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Developmental Family Processes and Interparental Conflict: Patterns of Micro-level Influences

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Abstract

Although frequent calls are made for the study of effects of children on families and mutual influence processes within families, little empirical progress has been made. We address these questions at the level of micro processes during marital conflict, including children's influence on marital conflict and parents' influence on each other. Participants were 111 cohabiting couples with a child (55 males, 56 females) aged 8 – 16 years. Data were drawn from parents' diary reports of interparental conflict over 15 days, analyzed using dynamic systems modeling tools. Child emotions and behavior *during* conflicts were associated with interparental positivity, negativity, and resolution at the *end* of the same conflicts. For example, children's agentic behavior was associated with more marital conflict resolution whereas child negativity was linked with more marital negativity. Regarding parents' influence on each other, among the findings, husbands' and wives' influence on themselves from one conflict to the next was indicated, and total number of conflicts predicted greater influence of wives' positivity on husbands' positivity. Contributions of these findings to the understanding of developmental family processes are discussed, including implications for advanced understanding of interrelations between child and adult functioning and development.

Keywords

interparental conflict; bidirectionality; daily diaries; dynamic systems methods

Several decades ago, Bell (1968) contradicted the widely held view that parent-child relationships are unidirectional (parent-to-child), arguing that children also influence their parents. Consistent with this perspective and with emerging views of families as consisting of interacting subsystems (Cicchetti, 2006; Cox & Paley, 1997), Schermerhorn and Cummings (2008) outlined a theoretical framework for conceptualizing family influence processes. Described as *transactional family dynamics*, this approach examines family members'

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influence on one another, including mutual influence processes in interparental, parent-child, and sibling relationships, unfolding over various time scales. These time scales range from moment-by-moment developmental processes to long-term (longitudinal) developmental processes.

However, despite frequent calls for the study of reciprocal effects of children on families and mutual influence processes within families, little empirical progress has been made. These questions are addressed in this study in the context of marital conflict, examining both children's influence on marital conflict within conflict episodes and patterns of intra- and inter-spousal influence from one conflict to the next, toward the goal of advancing understanding of these family relations at the level of micro processes.

Children's Influence on Family

Since Bell's work highlighting child effects, theorists have acknowledged that children are active participants in parent-child relationships (Cole, 2003; Emery, Binkoff, Houts, & Carr, 1983; Maccoby, 1984). Research has also demonstrated that siblings elicit differential treatment from parents (Tucker, McHale, & Crouter, 2003), and firstborn siblings' characteristics influence second-born siblings' characteristics (McHale, Updegraff, Helms-Erikson, & Crouter, 2001). Clark, Kochanska, and Ready (2000) found that maternal personality interacted with infants' negative emotionality to predict maternal parenting.

Yet, relatively few studies have tested child effects. Even fewer have examined children's influence on family systems other than parenting, including marital functioning. Among rare exceptions, Jenkins, Simpson, Dunn, Rasbash, and O'Connor (2005) found that in families with high levels of marital conflict, child externalizing problems predicted increases in marital conflict. Schermerhorn, Cummings, DeCarlo, and Davies (2007) reported that children's agentic behavior during marital conflict, defined as active helping behavior intended to diminish conflict, predicted decreases in marital conflict, whereas children's dysregulated behavior during conflict, defined as misbehavior and aggression, predicted increases in marital conflict.

Although children have been found to be vulnerable to the effects of family adversity and marital conflict (e.g., Crockenberg, Leerkes, & Lekka, 2007; Valentino, Cicchetti, Rogosch, & Toth, 2008), few studies have explored how children may help shape the dynamics of marital interactions. Moreover, studies examining reports of family interactions are lacking. Thus, although demonstrations of these mutual influence processes in the context of longitudinal research designs are vitally informative, there is scant corresponding study of these patterns of influence in "real time," for example, using reports of actual family interactions in the home. Such work could confirm, or even dispute, findings based on other research designs regarding children's influence on marital conflict.

Marital Partners' Influence on One Another

Study of the influence of spouses on one another (Cook and Snyder, 2005) also contributes to the growing literature on dynamic interdependency among family members. Studies have examined patterns of demand/withdraw behavior and gender differences in these patterns (Christensen & Heavey, 1990) and partners' efforts to influence one another during conflicts (Sagrestano, Christensen, & Heavey, 1998). Gottman, Swanson, and Murray (1999) found that spouses and their interactions influence one another and predict marital outcomes.

Moreover, diary studies have contributed substantially to the study of influence in intimate relationships (Larson & Almeida, 1999). For example, Laurenceau, Feldman Barrett, and Rovine (2005) found that self- and partner disclosure and perceived partner responsiveness

predict more couple intimacy. Relatedly, husbands' and wives' negative social interactions at work and wives' heavy workloads, predicted more marital negativity (Story & Repetti, 2006). Furthermore, whereas both husbands and wives bring work stress into the home, husbands' work stress influences wives' completion of household work more than wives' work stress influences husbands' housework (Bolger, DeLongis, Kessler, & Wethington, 1989).

Using dynamical systems modeling, Boker and Laurenceau (2006) found mutual influence among husbands' and wives' intimacy and disclosure. Husband intimacy and disclosure were linked with a slow-down in the rate of change in wives' intimacy and disclosure, and the same effect on husbands' intimacy was found for wife intimacy. Marital adjustment was associated with greater self-regulation of intimacy. We extend this direction, including investigation of possible differences in husbands' and wives' influence, measuring inter-spousal dynamics in the presence of child influences in an intensive repeated measurement framework. We use methods based on dynamic systems theories to shed light on how these dynamics unfold.

The Current Study

We examined family influence processes using methods inspired by general systems theories, which emphasize the *process* of development (Sameroff, 1995; Thelen & Ulrich, 1991). Utilizing parents' diary reports is an innovative approach to process-level assessment of marital disagreements (Cummings & Davies, 2002). In comparison with questionnaires or laboratory-based procedures, diary approaches provide a more ecologically valid window into these processes (Laurenceau & Bolger, 2005), focusing on everyday, spontaneously occurring family events. Marital negativity predicts children's negative emotional responses and adjustment problems (Cummings, Goeke-Morey, & Papp, 2003; 2004; Cummings, Goeke-Morey, Papp, & Dukewich, 2002). Building on this work, this study examines child-to-parent influence.

Relatedly, we examine whether longitudinal findings demonstrating children's influence on marital conflict over the course of a year (Schermerhorn et al., 2007) can also be observed at a micro-level in the context of individual conflict episodes. Second, partners' influence on each other—that is, associations of each partner's emotions and behavior in one conflict with each partner's emotions and behavior in the next conflict—is investigated. Such carryover is expected in a self-regulating system, as partners continue to reflect on their conflicts after they end (Schermerhorn & Cummings, 2008). For example, a spouse may decide to exercise more restraint in the next conflict, inhibiting expressions of anger, or, alternatively, continue to harbor angry feelings, fostering more negativity the next time around.

We use dynamic systems modeling tools to address how interparental dynamics operate at the micro level, and to examine the influence of children on interparental conflicts. We use the term *dynamic systems* to refer broadly to systems that change over time and we define *dynamic systems techniques* as the repertoire of tools that can help extract and represent patterns of change. Our key dynamic systems model, known in the time series literature as vector autoregressive (VAR) models (Shumway & Stoffer, 2004; Wei, 1990), allows us to consider the lead-lag relationships between husbands and wives as two coupled dynamic systems, while evaluating the roles of children in influencing this dynamic process.

We formulate the autoregressive model within a mixed effects modeling framework, and focus on inter-family differences in deviations from, and recovery toward, equilibrium. Within the context of our models, equilibrium refers to each individual's mean on a construct over the entire span of the data after removal of the linear trend in the data. Different individuals may have different equilibria that reflect different degrees of marital positivity, negativity, or conflict resolution. For example, when perturbed, wives might move back and forth past their respective equilibria before returning to their equilibria, whereas husbands might not be as easily perturbed or steered away from their equilibria in the first place. Models like this have

been useful for depicting such processes as emotion regulation (Chow, Ram, Boker, Fujita, & Clore, 2005).

The need to study complex patterns of change has arisen in such diverse areas as age differences in dynamic emotion-cognition linkages (Chow, Hamagami, & Nesselroade, 2007), the links between the rigidity of parent-child interactions and child externalizing problems (Hollenstein, Granic, Stoolmiller & Snyder, 2004), the study of dyadic interaction processes (Ferrer & Nesselroade, 2003), the study of lifespan developmental processes (Ferrer, McArdle, Shaywitz, Holahan, Marchione, & Shaywitz, 2007), and other intensive repeated measures studies (Walls & Schafer, 2006). The current approach advances study of one kind of change process, namely, developmental processes in families. This is an important gap in contemporary studies of developmental processes. The explicit emphasis on change in dynamic systems-inspired tools (Thelen & Smith, 1994; West, 1985) renders them particularly suited to these questions. The dynamical systems approach offers the potential to yield unique insights into family influence processes at a level of analysis that cannot be captured by other techniques.

