizing symptomatology

Internalizing symptomatology was assessed using scores on the Child Behavior Checklist 4-18 (CBCL; Achenbach, 1991a). The CBCL is a measure of behavior problems over the past six months. Mothers completed this questionnaire when their child was 4.5, 6, 7, 9, 10, 11, and 12 years old. The CBCL contains 118 items that are rated on a 3 point scale, ranging from 0 (not true) to 2 (very true or often true). Raw scores from the CBCL Internalizing Problems scale will be used for this study (α's ranged from.81 to .86). This scale contains 32 items from the anxious/depressed, withdrawn/depressed, and somatic complaints subscales. While the CBCL

does not confer diagnosis, its items correspond with items from the DSM-III-R (Sterba et al., 2007).

To address concerns over informant bias, the trajectories were validated using scores on the Internalizing Problems subscale of the Teacher Report Form 4-18 (Achenbach, 1991b) from 6th grade, which is comparable to the CBCL, but completed by teachers instead of parents (α = .87). Likewise, children's reports of depressive symptoms using the short form of the Children's Depression Inventory (CDI; Kovacs, 1992) from 6th grade (α = .76) were also used to corroborate the findings.

2.3.5 Child factors

Child gender was included as a covariate. See the Appendix for further information on analyses by gender. Given high levels of comorbidity between internalizing and externalizing behavior problems, the CBCL Externalizing Problems subscale at 54 months was included to control for its confounding influence. Lastly, an indicator of child race was included to control for differences in internalizing symptomatology due to race.

2.3.6 Family factors

Several additional characteristics of the family environment were included as control variables to account for the child's family environment. These variables included a measure of average family income from birth-54 months, and the number of children in the household under 18 at 54 months (to account for role strain). A dummy variable to indicate whether the mother

was in a stable relationship (i.e., married/partnered at all time points from birth-54 months) was also included in the model.

2.3.7 Maternal depression

Maternal depression was assessed with the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). This indicator of maternal depression was included in this study to account for the differential interactions that occur between depressed mothers and their offspring (Campbell et al., 2007). Mothers rated the frequency with which they experienced 20 symptoms during the past two weeks. The items were answered using a 4-point scale, ranging from 0 (rarely or none of the time) to 3 (most or all of the time). The CES-D has been shown to be reliable and valid (Radloff, 1977). For this analysis, CES-D scores prior to 54 months were averaged to assess general levels of maternal depression in early childhood (α's from 0.88 to 0.91).

3.0 DATA ANALYSIS

The primary goal of this study was to investigate the relationships between internalizing symptomatology from early to middle childhood and negative emotionality and positive (i.e., maternal warmth/sensitivity) and negative parenting (i.e., hostility, harsh discipline) factors in early childhood. Analyses focused on the direct effects of child and family factors as well as how they interact with one another to shape later child outcomes. To begin exploring the development of internalizing symptoms, trajectory group analyses were conducted using Nagin's (1999; 2005) semi-parametric growth modeling approach. This technique involves first determining the number of trajectories within the sample, and then estimating the proportion of individuals in each trajectory group. Raw scores on the CBCL Internalizing Behaviors Scale were used to model trajectories from 54 months to age 12.

In the first stage of analysis, the optimum number of groups was determined using SAS PROC TRAJ. The model with the maximum Bayesian Information Criterion (BIC) score was selected, while also taking into account substantive importance of the groups. BIC scores index how parsimonious the model is, by measuring model fit, with a penalty for the increase in parameters that results from adding additional groups (Nagin, 2005). For this analysis, 3-, 4-, 5-, and 6-group models of child internalizing symptoms were compared. While the BIC scores

increased with additional groups, the 5 and 6 group models were parsing the low-internalizing group into smaller segments, and thus were not of substantive interest.

The 3 and 4 group models were further compared using Nagin's (2005) recommended diagnostic procedures for determining model adequacy. As shown by Table 4, results suggested that while both models fit the data well, with the actual proportion of children classified into each group similar to the probability of group membership. Similarly, the average posterior probability for each group was greater than .9 and the odds of correct classification were well over the recommended score of 5. Since the four group model yielded a more preferable BIC score than the 3 group model (-18,065.83 versus -18,242.71) and also allowed for the distinction between two groups of children with higher internalizing scores, the four group model was chosen. Children were placed in the group based on their largest posterior probability score.

Table 4 Model Fit Statistics for 3 and 4 Group Models

	% Group Membership	Proportion Classified in Group	Average Posterior Probability	Odds of Correct Classification
3 Group Model				
Group 1	45.2	.45	.93	14.77
Group 2	43.6	.44	.91	12.87
Group 3	11.2	.11	.96	170.74
4 Group Model				
Group 1	39.3	.40	.91	14.52
Group 2	45.3	.45	.91	11.66
Group 3	12.9	.12	.93	100.30
Group 4	2.5	.03	.91	350.50

After identifying the optimal number of trajectory groups, multinomial logistic regression models were used to consider associations between child characteristics, parenting, and trajectories of internalizing disorders from 54 months to age 12. We began by estimating a model that included child characteristics (i.e., gender, CBCL externalizing total score at 54 months) and a series of control variables (i.e., average log income and maternal depressive symptoms in early childhood, number of children in the household at 54 months). Marital status and child race were dropped from the analyses due to collinearity problems. Next, measures of negative emotionality, positive and negative parenting, and the interactions between temperament and parenting were stepped into the model to address the main research questions, discussed below.

