Bidirectional Associations between Parental Responsiveness and Children’s Internalizing and Moderation by Negative Emotionality

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Abstract

Objective:

Positive parenting behaviors and children's internalizing problems are bidirectionally associated during late childhood and early adolescence. These bidirectional associations likely emerge earlier and may be stronger when the child is prone to reactive negative emotions, making parents’ support especially critical in children's regulation of negative emotions. The purpose of this study was to test (a) bidirectional associations between parents' positive responses to children's behaviors and children's internalizing problems from very early to middle childhood, and (b) the moderating role of children's negative emotionality in these bidirectional associations (N = 4,898).

Results:

Child-driven associations between internalizing problems and later responsive parenting were negatively associated from 3 to 5 years old and not associated from 5 to 9 years old. Parent-driven associations of responsivity at 3 and 5 years old were negatively associated with later internalizing problems at ages 5 and 9 years old respectively. Negative emotionality only moderated the parent-driven association between responsivity at 3 years old and internalizing problems at 5 years old, with higher responsivity being negatively associated with internalizing problems for children having more negative emotionality.

Conclusions:

Parents’ responsivity to child behavior in early and middle childhood tends to be associated with fewer internalizing problems. Parents’ positive response to very young children's behaviors may be especially beneficial for children with higher negative emotionality. These results also support those very young children experiencing internalizing problems may be more likely to receive less responsive parenting later, regardless of children's negative emotionality.

Background

Lower parental responsivity is concurrently and longitudinally associated with more child internalizing problems (Rose et al., 2018; Yap & Jorm, 2015). This association is bidirectional. Whereas positive parenting behaviors tend to precede fewer child internalizing problems, younger children's internalizing problems have also been found to precede lower levels of positive parenting behaviors (Lansford et al., 2018; Pinquart, 2017; Rothenberg et al., 2020). Parents adjust their parenting behaviors in response to children's internalizing problems (Lansford et al., 2018; Pinquart, 2017; Rothenberg et al., 2020), but presently, few studies have examined why parents’ responsivity might more adaptively change when children experience internalizing problems and at very early ages.

Parenting behaviors are more strongly associated with children’s internalizing problems during early childhood and when children have certain temperament traits like more negative emotionality (Ryan &
When children have more negative emotionality, they tend to be more emotionally reactive and prone toward negative emotions (Clark & Watson, 1991; Durbin et al., 2005). Possibly, children with more negative emotionality are less effective at eliciting positive parenting behaviors, which could undermine signals to parents when children experience internalizing problems. The role of children's negative emotionality could be especially critical in very early childhood when children rely heavily on parents’ support to help with regulating negative emotions. Whether children's negative emotionality explains why some parents tend toward more or less adaptive parenting behaviors when children experience internalizing problems has not been tested. The present study aims to address this knowledge by gap testing the moderating effects of children's negative emotionality in the bidirectional associations between responsivity and internalizing problems from very early through middle childhood.

**Parent Responsivity and Child Internalizing Problems**

Child internalizing problems are a broad spectrum of depressive, anxious, and somatic characteristics representing a child's inward psychological state (Achenbach, 1966) that tend to co-occur in children (Tully et al., 2014). Children with more internalizing problems tend to have increased risk for poor physical health, delinquency, and general psychopathology into adulthood and are thus a priority for prevention and treatment (Green et al., 2013; Mojtabai et al., 2016). Research has repeatedly demonstrated that various aspects of parenting behaviors are associated with children's internalizing problems (Yap & Jorm, 2018; Rose, 2018). Responsive parenting is described as parents' response to children's signaling with supportive efforts that help children focus attention (Bornstein & Tamis-LeMonda, 1989; Landry et al., 2008; Smith et al., 2000) or regulate emotions and behaviors (Zimmer-Gembeck & Skinner, 2016). Likely, parents’ response to children's signaling through these behavioral supports facilitates children's development of adaptive self-regulatory mechanisms, positioning children to better cope with stress and other precipitants of internalizing problems (Landry et al., 2006). When parents are less responsive to children's signaling, children may not receive the support needed to develop adaptive coping and emotion regulation strategies which could increase their risk for internalizing problems (Compas et al., 2017; Watson et al., 2014).