Analyzing the dynamics of micro-level developmental processes in families thus makes a novel methodological and measurement contribution for addressing the important topic of mutual influence processes in families. We apply dynamic systems methods to examine development in the marital relationship over the course of a 15-day period. That is, we examine husbands' and wives' influence on themselves and on their partners from one conflict to the next. We also examine children's influence on their mothers and fathers within conflict episodes over this15-day period. In examining children's influence, we distinguish between children's agentic behavior, i.e., intervention in marital conflict aimed at resolving conflict, and children's negativity, i.e., negative emotions and dysregulated behaviors during marital conflict. Our aim is to advance understanding of parents and children as participants in micro-level developmental processes in families using a data-intensive approach applied over a short-term period.

Based on previous work emphasizing the role of differences between families in levels of functioning (e.g., Patterson, 1997), we also test marital satisfaction and number of conflicts as predictors of these developmental processes. We investigate (a) links between children's agentic behavior and negativity during conflict and marital conflict positivity, negativity, and resolution at the end of interparental conflict; (b) influences of husbands and wives on themselves and on each other across occasions of conflict; and (c) marital satisfaction and number of conflicts as predictors of both (a) and (b). Children's agentic behavior during marital conflict is hypothesized to predict less negative and more positive and resolved marital functioning at the end of the same conflict (Schermerhorn et al., 2007). Conversely, children's dysregulated behavior and emotional negativity are expected to predict more negative, less positive and resolved interparental relations at the end of conflict episodes. Additionally, we anticipated that husbands and wives would influence one another from one conflict to the next and such dynamics would differ based on between-family differences in marital satisfaction and the number of conflicts.

Method

Participants

We collected data from a community sample of 116 cohabiting couples from a mid-sized Midwestern town. The data were drawn from a larger, longitudinal study of 299 families; the sample and study methods, including details of the diary methods, are described fully in Cummings et al. (2003). To be eligible to participate, couples had to have cohabited for at least two years and have a child 8 – 16 years old. Only participants who completed diary reports (the first 116 families to participate in the study) were included in these analyses. We were

unable to use data from five families who completed the diaries because their data did not have any variability. All analyses were, therefore, based on a sample of 111 families. Children (55 males; 56 females) had an average age of 10.83 years (*SD* = 2.15 years). Most couples (98%; *n* = 109) were married; couples reported having been married for a mean of 12.65 years (*SD* = 5.77). Wives' mean age was 37.53 years (*SD* = 5.19 years) and husbands' was 40.05 years (*SD* =6.07).

Participants were recruited through letters distributed through local schools, referrals from other participants, flyers distributed at churches and community events, and advertisements. Toward the goal of obtaining a sample representative of the geographic area, efforts were made to include families of low socioeconomic status (SES), by recruiting at community events intended for low SES members of the community and by targeting postcard mailings to low SES neighborhoods. In our sample, mean annual household incomes ranged from $40,001 – $65,000. Based on US Census Bureau statistics (2000, www.census.gov) for this county, median household income was $49,653. Approximately 90.7% of children in our sample were European-American, 6.5% were African American, 1.8% were biracial, and .9% was Asian. Based on US Census Bureau information, the population by race/ethnicity in this county in 2000 was 88% White, 8% Black, and 4% Hispanic. In our sample, all wives had completed at least a high school education, and 35.1% had completed at least a bachelor's degree; approximately 98.2% of husbands had completed at least a high school education and 51.3% had completed at least a bachelor's degree. In this county in 2000, 82% of the population had completed at least a high school education and 24% had completed at least a bachelor's degree.

Measures and Procedures

Marital satisfaction—Wives and husbands reported their global marital satisfaction on the 15-item Marital Adjustment Test (MAT; Locke & Wallace, 1959), which has demonstrated good content and concurrent validity (Locke & Wallace, 1959). Wives' and husbands' respective Cronbach's αs in this sample were .76 and .68. Some items assess the frequency of disagreements regarding a variety of issues, such as handling finances, with answer choices scaled from 1 (Always Agree) to 6 (Always Disagree). Other items assess overall happiness in the marriage and frequency of confiding in the spouse. Response scales vary for these items. Scores for the measure can range from 2 to 158; scores below 100 suggest marital distress (Crane, Allgood, Larson, & Griffin, 1990). The mean marital satisfaction scores were 111.47 for wives (*SD* = 23.51, range: 46.00 – 150.00) and 110.54 for husbands (*SD* = 22.28, range: 50.83 – 156). Thirty wives (27%) and 33 husbands (29.7%) had MAT scores below 100, and 48 couples (43.2%) included at least one partner with a score below 100. Although percentages of distressed participants are somewhat higher in our sample than in other community samples (e.g., McHale, Kuersten-Hogan, Lauretti, & Rasmussen, 2000), the average levels of distress are similar.

Marital conflict and children's behavior—After each naturally occurring marital conflict, partners completed Marital Daily Records (MDRs) and Child Report Records (CRRs Cummings et al., 2003), providing measures of marital conflict episodes and children's behavior during marital conflict over a 15-day period. We defined marital conflict as any major or minor interparental difference of opinion, regardless of whether it was primarily negative or positive and/or any interaction in which one or both partners felt emotional tension, frustration, or anger. We provided each couple with extensive training (approximately 1 hour), which included verbal, written, and videotaped depictions of each item on the MDR and CRR. Partners were encouraged to ask questions during training, and practiced completing the forms in the lab. For each variable, partners rated themselves and their spouses. Parents rated their positive, angry, sad, fearful emotions during and at the end of each conflict on a 10-point scale from 0 (none) to 9 (high), as well as indicating whether or not they had engaged in (endorsed/

not endorsed) any of 16 tactics during conflicts or 9 tactics at the end of conflicts. Parents also rated the degree to which each conflict was resolved, using a 10-point scale from 0 (not at all) to 9 (completely). We defined conflict endings as the point at which the parents stopped interacting. Thus, the diaries reflect discrete episodes, rather than the general marital climate. Husbands and wives were instructed to complete the MDRs independently, and to complete them as soon as possible after each conflict.

For each conflict that the target child was able to see or hear, parents completed the CRR, rating the child's emotional responses during, and at the end of, conflict (positive, angry, sad, afraid) on a 10-point scale from 0 (none) to 9 (high) and rating the child's behavioral responses during conflict (15 behaviors, endorsed or not endorsed) and at the end of conflict (16 behaviors, endorsed or not endorsed). Items tapping children's agentic behavior were helping out, comforting the parents, taking sides, and trying to make peace. Items tapping children's negativity were negative emotions (anger, sadness, fear) and dysregulated behaviors (misbehaving, yelling at the parents, aggression). Of the conflicts children were exposed to, children exhibited agentic behavior during 32.1% of the conflict episodes and exhibited negativity during 54.2% of the conflict episodes. Moreover, during nearly two-thirds (64.4%) of the conflict episodes, children exhibited either agentic behavior or negativity or both.

Because the number of diaries an individual completed was contingent upon the number of conflicts that occurred, the number of diaries completed varied across participants, ranging from 3 – 69 (M = 14.60; SD = 12.10). Participants demonstrated good reliability in rating the diary items on a matching task; values of κ ranged from .74 – .99 (M = .88) for wives and from .69 – .96 (M = .85) for husbands. Moreover, wives and husbands reliably coded during emotions and behaviors (for fathers, mean κ: .81, range: .62–.96; for mothers, mean κ: .89, range: .76–.99) and ending emotions and behaviors (for fathers, mean κ: .90, range: .80–.98; for mothers, mean κ: .96, range: .89–1.0). A recheck of reliabilities was conducted several weeks later, and reliabilities remained high for during (for fathers, mean κ: .81, range: .58–.99; for mothers, mean κ: .87, range: .60–1.0) and ending (for fathers, mean κ: .85, range: .71–.93; for mothers, mean κ: .88, range: .71–.93). Complete details regarding the MDR and CRR methodologies, including participant training and evidence of reliability and validity are available elsewhere (Cummings et al., 2003; 2004; Papp, Cummings, & Goeke-Morey, 2002). For the current study, our data consisted of diary reports of a total of 2157 conflicts. The mean length of time between conflict episodes and completion of the diary reports was approximately 3 ¾ hours; 28.5% of the reports were completed 30 minutes or less after the conflict occurred, 49.5% were completed within 2 hours of the conflict episode, and 95% were completed within 13 hours of the conflict episode.

Data Analysis

Data reduction, time-varying covariates, and between-family predictors—

Correlations between husbands' and wives' reports of their own and each others' behavior ranged from r = .52 for husbands' and wives' negativity to r = .67 for husbands' and wives' conflict resolution. All correlations were significant at the $p < .001$ level. Therefore, we created composite scores by averaging wives' and husbands' respective reports at the end of each conflict. In line with approaches used elsewhere (e.g., Goeke-Morey, Cummings, & Papp, 2007), composite scores were created for each spouse at the end of conflict indexing negativity (giving in, withdrawal/avoidance, verbal anger, anger, sadness, and fear), positivity (compromise and positive emotion), and conflict resolution (degree to which the problem was solved at the end). Negativity includes negative emotions and destructive marital conflict tactics, which are those that result in more negative than positive emotional reactions in children (Goeke-Morey, Cummings, Harold, & Shelton, 2003), and positivity includes emotional positivity and constructive marital conflict tactics, which are those that result in more positive

than negative emotional reactions in children (Goeke-Morey et al., 2003). This compositing produced a score for each partner for negativity, positivity, and resolution, all at the end of conflict.

