



Published in final edited form as:

J Early Adolesc. 2021 March ; 41(3): 472–497. doi:10.1177/0272431620931196.

Youth Internalizing Problems and Changes in Parent-Child Relationships Across Early Adolescence: Lability and Developmental Trends

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Abstract

Few longitudinal studies examine how *changes* in parent-child relationships are associated with changes in youth internalizing problems. In this longitudinal study, we investigated how developmental trends (linear change) and year-to-year lability (within-person fluctuations) in parental warmth and hostility across Grade 6–8 predict youth internalizing problems in Grade 9 ($N = 618$) and whether these linkages differ for boys and girls. Developmental trends (greater decreases in warmth, increases in hostility) were associated with more youth internalizing problems. Greater year-to-year lability (more fluctuations) in father hostility and warmth were also associated with more internalizing problems. Greater lability in mother warmth was associated with more internalizing problems for girls only. The strongest effects of lability on internalizing problems were found for youth with the highest lability scores. This study underscores the importance of differentiating developmental trends from lability in parent-child relationships, both of which may be important for youth internalizing problems.

Keywords

parent-adolescent relationships; parenting processes/practices; parenting; internalizing problems; anxiety; depression

Early adolescence is a sensitive period for the onset and escalation of youth internalizing problems. (Alloy & Abramson, 2007; Cyranowski, Frank, Young, & Shear, 2000). Youth experience high amounts of stress and greater reactivity to stress during the early adolescent transition than earlier developmental periods, which increase the risk for internalizing problems (Alloy & Abramson, 2007; Romeo, 2010; Steinberg & Morris, 2001). This is also a period of family change as parent-adolescent relationships reorganize to accommodate adolescents' need for greater autonomy and a more mature form of relatedness (Steinberg & Morris, 2001). Although these changes in the family system can be stressful, the family remains an important source of support for youth (Steinberg & Morris, 2001). High levels

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The authors declare that they have no conflict of interest.

of parenting warmth and consistency are documented protective factors while high levels of parental hostility, rigidity or overcontrol are risk factors for youth internalizing symptoms (Bogels et al., 2006). However, most research supporting this finding is cross-sectional or focused on time-specific associations that do not account for the dynamic nature of parenting itself (Bogels et al., 2006). We know little about how changes in parenting behaviors are related to the development of early adolescent internalizing problems, especially among nonclinical populations (Branje, Hale, Frijns, & Meeus, 2010). Prior work underscores the importance of capturing year-to-year dynamics in parenting behaviors – above and beyond static levels of parenting behaviors – in predicting youth substance use and delinquency (Lippold, Fosco et al, 2016; Lippold, Hussong et al., 2018). Internalizing symptoms may co-occur with externalizing problems but have distinct pathways and risk factors (Lilenfeld, 2003).

Advancing this literature, this study examines how dynamic changes in parental warmth and hostility across early adolescence are associated with later youth internalizing problems. We examined whether developmental trends (e.g., linear decreases) and year-to-year lability (e.g., intraindividual fluctuations) in mother and father warmth and hostility towards their young adolescents (Grades 6–8) were associated with later youth internalizing problems (Grade 9). We also tested whether these linkages differ for boys and girls.

Parental warmth and hostility are two central family predictors of adolescent developmental outcomes. Parental warmth refers to parents' expressions of love, affection, interest, and acceptance of their children. Parental hostility captures the extent to which parents express anger, contempt and resentment towards their children and associated behaviors such as arguing, yelling, and other forms of verbal and physical aggression (Khaleque, 2017; Weymouth & Buehler, 2016). Parenting that is supportive and warm fosters positive self-esteem, self-concept, and a positive worldview (Khaleque, 2017). In contrast, rejection-including hostility– is associated with low self-esteem, perceived inadequacy, a negative worldview and internalizing problems (Khaleque, 2017). Despite the importance of warmth and hostility for adolescent development, we know little about how they change over time.

Changes in Parenting During Early Adolescence

Transitions in early adolescence place new demands on parents that require new capabilities to meet those demands, thus leading to changes in parenting behaviors throughout early adolescence (Steinberg & Morris, 2001). Prior studies distinguished two types of changes in parenting behaviors (warmth and hostility) during early adolescence: developmental trends and lability (Lippold, Fosco et al, 2016; Lippold, Hussong et al., 2018; Marceau, Ram, & Susman, 2015). Developmental trends capture whether or not parental warmth and hostility increase or decrease on average over time (e.g., rate of linear change over adolescence). In addition to developmental trends, parental warmth and hostility may also fluctuate extensively from year-to-year showing extensive intraindividual variability (Lippold, Hussong et al, 2018). We term these within-person fluctuations in parenting behaviors as “*lability*”. Parents with high lability experience wide swings from high to low levels of warmth or hostility across time around this developmental trend from year-to-year, whereas parents with low lability show little fluctuation from their linear trajectory.

Developmental trends and lability are, by definition, independent constructs that provide distinct information about how parenting changes across adolescence. Parents with the same developmental trend may differ in terms of lability and vice versa.