4.0 RESULTS

4.1 ARE THERE DISTINCT DEVELOPMENTAL TRAJECTORIES OF INTERNALIZING SYMPTOMS FROM AGE 4 ½ TO 12?

The parameter estimates for the final four group model are in Table 5.

Table 5 Parameter Estimates for Trajectories of Children's Internalizing Symptoms

	Low Stable n = 420			Mean Stable n = 483			Moderate Stable n= 132			Moderate Increasing n= 28		
	Coeff.	*SE*	Sig.	*Coeff.*	*SE*	*Sig.*	*Coeff.*	*SE*	*Sig.*	*Coeff.*	*SE*	*Sig.*
Intercept	.98	.13	***	4.07	.25	***	8.84	.50	***	-6.05	3.92	
Linear Slope				.11	.02	***	.21	.05	***	3.78	.85	***
Quadratic Slope										-.13	.04	**

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

Figure 1 illustrates the 4 group solution, which is characterized by two low stable trajectories, a moderate stable trajectory, and a moderate increasing trajectory.

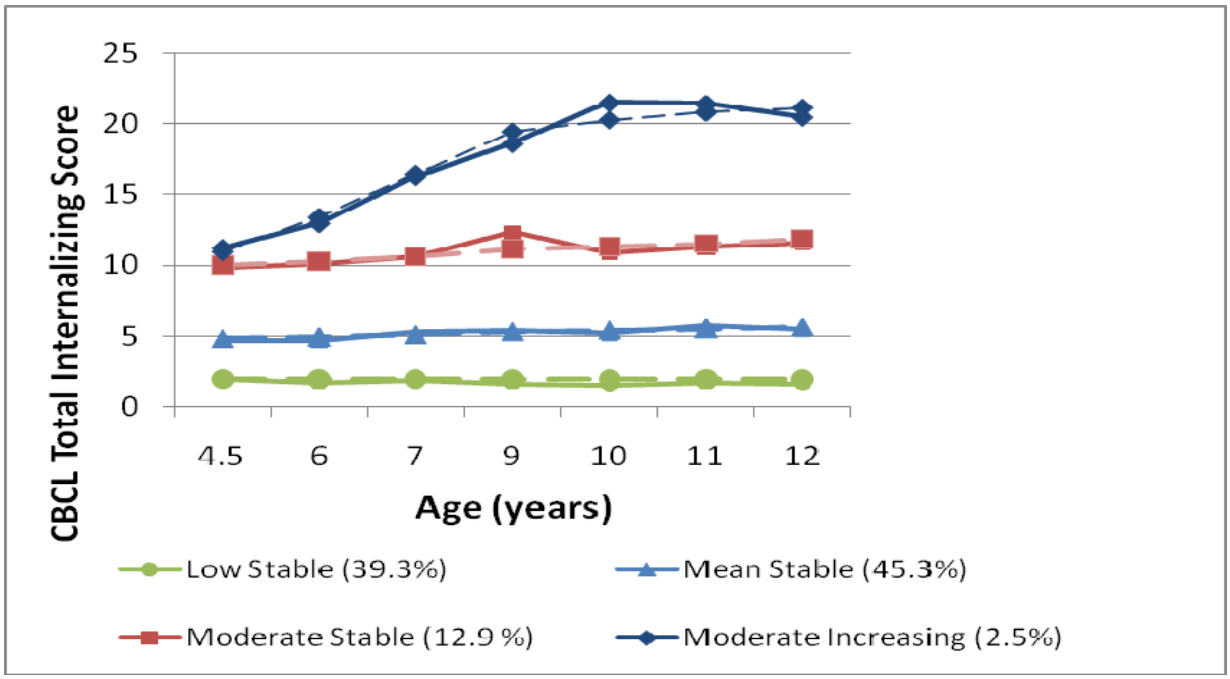

Figure 1. Trajectories of internalizing symptoms by child's age. Solid lines represent actual trajectories and dotted lines represent predicted trajectories.