We used composite scores, rather than factor analytic scores because the participants at times showed idiosyncratic, occasion-specific endorsements of selected items. Thus, considerable missingness would result if a factor analysis model was used to define the associations among items either independent of, or as part of, the dynamic models we fitted. Because we wanted to examine children's influence on marital conflict using child behavior and emotions that temporally precede parent behavior and emotions, the parent composites consisted of variables from the ends of the conflicts and the child composites consisted of variables from the portion of the conflict occurring prior to the ending (i.e., during conflict). Once the parent composites were formed, we removed the linear trend for each individual and each variable separately and retained the residuals for model fitting purposes. Removing the linear trend removed intra-individual linear change (increases or decreases) over the 15-day period and scaled all individuals' equilibrium points (mean of each dependent variable over the study span) to zero. We also replicated the analyses using data standardized within-persons across measurement occasions. Using unstandardized data preserves all the between-persons differences in response variability. In contrast, using standardized data precludes any pre-existing individual differences in response variability (and thus, any arbitrary response biases) and in this vein, may facilitate evaluation of within-family changes at the group level. We focus on reporting results based on the unstandardized data, and note discrepancies between the two sets of results.

We created time-varying covariates for children's behavior because missing child data prevented us from entering the child variables into the dynamic portion of the model. As with the marital composites, the time-varying covariates were created using the average of husbands' and wives' reports, which correlated $r = .28$, $p < .001$ for child negativity and $r = .41$, $p < .001$ for agentic behavior. The primary source of missing child data was interparental conflicts that children did not witness; parents only rated their child's behavior during conflicts the child witnessed. Because of excessive missingness in child data (> 67% for all child-related items)--that is, the children were usually not there when the conflicts took place--we did not use the child variables as dependent variables. In other words, this excessive missingness makes it less theoretically justifiable to use children as the "modeling focus" (i.e., as dependent variables). Methodologically, it is also much more practical to include these categorical child-related variables as covariates than categorical dependent variables, which requires the use of more complicated modeling options. Instead, in order to create time-varying covariates reflecting children's behavior and emotions during marital conflict, we created two dummy variables, $\text{Child}_{\text{Negt}}$ and $\text{Child}_{\text{Agentt}}$. For each conflict, the first variable, $\text{Child}_{\text{Negt}}$, was coded as a 0 if the child either was not present during the conflict or was present but did not show negativity (i.e., anger, sadness, fear, dysregulated behaviors); this variable was coded as a 1 if the child did show negative emotions or dysregulated behaviors. The second variable, $\text{Child}_{\text{Agentt}}$, was coded as a 0 if the child either was not present during the conflict or was present but did not show any agentic behavior; this variable was coded as a 1 if the child did show agentic behavior. This approach allowed us to use all of the conflict episodes, and to compare marital conflicts in which children were absent or did not engage in negativity or agentic behavior with marital conflicts in which children were present and exhibited negativity and/or agentic behavior. That is, this specification allowed us to test whether child agentic behavior and negativity led to additional differences over and above those contributed by the child's mere presence during the conflict.

We used two between-family variables (i.e., level 2 predictors) in our mixed effects models to evaluate differences in dynamics across families. We used each family's total number of conflicts over the 15-day study period as one between-family predictor. Marital satisfaction,

indicated by husbands' and wives' MAT scores, was used as another between-family predictor. These between-family predictors were standardized prior to model fitting to aid interpretation.

Data analytic plan—Prior to model fitting, we inspected each participant's auto- and partial autocorrelation plots on all the key dependent variables to determine the order of our proposed vector autoregressive (VAR) models. Results suggested that a vector autoregressive model of order 1 (i.e., VAR(1) model) would likely be appropriate. This means that most of the predictability in the system is accounted for once information from the immediately preceding time point is incorporated. We fitted a series of VAR models using the Proc Mixed procedure in SAS (Littell, Milliken, Stroup, & Wolfinger, 1996). Using the VAR(1) model as a starting point, we fitted a series of mixed effects extensions of the VAR(1) model to examine (a) children's agentic behavior and negativity as predictors of marital positivity, negativity, and resolution; (b) dynamics within and between husbands and wives (autoregressive and cross-regressive paths); and c) between-family differences in (a) and (b), as a function of marital satisfaction and the total number of conflicts over the 15-day period.

In the explications that follow, we only present the equations for positivity scores, but the same model was fitted separately to the scores for the husband-wife dyads' positivity, negativity, and resolution. We use *i* as an index for family, and *t* as an index for conflict number. We first considered an unconditional mixed effects bivariate AR(1) model with random effects for the auto- and cross-regression parameters and no between-family predictors, expressed as

Model 1 (unconditional model):

$$Pos_{wit}=\beta_{Pos_{w,t-1}\rightarrow Pos_{w,t},i}Pos_{wi,t-1}+\beta_{Pos_{h,t-1}\rightarrow Pos_{w,t},i}Pos_{hi,t-1}+\beta_{1w,i}Child_{Neg,it}+\beta_{2w,i}Child_{Agent,it}+e_{Pos,wit}, \quad (1)$$

$$Pos_{hit}=\beta_{Pos_{h,t-1}\rightarrow Pos_{h,t},i}Pos_{hi,t-1}+\beta_{Pos_{w,t-1}\rightarrow Pos_{h,t},i}Pos_{wi,t-2}+\beta_{1h,i}Child_{Neg,it}+\beta_{2h,i}Child_{Agent,it}+e_{Pos,hit}, \quad (2)$$

$$\begin{aligned}\beta_{Pos_{w,t-1}\rightarrow Pos_{w,t},i}&=a_0+u_{Auto\_\,Pos_w,i}\\ \beta_{Pos_{h,t-1}\rightarrow Pos_{h,t},i}&=b_0+u_{Auto\_\,Pos_h,i},\\ \beta_{Pos_{h,t-1}\rightarrow Pos_{w,t},i}&=c_0+u_{Cross\_\,Pos_w,i},\\ \beta_{Pos_{w,t-1}\rightarrow Pos_{h,t},i}&=d_0+u_{Cross\_\,Pos_h,i},\end{aligned} \quad (3)$$

$$\beta_{1w,i}=\beta_{1w0},\beta_{2w,i}=\beta_{2w0},\beta_{1h,i}=\beta_{1h0},\beta_{2h,i}=\beta_{2h0}, \quad (4)$$

$$\begin{bmatrix} e_{Pos,wit} & e_{Pos,hit}\end{bmatrix}' \sim N(\begin{bmatrix}0 & 0\end{bmatrix}', diag[\ \sigma^2_{e_{Pos,w}} \quad \sigma^2_{e_{Pos,h}}\ ]), \quad (5)$$

$$\begin{bmatrix} u_{Auto\_\,Pos_w,i}\\ u_{Auto\_\,Pos_h,i}\\ u_{Cross\_\,Pos_w,i}\\ u_{Cross\_\,Pos_h,i}\end{bmatrix} \sim N\left(\begin{bmatrix}0\\0\\0\\0\end{bmatrix}, \begin{bmatrix}\sigma^2_{Auto\_\,Pos_w} & & & \\ 0 & \sigma^2_{Auto\_\,Pos_h} & & \\ 0 & 0 & \sigma^2_{Cross\_\,Pos_w} & \\ 0 & 0 & 0 & \sigma^2_{Cross\_\,Pos_h}\end{bmatrix}\right), \quad (6)$$

where Pos_{wit} represents the wife's reported positivity *at the end of* the *t*th conflict in family *i* and Pos_{hit} represents the husband's reported positivity *at the end of* the *t*th conflict in family *i*. $Child_{Neg,it}$ is a dummy variable indicating whether any negativity was manifested by the child in family *i during* the *t*th conflict (0 = no, 1 = yes), $Child_{Agent,it}$ is a dummy code used to identify the presence of the child's agentic behaviors in family *i during* the *t*th conflict. Here, we describe elements of the model in terms of our three modeling objectives, i.e., to examine (a) the roles of children's agentic behavior and negativity as within-family, time-varying predictors, (b) the dynamics within and between spouses, and (c) between-family differences in (a) and (b).

Children's agentic behavior and negativity as within-family, time-varying predictors—$\beta_{1w,i}$ and $\beta_{1h,i}$ represent the family-specific influences of child negativity on the wife and husband manifest positivity, respectively; $\beta_{2w,i}$ and $\beta_{2h,i}$ represent the family-specific influences of child agentic responding on the wife and husband positive manifest variable, respectively. In Model 1, the regression parameters associated with the child-related covariates were constrained to be invariant across families (i.e., they are functions of the group-based intercepts, β_{1w0},β_{2w0}, β_{1h0}, and β_{2h0} but not other family-specific variables or components). This constraint was relaxed in later models. In the present model, β_{1w0}, β_{2w0}, β_{1h0} and β_{2h0} capture the general influences of agentic behavior and negativity (time-varying covariates) as predictors of marital positivity.