A recent study parsing developmental trends and lability found that developmental trends in parental warmth and hostility have important associations with delinquency and substance use (Lippold, Hussong et al, 2018). Youth who experienced steeper declines in warmth and greater increases in hostility across early adolescence were at increased risk for delinquency and substance use (Lippold, Hussong et al, 2018). Decreasing warmth and increasing hostility may reflect coercive family processes marked by negative interactions between parents and youth, leading to escalating coercion or disengagement (Dishion, Patterson, Stoolmiller, & Skinner, 1991). However, lability in parental warmth and hostility also predicted these outcomes, even when including developmental trends in the model. Although there were exceptions, in general, greater year-to-year lability in parental warmth and hostility also placed youth at increased risk for delinquency and substance use (Lippold, Hussong et al, 2018)

Building on this work, we examine how dynamic parenting changes across early adolescence predict later youth internalizing problems. Studies have shown overlap between externalizing and internalizing problems; however, there is also some evidence that these behaviors are distinct and have differential relationships with parenting (Lilienfeld, 2003; Wiggins, Mitchell, Hyde, & Monk, 2015). Further, theories on internalizing problems focus more heavily on stress processes and the socialization around emotion than theories on externalizing problems (Sheeber, Hops, & Davis, 2001). Specific aspects of parenting (i.e., overcontrol) have important implications for internalizing problems specifically (Allen et al., 1994; McLeod, Wood, & Weisz, 2007; Wood et al., 2003).

Developmental Trends and Youth Internalizing Problems

Steep developmental trends of worsening parent-child relationships (e.g., sharp increases in parents' hostility and decreases in warmth) may increase risk for depression and anxiety in two ways (Sheeber, Hops, & Davis, 2001). First, from a risky family perspective (Repetti, Robles & Reynolds, 2011), steep declines in relationship quality may be a direct stressor for youth, increasing their allostatic load and increasing their risk for internalizing problems (Lippold, McHale, Davis, Almeida, & King, 2016). Positive parent-child relationships, such as those with high warmth and support, provide youth with a sense of security and safety, thereby directly reducing youth stress (Lippold, McHale et al., 2016) and buffering youth from the negative effects of stress in other domains (e.g., peers, school) on their mental health (Lippold, Davis, McHale, Buxton, & Almeida, 2016; Power, 2004). Second, from an emotional socialization perspective, worsening parent-youth relationships may limit social support available during this time, which may be critical for teaching adolescents how to manage stress and negative emotions (Thompson & Meyer, 2007; Power, 2004). Parents who are warm and supportive provide feedback to youth that help them use positive cognitive strategies to reframe stressful experiences as less negative (Alloy & Abramson, 2007; Chen, Johnston, Sheeber, & Leve, 2009; Power, 2004), and reduce their impact on mental health. Parental support has been associated with increased emotion regulation,

especially during times of greater stress (Silk, Steinberg, & Morris, 2003; Thompson & Meyer, 2007). Thus, when youth experience steep increases in parental hostility and decreases in warmth, they may be more likely to experience stress and less likely to receive guidance in managing negative emotions through effective cognitive strategies, both of which may increase their risk for internalizing problems.

Longitudinal studies on developmental trends in parent-child relationships and youth internalizing problems are rare. Prior studies have found evidence of developmental trends in parenting marked by normative decreases in warmth from early to middle adolescence (Shanahan, McHale, Crouter & Osgood, 2007). Although these studies have not linked these factors to internalizing problems, other studies have shown developmental trends in parenting are associated with youth internalizing problems during childhood (ages 3–9; Wiggins et al., 2015) and young adulthood (Herrenkohl et al., 2009).

Lability and Youth Internalizing Problems

Year-to-year lability (e.g., intraindividual fluctuations) in parental warmth and hostility across early adolescence may also be associated with the development of youth internalizing problems, above and beyond developmental trends. Higher lability in parental warmth and hostility may reflect fluctuations in parenting behavior and a failure to exhibit consistent parental responses. For example, high lability may reflect periods of high warmth and responsiveness, followed by periods of low warmth and increased disengagement. Based on a risky families perspective, inconsistent parenting may be stressful for youth as they lack stable, consistent parental responses (Repetti, Robles & Reynolds, 2011). Such a lack of consistency in parental warmth and hostility may lead to anxiety about future parental reactions to as well as feelings of a loss of personal control - which may cause stress for youth and interfere with a youths' ability to obtain a sense of autonomy and feelings of self-efficacy in their environment. Youth who feel low efficacy over their environment and a loss of self control may experience lower self esteem and increased risk for internalizing problems (Bogels et al., 2006; Finkenauer, Engels, & Baumeister, 2005; Garber, 2005; Hoeltje, Silburn, Garton,, & Zubrick, 1996). Thus high levels of lability may pose increased risk for the development of adolescent depression and anxiety.

Two studies on lability in parent-child relationships have examined internalizing problems, and these studies focused on day-to-day lability over one week rather than year-to-year lability across adolescence. Lippold, Davis, Lawson et al., (2016) found day-to-day lability in positive parent-child interactions is associated with greater youth depression, particularly in early adolescence. Similarly (Fosco et al., 2019) found that greater day-to-day lability in parent-child connectedness was associated with increased risk for adolescent anxiety and depression. However, day-to-day lability is a different construct that captures immediate fluctuations in parental hostility and warmth, which may reflect differences in daily moods. Year-to-year lability captures broader fluctuations in parenting that may unfold across the adolescent transition, last longer than daily transitions with more time to have an impact, and reflect longer changes in the parent-adolescent system. Further, annual studies often assess parenting over a broad timeframe (e.g, over the past month), allowing examination of lability in overall youth perceptions of the parent-child relationship, which are likely more stable

than daily reports. Studies differentiating developmental trends in parenting and year-to-year lability, a particularly important marker of a risky, stressful family environment may be important for understanding effective parenting across the adolescent transition.