**Child Internalizing Problems and Parent Responsivity**

Internalizing problems in children as young as 8 years old have been bidirectionally associated with later lower parental warmth, but across children's older ages, child-driven effects were weaker or non-significant (Lansford et al., 2018; Rothenberg et al., 2020). There is meta-analytic evidence that greater child and adolescent internalizing problems often precede less adaptive changes in parenting behaviors (Pinquart, 2017). In children with internalizing problems, tendencies to withdraw could undermine signals that cue parents’ responsivity, leaving some parents unaware of their children's internalizing problems and thus less responsive (Pinquart, 2017). When children’s cues are undetected and not reinforced, children could perceive a parent's lack of responsiveness as distant or cold and children may stop seeking parental support (Downey & Coyne, 1990; McKee et al., 2008).
The effect of children's internalizing problems on later parenting behaviors seems more pronounced prior to adolescence, but few studies have examined very early childhood internalizing problems as they might precede changes in parenting behaviors through middle childhood. Results from two separate meta-analyses suggest the strength of the association between various parenting behaviors and later child internalizing problems varies by child age, with stronger effects for younger children (Yap & Jorm, 2015; Pinquart, 2017). It is not clear if very young children's internalizing problems are more strongly associated with later parenting behaviors. Given the importance of parents’ responsivity to very young children's signaling, the effects of very young children's internalizing problems on parental responsivity could have implications for children's developing affective self-regulation that affects children's continued signaling for parents’ support over time.

**Negative Emotionality**

Although parenting behaviors are generally associated with later internalizing problems, it remains less clear why some parents supportively adjust parenting behaviors when children experience internalizing problems, whereas other parents might not detect and respond or in some instances be overly responsive or enmeshed. Children's own temperament traits might explain why some parent-child dyads might tend toward more adaptive parenting responses when children experience internalizing problems. Negative emotionality is a relatively stable temperament trait described as the propensity toward negative affect or mood (Clark & Watson, 1991; Durbin et al., 2005). There is meta-analytic evidence that negative emotionality moderates the longitudinal associations between various negative parenting behaviors and child internalizing problems, and this moderating effect is most likely to be found when measured earlier in childhood (Slagt et al., 2016).

According to the Biological Sensitivity to Context Theory (BSC), some children have a pronounced psychobiological reaction to caregiving experiences; high negative emotionality is thought to be a phenotype for enhanced reactivity of the nervous systems that regulate the response to stress (Belsky et al., 2007; Boyce & Ellis, 2005; Pluess & Belsky, 2010). This enhanced psychobiological reactivity could more strongly canalize certain behavioral and affective regulation tendencies that are reinforced by parenting behaviors during early childhood (Pluess & Belsky, 2010). In highly reactive children, parents' supportive response to children's cues, particularly cues signaling distress, may especially help children learn to manage their anxiety and depression. Thus, having more negative emotionality could contribute to stronger associations between responsive parental responsivity and internalizing problems. More reactive children could plausibly display more pronounced signs of distress or negative affect. For example, these reactive children could be more withdrawn, more irritable, or more expressive of negative affect contributing to parents’ lower recognition and responsivity to children's signals of distress. However, while the effect of parenting on children's internalizing problems has been found to be moderated by child temperament (Ryan & Ollendick, 2018; Slagt et al, 2016), whether children's temperament moderates the effects of internalizing problems on later parenting behaviors has not been tested.
Present Study

To address this gap in the literature, we tested children's negative emotionality as a moderator of bidirectional effects between parent responsivity and child internalizing problems over time. We hypothesized: 1) Parental responsivity would be bidirectionally associated with children's internalizing problems from early childhood, beginning at 3 years old, to middle childhood at 9 years old, such that lower responsivity predicts more internalizing problems and more internalizing problems predicts less responsivity. 2) Negative emotionality would moderate these bidirectional associations, such that these bidirectional associations would be stronger and more negative for children with more negative emotionality.