Dynamics within and between spouses—Hypotheses concerning the dynamics within and between husbands and wives were tested by evaluating the auto- and cross-regression parameters-- $\beta_{Pos_{w,t-1}\rightarrow Pos_{w,t},i}$, $\beta_{Pos_{h,t-1}\rightarrow Pos_{h,t}i}$, $\beta_{Pos_{h,t-1}\rightarrow Pos_{w,t},i}$ and $\beta_{Pos_{w,t-1}\rightarrow Pos_{h,t},i}$. Of these parameters, $\beta_{Pos_{w,t-1}\rightarrow Pos_{w,t},i}$ is the lag-1 autoregression parameter capturing the influence of wife positivity at the previous conflict ($t-1$) on wife positivity during the conflict at time *t* for family *i*, $\beta_{Pos_{h,t-1}\rightarrow Pos_{h,t},i}$ represents the lag-1 autoregressive influence of husband positivity at conflict $t-1$ on husband positivity for family *i* at conflict *t*, $\beta_{Pos_{h,t-1}\rightarrow Pos_{w,t},i}$ represents the cross-regressive influence of husband positivity at conflict $t-1$ on wife positivity for family *i* at conflict *t* and $\beta_{Pos_{w,t-1}\rightarrow Pos_{h,t},i}$ represents the cross-regressive influence of wife positivity at conflict $t-1$ on husband positivity for family *i* at conflict *t*. All of the auto- and cross-regression parameters were represented as a function of an intercept (denoted as a_0, b_0, c_0 and d_0, respectively) and a family-specific deviation from the group-based intercept. The relative impact of the husband → wife and wife → husband influences at the group level was assessed using the statistical significance of the intercept parameters, c_0 and d_0. If, for example, model tests indicate that $c_0 \neq 0$, but $d_0 \neq 0$, that would indicate unidirectional coupling between husbands and wives, with husbands' positivity being the "leading indicator" of wives' positivity. The family-specific deviation terms (namely, $u_{Auto\_Pos_w,i}$, $u_{Auto\_Pos_h,i}$, $u_{Cross\_Pos_w,i}$ and $u_{Cross\_Pos_h,i}$) constitute the random effects components, which were assumed to be normally distributed with a mean vector of zeros and a diagonal covariance matrix. The group-based intercepts and any between-family covariates used to predict such deviations constitute the fixed effects components of the model.

Between-family differences in dynamics—To examine between-family differences in auto-and cross-regressive dynamics, we extended Model 1 to include marital satisfaction and number of conflicts as level-2 predictors in Model 2. Whereas Equations 1, 2, and 4–6 remain unchanged in Model 2, Equation 3 is now expressed as

Model 2 (model with between-family predictors of parental dynamics):

$$\begin{aligned}
\beta_{Pos_{w,t-1}\rightarrow Pos_{w,t}} &= a_0 + a_1 FMAT_i + a_2 NoConflict_i + u_{Auto_\,Pos_w,i},\\
\beta_{Pos_{h,t-1}\rightarrow Pos_{h,t}} &= b_0 + b_1 MMAT_i + b_2 NoConflict_i + u_{Auto_\,Pos_h,i},\\
\beta_{Pos_{h,t-1}\rightarrow Pos_{w,t}} &= c_0 + c_1 FMAT_i + c_2 NoConflict_i + u_{Cross_\,Pos_w,i},\\
\beta_{Pos_{w,t-1}\rightarrow Pos_{h,t}} &= d_0 + d_1 MMAT_i + d_2 NoConflict_i + u_{Cross_\,Pos_h,i},
\end{aligned} \tag{7}$$

where $FMAT_i$ denotes the wife's marital satisfaction in family i, $MMAT_i$ represents the husband's marital satisfaction in family i and $NoConflict_i$ represents the total number of conflicts that occurred in family i over the study span.

To examine potential between-family differences in the roles of children's responses, we incorporated random effects into the child-related regression parameters (Equation 4 in Model 1) and used marital satisfaction and number of conflicts as predictors of between-family differences in these parameters as

Model 3 (model with between-family predictors of child-related influences):

$$\begin{aligned}
\beta_{1w,i} &= \beta_{1w0} + \beta_{1w1} FMAT_i + \beta_{1w2} NoConflict_i + u_{\beta_{1w},i},\\
\beta_{1h,i} &= \beta_{1h0} + \beta_{1h1} MMAT_i + \beta_{1h2} NoConflict_i + u_{\beta_{1h},i},\\
\beta_{2w,i} &= \beta_{2w0} + \beta_{2w1} FMAT_i + \beta_{2w2} NoConflict_i + u_{\beta_{2w},i},\\
\beta_{2h,i} &= \beta_{2h0} + \beta_{2h1} FMAT_i + \beta_{2h2} NoConflict_i + u_{\beta_{2h},i},
\end{aligned}$$

where β_{1w0}, β_{1h0}, β_{2w0} and β_{2h0} are the group-based intercepts of the effect of the child's negativity on the wife's positivity in family i at conflict t, the effect of the child's negativity on the husband's positivity in family i at conflict t, the effect of the child's agentic behavior on the wife's positivity in family i at conflict t and the effect of the child's agentic behavior on the husband's positivity in family i at conflict t, respectively. The associated family-specific deviations in these parameters are denoted, respectively, by $u_{\beta_{1w},i}$, $u_{\beta_{1h},i}$, $u_{\beta_{2w},i}$ and $u_{\beta_{2h},i}$.

In sum, Model 1 was used to test group-based notions about the influence of children's behavior and emotions during marital conflict on interparental positivity at the end of that conflict. That is, we examined whether and how the levels of parental positivity might change at the end of a conflict depending on children's behavior and emotions during the conflict *in general*. In Model 2, we evaluated whether families with high marital satisfaction or more conflicts were characterized by significantly different auto- and cross-regression parameters. That is, we sought to address whether the ways that marital conflicts unfolded over time might depend on marital satisfaction or frequency of conflict. Finally, in Model 3, we sought to assess whether children's influence differed as a function of marital satisfaction or number of conflicts.

Importantly, instead of evaluating the roles of children aggregated across the time points, all three models were formulated to allow children's behaviors and emotions to influence the parents at each time point, and then extract regularity across all the time points. Our models allowed us to examine within-person dependence and between-person codependence in emotional and behavioral dynamics over the span of the study.

To avoid estimating too many random effects variance components simultaneously, we evaluated Models 1–3 sequentially. Specifically, we proceeded first by evaluating the statistical significance of the random effects variances (i.e., $\sigma^2_{Auto\_\,Pos_w}$, $\sigma^2_{Auto\_\,Pos_h}$, $\sigma^2_{Cross\_\,Pos_w}$ and $\sigma^2_{Cross\_\,Pos_h}$ Equation 6) in Model 1 and only retained random effects components for which the corresponding variances were statistically significant. Thus, in Model 2, between-family predictors were only added to explain auto- and cross-regression parameters with significant

between-family differences based on results from fitting Model 1. Subsequently, only the statistically significant estimates from Model 2 were retained before proceeding to fitting Model 3, in which between-family differences in the child-related regression parameters were assessed.

To provide a measure of effect size, the proportion of reduction in variance at the between-family level when family-level covariates are added as predictors (Hox, 2002; Snijders & Bosker, 1999) can be computed as

$$R^2_{2,x} = \frac{\sigma^2_{u_x|\text{Model w/o covariates}} - \sigma^2_{u_x|\text{Model with covariates}}}{\sigma^2_{u_x|\text{Model w/o covariates}}}$$

where $\sigma^2_{u_x|\text{Model w/o covariates}}$ is the variance for a particular random effect of interest (e.g., variance associated with a random effect in an autoregressive parameter) in a model without family-level covariates as predictors and $\sigma^2_{u_x|\text{Model with covariates}}$ is the corresponding variance for the same random effect in a model with family-level covariates. This proportion of reduction in variance indicates the proportion of reduction in a particular random effect variance when family-level (level 2) covariates are included in the model compared to a baseline model without covariates. [1] We have not provided a measure of effect size at the within-family level because it was less clear what an appropriate baseline might be for evaluating within-family effects. In the literature, a more complicated model is typically compared to an "intercept-only" baseline model with random effect for the intercept. However, this baseline model is not applicable in the present context; because of the detrending procedure we undertook during data preparation, the intercepts in our models are zero by default and there are no between-family differences in intercept.

Our formulation of the VAR(1) model differs from other standard approaches for incorporating autoregressive components into the residual error processes (see e.g., Verbeke & Molenberghs, 2000, p. 98–101). Specifically, we first created lag-1 manifest variables for wife and husband positivity, negativity and resolution[2]. We then used the lag-1 positivity, negativity, and resolution as manifest independent variables in the mixed effects VAR(1) models. Unlike other standard approaches that incorporate AR processes into the over-time residual errors, this model formulation allows us to evaluate between-family differences in the auto- and cross-regression parameters at level 2[3]. SAS code for fitting Models 1–3 is included in the Appendix.