The first group, hereafter referred to as the Low Stable group, accounted for 39.3% of the sample. Children in this group had low total scores on the CBCL internalizing scale at 54 months, scoring .58 of a standard deviation below the mean for the sample. These children were consistently low on internalizing symptoms through age 12 and scored .66 of a standard deviation below the sample mean at age 12. When converted to Achenbach's T-scores (1991a), both boys and girls initially had scores of 43; by age 12 girls' T-scores were 41 and boys' T-scores were 40. The second group, Mean Stable, included 45.3% of the sample. As Figure 1 illustrates, children in this group remained at the mean of the sample from 54 months through age 12. Similarly, based on CBCL norms, T-scores for this group were at the mean; at 54 months

boys' and girls' T-scores were 50. By age 12, girls' T-scores were 49 while boys' scores remained 50. The third group, Moderate Stable, comprised 12.9% of the sample. This group consisted of children who had moderate scores on the CBCL internalizing scale at 54 months (i.e., 1.28 standard deviations higher than the sample mean) and remained at this level through age 12. T-scores for girls were 57 at both 54 months and age 12. Boy's T-scores at 54 months were 59, while at age 12 they were 60 (i.e., borderline-clinical). Lastly, 2.5% of the sample fell into the Moderate Increasing group. This group demonstrated similar initial levels of internalizing symptoms at 54 months as the Moderate Stable group, scoring 1.60 standard deviations above the sample mean, but showed an increase in symptoms through age 12, at which time they scored 2.88 standard deviations above the sample mean. Interestingly, while initial scores between children in the Moderate Stable group and the Moderate Increasing group were nearly identical, by age 12, this difference grew to 1.66 sd units. While initially girls in the Moderate Stable group remained within normal limits (T-score = 59) and boys reached borderline clinical ranges (T-score = 61), by age 12, all children in the Moderate Increasing group exhibited clinical levels of internalizing symptoms (girls' T-score = 66; boys' T-score = 70). Trajectories were validated using teacher- and child-reported internalizing symptoms in 6th grade. Trajectory group membership was significantly associated with levels of internalizing symptoms on both the TRF and CDI, such that children belonging to groups with higher levels of mother-reported internalizing symptoms had higher self- and teacher-reported internalizing symptoms as well.

Table 6 shows a comparison of the descriptive statistics for each of the four trajectory groups.

Table 6 Child and parenting characteristics by trajectories of child internalizing problems

	Group1: **Low Stable** n = 420	Group 2: **Mean Stable** n = 483	Group 3: **Moderate Stable** n = 132	Group 4: **Moderate Increasing** n = 28
Negative Emotionality	2.33	2.39	2.53	2.57
Maternal Warmth/sensitivity	0.07	0.02	0.02	-0.40
Maternal Hostility	-0.07	-0.02	-0.01	0.50
Maternal Harsh Control	20.97	21.23	21.16	22.17
Girl (%)	47.62	49.69	59.09	50
Child's race				
Caucasian (%)	78.57	77.23	80.3	67.86
Other race (%)	21.43	22.77	19.7	32.14
Number of children in the household at 54 months	2.40	2.17	2.13	2.36
Log average income from 6 to 54 mos.	10.72	10.59	10.54	10.27
Average maternal depression symptoms from birth to 54 mos.	7.71	10.08	13.68	16.10
Marital status from birth to 54 mos. (% married/partnered at all times)	75.82	72.11	74.40	76.00
6^{th} grade CDI short form total	1.04	1.47	1.94	3.33
6^{th} grade TRF total internalizing score	4.16	4.85	7.46	10.04

In general, levels of negative emotionality, maternal hostility, maternal harsh control, and maternal depressive symptoms increased across trajectory groups, while levels of maternal warmth decreased. The Moderate Stable group contained the most girls. With respect to household characteristics, the Moderate Increasing group is made up of more ethnic minority children and children with lower levels of household income since birth. Children in the four trajectory groups were similar in the number of children in the household at 54 months and in their parents' marital status during early childhood. Next, we considered whether the main independent variables of interest in this study were significant predictors of trajectory group membership.

4.2 WHAT IS THE ASSOCIATION BETWEEN NEGATIVE EMOTIONALITY AND TRAJECTORIES OF INTERNALIZING SYMPTOMATOLOGY?

The first model tested whether higher levels of negative emotionality increased the probability of being in trajectory groups characterized by high or increasing levels of internalizing symptoms over time (see Table 7). Levels of negative emotionality did not significantly differentiate between groups.

Table 7 Model with Controls and Temperament

	Mean Stable			Moderate Stable				Moderate Increasing				
	Coefficient (SE)	Sig.[a]	Odds Ratio	Coefficient (SE)	Sig.[a]	Sig.[b]	Odds Ratio	Coefficient (SE)	Sig.[a]	Sig.[b]	Sig.[c]	Odds Ratio
Number of kids in the household at 54 months	-0.40 (0.11)	**	0.67	-0.52 (0.15)	**	*	0.59	-0.43 (0.23)	t			0.65
Average early childhood maternal depression symptoms	0.10 (0.02)	***	1.11	0.15 (0.03)	***	**	1.16	0.21 (0.04)	***	**		1.23
Child total externalizing score at 54 months	0.23 (0.03)	***	1.26	0.33 (0.03)	***	***	1.39	0.42 (0.04)	***	***	*	1.52
Girl	0.16 (0.20)		1.17	0.66 (0.28)	*		1.93	0.82 (0.51)				2.27
Log average early childhood income	-0.03 (0.16)		0.97	0.16 (0.21)			1.17	0.20 (0.35)				1.22
Negative emotionality	0.05 (0.18)		1.05	0.27 (0.24)			1.31	0.09 (0.39)				1.09

