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Decline in the Quality of Family Relationships Predicts Escalation in Children's Internalizing Symptoms from Middle to Late Childhood

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Abstract

An integration of family systems perspectives with developmental psychopathology provides a framework for examining the complex interplay between family processes and developmental trajectories of child psychopathology over time. In a community sample of 98 families, we investigated the evolution of family relationships, across multiple subsystems of the family (i.e., interparental, mother-child, father-child), and the impact of these changing family dynamics on developmental trajectories of child internalizing symptoms over 6 years, from preschool age to pre-adolescence. Parent-child relationship quality was observed during lengthy sessions, consisting of multiple naturalistic, carefully scripted contexts. Each parent completed reports about interparental relationship satisfaction and child internalizing symptoms. To the extent that mothers experienced a steeper decline in interparental relationship satisfaction over time, children developed internalizing symptoms at a faster rate. Further, symptoms escalated at a faster rate to the extent that negative mother-child relationship quality increased (more negative affect expressed by both mother and child, greater maternal power assertion) and positive mother-child relationship quality decreased (less positive affect expressed by both mother and child, less warmth and positive reciprocity). Time-lagged growth curve analyses established temporal precedence such that decline in family relationships preceded escalation in child internalizing symptoms. Results suggest that family dysfunction, across multiple subsystems, represents a driving force in the progression of child internalizing symptoms.

Keywords

Interparental relationship quality; Parent-child relationship quality; Child internalizing problems; Growth curve analyses; Time-lagged associations

Internalizing disorders in children and adolescents (anxiety and depression) may originate as early as toddler age (Tandon et al. 2009), and they undermine multiple dimensions of child

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functioning (Guyer et al. 2011). Internalizing symptoms increase over time (Bongers et al. 2003; Gilliom and Shaw 2004), yet risk factors for escalating anxiety and depressive symptoms throughout childhood are not well understood (El-Sheikh et al. 2013). Despite the prevalence and consequences of internalizing symptoms in young children, conceptual frameworks explaining pathways of risk are not well developed. This oversight might be attributed to the introverted nature of internalizing symptoms which tend to be less disruptive and more difficult to detect than other forms of childhood maladjustment (e.g., externalizing problems; Tandon et al. 2009).

A family systems perspective (Cox and Paley 1997; Cox et al. 2003; Minuchin 1985) provides a framework for understanding key factors leading to the development of internalizing symptoms in children, and emphasizes the centrality of family relationships in the development of these disorders. Within a systems framework, families are conceptualized as comprising multiple interdependent subsystems. Individual members of the family belong to multiple subsystems, and functioning in these subsystems influences each other's wellbeing.

Research examining the role of family in the development of child psychopathology has been focused primarily on the mother-child subsystem (Parke and Buriel 2006). A large body of literature demonstrates that multiple aspects of the mother-child relationship (e.g., power-assertive control, attachment security, responsiveness, interactive quality) are associated with increased risk for child internalizing symptoms across multiple periods of development spanning early childhood to adolescence (e.g., Brumariu and Kerns 2010; Chorpita and Barlow 1998; Crawford et al. 2011; Dubois-Comtois et al. 2013; Easterbrooks et al. 2008; Gilliom and Shaw 2004; Graham and Easterbrooks 2000; Kerns et al. 2011; Lee and Hankin 2009; McLeod et al. 2007; Silk et al. 2011).

Although informative, a focus on the mother-child dyad is incomplete. Adopting the tenets of ecological perspectives (Belsky 1984), many researchers have advocated for inclusion of additional subsystems that include the father (i.e., the interparental relationship, the father-child dyad) to gain a more comprehensive perspective on the whole family, and its impact on child psychopathology (Cox et al. 2003; Lamb 2010). Researchers have examined the quality of the father-child relationship, and its role in the development of child internalizing symptoms (e.g., Allen et al. 2012; Brumariu and Kerns 2010; Milevsky et al. 2006; Sheeber et al. 2007); however, much of this research has focused on adolescence. Thus, the impact of the father-child relationship on child internalizing symptoms during earlier developmental periods (e.g., preschool age and middle childhood) warrants attention.

Examinations of the associations between parent-child relationship quality and child internalizing symptoms are important; however, they yield an incomplete picture. The interparental relationship sets the tone for the larger family unit, and must also be considered in efforts to explain the development of children's internalizing symptoms over time. The interparental relationship has been described as the "cornerstone" of family functioning (Davies and Cicchetti 2004), regulating the family environment (Hindman et al. 2013), and discord and dysfunction in the interparental relationship predicts the functioning of both the

family as a whole and of its individual members (Bonds and Gondoli 2007), including child adjustment (Emery 1982; Grych and Fincham 1990).

The influential work of Cummings, Davies, and colleagues has demonstrated a key mechanism through which interparental discord influences child adjustment. Specifically, they propose an *emotional security hypothesis* (Davies and Cummings 1994) that purports that the child's sense of emotional security within the family is undermined as a result of interparental discord, contributing to child maladjustment (e.g., Cummings et al. 2012; Cummings et al. 2006; Goeke-Morey et al. 2003; Harold et al. 2004). Although extensive research has demonstrated the detrimental impact of interparental discord on child adjustment, much of this research has been focused on externalizing disorders. Further inquiry into the effects of the interparental relationship on children's *internalizing symptoms* is warranted. For example, in a recent article based on the same sample, we demonstrated that maladaptive marital conflict and negative emotional aftermath of conflict during toddler age predicted children's future internalizing problems, and identified child insecurity as a mechanism through which these pathways unfold (Brock and Kochanska 2015). Those analyses, however, did not consider the quality of the interparental and parent-child relationships more broadly and over time.

Family systems perspectives recognize multiple subsystems contributing to individual functioning and well-being; furthermore, another key tenet of this framework is that families are dynamic, developing systems. In response to transitions and strain from external forces, families are forced to adapt and reorganize (Cox et al. 2003). The process of adaptation and change within the family unit can have important implications for the developmental processes contributing to psychopathology in family members. Consequently, the evolution of family processes over time is key for understanding how these processes contribute to the development of internalizing disorders in children, and those dynamics must be captured. Yet, the majority of existing research has focused on concurrent family functioning as a static phenomenon, as opposed to family processes unfolding over time as they evolve and change (Davies and Cicchetti 2004). There is a need for long-term research designs and statistical techniques that are capable of modeling not only patterns of change in family subsystems over time, but also the interplay of these processes with developmental trajectories of child psychological adjustment (Davies and Cicchetti 2004).