Methods

We performed secondary data analyses on the Future Families and Child Wellbeing (FFCW) data, previously named Fragile Families and Child Wellbeing, a publicly accessible dataset (Reichman et al., 2001). Institutional Review Board approval was not needed for the present study. The original FFCW study sampled 4,898 parents who shared in the birth of one child during the years 1998-2000. Participants were sampled across several densely populated cities in the United States using stratified sampling methods to oversample unmarried parents. The original study aimed to understand the risks associated with family dissolution.

Participants

Of the 4,898 children (2,341 girls), most children (93%) spent all or most of their time living with the primary caregiver, typically the mother, at 9 years old. Some primary caregivers changed across waves. Of families with complete data on relationship to the child, mothers were listed as the primary caregiver who participated in the parenting observation 99% of the time when children were 3 years old, 98% of the time when children were 5 years old, and 92% of the time when children were 9 years old. Only twelve mothers were missing data on race and ethnicity, while 33% of children were missing data. Of children with complete data, 49% were Black and non-Hispanic, 25% were Hispanic, 18% were White and non-Hispanic, 5% were multi-racial, and 3% were of another race or ethnicity not listed here. Of mothers with complete data, 48% non-Hispanic and Black, 27% Hispanic, 21% non-Hispanic and White, and 4% of mothers were of another race or ethnicity not listed here. On average, mothers were about 25 years old when children were born. Of mothers with complete data, more than half had a high school degree or equivalent (65%), and 28% of children lived in homes at or below the poverty line when the child was 1 year old.

Measures

The Infant Toddler Home Observation of the Environment (IT-HOME) was used to measure responsive parenting when children were 3 years old, and the Early Childhood HOME was used to measure responsive parenting when children were 5 and 9 years old (EC-HOME) (Bradley et al., 1988). The IT-HOME and EC-HOME Parental Responsivity subscale indexes a number of parent's positive and
affectionate behaviors during observation believed to contribute positively to child development of children's self-regulatory mechanisms; a sum score was created as recommended for each age (Bradley, 2015). Parental responsivity observations were completed by trained researchers of the original FFCW study, and ratings were scored on a scale of 0-1 to create a total score (e.g., *Parent positively praises child at least twice* = 1, *Parent does not positively praise the child twice* = 0). The participating caregiver was observed without prompting on directed activities and behavioral interactions were coded by the researcher during the visit. FFCW used nine of the eleven items on the Responsivity subscale at 3 years old and eight items at 5 and 9 years old. Two reviews of the psychometric properties of the HOME found that the average interrater reliability of observers across studies was 90% (Elardo & Bradley, 1981; Totsika & Sylva, 2004). Information on inter-rater reliability of observers within the original FFCW is not presently provided. Given that the HOME is an index of formative rather than reflective indicators with no underlying latent construct, responsivity was treated as an observed variable (Bradley, 2015).

Internalizing Problems were assessed using the Child Behavior Checklist (CBCL), which consists of eight syndromes or subscales (Achenbach, 1996). Items are rated on a 0 - 2 scale (0 = *never true*, 1 = *sometimes true*, 2 = *very often true*). A latent variable reflective of Anxious/Depressed and Withdrawn problems known to commonly co-occur in young children were included for each age (3, 5, and 9 years old) using the primary caregiver's report on the Anxious/Depressed and Withdrawn subscales. For the current sample, the Anxious/Depressed problems subscale maintains reasonable reliability at 3 years old (α = .70), 5 years old (α = .62), and 9 years old (α = .78). For the current sample, the Withdrawn subscale maintains reasonable reliability at 3 years old (α = .74), 5 years old (α = .60), and 9 years old (α = .69). The overall Internalizing problems scale maintains reasonable reliability using 25 items at 3 years old (α = .82), 20 items at 5 years old (α = .72), and 21 items at 9 years old (α = .84).