Gender Differences

Girls' risk for internalizing problems may be particularly susceptible to lability in parents' warmth and hostility. Girls report higher levels of depression and anxiety than boys during early adolescence and this gender gap increases over time (Cyranowski et al., 2000). Girls are socialized to express their negative emotions more frequently than are boys (Leaper, 2002) and use negative cognitive styles and ruminate more often than boys (Hampel & Petermann, 2006), increasing their risk for internalizing problems. Further, girls report more frequent stressors and emotional reactivity to stressors, perhaps leaving them more strongly affected by the disruptions in parent relationships (Lippold, Davis, et al., 2016; Romeo, 2010; Shih, Eberhart, Hammen, & Brennan, 2006). Girls are also more strongly oriented towards relationships and affected by relationship conflicts and tensions (Lippold, McHale, et al., 2016). There is some evidence girls' internalizing problems are more affected by parenting behaviors than boys' (Chen et al., 2009; Letcher et al., 2008).

These differences in gender socialization may have important implications for how lability in parenting affects adolescent well-being, and the extent to which adolescents' emotional well-being is affected by ups and downs in parenting. Girls may find lability in parental warmth and hostility more stressful than boys, and they may be more likely to ruminate on lability in their relationship. This increased rumination for girls may result in parenting lability more strongly impacting youth internalizing problems in girls than boys. Indeed, prior studies have found stronger relationships between parenting lability and youth outcomes for girls than boys (Lippold et al, 2016; Lippold et al., 2018).

Lability in mother's and father's warmth and hostility may also have different linkages to youth internalizing problems—although study findings are mixed. Negative interactions with mothers may be especially stressful (Lippold, McHale et al., 2016) and more strongly linked to youth internalizing problems than father relationships, at least for girls (Meadows, Brown, & Elder, 2006; Khaleque, 2017). However, other studies found that father relationships are particularly critical for youth well-being, especially positive aspects of the parent-child relationship. Positive experiences with fathers have been linked to reduced stress and depression whereas less nurturing and rejecting relationships with fathers have been associated with increased social anxiety (Lippold, McHale et al., 2016; Mak, Fosco, & Feinberg, 2018; Weymouth, Fosco, & Feinberg, 2017). There is some evidence that father support may be more strongly linked to youth self-esteem than mother support (Gecas & Schwalbe, 1986), suggesting that changes such as lability in fathers parenting may also be important for internalizing problems. Because most studies only examine mothers, more studies are needed to examine both mother and father warmth and hostility and their associations with youth internalizing problems.

Present Study

In this longitudinal study, we examine how year-to-year lability and developmental trends in parents' warmth and hostility across early adolescence (e.g., Grades 6–8) are associated with youth internalizing problems in Grade 9 among a non-clinical population of adolescents and their parents. First, we hypothesized that developmental trends in parenting (i.e., greater decreases in warmth, increases in hostility) would be associated with higher levels of youth internalizing problems in Grade 9 (controlling for Grade 6 levels of internalizing problems). We also expected that year-to-year lability in parents' warmth and hostility would, separately from the developmental trends, also be uniquely associated with adolescents' internalizing problems. Specifically, we hypothesized that youth with greater lability in parental warmth and hostility would have increased risk for internalizing problems. Given prior studies, we also tested quadratic linkages, to assess if extremely high levels of lability had particularly large effects on youth internalizing problems. Second, we hypothesized that there would be stronger associations between lability and internalizing problems for girls than boys. We examine lability in mothers' and fathers' warmth and hostility separately. However, given mixed findings in the literature, we do not posit specific hypothesis regarding parent gender differences. Given prior studies that suggest positive and negative experiences with parents are distinct constructs (Dallaire et al., 2006), we tested the linkages between parental warmth and hostility and internalizing problems separately. Further, we used youth reports of internalizing problems but parent reports of their parenting behavior because youth internalizing problems may negatively affect youth perceptions of parenting, creating common method variance and confounding our analysis (Bank, Dishion, Skinner, & Patterson, 1990).

Method

Study Design and Participants

This paper used data from a subsample of early adolescents who participated in the PROSPER project (Promoting School-Community-University Partnerships to Enhance Resilience; Spoth, Greenberg, Bierman, & Redmond, 2004). PROSPER was a large-scale effectiveness trial of substance use preventive interventions and their diffusion into rural communities in Iowa and Pennsylvania. Participants resided in 28 rural communities and small towns in Iowa and Pennsylvania. Initial eligibility requirements for communities considered for the studies were (a) school district enrollment from 1,300 to 5,200, and (b) at least 15 % of the student population eligible for free or reduced-cost lunches (for more information see Spoth et al. 2004). A subsample of students and their families in the second cohort of the project were randomly selected and recruited for an in-home assessment which included survey questionnaires completed independently by the youth, mother, and, if present, father ($N=977$ for full sample at baseline, 3 participants added at later waves). In-home assessments were completed in five waves: fall of Grade 6, and spring of Grades 6 through 9. Retention rates were acceptable, ranging from 83% at Grade 6 to 76% at Grade 9. Youth also completed in-school questionnaires at each wave. Parents provided consent and youth assented for in-home data collection.

Our study used data from Waves 1–4 to assess parenting lability and data from Waves 1 and 5 to assess youth internalizing problems. Analyses were limited to those families where parents provided data on their warmth and hostility for three or more waves in order to maintain precision in our measurement of lability. Given our interest in both mother-youth and father-youth warmth and hostility, our analytic sample was also limited to two-parent homes. Analysis of two parent homes allows us to examine the effects of parental warmth and hostility for mothers and fathers on youth internalizing problems while avoiding potential confounds with family structure (90% of single parent homes were headed by mothers). We also removed individual parents where the reporter changed across waves: 25 fathers and 6 mothers were removed because the reporter changed from biological parent to stepparent. Thus, our final sample included 618 families with 598 mothers and 476 fathers.