Note. ***p < .001. **p < .01. * p < .05. t < .10

[a] Compared to Low Stable Group

[b] Compared to Mean Stable Group

[c] Compared to Moderate Stable Group

4.3 WHAT IS THE RELATIONSHIP BETWEEN POSITIVE AND NEGATIVE PARENTING AND CHILDREN'S ANXIOUS AND DEPRESSIVE TRAJECTORIES?

Levels of maternal warmth/sensitivity, and hostility in early childhood (6 to 54 months) and harsh control at 54 months were added as predictors to the prior model to test whether parenting behaviors were associated with trajectories of internalizing symptomatology (see Table 8). The probability of belonging to one group over another was not significantly associated with any of our parenting measures, with the exception that of a trend level finding for hostility. More specifically, a one unit increase in maternal hostility was associated with a 1.17 unit increase in belonging to the Moderate Increasing group compared to the Moderate Stable group.

Table 8 Model with Controls, Temperament, and Parenting

	Mean Stable			Moderate Stable				Moderate Increasing				
	Coefficient (SE)	Sig.[a]	Odds Ratio	Coefficient (SE)	Sig.[a]	Sig.[b]	Odds Ratio	Coefficient (SE)	Sig.[a]	Sig.[b]	Sig.[c]	Odds Ratio
Number of kids in the household at 54 months	-0.39 (0.11)	**	0.68	-0.46 (0.16)	**		0.63	-0.34 (0.25)				0.71
Average early childhood maternal depression symptoms	0.11 (0.02)	***	1.12	0.17 (0.03)	***	**	1.19	0.22 (0.05)	***	**		1.25
Child total externalizing score at 54 months	0.24 (0.03)	***	1.27	0.35 (0.03)	***	***	1.42	0.42 (0.04)	***	***	*	1.52
Girl	0.16 (0.21)		1.17	0.71 (0.28)	*	*	2.03	0.80 (0.52)				2.23
Log average early childhood income	-0.08 (0.18)		0.92	-0.17 (0.23)			0.84	0.09 (0.41)				1.09
Negative emotionality	0.01 (0.19)		1.01	0.27 (0.24)			1.31	-0.10 (0.42)				0.90
Maternal warmth	0.07 (0.22)		1.07	0.35 (0.30)			1.42	0.34 (0.56)				1.40
Maternal hostility	-0.41 (0.25)		0.66	-0.53 (0.32)			0.59	0.16 (0.42)			t	1.17
Maternal harsh control	0.01 (0.03)		1.01	-0.05 (0.05)			0.95	-0.03 (0.08)				0.97

Note. ***p < .001. **p < .01. * p < .05. t < .10

[a] Compared to Low Stable Group
[b] Compared to Mean Stable Group
[c] Compared to Moderate Stable Group

4.4 DO CERTAIN COMBINATIONS OF TEMPERAMENT AND PARENTING PREDICT DIFFERENTIAL TRAJECTORIES OF INTERNALIZING SYMPTOMS THROUGHOUT CHILDHOOD?

To test the hypothesis that negative emotionality would be more strongly related to internalizing behaviors when children experience lower rates of maternal warmth/sensitivity, and higher rates of hostility and harsh discipline, interactions between negative emotionality and each dimension of parenting were added to the multinomial regression model (see Table 9).

Table 9 Model with Controls, Temperament, Parenting, and Temperament by Parenting Interactions

	Mean Stable			Moderate Stable				Moderate Increasing				
	Coefficient (SE)	Sig.[a]	Odds Ratio	Coefficient (SE)	Sig.[a]	Sig.[b]	Odds Ratio	Coefficient (SE)	Sig.[a]	Sig.[b]	Sig.[c]	Odds Ratio
Number of kids in the household at 54 months	-0.37 (0.12)	**	0.69	-0.46 (0.16)	**		0.63	-0.28 (0.26)				0.76
Average early childhood maternal depression symptoms	0.11 (0.03)	***	1.12	0.17 (0.03)	***	**	1.19	0.21 (0.05)	***	*		1.23
Child total externalizing score at 54 months	0.24 (0.03)	***	1.27	0.35 (0.03)	***	***	1.42	0.42 (0.04)	***	***	t	1.52
Girl	0.16 (0.21)		1.17	0.71 (0.29)	*	*	2.03	0.86 (0.54)				2.36
Log average early childhood income	-0.11 (0.18)		0.90	-0.19 (0.24)			0.83	0.06 (0.43)				1.06
Negative emotionality	0.69 (1.23)		1.99	0.31 (1.64)			1.36	3.77 (2.99)				43.38
Maternal warmth	-2.00 (0.85)	*	0.30	-1.37 (1.14)			0.25	-2.93 (1.90)				0.05
Maternal hostility	-0.90 (1.00)		0.41	-0.51 (1.31)			0.60	-1.60 (1.75)				0.20
Maternal harsh control	0.08 (0.14)		1.08	-0.05 (0.19)			0.95	0.39 (0.33)				1.48
NE x warmth	0.86 (0.34)	*	2.36	0.72 (0.45)			2.05	1.29 (0.75)	t			3.63
NE x hostility	0.21 (0.4)		1.23	0.01 (0.51)			1.01	0.71 (0.68)				2.03
NE x harsh control	-0.03 (0.6)		0.97	0 (0.08)			1.00	-0.17 (0.13)				0.84