From the point of view of developmental psychopathology, longitudinal studies of the developmental period from late preschool age to preadolescence are particularly valuable. Such studies provide a window into children's emotional functioning after the normative transition to a new social ecology (kindergarten), followed by the continuing management of drastically expanding developmental tasks and challenges. The emerging salient issues of development include negotiating daily lengthy separations from the attachment figures, achieving multiple academic and social competencies, entering a broad social milieu, and navigating often conflicting influences of family, school, and the peer group. Those evolving tasks represent significant challenges for children's coping and emotion regulation abilities. Consequently, an understanding of factors that contribute to children's vulnerability to feelings of anxiety, sadness, depression, and worry over the course of that period, and of factors that offset such symptoms, is an important research goal. In particular, relatively

long-term individual trajectories of internalizing symptoms, such as anxiety and depression, and familial factors that contribute to continuity, change, acceleration, or deceleration of such symptoms are of great interest in developmental psychopathology (Degnan and Fox 2007; Kennedy et al. 2010; Ollendick and Benoit 2012).

The Present Study

In the present study, we investigated the evolution of multiple family processes over time and across multiple subsystems of the family (i.e., interparental, mother-child, father-child). We examined the impact of these changing dynamics on developmental trajectories of child internalizing symptoms. Growth curve analytic (GCA) techniques were used, which model within-subject change in a phenomenon over time (e.g., internalizing disorders) along with between-subject differences in those growth curve trajectories (see Karney and Bradbury 1995, and Kenny et al. 2006, for a discussion of the advantages of GCA.)

Modeling the development of psychological symptoms over time is advantageous because the *progression* of symptoms is conceptualized as more informative than symptom levels at a given point in time (Graber 2004). Indeed, although notable exceptions exist, particularly in research on anxiety (e.g., Degnan and Fox 2007), most of the existing research has been largely limited to “still photographs of moving targets” (p. 4; Hayden and Mash 2014), failing to capture the dynamic nature of child psychopathology. Developmentally sensitive measures of psychopathology across a broad span of child development have numerous advantages (Hayden and Mash 2014). Further, dynamic assessments of symptom trajectories are considered more reliable and informative than simply controlling for prior levels of symptoms (Cole et al. 2002), as in the context of an autoregressive model.

We further argue that it is insufficient to simply examine concurrent covariation between family processes and child internalizing disorders over time, which is customary in GCA, given the bidirectional relations between child psychopathology and family functioning (Cox et al. 2003; Cox and Paley 1997; Emery 2014; Schermerhorn and Cummings 2008). Thus, we also implemented a time-lag approach such that changes in family processes were modeled as *temporally preceding* changes in internalizing symptoms. That is, we examined whether interparental and parent–child relationship quality assessed at time t were associated with changes in child internalizing symptoms at time $t+1$ (i.e., 1 to 2 years later).

To capture the quality of the interparental relationship, we used a measure of relationship satisfaction (i.e., global relationship sentiment or happiness as a unitary construct; Lawrence et al. 2009). Relationship satisfaction can be conceptualized as a global indicator of functioning in the interparental relationship across multiple domains. More positive relationship functioning (e.g., high levels of emotional intimacy, adequate partner support) and more negative relationship processes (e.g., poor conflict management) are robustly related with global relationship satisfaction (Lawrence et al. 2011). Further, repeated measures of relationship satisfaction over extended periods of time capture a relationship trajectory that is sensitive to fluctuations in overall relationship functioning (Bradbury et al. 2000). We hypothesized that decreases in interparental relationship satisfaction would

predict subsequent increases in child internalizing symptoms, controlling for the passage of time.

Multiple aspects of parent–child relationship quality were observed and coded during lengthy observations of interactions of each mother–child and father–child dyad in the laboratory. To assess negative relationship quality, the parent’s expressions of negative affect with the child, the child’s negative affect with the parent, and the parent’s observed power-assertive control with the child were scored and aggregated.

Positive aspects of the parent–child relationship were also observed and coded. In addition to the parent’s positive affect with the child, and the child’s positive affect with the parent, we examined a dyadic construct of mutually responsive orientation (MRO) – a cooperative, trusting, supportive, and reciprocal parent–child relationship, infused with positive affectivity (Kochanska 1997). MRO has been well-established as a correlate and a cause of overall adaptive socio-emotional development, particularly a broad range of outcomes reflecting internalization of values, and regard for and compliance with rules of conduct (e.g., Kochanska 2002; Kochanska et al. 2014; Kochanska and Kim 2013). The association of MRO with child internalizing disorders, however, has rarely been studied and warrants attention. Based on the extant literature on parental warmth and responsiveness (e.g., Ollendick and Benoit 2012), we hypothesized that increases in negative parent–child relationship quality and decreases in positive parent–child relationship quality would predict subsequent increases in child internalizing symptoms, controlling for the passage of time.

Method

Participants and Procedures

Two-parent families of infants ($N=102$) volunteered for a longitudinal study in response to advertisements and fliers distributed in the community. A family was accepted if the parents were living together and both wished to participate, parents were willing to speak English during sessions, the infant was their biological child, normally developing, and free of major birth complications or health problems, and the family had no plans to move in the next 5 years. Mothers were, on average, 30.80 years of age ($SD=5.30$) and fathers were 32.23 ($SD=6.03$). Approximately 25 % of mothers had a high school education (or less), 54 % had an associate or college degree, and 21 % had a postgraduate education. The respective figures for fathers were approximately 30, 51, and 20 %. Thirty-eight percent of mothers and 55 % of fathers were employed in a management or professional occupations. The annual incomes of families ranged from less than \$20,000 (8 %), to \$20,000–\$40,000 (17 %), to \$40,000–\$60,000 (26 %), to over \$60,000 (49 %). Approximately 90 % of mothers were White, 3 % Hispanic, 2 % African American, 1 % Asian, 1 % Pacific Islander, and 3 % other non-White. Among fathers, 84 % were White, 8 % Hispanic, 3 % African American, 3 % Asian, and 2 % other. In 20 % of families, one or both parents were non-White. On average, families had 2.03 children ($SD=1.07$); 37 % of the target children were first-borns. All procedures were approved by the institutional review board at a large Midwestern university.