The demographics of the analytic sample at Wave 1 are as follows. Youth (52% female) resided in Iowa (61%) and Pennsylvania (39%), and were, on average, 11.3 years old ($SD = .49$) at Wave 1. The mothers' mean age was 38.8 years ($SD = 5.58$) and fathers' was 41.08 years ($SD = 6.75$). Average household income in 2003 was \$58,738 and 60% of parents had some postsecondary education. Households had an average of three children ($SD = 1.56$). The majority of youth (68%) were living with both biological parents. Eleven percent of fathers were stepparents, and 1% of mothers were stepparents. Less than 2% were adoptive parents (1.6% of fathers; 1.2% mothers). Most youth were Caucasian (90%), Hispanic/Latinx (4%), African American (2%), Native American (1%), Asian (1%), and other (3%).

Measures

Measures were adapted from the Iowa Youth and Families Project (Conger, 1989; McMahon & Metzler, 1998; Spoth, Redmond, & Shin, 1998). This analysis used four waves of data for parental warmth and hostility (Fall of Grade 6, Spring of Grades 6, 7, and 8) and two waves of data for youth internalizing problems (Fall Grade 6, Spring Grade 9). Measures of parental hostility and warmth assessed parent perceptions of their behavior towards their children. Measures of youth outcomes were reported by youth.

Parental hostility.—Parent perceptions of parental hostility toward their adolescent were measured using the Behavioral Affect Rating Form, BARS; McMahon & Metzler, 1998; Fosco et al., 2014) which was the average of four items (e.g., “During the past month when you and your child have spent time talking or doing things together, how often did you yell, insult or swear at him/her when you disagreed”) that were answered on a 7-point Likert scale ranging from *never* (1) to *always* (7). Higher scores indicated greater levels of parental hostility toward the adolescent. Across reporters and waves, average Cronbach's α was .82 (range .80–.84).

Parental warmth.—Parent perceptions of parental warmth toward their adolescent were measured using the Behavioral Affect Rating Form as the average of three items (e.g., “During the past month when you and your child have spent time talking or doing things together, how often did you act loving and affectionate towards him/her”) that were answered on a 7-point Likert scale ranging from *never* (1) to *always* (7). Across reporters and waves, average Cronbach's α was .88 (range .79 – .90).

Internalizing Problems.—Youth internalizing problems were measured using the 14-item internalizing subscale from the youth self-report of the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001). Items asked whether respondents felt sad, depressed, or worried. Responses were provided on a 3-point scale (0 = *not true* to 2 = *very true or often true*) and were summed to create a total internalizing problems score (Cronbach's $\alpha = .88$).

Control variables.—Models controlled for demographic variables that were associated with youth outcomes in prior literature (Greenberg & Lippold, 2013) including gender (0 = *female*, 1 = *male*), dual biological parent status (0 = *not living with biological parents*, 1 = *living with both biological parents*) and average parental education (years in school including secondary education, $M = 13.19$, $SD = 2.18$). We also included intervention condition (0 = *control*, 1 = *intervention condition*) and baseline levels of internalizing problems (W1).

Data Analysis

Following procedures outlined in other developmentally oriented studies of intraindividual variability, our data analysis proceeded through two stages. In our first stage as a preliminary step, we derived intercept, developmental trend, and lability scores for each parent reporter of warmth and hostility (See Lippold et al., 2018 for further description). To derive these scores, we modeled parent-reported parental warmth and hostility using a linear growth model. As reported elsewhere (Lippold et al., 2018), both mother and father warmth demonstrated linear decreases across Grades 6–8 (mothers' $B = -.16$, $p < .001$; fathers' $B = -.07$, $p < .001$); hostility demonstrated linear declines (fathers' $B = -.09$, $p < .001$ and mothers' $B = -.09$, $p < .001$); and variance decomposition suggested that 7.5–48 % of variance in the repeated measures of parental warmth and hostility was accounted for by developmental trends.

In stage one of preliminary analysis, following procedures described by Ram et al. (2011), and Lippold et al., (2018) separate linear growth models were used to obtain person-specific scores for the intercept, developmental trend, and lability of warmth and hostility for each parent in our sample (Bayesian empirical estimates of intercept and slope obtained using SAS Proc Mixed). Lability scores were calculated as the within-person standard deviation of each parent's residuals from the growth model (see Ram et al., 2011 for equations).¹ Parents higher in lability had relatively large deviations from their estimated developmental trends in parental warmth across waves, whereas those lower in lability had relatively small deviations from the estimated trends. The same steps were followed for parental hostility.

In a second stage of analysis, we used Poisson regression to examine the association of lability in parental warmth and hostility across Grades 6–8 with Grade 9 measures of youth internalizing problems (controlling for baseline levels of internalizing problems). Predictors included the variables derived from the growth model (i.e., level, developmental trend, and lability score), control variables, and, a quadratic term for lability (lability score*lability score). The Poisson model had the following form:

¹The standard deviation of the residuals is used to calculate lability because the mean value of residuals is zero.

$$\begin{aligned} \text{Log}_e(\text{Internalizing Problems}_i) & \\ &= \alpha_0 + \alpha_1 \text{warmthlability}_i + \alpha_2 \text{warmthlability}_i^2 + \alpha_3 \text{warmthdevelopmentalchange}_i \\ &+ \alpha_4 \text{warmth level}_i + \alpha_5 - 10 \text{controls}_i \end{aligned}$$

where *Internalizing Problems_i* is the level of youth problem behavior in Grade 9 and *controls_i* included gender, dual biological marital status, condition, parental education, and baseline levels (fall Grade 6 scores) of the youth internalizing problems. Of particular interest were the unique linear (α_1) and quadratic (α_2) associations of lability with youth internalizing problems. Given that lability scores were moderately correlated with the level of parental warmth and hostility ($r = .24 - .37$), additional analyses were run to test the role of multicollinearity. For each model, we calculated the variance inflation factor (VIF), which assesses the extent to which the standard errors of model estimates are inflated due to multicollinearity. The VIF ranged from 1.08–1.16, which is well below the recommended cutoff value of 10 (Hair, Anderson, Tatham, & Black, 1995). Multicollinearity was not likely to have biased our estimates. We also present the Incident Rate Ratio (IRR), which describes the change in the incident rate of youth depression at Wave 5 for every one unit increase in a predictor, holding other variables constant. The IRR is calculated by the exponentiation of the Poisson regression coefficient.²