Notably, the Proc Mixed procedure in SAS is designed specifically for univariate models. To fit the bivariate equations in Models 1–3, we used the procedure described in MacCallum, Kim, Malarkey, and Kiecolt-Glaser (1997), stacking husbands' and wives' responses into a single vector and using dummy indicators to combine the two processes into a single, univariate equation. The denominator degrees of freedom for assessing statistical significance of the fixed effects parameters were adjusted using the Kenward-Roger option (Kenward & Roger, 1997;

[1]Effect size measures for mixed effects models are still an active area of research and there is currently no clear consensus on the optimal effect size measure to use. Although some researchers have cautioned against the use of this R^2 measure because it is known to yield negative R^2 values in some cases (Hox, 2002; Snijders & Bosker, 1999), we chose to report this measure because of its intuitive appeal.

[2]That is, if Pos_{wit} represents the wife's positivity at time t (with $t = 2, 3, \ldots T$), $Pos_{wi,t-1}$ was created by lagging the time series of the wife's positivity by one time point (with $t = 1, 2, \ldots T-1$) so the positivity at $t = 2$ was matched with the wife's positivity at $t = 1$ and so on.

[3]For comparison purposes, we fitted a simplified version of Model 1 wherein all the random effects components in the mixed effects models were omitted and a state-space maximum likelihood procedure implemented in a Fortran-based program, mkfm6 (Dolan, 2002), was used to estimate the model parameters. The parameter estimates and their associated standard errors obtained using both approaches were very close to one another.

Littell et al., 1996) to control for the inflation in Type I error rate due to the presence of residual correlations among the repeated measurements and the arbitrary gain in degrees of freedom resulting from stacking the husbands' and wives' responses into a single column of responses.[4]

Results

Preliminary Analyses

Figures 1a–f show the changes in positivity, negativity, and resolution in all families over all the conflicts. Most families reported fewer than 30 conflicts over the 15-day study span. The plots suggest the appearance of less variability in positivity, negativity, and resolution over time.

The absolute number of conflicts children witnessed (M = 6.48 conflicts; SD = 5.70) was positively correlated with the proportion of the parents' total conflicts that children witnessed, $r = .46$, $p < .001$, indicating that children who witnessed relatively large numbers of conflicts witnessed a higher proportion of their parents' conflicts. Relating the proportion of conflicts witnessed to parents' reports of marital conflict, we tested whether child presence during marital conflict is associated with conflict endings. The proportion of conflicts children were present for was uncorrelated with child gender, marital positivity, negativity, conflict resolution, marital satisfaction, and number of conflicts, but was negatively correlated with child age, $r = -.24$, $p < .05$. As expected, given how the child behavioral variables were coded, the proportion of conflicts children were present for was positively correlated with child agentic behavior, $r = .50$, $p < .001$, and with child negativity, $r = .66$, $p < .001$. The lack of associations between children's presence and all of the marital constructs underscores the need to move beyond simply examining associations with children's presence, to examine the influence of children's behavior and emotions on parents from conflict to conflict.

Whereas the dynamic models summarized in Equations 1–7 allowed us to evaluate the direct linkages among ongoing changes in child and parental variables from conflict to conflict, several other issues could potentially affect the results from fitting the dynamic models. We thus conducted some preliminary analyses to clarify some of their linkages. To examine possible child gender differences in these constructs, we conducted independent samples t tests. The Type-I error rate for these tests was adjusted using the Bonferroni method; thus, the p value was calculated as .05/11 = .005. We found no gender differences in any of the primary constructs.

Descriptive statistics and intercorrelations based on averages across all the conflicts appear in Table 1. All of the marital behaviors were correlated with one another and with marital satisfaction in the expected direction, number of conflicts was positively correlated with marital positivity and negatively correlated with husbands' negativity, and wives' and husbands' marital satisfaction were positively intercorrelated. Notably, the preliminary analyses suggest more associations between the marital dynamic constructs and the total number of conflicts, compared with the proportion of conflicts witnessed by the child. In contrast, whereas child

[4]In the context of our modeling example, it is substantively meaningful to allow the residuals of the husbands and wives (e.g., $e_{Pos,hit}$ and $e_{Pos,wit}$ in Equations 1 and 2) to be correlated. Current restrictions in SAS do not allow for correlations between husbands' and wives' residuals to be included in a straightforward way without imposing additional correlations across time points within these residuals (e.g., AR(1) structure). However, such time dependency had already been explicitly incorporated into the fixed effects structure of our proposed models. Including correlated residuals would thus lead to model redundancy and other estimation issues. This, together with the inclusion of bivariate responses and the use of the Kenward-Roger adjustment of degrees of freedom, limited us to adopt a simpler structure (i.e., a diagonal structure) for the residual errors of husbands and wives. We did, however, compare the parameter estimates obtained in SAS when no random effects and correlation between residuals were included to those obtained from fitting a comparable model in mkfm6 (see footnote 3) wherein correlation between the residuals was included. The estimates from SAS were very close to those obtained from mkfm6 despite the omission of the correlation parameter.

age was negatively associated with proportion of conflicts witnessed, age was unrelated to the total number of conflicts. We chose to test the total number of conflicts as a between-families predictor in our primary analyses, because it provides information about all the conflicts, rather than only the portion that children witnessed. Child age was generally unrelated to the other constructs in Table 1.

Children's negativity and agentic behavior were positively intercorrelated (see Table 1). This association highlights one important inadequacy in contemporary studies of developmental family processes, namely, children are only able to react to parental conflicts when they are present during the conflicts. The positive association between these two variables is thus to be expected. In addition, agentic behavior correlated positively with husbands' marital satisfaction, and children's negativity correlated positively with both partners' negativity, but neither of the child variables correlated with any other variables. These correlational results suggest that evaluating the linkages between child and parent variables aggregated over time does not reveal ongoing influence of children on parents. Furthermore, whereas children's negativity and agentic behavior were both related to long-term marital outcomes in previous studies, their precise roles in marital discord from conflict to conflict had yet to be investigated using dynamic models.

Model Fitting Results

We organized the results into three sections: marital positivity, negativity, and resolution. In each section, we discuss findings pertinent to the child predictors (negativity and agentic behavior), the interparental dynamics, and any between-family differences. We focus on the unstandardized data, but we also discuss findings from analysis of the standardized data that differ from those of the unstandardized data. In each section, we report the results from the most complicated, best-fitting models based on Model 3; we also include the estimates from the best-fitting versions of Model 2 in Table 2.

Positivity—We hypothesized that children's negativity would predict decreases in marital positivity, that children's agentic behavior would predict increases in marital positivity, and that spouses would influence their own and each others' positivity. Results from fitting Model 3 indicated that children's negativity during interparental conflict was linked with less positivity between the parents at the end of conflict, and that children's agentic behavior, on the other hand, was associated with more positivity (see Table 2). Thus, children's negativity is associated with less marital positivity and agentic behavior is associated with more marital positivity.

Our hypothesis of influence from one conflict to the next was partially supported for interparental positivity. We found that husbands' positivity was influenced by their positivity at the end of the immediately preceding conflict; when husbands reported levels of positivity that were above their own average, they tended to report lower levels of positivity at the end of the next conflict. Husbands' negative autoregressive weight suggests that their trajectory tended to fluctuate considerably around a point of equilibrium, or baseline (Wei, 1990). Thus, when their positivity is pushed away from its equilibrium, it tends to move back and forth past the equilibrium to a significant degree. That is, husbands' behavior and emotions during one conflict episode could be predicted from their behavior and emotions at the preceding time point in a *negative* direction. In other words, if a husband had a high level of positivity at one time point, he tended to have a low level of positivity at the next time point. Notably, there was no evidence of predictability from one time point to the next for the wives. That is, there was no continuity, or predictability, in how wives "self-regulate" these constructs back to their equilibria.

There were no significant cross-lagged regression relationships between husbands' positivity and wives' positivity in the sample as a whole, but there were significant between-family differences in the wife → husband cross-lagged regression parameter. The total number of conflicts was a significant predictor of these differences such that families with frequent conflicts manifested a higher degree of positive coupling from wives' positivity to husbands' positivity. In other words, having relatively frequent conflicts was associated with a stronger positive association between wives' positivity in one conflict and husbands' positivity in the next conflict. That is, for couples with relatively frequent conflicts, husbands' positivity in one conflict could be predicted from their wives' positivity in the preceding conflict. Therefore, since wives' positivity had no continuity (or predictability) across time points, and since for couples with relatively frequent conflicts, husbands' positivity could be predicted from wives' positivity in the preceding conflict, having relatively frequent conflicts tended to attenuate or diminish the continuity in the husbands' positivity, thereby offsetting the regularity in the husbands' positivity.

There were no significant between-family differences in the regressions relating child negativity or agentic behavior to marital positivity. Table 2 presents the parameter estimates for the final, best-fitting variations of Models 2 and 3, in which only parameter estimates that were statistically significant were retained.