We report data collected across five time points ranging from when children were aged 4.5 to 10. Four families had withdrawn from the longitudinal study by the time the target child was aged 4.5. Each parent completed reports about interparental relationship satisfaction (at 4.5 years, $N=98$; 5.5 years, $N=89$; 6.5 years, $N=84$; 8 years, $N=80$) and child internalizing symptoms (at 5.5 years, $N=92$; 6.5 years, $N=90$; 8 years, $N=87$; 10 years, $N=82$). Trained observers produced multiple measures of the quality of the mother-child and father-child relationships (at 4.5 years, $N=98$; 5.5 years, $N=90$; 6.5 years, $N=87$), based on many lengthy scripted interactive contexts (see the supplemental tables for more information).

Each parent-child dyad was observed during lengthy sessions (2–3 h). Measures of parent-child relationship quality encompassed the parent's and the child's expressed affect toward one another, an overall dyadic quality of their interaction, and the parent's power assertion used during control encounters. Those constructs were coded, by independent groups of coders, in multiple naturalistic, carefully scripted, developmentally appropriate contexts that had been designed to elicit a variety of emotions, behaviors, and interactions within the dyad (e.g., parent is busy while child has free time, snack time, parent and child play with toys or complete a craft project, child cleans up toys, parent and child open gifts together). Notably, all of the reported coding systems have been used extensively in our laboratory including the systems for the parent's and the child's expressed affect (e.g., Kochanska et al. 2007), parent-child MRO (e.g., Kochanska et al. 2013), and the parent's power assertion (e.g., Kochanska et al. 2008). Overall, each parent-child dyad was coded in 185 min over the repeated assessments (65, 60, and 60 at 4.5, 5.5, and 6.5 years). All sessions were conducted by female experimenters, and videotaped for future coding. The laboratory includes a naturalistic living room and a sparsely furnished playroom.

Parent-Reported Child Internalizing Behavior Symptoms

Mothers and fathers completed Child Symptom Inventory-4 (CSI-4; Gadow and Sprafkin 2002; Sprafkin and Gadow 2002). CSI-4 is a well-established instrument that corresponds to DSM-IV (American Psychiatric Association 2000), with excellent psychometric properties (Gadow and Sprafkin 2002; Sprafkin and Gadow 2002). We used Symptom Severity scoring, based on each parent's ratings of the CSI-4 items from 0 (*never*) to 3 (*very often*). For each parent, we created an internalizing symptoms score by adding the scales of depression, generalized anxiety disorder, specific phobia, obsessive-compulsive disorder, post-traumatic stress, tic disorder, social phobia, and separation anxiety. Cronbach's alphas ranged from 0.61 to 0.66 for mothers over time and 0.62 to 0.70 for fathers. The mothers' and fathers' scores modestly correlated (average r of 0.33 across time), and were averaged into one score of child internalizing symptoms at each time point (5.5, 6.5, 8, and 10 years; see Lengua et al. 2008 for benefits of such approach).

Interparental Relationship Satisfaction

The Quality of Marriage Index (QMI; Norton 1983) is a well-established self-report questionnaire designed to assess the "essential goodness of a relationship" or global sentiment about one's intimate relationship. The measure includes six items (e.g., "we have a good relationship," "my relationship with my partner makes me happy"). Participants indicate the extent to which they agree or disagree with each item using a 7-point Likert

scale. Cronbach's alphas ranged from 0.95 to 0.98 for mothers over time and 0.97 at each of the time points for fathers. Sum scores of mother-reported marital satisfaction and father-reported marital satisfaction were calculated (at 4.5, 5.5, 6.5, and 8 years). The possible range of composite scores was 7 to 42 (note that an alternative version of the QMI includes a 10-point Likert scale for the sixth item for a possible range of 7 to 45).

Negative Parent–child Relationship Quality

An aggregate (average) score of the parent's and the child's negative affect and the parent's power-assertive control was computed separately for each dyad (mother-child, father-child) at each time point (4.5, 5.5, and 6.5 years).

The Parent's Negative Affect with Child—The parent's affect was coded in each of the scripted contexts, for every 30-s segment. Kappas ranged from 0.73 to 0.84 across time and both parents. We then tallied the instances of the parent's intense or pervasive negative affect (weighed by 3), discrete negative emotions (weighed by 2), and neutral/negative mood (weighed by 1). Those figures were added and divided by the number of coded segments into a score of the parent's *negative affect with the child*.

The Child's Negative Affect with Parent—During each of the scripted contexts, the child's affect was also coded, for every 30-s segment. Kappas ranged from 0.65 to 0.83. Instances of the child's expressions of negative affect (intense or pervasive, discrete negative emotions, or neutral/negative mood) were weighted and tallied, added across contexts, and divided by the number of coded segments into a score of the child's *negative affect with the parent*.

The Parent's Observed Power-Assertive Control—At the outset, parents were asked to convey to their children a prohibition that pertained to not touching very attractive toys displayed on low, easily accessible shelves, and enforce it throughout the session (the same scripted contexts that were coded for affect). First, coders identified all episodes of control (starting when the child's attention turned to the prohibited toys). Then, another coding team coded, for every 30-s segment within those episodes, the parent's *overall control style*. Only codes reflecting power assertion were used here: assertive control (matter-of-fact, firm, decisive control style), and forceful, negative control (negative, angry, threatening, harsh control style). Also for each 30-s segment, the parent's *physical power-assertive strategies* were coded: assertive physical control (firmly holding the child, taking a toy away, blocking access to toys), and forceful, negative physical control (handling child roughly, spanking, yanking toys away). Reliability, kappas, ranged from 0.68 to 0.76 across repeated assessments.

During another context (the toy cleanup), parents were instructed to ask their children to clean up numerous small toys or craft materials, and the parent's style of control was also coded for every 30s segment, using the same coding system. Reliability, kappas, ranged from 0.71 to 0.88 across repeated assessments.

The instances of each code were tallied, divided by the number of coded segments, and standardized. For the prohibition encounters, the two scores for the overall control style

(assertive and forceful) were averaged, and the two scores for physical power-assertive strategies (assertive and forceful) were averaged. Those scores were then averaged to create an overall score for prohibition. A parallel overall score was also obtained for the toy cleanup. Finally, the overall prohibition and toy cleanup scores were aggregated into one parent's *observed power-assertive control* score at each time of assessment.