Lastly, we tested whether the relations between lability and internalizing problems differed for boys and girls. We tested for moderation for both the main effect of lability, as well as the quadratic effect of lability by adding interaction terms to our models (lability * gender; Lability * lability * gender). When interaction terms were significant, we used tests of the simple slopes to derive estimates specific to girls and boys.

Results

Descriptive Statistics

The lability scores ranged from .36 to .44 (SD .20-.27; See Table 1). More lability in fathers' warmth was associated with lower levels of warmth ($r = -.24, p < .001$). More lability in fathers' hostility was associated with higher levels ($r = .30, p < .001$) and steeper developmental trends in hostility ($r = -.26, p < .001$). More lability in mothers' warmth was associated with lower levels of warmth ($r = -.37, p < .001$) and steeper developmental trends in warmth ($r = -.27, p < .001$). Higher lability in mothers' hostility was associated with higher levels of hostility ($r = .34, p < .001$) and steeper developmental trends in hostility ($r = -.10, p < .01$). Youth internalizing problems were correlated with developmental trends in mother ($r = -.09, p < .05$) and father ($r = -.14, p < .01$) warmth and lability in father hostility ($r = .13, p < .01$).

²Additional analysis were conducted using Wave 4 parenting as a predictor. These models had the same pattern of effects. Adding within-person measures of lability and slope explain additional variance above and beyond Wave 4 parenting measures. More information is available from the first author upon request.

Changes in Father's Parenting and Youth Internalizing Problems

Results from the Poisson regression models examining associations between change in parenting and internalizing behavior are shown in Table 2.³ As hypothesized, developmental trends in fathers' warmth and hostility were associated with internalizing problems. Greater decreases in fathers' warmth ($\alpha_3 = -2.87$) and greater increases in father hostility ($\alpha_3 = 3.99$) were each associated with more youth internalizing problems. Level of father hostility was also positively associated with internalizing problems ($\alpha_4 = .16$).

As hypothesized, lability in fathers' warmth and hostility was also uniquely associated with youth internalizing problems: The associations between lability in fathers' *warmth* and internalizing problems had both linear ($\alpha_7 = -.35$) and quadratic ($\alpha_2 = .97$) components (Table 2). Figure 1 displays the quadratic linkages between lability in fathers' warmth and youth internalizing problems. Greater lability was associated with more internalizing problems. This association was strongest at the highest levels of lability in father-reported warmth, as marked by the sharp increase in Figure 1. Higher lability in father *hostility* was linearly associated with more internalizing problems ($\alpha_7 = .36$). Youth gender did not moderate any of these associations.

Changes in Mothers' Parenting and Youth Internalizing Problems

Developmental trends in mothers' warmth and hostility were also associated with youth internalizing problems. Greater decreases in mother's warmth ($\alpha_3 = -1.06$) and greater increases in mothers' hostility ($\alpha_3 = .61$) were associated with more youth internalizing problems (Table 2). Level of mother hostility was also positively associated with internalizing problems ($\alpha_4 = .06$). Similar to fathers, the linkages between mothers' lability in warmth was also quadratic in nature (See Table 2). Lability in mothers' *warmth* exhibited both linear ($\alpha_7 = -.49$) and quadratic linkages ($\alpha_2 = .82$) with youth internalizing problems. However, mother-reported lability in *hostility* was not significantly associated with internalizing problems.

Youth Gender Differences in Association between Lability and Internalizing Problems

Importantly, the linkages between mothers' lability in warmth and hostility and youth internalizing problems were moderated by youth gender (See Table 3). Youth gender moderated the quadratic ($\alpha_{17} = -2.92$) linkages between lability in mother's *warmth* and youth internalizing problems. Tests of the simple slopes revealed that for girls, the associations between lability in *warmth* had significant linear ($B = 1.50$, $SE = .36$, $p < .001$) and quadratic ($B = 1.54$, $SE = .35$, $p < .001$) associations with internalizing problems. Similar to Figure 1, greater lability was associated with more internalizing problems for girls and this association was strongest at the highest levels of lability in warmth. The linkages between lability in mother's warmth and internalizing problems were not significant for

³The IRR can be interpreted as the change in the incident rate of youth depression at Wave 5 for every one unit increase in a predictor variable. For example, for every one point increase in mother's developmental trend in warmth, the incident rate of youth internalizing problems would decrease by a factor of .06 (IRR = .06). Please note that because many of our variables are on a very small scale, IRR's may appear very high or low. For example, the IRR for the developmental trend in father's hostility is 54. This means that for every increase in one unit of the developmental trend of father's hostility, the incident rate of youth depression goes up by a factor of 54. However, a one point increase in the slope is not seen in our data (the range of the developmental trend is -.10 to .06). An increase in the slope from within this range would result in a much smaller increase.

boys (linear, $B=.24$, $SE=.63$, $p > .05$; Quadratic $B=-1.38$, $SE=.73$, $p > .05$). Youth gender also moderated the linear associations between lability in mothers' *hostility* and youth internalizing problems ($\alpha_{1f} = -.75$). However, follow up tests of the simple slopes revealed these linkages were not significant for either boys or girls ($p > .05$).