Note. ***p < .001. **p < .01. * p < .05. t < .10

[a] Compared to Low Stable Group
[b] Compared to Mean Stable Group
[c] Compared to Moderate Stable Group

Results revealed a significant interaction between negative emotionality and maternal warmth in distinguishing between membership in the Low Stable group and the Mean Stable group. Figure 2 depicts this interaction; maternal warmth moderated the relationship between negative emotionality and internalizing symptoms.

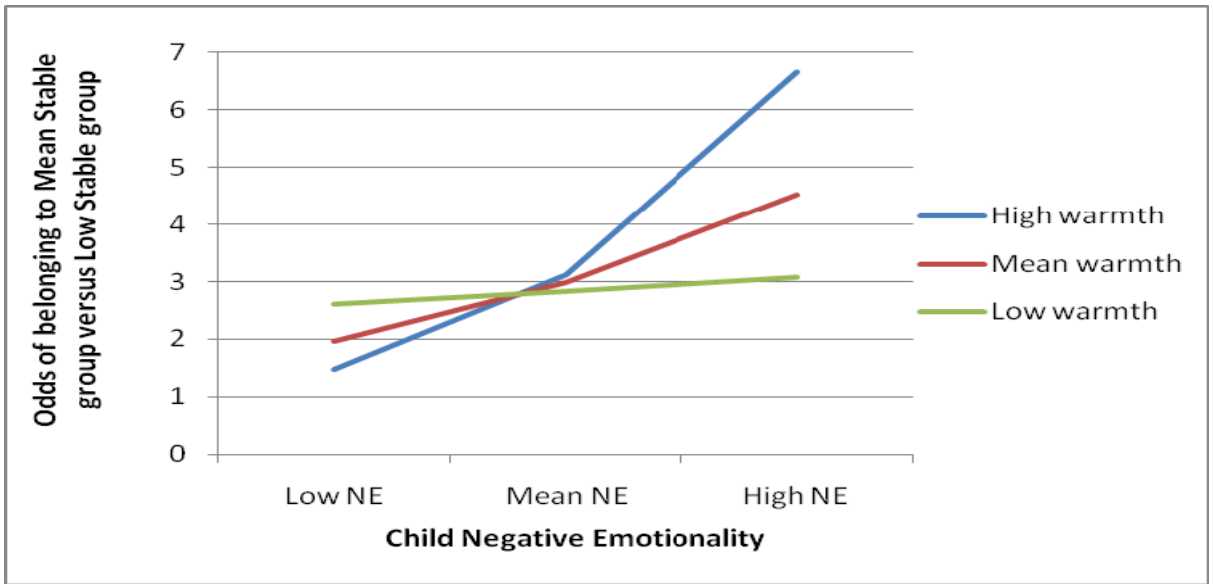

Figure 2. Comparison of the odds of belonging to the Mean Stable group versus the Low Stable group based on the interaction between negative emotionality and maternal warmth/sensitivity.

Here it can been seen that for children with higher levels of negative emotionality, higher levels of maternal warmth predicted a greater likelihood of belonging to groups that demonstrated higher levels of internalizing symptoms. Maternal warmth did not appear to affect the probability of membership into the Mean Stable group over the Low Stable group for children who

demonstrate low (1 sd below the mean) or mean levels of negative emotionality. However, for children with high levels of negative emotionality (1 sd above the mean), the probability of belonging to the Mean Stable group *increases* with higher levels of maternal warmth. Similar patterns were seen when distinguishing the Low Stable group from the Moderate Stable and Moderate Increasing groups, although these findings were only at or near trend level (p = .108 and p = .086, respectively). There were no significant interactions between negative emotionality and either aspects of negative parenting (i.e., hostility and harsh discipline).

5.0 DISCUSSION

The aim of this study was to examine the joint associations of negative emotionality and aspects of positive (i.e., warmth/sensitivity) and negative (i.e., hostility and harsh control) parenting on developmental trajectories of internalizing symptoms from early to middle childhood. Similar to the work of Brendgen et al. (2005) and Feng et al. (2008), a four group model yielded the best fit for the data, with a Low Stable group, a Mean Stable group, a Moderate Stable group, and a Moderate Increasing group, indicating variability in the development of internalizing symptoms throughout childhood. All four groups were comprised of children who were within normal limits on the CBCL internalizing scale at 54 months (e.g., T-scores under 60). It is not surprising that children did not initially exhibit high levels of anxious and depressive symptomatology, since this is a community sample. While most children remained within normal limits on internalizing scores throughout childhood, by age 12, children in the Moderate Increasing group reached clinically significant levels of internalizing symptoms (e.g., T-score > 64).