Data Aggregation—Correlations among the scores that were averaged to create a composite score were generally small to medium in magnitude (average r of mother-child scores was 0.12 at 4.5 years, 0.02 at 5.5 years, and 0.04 at 6.5 years; average r of father-child scores was 0.40 at 4.5 years, 0.17 at 5.5 years, and 0.09 at 6.5 years). We had anticipated relatively low correlations among components used to create aggregate scores for three reasons. First, negativity in the family can manifest in numerous ways, and we did not necessarily expect its various forms to be related. For example, a parent's negative affect may be associated either with harsh or intrusive discipline or with a disengagement from control interactions altogether (Cummings and Davies 1994; Dix 1991). Never-theless, each of the three variables (the parent's and the child's negative affect, the parent's power assertion) can be legitimately viewed as reflecting a poor quality of their relationship. Second, as expected in a community sample, instances of negative affect and power assertion were relatively infrequent, reducing the magnitude of correlations (although the final composites had acceptable distributions). And third, power assertion occurred only in the small subset of the time in which affect was coded (during the actual episodes of control), and thus was less robust than the affect scores. Scores were standardized before averaging to create a final score of *negative parent-child relationship quality*.

Positive Parent-child Relationship Quality

An aggregate (average) score of the parent's and the child's positive affect and MRO in the parent-child relationship were computed separately for mothers and fathers, and at each time point (4.5, 5.5, and 6.5 years). The same scripted contexts were used as those coded for scores of negative parent-child relationship quality.

The Parent's Positive Affect with Child—The parent's affect was coded in each of the contexts, for the parent's intense or pervasive positive affect (weighed by 3), discrete positive emotions (weighed by 2), and neutral/positive mood (weighed by 1). Those figures were added and divided by the number of coded segments into a score of the parent's *positive affect with the child*. Kappas ranged from 0.73 to 0.84 across time and both parents.

The Children's Positive Affect with Parent—During each of the scripted contexts, the child's affect was also coded, for every 30-s segment. Kappas ranged from 0.65 to 0.83. Instances of the child's expressions of positive affect (intense or pervasive, discrete positive emotions, or neutral/positive mood) were tallied, added across contexts, and divided by the number of coded segments into a score of the child's *positive affect with the parent*.

Parent-child MRO—Parent-child MRO was coded in the same contexts as affect. Coders assigned one overall MRO rating for each observed context (e.g., snack, play), ranging from 1 (*very untrue of the dyad*) to 5 (*very true of the dyad*). The coder integrated four dyadic

dimensions (low and high anchors are described below). *Coordinated routines*: Dyad has no routines or routines are choppy, rough, and a source of conflict; dyad has easy, comfortable, coordinated routines that reflect shared procedural expectations. *Harmonious communication*: Dyad communicates very little or not at all; dyad communicates smoothly, in a connected, harmonious, back-and-forth way. *Mutual cooperation*: Dyad is unable to cooperate, struggles and conflicts escalate; parent and child adopt an open, willing, receptive stance toward each other, with even subtle cues sufficient for cooperation. *Emotional ambience*: Negative ambience permeates interaction, there are bouts of negative affect; parent and child clearly enjoy each other's company, very positive, warm ambience, with bouts of joy and displays of affection. The conventions specified how to arrive at the overall score for each context. Reliability, weighted kappa, was 0.73. At each assessment, the scores across all observed contexts cohered substantially, with Cronbach's alphas ranging from 0.75 to 0.81. Consequently, they were averaged across all contexts into one score for each parent–child dyad at each time.

Data Aggregation—The parent's positive affect with the child, the child's positive affect with the parent, and parent–child MRO were averaged into an aggregate score of positive parent–child relationship quality (separately for mother-child and father-child dyads). Correlations among averaged scores at each time point were generally medium to large in magnitude (average r of mother-child scores was 0.36 at 4.5 years, 0.43 at 5.5 years, and 0.23 at 6.5 years; average r of father-child scores was 0.35 at 4.5 years, 0.39 at 5.5 years, and 0.42 at 6.5 years). Scores were standardized before averaging to create a final score of *positive parent–child relationship quality*.

Statistical Analyses

Analyses were conducted with growth curve modeling techniques (GCM; Bryk and Raudenbush 1987; Raudenbush and Bryk 2002) and the HLM computer program (Raudenbush et al. 2004). GCM estimates within-individual change or growth trajectories for a variable (i.e., child internalizing symptoms) described by two parameters: intercept and slope (e.g., rates of change in internalizing symptoms over time). GCM provides tests of whether, on average, intercepts and slopes differ significantly from zero and whether there is variability in parameter estimates. In GCM, the coefficients can be understood as functionally similar to unstandardized regression coefficients, and they represent the degree of association between two variables. HLM uses all available data from each individual to estimate within-subject parameters; thus, participants without data at every time point are retained in the analyses. HLM also provides reliable estimates of parameters in the context of relatively small samples, compared to other analytic approaches (e.g., OLS, SEM).

Results

Missing data were addressed using GCM techniques, which incorporate all available data regardless of missing data at certain points in time. Descriptive statistics for each family variable and child internalizing symptoms, at each time point, are reported in Table 1. Correlations among scores of family processes are reported in Table 2 and suggest that interparental relationship satisfaction, negative parent–child relationship and positive

parent–child relationship are distinct family processes. However, within the same family process, there were consistently significant and moderate correlations between the two parents (e.g., between mother–child and father–child negativity). Correlations between family processes and scores of internalizing symptoms are reported in Table 3.

Models of Change in Child Internalizing Symptoms, Age 5.5 to Age 10

We tested a linear model of change for child internalizing symptoms by specifying the following model:

$$\text{Level 1: } Y_{ti} \text{ (Internalizing Symptoms)} = \pi_{0i} \text{ (Intercept)} + \pi_{1i} \text{ (Time)} + e_{ti}$$

$$\text{Level 2: } \pi_{0i} \text{ (Intercept)} = \beta_{00} + r_{0i}$$

$$\pi_{1i} \text{ (Time)} = \beta_{10} + r_{1i}$$

where Y_{ti} is the level of symptoms at time t for subject i , π_{0i} is the intercept for subject i , π_{1i} is the rate of linear change in symptoms over time for subject i , and e_{ti} is the residual variance in repeated measures for individual i , which is assumed to be independent and normally distributed.