Discussion

Early adolescence is a period of high stress and vulnerability for internalizing problems (Alloy & Abramson, 2007). In the current study, we examined how developmental trends and year-to-year lability in parental warmth and hostility were associated with later youth internalizing problems. We found evidence that both aspects of change were uniquely associated with girls' and boys' internalizing problems, though patterns were nuanced and differed both by gender of the parent and child. Given our study was on a non-clinical sample, these findings highlight the key role that dynamic changes in parenting may play in the development of internalizing problems in normative populations.

First, developmental trends in father and mother warmth and hostility had important linkages to youth internalizing problems, even when controlling for the level and lability of these constructs. Greater declines in parental warmth and greater increases in parental hostility were associated with more youth internalizing problems. Perhaps during the transition to adolescence, the developmental trend of a declining parent-child relationship has important implications for youth stress and coping. Youth who experience parent-child relationships that worsen over time may be less likely to access parental support to cope with the increased demands and stressors of the adolescent transition than youth whose relationships improve or stay the same. Thus, developmental trends of worsening parent-child relationships may increase the probability of youth anxiety and depression (Alloy & Abrahamson, 2007).

Second, year-to-year *lability* in parent warmth and hostility also mattered for youth internalizing problems. However findings were more nuanced and differed based on gender of the parent and child. Further, in some of our models there were quadratic associations between lability and youth internalizing problems. The association between lability and youth internalizing problems was strongest at the highest levels of lability-- suggesting that lability may be most problematic for youth adjustment when it occurs at very high levels. These findings support other studies that have found greater lability in parenting to be linked to youth maladjustment (Lippold et al., 2015; Lippold et al., 2016; Lippold et al, 2018, Lippold, Fosco et al., 2016). Here, lability has more nuanced relationships with internalizing problems, with some evidence that very high levels may be associated with the highest risk and evidence that these effects may vary by gender of the parent and youth. More studies are needed that examine lability across different subgroups and outcomes to fully assess its effects.

Greater lability in *fathers'* warmth and hostility were associated with higher youth internalizing problems, even when controlling for levels and developmental trends in parenting. High lability in father's warmth and hostility may reflect fluctuations in parenting- where fathers alternate between being warm with their youth versus withdrawn.

Such fluctuating parental responses may create stress for adolescents, with negative implications for their well-being (Zimmer-Gembeck & Collins, 2003). Fathers' parenting may be particularly important because they spend more time engaging in leisure activities with their children and consistent father engagement may be important for reducing youth stress and increasing youth self-efficacy and self-esteem, both of which may reduce the risk for internalizing problems (Lamb, 2004).

Lability in mother's warmth also had implications for youth adjustment, but these the effects of lability on youth internalizing problems were limited to girls. Girls are more sensitive to stressors in interpersonal relationships and may find fluctuations in their mother's warmth to be more stressful than boys—which may make parenting lability have stronger effects on their mental health (Hankin & Abramson, 2001; Leaper, 2002; Lippold, McHale et al., 2016). Girls may also ruminate more than boys on the lability in their relationships with their mothers, which may also increase their risk for internalizing problems (Chen et al., 2009; Garside & Klimes-Dougan, 2002). Prior studies have found that parental support is critical to the development of a positive self-esteem, which may also be another reason why lability in mothers' warmth was important for girls' adjustment (Gecas & Schwalbe, 1986). These findings support those reported in other studies that have found linkages between lability in parenting and delinquency for girls but not boys (Lippold, Fosco et al., 2016; Lippold, McHale et al., 2015).

Interestingly although we found effects for lability in mothers' warmth, we found no effects for lability in mothers' hostility on youth internalizing problems. We hypothesized that fluctuations in mothers' hostility would be stressful for adolescents, as it may lead to anxiety, feelings of loss of control, and lower self-esteem- which may increase risk for internalizing problems (Bogels et al., 2006; Finkenauer, Engels, & Baumeister, 2005; Garber, 2005; Hoeltje et al., 1996). This was surprising given that prior studies have found negative interactions with mothers to be linked to greater youth stress (Lippold, McHale et al., 2016). However, prior studies have focused on levels of mothers' hostility and not lability. In our study, mean levels of mother hostility were also associated with greater risk for internalizing problems- suggesting that it may be average levels of hostility that are most stressful for youth. More studies are needed to understand reasons for these parent gender differences in the effects of lability in hostility.

Limitations

This study has important limitations. Our sample was comprised of rural adolescents who were in two-parent homes and primarily Caucasian. Results may not be generalizable to other groups. Race and ethnic differences have been found in the type of parenting practices used and their effects on outcomes for youth (Harkness & Super, 2002). More studies are needed on the effects of lability in other racial groups as well as family structures, including single parent-homes and LGBTQ families. Our study was from a trial of universal preventive interventions in a community-based sample. Although we controlled for intervention condition in analyses, more studies are needed to understand intervention effects on lability as well as how study results might differ in clinical populations. Our study examined effects separately for mothers and fathers but did not assess statistical differences in effects

by parent gender. Our longitudinal study controlled for baseline levels of internalizing problems, however our study cannot definitively discern the direction of effect. There are likely reciprocal effects between parenting and youth internalizing problems (Boutelle, et al., 2009) which were not captured in this study. Further, this study relied on self-report measures that included a small number of items. Measures that include more items may capture a broader array of hostile and warm interactions. Given that parents often rated their relationships as high in warmth and low in hostility, there may be ceiling effects in our data that make it difficult to fully assess lability. Observations of parenting behaviors may have different associations with youth outcomes. Our study did not test mechanisms that may explain the linkages in this study such as the role of youth stress, self-esteem, or autonomy. We used a global assessment of depression and anxiety. Studies that separate types of depression and anxiety might enhance our understanding of whether these processes differ by types of internalizing problems. Lastly, our study used only four occasions to measure lability, and focused on year-to-year changes in parents' global reports of warmth and hostility over the past month. Future studies are needed that use ecological momentary assessments to understand changes in parenting at different time-scales (i.e. month to month, moment to moment) and their implications for youth (Lippold & McNamee, 2014; Ram, 2011)