Negativity—We hypothesized that children's agentic behavior would predict decreases in marital negativity, that children's negativity would predict increases in marital negativity, and that spouses would influence their own and each others' marital negativity. Results from fitting Model 3 indicated that children's negativity during interparental conflict was linked with more negativity between the parents at the end of conflict, but children's agentic behavior was not associated with less marital negativity at the end of conflict. Thus, we found support for our hypothesis that children's negativity was associated with more marital negativity.

Our hypothesis of influence from one conflict to the next was partially supported for interparental negativity. The intercept of the wife autoregression parameter was significantly different from zero. That is, when wives reported elevated negativity (i.e., above their own average) at the end of one conflict, they tended to report lower levels of negativity at the end of the next conflict. No significant between-family differences were found in this parameter. Although there was no evidence of predictability from one time point to the next for husbands' negativity in the sample as a whole, statistically significant between-family differences were found in this parameter. Significant between-family differences were also found in the husband → wife cross-regression parameter, and marginally significant between-family differences were observed in the wife → husband cross-regression. In addition, between-family differences in the regressions relating child negativity to husbands' negativity were present at trend level. However, neither the number of conflicts nor marital satisfaction predicted between-family differences in any of these parameters. Parameter estimates for the final, best-fitting Models 2 and 3, in which only statistically significant estimates were retained, are summarized in Table 2.

Conflict resolution—Finally, we tested our hypothesis that children's agentic behavior would predict increases in marital conflict resolution, that children's negativity would predict decreases in resolution, and that spouses would influence their own and each others' resolution. Results from fitting Model 3 indicated that children's negativity during interparental conflict was linked with less conflict resolution between the parents at the end of conflict, and children's agentic behavior was associated with more resolution at the end of conflict (see Table 2). Thus, our hypotheses regarding children's negativity and agentic behavior were supported.

Our hypothesis of marital influence from one conflict to the next was not supported for interparental conflict resolution. That is, none of the auto- or cross-regressions was significant. Although the overall wife → husband cross-regression effect was not statistically significant, there were significant between-family differences in this parameter. However, these differences were not predicted by marital satisfaction or number of conflicts. In addition, there were no significant between-family differences in the regressions relating child negativity or agentic behavior to parents' resolution. Table 2 presents the parameter estimates for the final, best-fitting Models 2 and 3, in which only parameter estimates that were statistically significant were retained.

Tests using standardized data—Results from model fitting using the standardized data were largely consistent with those obtained using the unstandardized data, with a few minor discrepancies. Compared with the results of model fitting with the unstandardized data, there were a few differences for the final models (Model 3). For positivity, children's agentic behavior did not predict wives' positivity, and husbands' auto-regression was significant, instead of showing marginal significance ($B = -.06$, $SE = .03$, $t = -2.20$, $p < .05$). The between-family differences in the wife → husband cross-regression parameter found with the unstandardized data remained significant with the standardized data, but the between-family differences in husbands' auto-regression and in the husband → wife cross-regression did not, and the marginally significant between-family differences in the regression relating child negativity to husbands' negativity for the unstandardized data was also non-significant with the standardized data. For resolution, number of conflicts significantly predicted between-family differences in the wife → husband cross-regression, whereas it did not predict between-family differences in the unstandardized data; this coefficient was larger for families with more conflicts ($B = .07$, $SE = .03$, $t = 2.45$, $p < .05$). In sum, several additional within-family parameter estimates were found to be significant using the standardized data but all the within-family estimates that were statistically significant based on the unstandardized data were still observed to be reliably different from zero when the standardized data were used. In addition, some of the significant between-family variance estimates obtained using the unstandardized data were no longer significant using the standardized data. Our speculation was that standardizing the data reduced idiosyncratic differences in the model structures, leading to less variability (i.e., standard errors) in the parameter estimates and consequently, greater power for detecting statistically significant fixed effects and regression parameters, but smaller between-family differences in some of the parameters. We focused more on discussing results of the unstandardized data because some of these idiosyncratic family differences may, in our view, reflect true between-family differences.

Discussion

Children's Influence on Marital Conflict

Consistent with hypotheses, children's agentic behavior during interparental conflict was linked with better marital conflict endings (more positivity, less negativity, more resolution), and children's negative emotions and dysregulated behavior during conflict were associated with worse conflict endings (less positivity, more negativity, less resolution). Thus, these findings provide evidence of children's influence on marital functioning within conflict episodes, similar to findings observed longitudinally over the course of one year (Schermerhorn et al., 2007). This is a novel finding that adds to the literature on child effects in important ways. Although theoretical perspectives have suggested that children influence marital conflict (Emery & Kitzmann, 1995) and empirical work has documented such influence over the course of one year or two years (e.g., Jenkins et al., 2005), this is the first empirical demonstration of children's influence within marital conflict episodes. Demonstrating process relations at a micro-analytic level increases confidence in findings based on longer time frames, by providing

evidence of process associations in short as well as long time frames. Thus, the influence of children on marital processes identified here, reiterated over and over may contribute to long-term effects. In addition, the modeling tools employed here yielded information not provided by other analytic approaches. For example, the correlational analyses suggested that children's presence during conflict and agentic behavior and negativity were largely unrelated to parents' marital emotions and behaviors, but the dynamic analyses demonstrated children's agentic behavior and negativity predict parents' marital emotions and behavior from conflict to conflict. Furthermore, using diary reports of conflicts occurring at home lends ecological validity to the findings. Thus, these findings suggest child behavior and emotions should not be viewed solely as dependent variables in the context of marital conflict, but also as independent variables, predicting subsequent marital conflict, in a complex pattern of reciprocal relations.

The conceptual distinction between children's agentic behavior and negativity merits further discussion. Agentic behavior involves children's intervention in marital conflict aimed at resolving conflict, and negativity involves negative emotions and dysregulated behaviors during marital conflict. Notably, just as we consider children's agentic behavior intentional, children's negative behaviors might also be intentional. That is, children may behave in a dysregulated way to distract their parents from an episode of conflict, in an effort to diminish the conflict. One question for future research involves understanding children's intent. At the same time, it may be that children's intent is less important than the valence of children's affect.

Moreover, the implications of these findings for child mental health are substantial. That is, when children engage in agentic behavior, their parents' conflicts may become less negative and more positive over time, but if children engage in negative, dysregulated behavior, their parents' conflicts may become more negative and less positive over time. Previous research has documented an association between destructive marital conflict and subsequent child mental health problems (see Cummings & Davies, 2002 for a review). Thus, if children behave in ways that eventually worsen marital conflict, they may contribute to processes ultimately with negative implications for their own mental health.

At the same time, previous research also suggests children's involvement in marital conflict may have negative implications for child adjustment. Examining triangulation in parents' conflicts (i.e., inappropriate involvement or enmeshment in parents' conflicts), associations have been reported between triangulation and child internalizing and externalizing problems (Franck & Buehler, 2007; Grych, Raynor, & Fosco, 2004). Moreover, children's helping behavior in the context of depressed interparental interactions might contribute to their own dysphoria (Davis, Sheeber, Hops, & Tildesley, 2000). However, agentic efforts by children to resolve interparental conflict are different from triangulation and may contribute positively to the family environment and support children's well-being (Schermerhorn et al., 2007). Future research should examine the replicability of associations between agentic behavior and child outcomes, and further test for differences between triangulation and agentic behavior as mediators or moderators of child and interparental outcomes.

Influence of Husbands and Wives across Conflicts

In addition to assessing children's influence on conflicts, influences of parents on themselves and on each other at a micro level of development were studied. Examining the dynamics between husbands and wives, we found that husbands tended to show more rapid fluctuations in their positivity (but not negativity or conflict resolution) and wives tended to show more rapid fluctuations in their negativity (but not positivity or conflict resolution) from one conflict to the next. That is, husbands and wives tended to have very different behavior and emotions from one time point to the next and oscillated back and forth around their baseline levels. That is, deviations in the husbands' positivity and wives' negativity at one time point could be

predicted in a negative direction from deviations in their positivity/negativity at the preceding time point. This does not mean that the husbands' negativity and wives' positivity were *unpredictable* in a dysfunctional sense, but simply that, for example, having an unusually high or low negativity on one occasion did not help indicate husbands' negativity at the next conflict. Individuals who show consistently high or low positivity (and thus, very little deviations relative to the baseline), for instance, may manifest no continuity in the form of autoregression weight because of the lack of systematic deviations that persisted from one conflict to another. Adding to previous research examining gender differences in marital behavior (e.g., Christensen & Heavey, 1990), our findings suggest that parents' gender may be associated with some differences in marital positivity and negativity. Such gender differences may have either adaptive or maladaptive implications for marital quality. For example, differences in marital behavior may be part of the process by which partners regulate their behavior as a couple, recovering from conflict. Alternatively, gender-related differences in marital behavior may result in communication difficulties, if they create a sense of difficulty in understanding one's partner.