Child negative emotionality was assessed using maternal reports when children were between 1-1.5 years old using the Emotionality and Shyness Temperament Survey (EAST) (Buss & Plomin, 1984). When maternal report was not available, the biological father's report was used. We used the three items (questions b, d, and e) from the five-item Emotionality subscale that were used in the original FFCW study (α = .60). Mothers rated child emotionality using a five-point Likert scale from 1 (*not at all like my child*) to 5 (*very much like my child*). Mothers were asked questions like, “Child reacts intensely when upset,” “Child often fusses and cries,” “Child gets upset easily.” The mean ranged from 2.16 – 2.71 (*SD* = 1.38 – 1.64) across the three items. A latent variable was created with these three items to reflect the underlying and unobserved trait of negative emotionality or phenotypic expression of the trait. Higher values indicate higher levels of negative emotionality.

Covariates for the present study included: maternal race, child's gender, and the Material Hardship Scale (MHS). Maternal race was dummy coded into two groups: non-Hispanic and Black, and non-Hispanic and White, with Hispanic and other racial and ethnic groups treated as one reference group. Children's gender was included as a covariate reported by the mother shortly after birth (0 = *boys*, 1 = *girl*). To account for the effect of poverty on responsivity and children's internalizing problems, we used the Material Hardship scale, which has been used previously in large, nationally representative studies (Survey on Income and
The Material Hardship scale ($\alpha = .64$) assesses a family’s ability to meet basic needs. The primary caregiver answered twelve questions as either yes or no ($1 = \text{no}; 2 = \text{yes}$), like, “In the past year, did you receive food or free meals because there was not enough money?” A mean score was calculated and included as a covariate ($M = 1.83$, $SD = .17$).

**Data Analysis**

Data preparation was done using SPSS V. 25, and all hypothesis testing was done using Mplus V8. Maximum likelihood estimation with robust standard errors (MLR) was used as it is robust to the multivariate non-normality inherent to latent variables. We used a measurement model to define latent variables, assess the psychometric properties of constructs, and assess correlations between constructs. We created four latent variables: negative emotionality at 1 year old and internalizing problems at ages 3, 5, and 9 years old. The residuals for each of the two indicators for internalizing problems, the Anxious/Depressed and Withdrawn subscales, were correlated within each age. Factor loadings for both indicators were set equal to one another within each time point; thus, the structural model was just identified. Concurrent residuals between constructs were correlated. Residual variances of the latent variables were scaled to one.

A path-analytic structural model with latent and observed variables tested the bidirectional associations specified in hypothesis 1 (see Figure 1). The structural model estimated autoregressive effects and cross-lagged effects while controlling for the other. In the structural model, we treated negative emotionality as a covariate. Overall model fit was assessed using comparative fit index (CFI) and the Root Mean Square Error of Approximation (RMSEA) with adequate fit for CFI considered greater than .95 and RMSEA below .06 considered adequate levels of misfit (West et al., 2012). A latent-interaction model tested hypothesis 2: moderation by negative emotionality for the hypothesized bidirectional associations. In the latent-interaction model, we defined the four previously described latent variables and four latent interaction terms, the interaction between 1.) negative emotionality and internalizing problems at 3 years old, 2.) negative emotionality and internalizing problems at 5 years old, 3.) negative emotionality and responsivity at 3 years old, 4.) negative emotionality and responsivity at 5 years old. The latent interaction terms were included to test for moderation by children’s negative emotionality for the cross-lagged paths. We followed Klein and Moosebrugger’s (2000) example of maximum likelihood estimation for latent-moderated structural modeling using a two-step approach that can be implemented in Mplus. We then compared the null model without the interactions (Model 1), and second model with the hypothesized interactions (Model 2), using a log likelihood test for significant loss in model fit (Maslowsky et al., 2016). The Mplus STANDARDIZE command was used to standardize beta coefficients which provides a standardized effect size for the interaction effects. Graphing of the standardized regression coefficients were used to interpret significant interactions (Dawson, 2014).