This study underscores the importance of differentiating developmental trends from lability (within-person fluctuations) in parents' warmth and hostility, both of which are important for youth internalizing problems. Steeper increases in hostility and decreases in warmth (developmental trends) were important predictors of adolescents' internalizing problems. Greater lability in father's warmth and hostility were linked to greater internalizing problems. Mother lability in warmth was associated with increased risk for internalizing problems for girls but not boys. Very high levels of lability may be especially detrimental. Future studies should examine the mechanisms that explain the impact of these changes in parenting on youth adjustment.

Acknowledgements:

Work on this paper was supported by research grants from the National Institutes of Health including grants R03 DA038685 and R01 DA013709 and from the National Institute on Drug Abuse, as well as P2C HD041025 and UL TR000127. Further support was given to Dr. Fosco through the Karl R. and Diane Wendle Fink Early Career Professorship for the Study of Families. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute on Drug Abuse or the National Institutes of Health.

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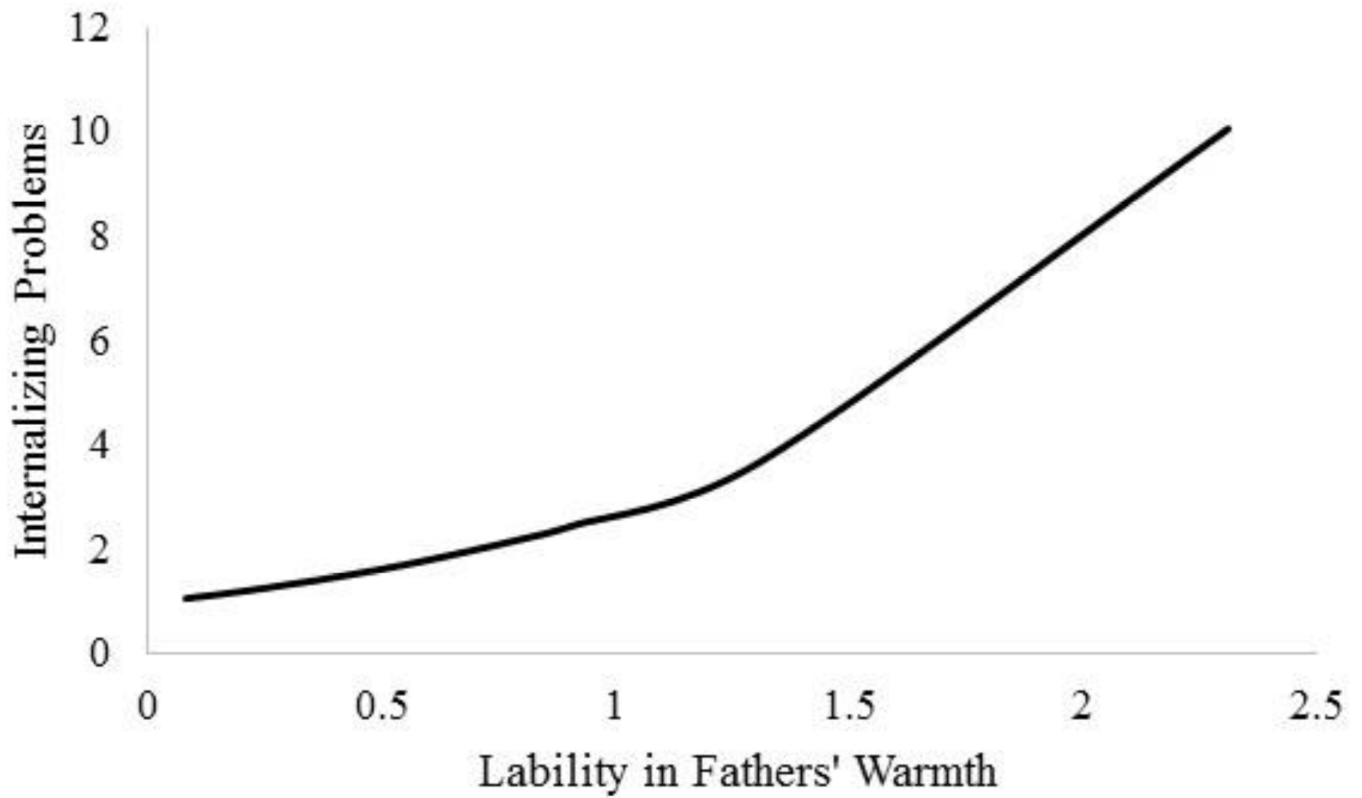


Figure 1. Lability in fathers' warmth and youth internalizing problems.

Linear and quadratic linkages were found between lability in father's warmth and youth internalizing problems. Greater lability was associated with more internalizing problems. This association was strongest at the highest levels of lability in father-reported warmth.

Table 1.