Marital Satisfaction and Number of Conflicts

We also examined between-family factors that we anticipated might help explain differences between families in the marital dynamics. These analyses build on the correlational analyses which suggested the marital conflict constructs were associated with marital satisfaction and number of conflicts. The results of the primary analyses were surprising in that marital satisfaction did not alter marital dynamics. However, the number of conflicts that occurred in the 15-day diary report period was associated with differences in marital positivity. Specifically, for couples who had more conflicts, the wife → husband association for marital positivity was stronger than for couples who had fewer conflicts. This finding is interesting, because it suggests that for couples with more frequent conflict, wives' positivity in one conflict may trigger husbands' positivity in the next, which may be part of the process by which these couples regulate their interactions. There may be something about experiencing more frequent conflicts that prompts couples to engage in this sort of self-regulation. This notion is bolstered by Figure 1a–f, which suggests some consistency in how families who have a lot of conflicts handle their conflicts, consistent with the notion that the more conflict episodes families have, the fewer possibilities they have for handling conflict (Cummings & Davies, 1994).

An alternative possibility is that the decrease in variability at greater numbers of conflict episodes reflects a "practice effect" resulting from increased familiarity with completing the diaries. Another possibility is that couples who have more interspousal regulation of positivity have more frequent, but not necessarily more intense or destructive, conflicts. Importantly, marital satisfaction did not predict between-family differences in the positive association between wives' and husbands' positivity, suggesting that this association is not specific to couples with low marital satisfaction. Further research is needed on all of these issues, and on the implications of these relations for development over longer periods of time.

Moreover, children's influence on marital conflict endings was not isolated or specific to subpopulations. Thus, for the sample as a whole, children's agentic behavior during conflict predicted marital positivity and conflict resolution at the end of conflict, and children's negativity during conflict predicted all three marital conflict endings. This finding builds on preliminary analyses indicating no child gender or age differences in any of the primary constructs of interest, and it further suggests that children's behavior may be such a strong stimulus that it might influence marital conflict, regardless of between-family differences in marital satisfaction and conflict frequency. That is, findings did not vary by marital satisfaction or number of conflicts. The findings of children's influence on conflict resolution are particularly interesting, because previous work has documented the importance of conflict

resolution for children (Goeke-Morey et al., 2007), but to our knowledge, this is the first study to show that children also influence marital conflict resolution.

Interestingly, children's presence may be another "child effect," linked with parents being less likely to engage in conflict with one another. For example, Papp et al. (2002) reported that although children were present for only about one-third of their parents' conflicts, the conflicts that children were present for were more negative. Thus, although children's presence may prompt parents to postpone engaging in conflict most of the time, for the most anger-arousing conflicts, parents may be unable or unwilling to postpone their conflicts.

Limitations and Future Directions

A number of limitations of the study merit discussion. Because of missing child data, the potential models that could be examined were limited. For example, we did not run models with child agentic behavior and negativity as continuous variables with trivariate couplings (mother-father-child) because the children were only present in a relatively small proportion of the conflicts. The primary source of missing child data was interparental conflicts that the child did not witness, rather than being due to an error in parents' reporting. Examination of whether these findings apply to other samples and other populations, such as clinical populations, is also needed. The current analyses also do not rule out the possibility other factors may be important in these family processes. For example, marital conflict intensity and the presence of siblings, who themselves may well exhibit agentic behavior and/or negativity during conflicts, may uniquely influence marital conflict. Relatedly, rather than examining the interplay among marital positivity, negativity, and resolution, in the current study, we focused on one marital construct at a time. However, we do not assume that these processes operate independently. For example, positivity in the preceding conflict might influence resolution of the current conflict, and examining these processes concurrently might have produced different results. Further, child age and gender and marital conflict topics might moderate associations between children's behavior and parents' conflict. Similarly, the proportion or absolute number of conflicts children witness might have different implications for family dynamics than the total number of conflicts. These are important questions for future research.

Notably, caution is needed in interpreting the auto- and cross-regressive weights, because of the possibility that the dynamic parameters resulted from individuals' discrepant responses to indicators that were intended to measure the same, underlying construct. Furthermore, although we used conflict number as the time index in our models to circumvent the need to deal with the irregular time intervals in the data, the time elapsed between successive conflicts may play an important role in determining the intensity and dynamics of the families' subsequent conflicts. Thus, continuous-time formulations of the VAR models should also be explored in future research to accommodate the irregular intervals between conflicts (e.g., Harvey, 2001; Oud & Jansen, 2000). Alternatively, growth curve models utilizing "time" as an independent variable in the mixed effects formulation may be used, with the appropriate error structure defined to handle the irregular intervals in the data (see e.g., Verbeke & Molenberghs, 2000), although this approach does not allow for random effects in the auto and cross-regressive parameters, which were of interest in the current investigation.

We made some assumptions about stationarity and homogeneity. That is, we assumed that the distributional properties of our data do not change over time (stationarity) and that there are some commonalities in the model structures for all participants (e.g., homogeneity in the optimal order of the VAR models). In standardizing the data for model validation purposes, we also made the assumption that the mean and variances of our dependent variables of interest remain constant over time. Such assumptions are not always tenable and in some cases alternative models may merit consideration, e.g., generalized autoregressive conditional heteroskedasticity (GARCH) Models (Bollerslev, 1986). In addition, techniques based on a

multiple-subject version of the prediction error decomposition function (Chow, Hamaker, Fujita, & Boker, in press; Shumway & Stoffer, 2004) offer an alternative approach to obtaining maximum likelihood estimates of the parameters when the objective is to obtain a group-based picture of the pooled dynamics of the sample. Moreover, Hamaker, Dolan and Molenaar (2005) offer an approach for evaluating dynamics at the idiographic level without imposing any preconceived group-based modeling assumptions.

Conclusions

Prominent developmental researchers such as Richard Bell (1968), Urie Bronfenbrenner (1979), Robert Hinde (Hinde & Stevenson-Hinde, 1987), Hugh Lytton (1979), Harriet Rheingold (1969), and Arnold Sameroff (1975) began asking questions about complex family influence processes several decades ago, including questions about the direction of influence in family relationships. In the ensuing years, the notion that family influence processes are transactional, rather than unidirectional, has gained increasing recognition at a theoretical level. However, until recently, relatively little empirical work has reflected that recognition. One reason for this lag is that the methodological and statistical tools needed to answer the questions posed in previous decades have only recently become available. An important take-home message from this study is that it is now possible with approaches such as described in this report to return productively to the innovative questions raised several decades ago about developmental family influence processes, which were far ahead of their time. Thus, the time is ripe to move forward with new advances in the study of family influence processes.

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References

Bell RQ. A reinterpretation of the direction of effects in studies of socialization. Psychological Review 1968;75:81–95. [PubMed: 4870552]

Boker, SM.; Laurenceau, J-P. Dynamical systems modeling: An application to the regulation of intimacy and disclosure in marriage. In: Walls, TA.; Schafer, JL., editors. Models for Intensive Longitudinal Data. New York: Oxford University Press; 2006. p. 195-218.

Bolger N, DeLongis A, Kessler RC, Wethington E. The contagion of stress across multiple roles. Journal of Marriage and the Family 1989;51:175–183.

Bollerslev T. Generalized autoregressive conditional heteroskedasticity. Journal of Econometrics 1986;31:307–327.

Bronfenbrenner, U. The ecology of human development: Experiments by nature and design. Cambridge, MA: Harvard University Press; 1979.

Chow SM, Hamagami F, Nesselroade JR. Age differences in dynamical emotion-cognition linkages. Psychology and Aging 2007;22:765–780. [PubMed: 18179296]

Chow S-M, Hamaker E, Fujita F, Boker SM. Representing time-varying cyclic dynamics using multiple-subject state-space models. British Journal of Mathematical and Statistical Psychology. (in press).

Chow SM, Ram N, Boker SM, Fujita F, Clore G. Emotion as a thermostat: Representing emotion regulation using a damped oscillator model. Emotion 2005;5:208–225. [PubMed: 15982086]

Christensen A, Heavey CL. Gender and social structure in the demand/withdraw pattern of marital conflict. Journal of Personality and Social Psychology 1990;59:73–81. [PubMed: 2213491]

Cicchetti, D. Development and psychopathology. In: Cicchetti, D.; Cohen, DJ., editors. Developmental psychopathology: Volume 1: Theory and method. 2. Hoboken, NJ: John Wiley & Sons, Inc; 2006. p. 1-23.

Clark LA, Kochanska G, Ready R. Mothers' personality and its interaction with child temperament as predictors of parenting behavior. Journal of Personality and Social Psychology 2000;79:274–285. [PubMed: 10948980]

Cole, PM. The developmental course from child effects to child effectiveness. In: Crouter, AC.; Booth, A., editors. Children's influence on family dynamics: The neglected side of family relationships. Mahwah, New Jersey: Lawrence Erlbaum Associates, Publishers; 2003. p. 109-118.

Cook WL, Snyder DK. Analyzing nonindependent outcomes in couple therapy using the actor-partner interdependence model. Journal of Family Psychology 2005;19:133–141. [PubMed: 15796659]

Cox MJ, Paley B. Families as systems. Annual Review of Psychology 1997;48:243–267.

Crane DR, Allgood SM, Larson JH, Griffin W. Assessing marital quality with distressed and nondistressed couples: A comparison and equivalency table for three frequently used measures. Journal of Marriage and the Family 1990;52:87–93.