5.1 PREDICTORS OF TRAJECTORY GROUP MEMBERSHIP: EXAMINING THE CHILD IN CONTEXT

One of the distinctive features of this analysis was the exploration of interactions between temperament and parenting in predicting trajectories of internalizing symptoms. Based on prior research by Crockenberg & Leerkes (2006), we expected children with high levels of negative emotionality would be more susceptible to internalizing symptoms if their mothers exhibited *less* warmth based on prior research. Conversely, our findings suggest just the opposite; children with high levels of negative emotionality are at heightened risk for internalizing symptoms if their mothers show *greater* levels of warmth. More specifically, children with higher levels of negative emotionality had a greater likelihood of belonging to a group with higher levels of internalizing symptoms if their mothers demonstrated high levels of warmth. This finding was significant for differentiating the Low Stable and Mean Stable groups and was marginally significant when comparing the Low Stable group to the Moderate Stable and Moderate Increasing groups. Interestingly, the direction of the interaction was opposite of our prediction.

The interaction only reached statistical significance when distinguishing between children in the Low Stable and the Mean Stable groups. Children in the Low Stable group exhibited levels of internalizing symptoms that were below the CBCL average (e.g., T-scores were in the low 40s), while children in the Mean Stable group exhibited average levels of internalizing symptoms (e.g., T-score of 50) from age 4 ½ to 12. This finding alone is not of substantive interest, as children in both trajectory groups demonstrate typical levels of internalizing symptoms over childhood (i.e., not reaching clinical levels of concern). However, this same pattern emerged at a trend level when differentiating the Low Stable from the

Moderate Stable group. As our analysis was conservative (i.e., controlling for maternal depressive symptoms and child externalizing symptoms), it is possible that this finding failed to reach statistical significance due to controlling for these other salient predictors. In other words, as we would expect both maternal depressive symptoms and child externalizing symptoms to be strongly associated with trajectories of internalizing symptoms, it is possible that including these predictors in our model reduced our potential to detect more nuanced interaction effects (e.g., removed too much variance).

Indeed, both maternal depressive symptoms and child externalizing scores were significantly associated with trajectory group membership in all models. In the final model, children of mothers who had higher levels of depressive symptoms from birth to 54 months were more likely to belong to the Mean Stable (OR = 1.12), Moderate Stable (OR = 1.19), and Moderate Increasing (OR = 1.23) groups, over the Low Stable Group. This finding is consistent with prior research on maternal depression and child psychopathology (Beardslee, Bemporad, Keller, & Klerman, 1983; Gotlib & Goodman, 1999). Importantly, part of the association between maternal depression and child outcomes is through parenting behaviors. For instance, depressed mothers demonstrate less warmth, and more negative parenting than non-depressed mothers (Lovejoy, Graczyk, O'Hare, & Neuman, 2000). Additionally, mothers with depressive symptoms may be more likely to characterize their child with difficult temperament (McGrath, Records, & Rice, 2008). Thus, the inclusion of maternal depressive symptoms, and its strong association with both temperament and parenting, may be reducing our ability to detect significant main effects and interactions between temperament and parenting.

Similarly, child internalizing problems are often comorbid with externalizing behaviors (Zahn-Waxler et al., 2000). In the final model, children of mothers who had higher levels of

externalizing symptoms at 54 months were more likely to belong to the Mean Stable (OR = 1.26), Moderate Stable (OR = 1.39), and Moderate Increasing (OR = 1.52) groups, over the Low Stable Group. This finding is consistent with prior research that indicates high rates of cormorbidity between internalizing and externalizing problems (Oland & Shaw, 2005). For instance, Gilliom and Shaw (2004) found positive associations between internalizing and externalizing symptoms in 2 year old boys, as well as positive associations between the change in internalizing and externalizing symptoms from age 2 to 6. Children who present with comorbid psychopathology often have a more severe clinical presentation (e.g., more symptoms, greater chronicity; Oland & Shaw, 2005). As externalizing problems are also related to levels of negative emotionality (Rothbart & Bates, 1998), and positive and negative parenting (Pettit et al., 2001; Bradley & Corwyn, 2007), including externalizing behaviors in our models may have reduced our chance to detect associations between temperament, parenting, and internalizing symptoms.

Interestingly, the interaction between negative emotionality and maternal warmth reached a trend level of significance in distinguishing the Moderate Increasing group from the Low Stable group. This finding may suggest that for children with high levels of negative emotionality, high maternal warmth may exacerbate internalizing symptoms (e.g., by limiting children's abilities to acquire coping skills to handle stressful situations, threatening their self-worth). It is possible that if the size of the Moderate Increasing group had been larger, our analysis may have had the power to detect a significant interaction. For example, in a similar study by Côté and colleagues (2009) that predicted trajectories of anxious and depressive symptoms in children ages 1 ½ to 5, difficult child temperament *and* maternal depressive

symptoms significantly differentiated the High-Rising group from both the Low and Moderate-Rising groups.