	Fathers Mean Std.	Mothers Mean Std.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	
1. Warmth-lability	.44	.27	.36	.20	1.00	-.07	-.24***	.21***	.16***	.03	-.05	.01	-.06	-.01
2. Warmth-developmental trend	-.07	.08	-.06	.07	-.27***	1.00	.30***	-.01	.02	-.19***	-.14**	.06	.07	.07
3. Warmth-level	5.46	.87	6.07	.69	-.37***	.59***	1.00	-.08	.30***	-.37***	-.05	-.04	-.01	.13*
4. Hostility- lability	.39	.22	.37	.24	.12**	-.02	1.00	-.26***	.30***	.13***	-.03	-.04	.13**	-.01
5. Hostility-developmental trend	-.09	.02	-.09	.07	-.01	-.20***	1.00	-.10**	-.75***	-.07	-.03	-.04	-.16**	-.03
6. Hostility-level	2.72	.67	2.84	.68	.12**	-.21***	.34***	-.22***	1.00	.11*	.09	-.01	-.17**	-.03
7. Internalizing Problems	3.35	4.37			-.01	-.09*	.05	-.01	.13*	1.00	-.29***	.01	-.06	-.15*
8. Youth gender	52% female				.10*	-.03	.06	.03	-.04	-.04	1.00	-.04	.06	.09*
9. Intervention condition	61% Iowa				.04	.05	-.01	-.03	-.07	.01	-.04	1.00	.04	.03
10. Parent Education	13.19	2.18			-.02	-.01	-.09**	-.13**	-.01	-.05	.06	.04	1.00	.14*
11. Dual Biological Marital Status	68% with both bio parents				-.01	.01	-.04	-.04	-.04	.21***	.09*	.03	.14*	1.00

Note. Means are presented for youth report of Wave 5 internalizing problems. N = 618. Correlations for fathers are above the diagonal and correlations for mothers are below the diagonal.

* p < .05,

**

p < .01,

p < .001.

Table 2. Developmental Trends and Liability in Parents' Warmth and Hostility as Predictors of Youth Internalizing Problems

	Parents' Warmth				Parents' Hostility							
	Fathers		Mothers		Fathers		Mothers					
	Est	SE	IRR	Est	SE	IRR	Est	SE	IRR			
Liability (α_1)	-.35*	.14	.70	-.49***	.13	.61	.36*	.17	1.44	-.03	.17	.97
Liability* liability (α_2)	.97***	.24	2.64	.82***	.31	2.29	.29	.25	1.34	.49	.29	1.63
Developmental change (α_3)	-2.87**	.38	.06	-1.06*	.51	.34	3.99*	1.67	54.39	.61*	.29	1.84
Level (α_4)	.07	.03	1.07	.06	.05	.94	.16*	.07	1.17	.06*	.04	1.06
Grade 6 internalizing problems (α_5)	.07***	.01	1.07	.06***	.01	1.07	.07***	.01	1.07	.07***	.01	1.07
Gender (α_6)	-.79***	.06	.46	-.57***	.05	.56	-.70***	.07	.49	-.58***	.06	.56
Condition (α_7)	-.01	.01	.99	.05	.06	1.05	.01	.06	1.00	.05	.06	1.05
Parent education (α_8)	-.01	.01	.99	-.01	.01	.98	-.01	.02	.99	-.01	.01	.99
Parent dual-bio marital status (α_9)	-.22**	.07	.79	-.14*	.06	.87	-.18**	.07	.83	-.13**	.06	.88

* $p < .05$,

** $p < .01$,

*** $p < .001$.

Separate models were run for mother and father warmth and hostility. All estimates are unstandardized. All variables were centered for our analysis. The IRR is the Incident Rate Ratio (IRR). The IRR describes the change in the incident rate of youth depression for every one point unit increase in a predictor. When variables are on a small scale, the IRR may appear very high or low.

Table 3. Youth Gender Moderates the Linkages Between Liability in Parents' Warmth and Hostility and Youth Internalizing Problems.

	Parents' Warmth						Parents' Hostility					
	Fathers			Mothers			Fathers			Mothers		
	Est	SE	IRR	Est	SE	IRR	Est	SE	IRR	Est	SE	IRR
Liability (α_1)	-.35*	.15	.71	-.56***	.15	.57	.35	.20	1.41	-.14	.18	.87
Liability* liability (α_2)	1.15**	.30	3.07	.14	.39	1.15	.98	.50	2.67	.12	.40	1.13
Developmental change (α_3)	-2.80**	.38	.06	-1.32*	.52	.27	3.55*	1.69	34.84	.67*	.30	1.96
Level (α_4)	.07	.03	1.07	-.04	.05	.96	.15*	.07	.82	.07	.03	1.07
Grade 6 internalizing problems (α_5)	.07***	.01	1.07	.07***	.01	1.06	.07***	.01	1.07	.07***	.01	1.07
Gender (α_6)	-.82***	.08	.43	-.42***	.07	.65	-.77***	.08	.46	-.54***	.04	.58
Condition (α_7)	-.10	.06	.98	.05	6.0	1.04	-.01	.06	.99	.04	.06	1.04
Parent education (α_8)	-.01	.01	.99	-.01	.01	.99	-.01	.02	.99	-.01	.01	.99
Parent dual-bio marital status (α_9)	-.22**	.07	.79	-.11	.06	.89	-.19**	.07	.83	-.14**	.06	.86
Gender * liability (α_{10})	.03	.29	1.03	-.37	.27	.69	.21	.39	1.24	-.75*	.35	.47
Gender * liability * liability (α_{11})	.53	.61	1.07	-2.92***	.79	.05	1.33	1.03	3.79	-.72	.83	.49

* $p < .05$,

** $p < .01$,

*** $p < .001$.

Separate models were run for mother and father warmth and hostility. All estimates are appear very high or low. unstandardized. All variables were centered for our analysis. The IRR is the Incident Rate Ratio (IRR). The IRR describes the change in the incident rate of youth depression for every one point unit increase in a predictor. When variables are on a small scale, the IRR may appear very high or low.