On average, there was a trend toward internalizing symptoms increasing over time, $t(91)=1.73, p=0.087$. There was significant between-subject variability in slope coefficients, $\chi^2(89)=152.93, p<0.001$, suggesting that rates of change in symptoms varied across children. Next, we examined sex differences in rates of change in child internalizing symptoms over time by testing the following model:

$$\text{Level 1: } Y_{ti} \text{ (Internalizing Symptoms)} = \pi_{0i} \text{ (Intercept)} + \pi_{1i} \text{ (Time)} + e_{ti}$$

$$\text{Level 2: } \pi_{0i} \text{ (Intercept)} = \beta_{00} + \beta_{01} \text{ (Child Gender)} + r_{0i}$$

$$\pi_{1i} \text{ (Time)} = \beta_{10} + \beta_{11} \text{ (Child Gender)} + r_{1i}$$

Child gender did not predict rates of change in internalizing symptoms, $t(90)=0.39, p=0.697$. Children also did not differ with regard to levels of internalizing symptoms at age 10 (Intercept), as a function of gender, $t(90)=0.83, p=0.409$. Accordingly, child gender was not included as a covariate in subsequent analyses.

The Interparental Relationship and Internalizing symptoms: Time-Lag Associations

We conducted time-lagged analyses to test whether changes in interparental relationship satisfaction predict *subsequent* changes in child internalizing symptoms. Maternal and paternal reports of relationship satisfaction were added as time-varying covariates at Level 1: $Y_{t+1i} \text{ (Symptoms)} = \pi_{0i} + \pi_{1i} \text{ (Time)} + \pi_{2i} \text{ (Maternal Satisfaction)} + \pi_{3i} \text{ (Paternal Satisfaction)} + e_{ti}$, where Y_{t+1i} represents internalizing symptoms for child i at Time $t+1$, π_{0i} is the intercept of child i at Time 0, π_{1i} is the rate of linear change in internalizing symptoms for child i over time, π_{2i} is the association between maternal relationship satisfaction at Time t and child internalizing symptoms at Time $t+1$ (i.e., time-lag association), π_{3i} is the association between paternal relationship satisfaction at Time t and child symptoms at Time $t+1$, and e_{ti} is the residual variance in repeated measures for child i (random error).

Maternal satisfaction and paternal satisfaction were examined simultaneously within the same model to account for interdependence. Changes in maternal relationship satisfaction were associated with subsequent changes in child internalizing symptoms, $t(226)=-2.06$, $p=0.04$. Changes in paternal satisfaction were not significantly associated with changes in child symptoms, $t(226)=0.00$, $p=0.997$. See Table 4 for detailed model results (i.e., coefficients, *SEs*, and *t*-values for all model parameters). Fig. 1 includes an application of these results for estimating diverging trajectories of child internalizing symptoms based on different patterns of change in maternal interparental relationship satisfaction over time.

The Parent–child Relationship and Internalizing Symptoms: Time-Lag Associations

Next, we examined associations between changes in the quality of the parent–child relationship with *subsequent* changes in internalizing symptoms. Mother-child relationship quality and father-child relationship quality were added as time-varying covariates at Level 1: Y_{t+1i} (Internalizing Symptoms) = π_{0i} (Intercept) + π_{1i} (Time) + π_{2i} (Mother-Child Relationship Quality) + π_{3i} (Father-Child Relationship Quality) + e_{ti} . Note that, due to the multiple levels of aggregation necessary for creating global scores of negative and positive parent–child relationship quality, final scores are standardized. Thus, changes in parent–child relationship quality over time reflect changes in status relative to other families as opposed to fluctuations in raw scores.

Negative Relationship Quality—Mother-child negative relationship quality and father-child negative relationship quality were examined simultaneously within the same model to account for interdependence. Changes in mother-child negative relationship quality were associated with subsequent changes in child internalizing symptoms, $t(226)=2.39$, $p=0.017$. Changes in father-child negative relationship quality were not significantly associated with changes in child symptoms, $t(226)=0.37$, $p=0.709$. See Table 4 for detailed model results.

Positive Relationship Quality—Mother-child positive relationship quality and father-child positive relationship quality were examined simultaneously within the same model to account for interdependence. Changes in mother-child positive relationship quality were associated with subsequent changes in child internalizing symptoms, $t(226)=-2.00$, $p=0.047$. Changes in father-child relationship quality were not significantly associated with changes in child symptoms, $t(226)=-0.33$, $p=0.742$. See Table 4 for detailed model results.

Supplementary Analyses

Accounting for Interrelations Among Family Variables—Two types of family relationship variables (functioning in the interparental subsystem and quality of the mother-child relationship) emerged as significant predictors of child internalizing symptoms. Consistent with a family systems perspectives and the spillover hypothesis (Erel and Burman 1995), dysfunction in the interparental relationship may spill over into the parent–child relationship (Parke et al. 2001). Thus, dysfunction in the parent–child relationship might account for the link between interparental discord and child maladjustment. Accordingly, a follow-up analysis was conducted to account for this possibility: Y_{ti} (Mother-Child Relationship Quality) = π_{0i} (Intercept) + π_{1i} (Time) + π_{2i} (Maternal Relationship Satisfaction) + e_{ti} . Rates of change in maternal relationship satisfaction were not

significantly associated with rates of change in *negative* mother-child relationship quality, $t(211)=-0.79$, $p=0.433$. Further, changes in maternal relationship satisfaction were not associated with changes in *positive* mother-child relationship quality, $t(211)=-0.77$, $p=0.441$. Increasing dysfunction in the interparental relationship and escalating dysfunction in the parent-child relationship appear to serve as independent risk factors for the progression of internalizing symptoms in children. However, not surprisingly, positive mother-child relationship quality significantly covaried with negative mother-child relationship quality, $t(211)=-6.00$, $p<0.001$. To the extent that positivity in the mother-child relationship decreased over time, negativity increased, and vice versa.