Notably, our findings are in contrast to a few prior studies (e.g., Brendgen et al., 2005; Crockenberg & Leerkes, 2006). For example, Crockenberg and Leerkes (2006) found a significant interaction between child negative emotionality and maternal warmth, but it was in the opposite direction from our results; their findings suggest that infants who are high on reactivity are more likely to exhibit anxious symptoms if their mothers exhibit low levels of sensitivity. Results from our study may differ due to differences in the age we assessed internalizing symptoms. Crockenberg and Leerkes (2006) were predicting anxious symptoms at age 2 ½, while the present study examined trajectories of internalizing symptoms from age 4 ½ to age 12. It is possible that while there are short-term benefits to warm and sensitive parenting for children who are high on negative emotionality, over time such parenting may have more negative effects on child outcomes (e.g., limiting coping skills, reducing self-esteem).

5.2 OTHER SIGNIFICANT PREDICTORS OF INTERNALIZING TRAJECTORIES

In addition to the interaction between maternal warmth and negative emotionality, there was a trend level finding for maternal hostility, which suggested that children exposed to higher levels of maternal hostility between ages 6 and 54 months were more likely to belong to the Moderate Increasing group compared to the Moderate Stable group. Prior research has yielded similar findings (Dallaire et al., 2006; Ge et al., 1994; Gruner et al., 1999; Kim et al., 2003; Muris et al., 2001), indicating that exposing children to high levels of hostility early in life

increases children's chances of developing anxious and depressive symptoms. Children whose parents are more likely to exhibit negative emotions, such as anger and frustration, in response to their child's behavior, may later develop internalizing symptoms due to the effect of these maternal behaviors on the child's self-esteem. Children may foster feelings of worthlessness when continually exposed to negative parental reactions, which may lead to feeling down on oneself or developing worries associated with previous actions (e.g., the child ruminating over whether his behaviors were okay, seeking constant reassurance).

5.3 NON-SIGNIFICANT PREDICTORS OF INTERNALIZING TRAJECTORIES

Our other dimension of negative parenting, harsh control, did not differentiate between trajectory groups. This may be due to the way we measured this behavior. Parenting style was derived from a parent-report questionnaire, which assessed beliefs about how their child should behave (e.g., do you *expect* your child to obey you without any questions asked, do you *think* praising your child will spoil him/her [emphasis added]). It is possible that mothers' expectations were not in agreement with their actual behavior toward their child. It might be the case that parents who endorse questions suggestive of harsh control are not in fact employing this type of behavior when disciplining their child, which would reduce the validity of the measure. Additionally, levels of negative parenting in this sample are relatively low and, unlike positive parenting, not stable over the course of early childhood (Dallaire & Weinraub, 2005). Given fluctuations in the presence of negative parenting in the current sample, it is less likely to be a significant predictor of internalizing trajectories. Thus, the low frequency of observed negative

parenting and its relative instability may explain why neither the hypothesized main effects nor interactions between temperament and negative aspects of parenting were supported, rather than reflect a true lack of association between these variables.

Taken as a whole, results from this study add support to examining interaction effects between temperament and parenting when predicting trajectories of internalizing symptoms. While prior research supports the main effects of temperament and parenting on the development of internalizing symptoms (e.g., Brendgen et al. 2005; Leve et al., 2005), it appears that when both factors are simultaneously taken into account, it may be the specific combination of high negative emotionality and maternal warmth that is associated with elevated trajectories of internalizing symptoms throughout childhood. This finding fits within the broader framework of transactional and goodness of fit models and underscores the importance of studying the child in context.

5.4 LIMITATIONS

As with all research, this study has its share of limitations. The study utilized a low-risk community sample and modeled trajectories during a developmental period when rates of internalizing symptoms tend to be lower (e.g., before the marked rise of depression in adolescence). Had data extended into adolescence (i.e., through age 14), we might have picked up on more significant distinctions between trajectory groups. More specifically, we would have been able to assess whether children who exhibit some internalizing symptoms earlier in childhood can be differentiated from children who exhibit symptoms in adolescence based on

levels of negative emotionality and parenting in early childhood. A second limitation was that although the four group model best fit the data, the fourth group (i.e., Moderate Increasing) was comprised of only 28 children, which is at the low end of Nagin's (2005) recommendation for an adequate group size. Perhaps some of our hypotheses were not supported because of the lack of statistical power associated with such a small group. If our data extended through adolescence, the size of this fourth group might have increased, which would have improved our power to detect significant differences between the Moderate Increasing group and the other three trajectory groups. Likewise, due to the small sample size of the Moderate Increasing group, we were unable to examine whether there were gender differences in the association between temperament, parenting, and trajectory group membership. As internalizing symptoms tend to be more common in girls than boys (Eley & Stevenson, 1999), it would have been interesting to explore whether gender moderated any of the findings in the current study.