**Results**

**Missing data**
Missing data analyses were conducted using SPSS V25. Little's Missing Completely at Random test was found to be significant, \( \chi^2(627) = 1012.91, p < .01 \). A chi-square test of independence showed children's maternal race was significantly associated with odds of missing HOME responsivity observation data when children were 3 years old, \( \chi^2 (2, N = 4,886) = 76.88, p < .01 \), and 5 years old, \( \chi^2 (2, N = 4,886) = 56.30, p < .01 \), and 9 years old, \( \chi^2 (2, N = 4,886) = 43.66, p < .01 \). Lastly, logistic regression found material hardship significantly predicted the odds of missing HOME responsivity observation data at 3 years old, \( \chi^2(1) = 20.45, p < .01 \), or 5 years old, \( \chi^2(1) = 22.28, p < .01 \), and 9 years old, \( \chi^2(1) = 18.86, p < .01 \). We included maternal race and material hardship as covariates to improve accuracy in of FIML fitting for missing data. Additional descriptives for each of the measures can be found in Table 1.

**Hypothesis 1**

The structural model testing hypothesis 1 fit the data well, \( \chi^2(59) = 342.89, p < .01 \), CFI = .96, RMSEA = .08 [90% CI: .03, .04]. All factor loadings for latent constructs were positive and statistically significant (see Figure 1 for exact estimates of factor loadings, correlated residuals, and autoregressive correlations). Residuals were significantly correlated overtime for indicators of Internalizing problems except for Anxious/ Depressed problems from age 3 to 5 years old \( (r = .02, p = .11) \) and Withdrawn problems from ages 3 to 9 years old \( (r = .03, p = .09) \). There were positive autoregressive effects for internalizing problems from ages 3 to 5 and 5 to 9, and for responsivity from ages 3 to 5 and from 5 to 9 years old. Parental responsivity was cross-sectionally correlated with internalizing problems at 3 years old, \( r = -.13, p < .01 \), but the residuals of parental responsivity and internalizing problems were not significantly correlated at 5 or 9 years old (See Table 2 for additional correlations).

In support of hypothesis 1, there was a small negative effect of children’s internalizing problems at 3 years old on responsivity at 5 years old, \( \beta = -.09, p < .01 \), although the effect of children’s internalizing problems at 5 years old on responsivity at 9 years old was not significant. Parental responsivity at 3 years old and 5 years had a significant effect on children’s internalizing problems at 5 years old, \( \beta = -.07, p = .04 \), and 9 years old, \( \beta = -.08, p = .02 \), respectively. Children of mothers who were non-Hispanic and Black had significantly lower internalizing problems at 5 years old, \( \beta = -.27, p < .01 \), and 9 years old, \( \beta = -.16, p < .01 \). Material Hardship had a negative effect on children’s internalizing problems at 5 years old, \( \beta = -.08, p = .03 \). At 5 years old, children of mothers identifying as non-Hispanic and Black received lower responsivity, \( \beta = -.23, p < .01 \), and children of mothers identifying as non-Hispanic and White received more responsivity, \( \beta = .11, p = .05 \). At 9 years old, children of mothers identifying as non-Hispanic and Black received higher responsivity, \( \beta = .09, p = .03 \), and children of mothers identifying as non-Hispanic and White received more responsivity, \( \beta = .28, p < .00 \). At 5 years old, girls were received higher responsivity, \( \beta = .10, p = .02 \).

**Hypothesis 2**

Model 1, the path-analytic model treating negative emotionality as a covariate, was compared to Model 2, the path-analytic model including interaction terms to test for moderation by negative emotionality for the
cross-lagged paths. We compared the two models for significant loss of fit using a log-likelihood ratio test using the uncorrected H0 value. Using the uncorrected H0 value has been found to outperform the corrected H0 value when comparing models with latent interactions, \( D = -2 \left[ \log \text{-likelihood for model 1} - \log \text{-likelihood for model 2} \right] \) (Gerhard et al., 2015; Maslowsky et al., 2016). The values of \( D \) are similarly distributed to a \( \chi^2 \) and the df are calculated by the difference between the 93 free parameters from Model 1 to the 97 free parameters of Model 2. We found Model 1 to be significantly worse fitting relative to Model 2, \( -2 \left[ (-61956.99 \text{ model 1}) - (-80993.87 \text{ model 2}) \right] \), and concluded that Model 1, which is a well-fitting structural model, has significantly worse fit compared to Model 2.