Incremental Effects of Family Variables—We also tested a multivariate model to determine whether changing dynamics in certain subsystems demonstrate incremental predictive utility for explaining escalation in child internalizing symptoms. Maternal and paternal interparental relationship satisfaction, negative parent-child relationship quality, and positive parent-child relationship quality were entered simultaneously within the same model as cross-lagged, time-varying covariates of child internalizing symptoms. Only decline in maternal interparental relationship satisfaction was uniquely associated with subsequent escalation in child internalizing symptoms, controlling for other family dynamics and the passage of time, $t(222)=-2.08$, $p=0.039$. Notably, this finding is most likely due to the robust association between negative mother-child relationship quality and positive mother-child relationship quality. Positive versus negative aspects of the parent-child relationship do not uniquely predict child internalizing problems. Rather, the overall quality of the mother-child relationship appears to be key. In contrast, changes in interparental relationship satisfaction were not significantly associated with changes in mother-child relationship quality; thus, these family subsystems appear to function as independent, not overlapping, risk factors for child internalizing problems.

Discussion

Within the past decade, researchers have been urged to integrate family systems approaches with developmental psychopathology to capture the complexity and richness of the family unit, and to elucidate how changing family systems explain psychopathology in children (Davies and Cicchetti 2004; Hayden and Mash 2014). Davies and Cicchetti (2004) proposed “an ongoing transactional interplay between an active changing organism in a dynamic changing context” (p. 478), and advocated for research explaining the interplay between family processes and developmental trajectories of psychopathology. Consistent with this growing emphasis, we investigated the evolution of family processes, across multiple subsystems of the family and the role of these changing family dynamics in developmental trajectories of child internalizing symptoms from preschool age to early pre-adolescence.

Consistent with research demonstrating escalation in internalizing symptoms during childhood (Bongers et al. 2003; Gilliom and Shaw 2004), we found that, on average, there was a trend for child internalizing symptoms to increase from childhood to preadolescence. Nonetheless, there was significant between-subject variability in these trajectories, suggesting that internalizing symptoms increase and decrease at varying rates for individual children. Examinations of family processes revealed that changes in the quality of the

interparental and parent–child subsystems explain, in part, differing trajectories of child internalizing symptoms over time. Indeed, the effect of time on child internalizing symptoms was no longer significant when accounting for changes in the quality of the mother–child relationship. Thus, evolution of the mother–child relationship appears to explain most of the time-related changes observed in internalizing symptoms.

To the extent that mothers experienced a steeper decline in their interparental relationship satisfaction, children experienced a faster rate of increase in symptoms over time. Further, internalizing symptoms developed at a faster rate to the extent that there was (a) an escalation in negative mother–child relationship quality (i.e., more displays of negative affect by both mother and child during interactions, more power assertion by mothers), and (b) an erosion in positive mother–child relationship quality (i.e., fewer displays of positive affect by both mother and child, less mutually positive and warm dyadic ambience). The implementation of time-lagged growth curve models establishes temporal precedence, indicating that decline in family functioning represents a driving force in the progression of child internalizing symptoms.

We believe that our analyses strongly imply causality, such that deterioration in the interparental relationship and in the mother–child relationship likely cause the subsequent elevation in the child’s internalizing symptoms, encompassing sadness, depression, fears, worries, concerns about separation, etc. Although certainly valuable, those results yield an incomplete account of the developmental mechanisms involved, and they lead to a next set of questions. For example, consistent with the spillover hypothesis (Erel and Burman 1995), perhaps an erosion in the interparental relationship was the primary pathogenic factor, which caused the worsening of the mother–child relationship, and it, in turn, led to the child’s internalizing symptoms? In additional analyses, we examined such a possibility by testing whether changes in the interparental relationship were associated with changes in the parent–child relationship which, in turn, contributed to escalating child internalizing problems. However, the associations between the interparental relationship and parent–child relationships were not significant.

As well, although this study establishes temporal – and presumably causal – precedence between the quality of family relationships and children’s rate of change in internalizing problems, it does not elucidate *specific mechanisms* that account for those links. Developmental psychopathology literature offers multiple explanations that should be tested in the future, along with the examination of the causal links. For example, extensive literature has described children’s emotional (in)security as a factor mediating links between interparental conflict and children’s adjustment (e.g., Brock and Kochanska 2015; Cummings et al. 2012; Cummings et al. 2006; Goeke-Morey et al. 2003; Harold et al. 2004). Further, equally extensive evidence has shown that a positive parent–child relationship fosters children’s attachment security, associated with adaptive regulation of emotion and constructive coping (DeKlyen and Greenberg 2008; Thompson 2006).

Examining mother and father scores simultaneously as predictors of internalizing symptoms addressed interdependence inherent in interparental dyads, providing a rigorous test of maternal versus paternal contributions to child psychopathology. Whereas changes in

interparental relationship satisfaction (reported by mothers) and the quality of the mother-child relationship explained the development of children's internalizing symptoms over time, evaluating the father's relationships within the family system did not result in any unique predictive utility. Research focused on internalizing disorders in adolescence suggests that insecurity in the father-child relationship is associated with depression and anxiety (e.g., Brumariu and Kerns 2010); however, in our sample of children, assessed consecutively from ages 4.5 to 10, father-child relationship quality and the father's report of interparental relationship satisfaction did not explain the trajectories of internalizing symptoms.

Despite non-significant direct associations between paternal family variables and child internalizing symptoms, it is worth noting that the correlations between the father's and mother's scores of family variables were significant (see correlations along the diagonal in Table 2). Consistent with a family systems perspective, which emphasizes the interrelated nature of the family, fathers may exert *indirect* influences on child internalizing symptoms by undermining or bolstering the quality of the mother-child relationship and maternal interparental relationship satisfaction. Moreover, father-child relationships may influence trajectories of children's *social competence* more prominently than they influence trajectories of internalizing problems. Indeed, numerous studies demonstrate a robust link between father-child relationship quality and social competence in peer groups (e.g., McDowell et al. 2003; Williams and Kelly 2005), perhaps because of the prominent role of play in father-child interactions and its links to social competence with peers (McDowell and Parke 2009). Finally, relations between father-child relationship quality and internalizing problems might emerge in clinical samples comprised of families exhibiting greater family dysfunction and higher levels of internalizing problems relative to the community sample of families followed in the present study.