5.5 FUTURE DIRECTIONS

Results from the current study highlight the importance of considering the child in context. Future research should continue to explore the interactions between temperament and parenting, especially with respect to aspects of negative parenting, as these behaviors were of low frequency in the current sample. Additionally, researchers should continue to disentangle which aspects of maternal warmth are negatively impacting children with high levels of negative emotionality. It would be useful to compare findings from this study to a high-risk sample of children to determine whether the combination of high negative emotionality and high maternal

warmth is predictive of clinical levels of anxiety and depression as well as the non-clinical expression of symptoms. Future research should also include measures of parental overcontrol; while unavailable in the current dataset, this dimension of parenting has frequently been shown to be associated with the development of child anxiety (e.g., Morris et al., 2002; Rapee, 2002).

There is a need for more prospective, longitudinal studies of the development of internalizing trajectories. Future studies should continue to employ person-centered analyses, thus allowing for a comparison between clusters of individuals as opposed to associations between individual variables (Zahn-Waxler et al., 2000). Such an approach would continue to follow theoretical models of development (e.g., transactional models), and take into account the complexity of children's environments. Additionally, future research would benefit from including concurrent measures of temperament and parenting, which would allow for a more careful study of the transactional relationship between these variables and their impact on internalizing symptoms.

APPENDIX

EXAMINATION OF GENDER DIFFERENCES IN PREDICTING TRAJECTORY GROUP MEMBERSHIP

Gender differences in the relationship between temperament, parenting, and internalizing behaviors have often not been analyzed. The few studies that look at these joint relationships have yielded somewhat mixed results (Leve et al., 2005). As such, we examined the role of gender in moderating the association between negative emotionality, maternal warmth, hostility, and harsh control, and trajectories of internalizing symptoms. First, we tested whether there was a main effect of gender in predicting trajectory group membership by including gender as a covariate in the initial model with control variables (Table A1).

Table A1 Model with Controls and Temperament

	Mean Stable			Moderate Stable				Moderate Increasing				
	Coefficient (SE)	Sig.[a]	Odds Ratio	Coefficient (SE)	Sig.[a]	Sig.[b]	Odds Ratio	Coefficient (SE)	Sig.[a]	Sig.[b]	Sig.[c]	Odds Ratio
Number of kids in the household at 54 months	-0.43 (0.11)	**	0.65	-0.54 (.015)	**		0.58	-0.42 (0.24)	t			0.66
Average early childhood maternal depression symptoms	0.09 (0.02)	**	1.09	0.15 (0.03)	***	**	1.16	0.19 (0.04)	***	**		1.21
Child total externalizing score at 54 months	0.23 (0.03)	***	1.26	0.33 (0.03)	***	***	1.39	0.41 (0.04)	***	***	**	1.51
Girl	0.18 (0.2)		1.20	0.74 (0.27)	**	*	2.10	0.68 (0.51)				1.97
Log average early childhood income	-0.05 (0.16)		0.95	0.15 (0.2)			1.16	0.15 (0.35)				1.16

Note. ***p < .001. **p < .01. * p < .05. t < .10

[a] Compared to Low Stable Group
[b] Compared to Mean Stable Group
[c] Compared to Moderate Stable Group

Gender was found to be significantly associated with differentiating membership into the Moderate Stable group compared to the Low Stable and Mean Stable groups. Specifically, girls were 2.1 and 1.75 times more likely to belong to the Moderate Stable Group versus the Low Stable and the Mean Stable groups, respectively, controlling for all other variables. Gender remained a significant predictor of group membership in models with temperament, parenting, and temperament by parenting interaction terms. In these models, being a girl increased the odds of being in the Moderate Stable group compared to both the Low Stable and Mean Stable groups. The only exception to this pattern was that the difference between the Mean Stable and Moderate Stable groups was not significant in the model with temperament and control variables.

In our proposed analytic strategy, if gender was a significant covariate, we planned to run separate estimations of internalizing trajectories for boys and girls. Since there is no statistical method that allows for the direct comparison between coefficients from different samples (e.g., from models with only boys compared to models with only girls), it was instead decided to include a gender interaction term to every variable in the model (i.e., still allowing to test whether gender moderated the relationship between temperament and internalizing symptoms or the relationship between parenting and internalizing symptoms). However, since the fourth group was so small (n = 28), splitting this group into males and females diminished the ability to run stable analyses.

We also attempted to examine our gender hypotheses by specifying separate three-group models for boys and girls. A comparison of the parameter estimates and percentage of individuals in each group indicated that trajectories for girls and boys were nearly identical (see Table A2). Based on the high degree of similarity between the two models and the decrease in

sample size when the models were split by gender, we decided to forego further analyses of gender differences.

Table A2 Comparison of 3-group model for girls and boys

	Parameter Estimate (SE)		Group Membership (%)	
	Girls (N = 532)	Boys (N = 532)	Girls	Boys
Group 1			43.74	42.96
Intercept	1.39 (.17)	1.35 (.17)		
Group 2			43.39	43.99
Intercept	4.60 (.36)	5.71 (.19)		
Linear	.12 (.03)*			
Group 3			12.88	13.05
Intercept	8.48 (.64)	8.30 (.63)		
Linear	.43 (.06)	.44 (.06)		

Note. All parameter estimates were significant at $p < .001$ unless otherwise noted.
*Significant at $p < .01$

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