The interaction between negative emotionality at 1 year old and parental responsivity from the previous waves had a small significant effect on later internalizing problems at 5 years old, \( \beta = -0.06, p = 0.04 \), and not at 9 years old, \( \beta = -0.14, p = 0.38 \). The interaction between negative emotionality at 1 year old and internalizing problems at the previous waves had no significant effect on responsivity at 5 years old, \( \beta = 0.03, p = 0.45 \), or 9 years old, \( \beta = 0.03, p = 0.47 \). See Table 3 for additional estimates from Model 2. Tests of simple slopes revealed that the effect of responsivity at age 3 on internalizing problems at age 5 was positive and not statistically significant, \( \beta = 0.09, p = 0.23 \), at low levels of negative emotionality (NE) (1 SD below the mean of NE); The effect of responsivity at age 3 on internalizing problems at age 5 was negative and statistically significant at mean levels, \( \beta = -0.25, p < 0.01 \), and at high levels of NE, \( \beta = -0.60, p < 0.01 \) (1 SD above the mean).

**Discussion**

In the present study, we tested the bidirectional associations between children’s internalizing problems and responsive parenting moderated by children’s negative emotionality. This research aims to understand why internalizing problems and parenting behaviors are more strongly associated in certain parent-child dyads in early and middle childhood. We found that lower responsivity was associated with more child internalizing problems over time, and that this association was stronger for children with more negative emotionality. We also found that children’s internalizing problems was associated with less responsive parenting over time as early as 3 years old, and further, these child-driven effects were not moderated by negative emotionality.

**Parent-driven Effects Moderated by Child Negative Emotionality**

High parental responsivity to young children with difficult temperament traits, like more negative emotionality, may have reflected parents’ supportive efforts to help children regulate their emotions. High parental responsivity to children with more difficult temperament traits could support children's development of self-regulation, thus contributing to lower internalizing problems at 5 years old. Also, parents who are highly responsive to children with difficult temperaments and high internalizing problems may have positive characteristics, like patience and parental acceptance. These parenting characteristics likely promote their children’s healthy psychological development. Further, children with more negative emotionality tend to react more strongly to caregiving experiences, like parents’ responsivity, through
psychobiological processes in autonomic and adrenocortical reactivity (Ellis et al., 2011; Pluess & Belsky, 2010). This enhanced reactivity could strongly reinforce feelings that children with high negative emotionality are loved, supported, and can work through challenging situations. Thus, enhanced reactivity in children with more negative emotionality could explain the negative association between early responsivity and later internalizing problems when independent self-regulation is more expected.

**Child-driven effects**

Very young children’s internalizing problems, like tendencies to withdraw, likely make connecting with parents and seeking support more difficult which might explain the negative association between internalizing problems and later positive parenting behaviors like responsivity (Pinquart, 2017). This specific finding in very young children could also imply it is difficult for parents to notice and respond positively to child behaviors when very young children experience internalizing problems.

**Limitations**

Limitations to the present study should be considered. The FFCW study only included an observational measure of parental responsivity. The HOME responsivity subscale quantifies only the number of different types of responsive behaviors observed and does not measure the frequency or quality of specific responsive behaviors. The present study also includes a behavioral measure (the EAST) of negative emotionality, which uses items like “Often fusses or cries,” that could be confounded by physical illness or neglectful parenting.