The present study has several limitations. Despite the strengths of GCA techniques, examining the association between changes in family processes and changes in internalizing symptoms limits our ability to test certain developmentally-focused questions, such as whether family processes have differential effects across different developmental periods. Further, the sample was low in risk, and relatively ethnically homogenous. Levels of internalizing symptoms were comparable to a normative group, as reported in the CSI manual (Gadow and Sprafkin 2002), such that children's scores were in the low-severity range. This was expected in a sample of typically developing children; consequently, replication in clinical samples of children with more severe internalizing symptoms is necessary. Moreover, family relationships were generally harmonious, limiting the generalizability of the results. It is notable that, despite the restricted ranges observed in this sample, significant associations between family dysfunction and child internalizing symptoms were nevertheless detected. We would expect larger effect sizes in at-risk populations.

Due to the low-risk nature of the sample, we chose to focus on symptoms of internalizing disorders in general, rather than on specific sub-domains of symptoms (e.g., depression, generalized anxiety, separation anxiety). Perhaps various family subsystems would have unique implications for different sub-domains of internalizing disorders in at-risk or clinical

populations. Finally, examining satisfaction in the interparental relationship allowed us a window into global functioning in this subsystem, reflective of multiple underlying relationship processes. Nonetheless, future research should include examinations of specific facets of interparental relationship quality (e.g., levels of intimacy, respect, balance of power, conflict management, support, etc.), and determine how various facets are associated with differing trajectories of child psychopathology. Indeed, specific aspects of family relationships may differentially predict unique dimensions of child internalizing symptoms (e.g., depressive versus anxiety symptoms). Additionally, including measures of parents' personality and internalizing symptoms, such as neuroticism, depression, and anxiety, which themselves may follow divergent trajectories over time and interact with their family relationships and with children's symptoms, would be very informative. As well, including sibling relationships would certainly enrich the picture of the family system.

Finally, the implementation of a time-lag approach to examining whether changes in family processes *temporally precede* changes in child internalizing symptoms represents an important advancement to prior research given the expected reciprocal relations between family systems and individual psychopathology. Nonetheless, due to insufficient data (there was only one cross-lag pairing of internalizing symptoms at age 5.5 to subsequent parent–child relationship at Age 8), we were unable to examine the reverse, cross-lag association between internalizing symptoms and subsequent family processes. Future research might include closer examinations of the bidirectional dynamics between family processes and child internalizing problems over time.

The present study has clinical implications. Early intervention for treating childhood internalizing disorders, especially anxiety disorders, is of paramount importance, given that these disorders tend to persist later in adolescence and adulthood if untreated (Hirshfeld-Becker et al. 2010). Unfortunately, younger children tend to be underrepresented in treatment outcome research; however, emerging research has produced promising results. For example, Hirshfeld-Becker et al. (2010) demonstrated the efficacy of a developmentally modified parent–child cognitive behavioral therapy (CBT) for anxiety disorders in children ages 4–7. Results of the present study demonstrate the potential utility of implementing a family systems approach into treatment protocols, by targeting and improving aspects of both the interparental and parent–child relationships. Indeed, existing interventions largely target aspects of the parent–child relationship, overlooking the interparental relationship. Results of the present study highlight the importance of promoting adaptive functioning in the interparental relationship in preventative interventions to most effectively disrupt maladaptive developmental pathways leading to increased child internalizing symptoms.

Conclusions

The dynamic, evolving nature of multiple family subsystems has important implications for the developmental course of child internalizing disorders from early childhood to pre-adolescence. To the extent that family functioning improves over time, children may actually experience decline in internalizing symptoms, thus demonstrating the importance of promoting healthy adaptation during family transitions and stressors. Further, the interparental relationship and the parent–child relationship appear to function as independent

sources of risk, having unique implications for the development of childhood internalizing disorders. As such, interventions that target multiple subsystems of the family appear highly promising as means to best promote child mental health, including treatment components that target the interparental relationship (e.g., couples therapy), as an important complement to strategies that address the quality of the parent–child relationship.

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Figure 1.

Diverging trajectories of internalizing symptoms from 5.5 to 10 years as a function of change in maternal QMI over time. The results of the GCA were applied to estimate trajectories of internalizing symptoms for three different scenarios: (1) maternal QMI scores decrease by 1 unit per month, (2) maternal QMI scores remain stable over time, and (3) maternal QMI scores increase by 1 unit per month. Trajectories were estimated *assuming a similar starting point*: scores of internalizing symptoms at 5.5 years were estimated at mean levels of maternal QMI at 4.5 years ($M=33.66$).

Table 1

Descriptive statistics

Maternal family variables	N	Min.	Max.	M	SD
Interparental satisfaction, 4.5 years	98	6.00	42.00	33.66	8.82
Interparental satisfaction, 5.5 years	88	6.00	42.00	34.72	7.11
Interparental satisfaction, 6.5 years	83	11.00	42.00	35.98	5.42
Interparental satisfaction, 8 years	80	11.00	42.00	35.44	7.53
Negative parent–child relationship, 4.5 years ^a	98	−0.79	2.65	0.00	0.64
Negative parent–child relationship, 5.5 years ^a	90	−0.78	2.70	0.00	0.57
Negative parent–child relationship, 6.5 years ^a	87	−0.63	1.76	0.00	0.55
Positive parent–child relationship, 4.5 years ^a	98	−2.04	1.92	0.00	0.76
Positive parent–child relationship, 5.5 years ^a	90	−1.93	2.40	0.00	0.79
Positive parent–child relationship, 6.5 years ^a	87	−1.99	2.14	0.00	0.70
Paternal family variables	N	Min.	Max.	M	SD
Interparental satisfaction, 4.5 years	98	10.00	42.00	35.41	7.25
Interparental satisfaction, 5.5 years	89	10.00	42.00	34.57	7.24
Interparental satisfaction, 6.5 years	84	16.00	42.00	35.83	6.35
Interparental satisfaction, 8 years	80	12.00	42.00	35.56	7.02
Negative parent–child relationship, 4.5 years ^a	98	−0.73	4.92	0.00	0.77
Negative parent–child relationship, 5.5 years ^a	88	−0.41	4.29	0.00	0.67
Negative parent–child relationship, 6.5 years ^a	85	−0.63	4.18	0.00	0.63
Positive parent–child relationship, 4.5 years ^a	98	−2.11	1.96	0.00	0.75
Positive parent–child relationship, 5.5 years ^a	88	−1.64	3.02	0.00	0.77
Positive parent–child relationship, 6.5 years ^a	85	−2.33	2.43	0.00	0.78
Child psychopathology	N	Min.	Max.	M	SD
Internalizing symptoms 5.5 years	92	2.50	23.00	9.90	4.68
Internalizing symptoms 6.5 years	90	2.50	24.00	9.66	4.67
Internalizing symptoms 8 years	87	2.00	31.50	10.06	6.68
Internalizing symptoms 10 year.	82	2.50	25.50	10.69	5.76

Composite of constituent standardized scores_p

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Table 2

Correlations among family processes

Paternal family variables	Maternal family variables									
	1	2	3	4	5	6	7	8	9	10
1. Interparental satisfaction, 4.5 years	0.51 **	0.49**	0.50**	0.32**	-0.06	0.07	-0.08	-0.06	0.04	0.11
2. Interparental satisfaction, 5.5 years	0.74**	0.67 **	0.77**	0.51**	0.03	-0.04	-0.10	0.04	0.04	0.18
3. Interparental satisfaction, 6.5 years	0.69**	0.80**	0.55 **	0.67**	-0.06	-0.06	0.06	0.06	0.06	0.11
4. Interparental satisfaction, 8 years	0.61**	0.70**	0.70**	0.52 **	-0.08	0.03	-0.01	0.05	-0.02	0.12
5. Negative parent-child, 4.5 years	0.02	-0.15	-0.21	-0.09	0.34 **	0.58**	0.53**	-0.57**	-0.41**	-0.33**
6. Negative parent-child, 5.5 years	0.07	0.06	-0.05	0.03	0.43**	0.35 **	0.52**	-0.47**	-0.56**	-0.51**
7. Negative parent-child, 6.5 years	0.11	0.01	0.05	0.02	0.25*	0.16	0.40 **	-0.42**	-0.47**	-0.62**
8. Positive parent-child, 4.5 years	-0.04	0.11	0.16	-0.06	-0.63**	-0.24*	-0.34**	0.22 *	0.51**	0.48**
9. Positive parent-child, 5.5 years	-0.19	-0.12	-0.05	-0.14	-0.24*	-0.40**	-0.44**	0.54**	0.25 *	0.59**
10. Positive parent-child, 6.5 years	-0.17	-0.02	-0.04	-0.09	-0.28**	-0.02	-0.52**	0.54**	0.62**	0.35 **

Correlations among maternal scores are above the diagonal. Correlations among paternal scores are below the diagonal. Correlations between mother and father scores of each construct are in bold and are shaded along the diagonal.

* <0.05.

** <0.01

Table 3

Correlations between family processes and internalizing symptoms

Maternal family variables	Child internalizing symptoms			
	5.5 years	6.5 years	8 years	10 year
Interparental satisfaction, 4.5 years	−0.15	−0.11	−0.10	−0.09
Interparental satisfaction, 5.5 years	−0.17	−0.18	−0.03	−0.15
Interparental satisfaction, 6.5 years	−0.17	−0.17	−0.19	−0.18
Interparental satisfaction, 8 years	−0.04	−0.06	−0.10	−0.17
Negative parent–child relationship, 4.5 years	0.19	0.13	0.07	0.01
Negative parent–child relationship, 5.5 years	0.34**	0.27**	0.21*	0.14
Negative parent–child relationship, 6.5 years	0.28**	0.26*	0.16	0.22
Positive parent–child relationship, 4.5 years	−0.21*	−0.18	−0.14	−0.09
Positive parent–child relationship, 5.5 years	−0.08	−0.11	−0.10	−0.12
Positive parent–child relationship, 6.5 years	−0.23*	−0.18	−0.20	−0.16
Paternal family variables	5.5 years	6.5 years	8 years	10 years
Interparental satisfaction, 4.5 years	0.01	−0.02	0.00	−0.05
Interparental satisfaction, 5.5 years	−0.02	−0.15	−0.02	−0.12
Interparental satisfaction, 6.5 years	−0.08	−0.25*	−0.12	−0.30**
Interparental satisfaction, 8 years	0.01	−0.18	−0.11	−0.17
Negative parent–child relationship, 4.5 years	0.28**	0.20	0.05	0.13
Negative parent–child relationship, 5.5 years	0.22*	0.11	0.23*	0.18
Negative parent–child relationship, 6.5 years	0.14	0.13	0.05	0.24*
Positive parent–child relationship, 4.5 years	−0.22*	−0.15	0.08	−0.09
Positive parent–child relationship, 5.5 years	−0.17	−0.03	0.00	−0.10
Positive parent–child relationship, 6.5 years	−0.20	−0.09	0.03	−0.10

*
<0.05.**
<0.01

Table 4**Results of time-lagged analyses**

	Coefficient	SE	t	df	p	Effect size <i>r</i>
Interparental relationship satisfaction						
π_{0j} (Intercept)	10.92	0.68	16.03	89	<0.001	
π_{1j} (Time)	0.03	0.01	2.05	89	0.044	
π_{2j} (Maternal Satisfaction)	-0.08	0.04	-2.06	226	0.04	0.14
π_{3j} (Paternal Satisfaction)	0.00	0.05	0.00	226	0.997	0.00
Negative parent-child						
π_{0j} (Intercept)	10.79	1.05	10.29	89	<0.001	
π_{1j} (Time)	0.02	0.02	0.98	89	0.33	
π_{2j} (Mother-Child)	1.14	0.48	2.39	226	0.017	0.16
π_{3j} (Father-Child)	0.23	0.62	0.37	226	0.709	0.02
Positive parent-child						
π_{0j} (Intercept)	10.70	1.06	10.09	89	<0.001	
π_{1j} (Time)	0.02	0.02	0.84	89	0.402	
π_{2j} (Mother-Child)	-0.76	0.38	-2.00	226	0.047	0.13
π_{3j} (Father-Child)	-0.15	0.45	-0.33	226	0.742	0.02

Changes in maternal interparental relationship satisfaction, negative mother-child relationship quality, and positive mother-child relationship quality were associated with subsequent changes in child internalizing symptoms. Effect size $r = [t^2 / (t^2 + df)]$