**Future Directions and Implications**

Future research could aim to identify specific adaptive parenting responses to children’s internalizing problems, such as responses that encourage self-regulation to diminish the continuation of internalizing problems throughout childhood. Results from the present study suggest young children’s internalizing problems could be difficult for most parents to recognize or respond to regardless of children’s negative emotionality. Results further suggest children's temperament traits importantly play a role in how strongly parental responsivity is associated with later child internalizing problems. Specifically, children with more difficult temperament traits may benefit more strongly from more responsive parenting very early in development, suggesting parents’ adaptive responsivity to children's temperament could be especially beneficial. This finding may be especially noteworthy given that responsivity was beneficial for children with more difficult temperament traits in a racially and ethnically diverse sample of participants from different family compositions. The original FFCW study oversampled unmarried parents from diverse backgrounds who often experience co-occurring stressors like high parenting stress and depression (Petts, 2018). While we found small effects of race on internalizing problems and responsivity, the effects of race on both variables were inconsistent across ages and would need further study to draw meaningful interpretations. Thus, results from this study underscore the importance of positive parenting practices and the need to invest in efforts to support positive parenting for children from diverse backgrounds, and particularly children with more difficult temperament traits.
Our results generally suggest that parents' increased ability to respond to very young children's internalizing problems is beneficial. Greater parental responsivity could reinforce feelings that the child is safe and supported, and for more reactive children with high levels of negative emotionality, high parental responsivity may be especially protective against internalizing problems. The present study adds to previous research supporting that flexible parenting practices that respond to children's phenotypic expressions of their genetic architecture could be beneficial. The present study is the first to find evidence suggesting that children's negative emotionality could moderate parent-driven associations in a test of bidirectional associations during very early childhood. Implications from this research could potentially extend to research examining parents' flexibility to accommodate children's temperament traits to mitigate the risk of continued internalizing problems. This research could extend our understanding of the psychobiological processes that position some children to be at greater risk for internalizing problems. When parents can respond flexibly to children's temperament, all families should generally benefit. However, it is plausible that some children are positioned to benefit more strongly when parents are better able to adapt to children's temperament.

Declarations

Ethical Approval

Not applicable. The present study performed secondary data analyses on the Future Families and Child Wellbeing (FFCW) data, previously named Fragile Families and Child Wellbeing, a publicly accessible dataset. Institutional Review Board approval was not needed for the present study.

Consent to Publish

Not applicable

Consent to Participate

Not applicable

Competing interests

Authors have no competing interests to declare.

Authors' contributions

Amanda Thompson designed and conceptualized the study, performed analyses, and wrote the manuscript. Erin Tully and Christopher Henrich both provided support during conceptualization and design, interpreting the results, and feedback on several manuscript drafts. Christopher Henrich provided additional support with performing and interpreting analyses.

Funding
This research received no specific funding from any funding agency.

**Availability of data and materials**

The current study is a secondary data analysis using data from the Future Families and Child Wellbeing study (https://fragilefamilies.princeton.edu/).

**References**


### Tables

#### Table 1

Descriptives for Continuous Measures

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<th>SD</th>
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Table 2

*Correlations between Latent and Observed Constructs*

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<td>.44**</td>
<td>1.00</td>
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<td>.00</td>
<td>-.06</td>
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<tr>
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<td>.00</td>
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<td>.17**</td>
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<tr>
<td>Responsivity 9 yrs.</td>
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<td>.00</td>
<td>.00</td>
<td>-.05</td>
<td>.10**</td>
<td>.17**</td>
<td>1.00</td>
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</table>

*Note:* **p < .01, *p < .05, Negative Emotionality 1 yr.*

Table 3

Latent-Moderated Structural Model, Testing Moderation by Negative Emotionality
<table>
<thead>
<tr>
<th>Outcome</th>
<th>Predictor</th>
<th>Std.</th>
<th>S.E.</th>
<th>p</th>
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<td>Internalizing, 5 yrs.</td>
<td>Negative Emotionality, 1 yr.</td>
<td>0.09</td>
<td>0.03</td>
<td>.00</td>
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<tr>
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<td>0.03</td>
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<td>0.02</td>
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</tr>
<tr>
<td></td>
<td>Material Hardship</td>
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<td>0.02</td>
<td>.00</td>
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<tr>
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<td>NExInternalizing, 5 yrs.</td>
<td>Responsivity, 5 yrs.</td>
<td>Gender</td>
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</tbody>
</table>

*Note*: NEx = Negative emotionality interaction.

**Figures**

![Diagram](image)

*Note*: Negative Emotionality b, d, e are the three items of the emotionality subscale.

**Figure 1**

Legend not included with this version.