Crockenberg SC, Leerkes EM, Lekka SK. Pathways from marital aggression to infant emotion regulation: The development of withdrawal in infancy. Infant Behavior & Development 2007;30:97–113. [PubMed: 17292783]

Cummings, EM.; Davies, PT. Children and Marital Conflict: The Impact of Family Dispute and Resolution. New York: The Guilford Press; 1994.

Cummings EM, Davies PT. Effects of marital conflict on children: Recent advances and emerging themes in process-oriented research. Journal of Child Psychology and Psychiatry 2002;43:31–63. [PubMed: 11848336]

Cummings EM, Goeke-Morey MC, Papp LM. Children's responses to everyday marital conflict tactics in the home. Child Development 2003;74:1918–1929. [PubMed: 14669904]

Cummings EM, Goeke-Morey MC, Papp LM. Everyday marital conflict and child aggression. Journal of Abnormal Child Psychology 2004;32:191–202. [PubMed: 15164860]

Cummings EM, Goeke-Morey MC, Papp LM, Dukewich TL. Children's responses to mothers' and fathers' emotionality and tactics in marital conflict in the home. Journal of Family Psychology 2002;16:478–492. [PubMed: 12561293]

Davis B, Sheeber L, Hops H, Tildesley E. Adolescent responses to depressive parental behaviors in problem-solving interactions: Implications for depressive symptoms. Journal of Abnormal Child Psychology 2000;28:451–465. [PubMed: 11100919]

Dolan CV. MKF provisional documentation. Unpublished mkfm6 user manual. 2002

Emery RE, Binkoff JA, Houts AC, Carr EG. Children as independent variables: Some clinical implications of child-effects. Behavior Therapy 1983;14:398–412.

Emery, RE.; Kitzmann, KM. The child in the family: Disruptions in family functions. In: Cohen, DJ.; Cicchetti, D., editors. Developmental psychopathology, Vol. 2: Risk, disorder, and adaptation. Oxford, England: John Wiley & Sons; 1995. p. 3-31.

Ferrer E, Nesselroade JR. Modeling affective processes in dyadic relations via dynamic factor analysis. Emotion 2003;3:344–360. [PubMed: 14674828]

Ferrer E, McArdle JJ, Shaywitz BA, Holahan JM, Marchione K, Shaywitz SE. Longitudinal models of developmental dynamics between reading and cognition from childhood to adolescence. Developmental Psychology 2007;43:1460–1473. [PubMed: 18020824]

Franck KL, Buehler C. A family process model of marital hostility, parental depressive affect, and early adolescent problem behavior: The roles of triangulation and parental warmth. Journal of Family Psychology 2007;21:614–625. [PubMed: 18179333]

Goeke-Morey MC, Cummings EM, Harold GT, Shelton KH. Categories and continua of destructive and constructive marital conflict tactics from the perspective of U.S. and Welsh children. Journal of Family Psychology 2003;17:327–338. [PubMed: 14562457]

Goeke-Morey MC, Cummings EM, Papp LM. Children and marital conflict resolution: Implications for emotional security and adjustment. Journal of Family Psychology 2007;21:744–753. [PubMed: 18179346]

Gottman J, Swanson C, Murray J. The mathematics of marital conflict: Dynamic mathematical nonlinear modeling of newlywed marital interaction. Journal of Family Psychology 1999;13:3–19.

Grych JH, Raynor SR, Fosco GM. Family processes that shape the impact of interparental conflict on adolescents. Development and Psychopathology 2004;16:649–665. [PubMed: 15605630]

Hamaker EL, Dolan CV, Molenaar PCM. Statistical modeling of the individual: Rationale and application of multivariate stationary time series analysis. Multivariate Behavioral Research 2005;40:207–233.

Harvey, AC. Forecasting, structural time series models and the Kalman Filter. Cambridge: Cambridge University Press; 2001.

Hinde RA, Stevenson-Hinde J. Interpersonal relationships and child development. Developmental Review 1987;7:1–21.

Hollenstein T, Granic I, Stoolmiller M, Snyder J. Rigidity in parent-child interactions and the development of externalizing and internalizing behavior in early childhood. Journal of Abnormal Child Psychology 2004;32:595–607. [PubMed: 15648527]

Hox, J. Multilevel Analysis: Techniques and Applications. Mahwah, NJ: Erlbaum; 2002.

Jenkins J, Simpson A, Dunn J, Rasbash J, O'Connor TG. Mutual influence of marital conflict and children's behavior problems: Shared and nonshared family risks. Child Development 2005;76:24–39. [PubMed: 15693755]

Kenward MG, Roger JH. Small sample inference for fixed effects from restricted maximum likelihood. Biometrics 1997;67:983–997. [PubMed: 9333350]

Larson RW, Almeida DM. Emotional transmission in the daily lives of families: A new paradigm for studying family processes. Journal of Marriage and the Family 1999;61:5–20.

Laurenceau JP, Bolger N. Using diary methods to study marital and family processes. Journal of Family Psychology 2005;19:86–97. [PubMed: 15796655]

Laurenceau JP, Feldman Barrett L, Rovine MJ. The interpersonal process model of intimacy in marriage: A daily-diary and multilevel modeling approach. Journal of Family Psychology 2005;19:314–323. [PubMed: 15982109]

Littell, RC.; Milliken, GA.; Stroup, WW.; Wolfinger, RD. SAS system for mixed models. Cary, NC: SAS Institute, Inc; 1996.

Locke HJ, Wallace KM. Short marital adjustment prediction tests: Their reliability and validity. Marriage and Family Living 1959;21:251–255.

Lytton H. Disciplinary encounters between young boys and their mothers and fathers: Is there a contingency system? Developmental Psychology 1979;15:256–268.

MacCallum RC, Kim C, Malarkey WB, Kiecolt-Glaser JK. Studying multivariate change using multilevel models and latent curve models. Multivariate Behavioral Research 1997;32:215–253.

Maccoby EE. Socialization and developmental change. Child Development 1984;55:317–328.

McHale JP, Kuersten-Hogan R, Lauretti A, Rasmussen JL. Parental reports of coparenting and observed coparenting behavior during the toddler period. Journal of Family Psychology 2000;14:220–236. [PubMed: 10870291]

McHale SM, Updegraff KA, Helms-Erikson H, Crouter AC. Sibling influences on gender development in middle childhood and early adolescence: A longitudinal study. Developmental Psychology 2001;37:115–125. [PubMed: 11206426]

Oud JHL, Jansen RARG. Continuous time state space modeling of panel data by means of SEM. Psychometrica 2000;65:199–215.

Papp LM, Cummings EM, Goeke-Morey MC. Marital conflicts in the home when children are present versus absent. Developmental Psychology 2002;38:774–783. [PubMed: 12220054]

Patterson, GR. Performance models for parenting: A social interactional perspective. In: Grusec, JE.; Kuczynski, L., editors. Parenting and children's internalization of values: A handbook of contemporary theory. New York: John Wiley & Sons, Inc; 1997. p. 193-226.

R Development Core Team. R Foundation for Statistical Computing. Vienna, Austria: 2006. R: A language and environment for statistical computing. URL http://www.R-project.org

Rheingold, HL. The social and socializing infant. In: Goslin, D., editor. Handbook of socialization theory and research. Chicago: Rand McNally; 1969. p. 779-790.

Sagrestano LM, Christensen A, Heavey CL. Social influence techniques during marital conflict. Personal Relationships 1998;5:75–89.

Sameroff A. Transactional models in early social relations. Human Development 1975;18:65–79.

Sameroff, AJ. General systems theories and developmental psychopathology. In: Cicchetti, D.; Cohen, DJ., editors. Developmental psychopathology, Vol. 1: Theory and methods. Oxford, England: John Wiley & Sons; 1995. p. 659-695.

Schermerhorn AC, Cummings EM. Transactional family dynamics: A new framework for family research. Advances in Child Development and Behavior 2008;36:187–250. [PubMed: 18808044]

Schermerhorn AC, Cummings EM, DeCarlo CA, Davies PT. Children's influence in the marital relationship. Journal of Family Psychology 2007;21:259–269. [PubMed: 17605548]

Shumway, RH.; Stoffer, DS. Time Series Analysis and Its Applications: With R Examples. New York: Springer Verlag; 2004.

Snijders, T.; Bosker, R. Multilevel analysis. Thousand Oaks, CA: Sage; 1999.

Story LB, Repetti R. Daily occupational stressors and marital behavior. Journal of Family Psychology 2006;20:690–700. [PubMed: 17176205]

Thelen, E.; Smith, LB. A Dynamic Systems Approach to the Development of Cognition and Action. Cambridge, MA: MIT; 1994.

Thelen E, Ulrich BD. Hidden skills: A dynamic systems analysis of treadmill stepping during the first year. Monographs of the Society for Research in Child Development 1991;56 [Serial No 223].

Tucker CJ, McHale SM, Crouter AC. Dimensions of mothers' and fathers' differential treatment of siblings: Links with adolescents' sex-typed personal qualities. Family Relations 2003;52:82–89.

U.S. Census Bureau. United States Census 2000 [Data file]. 2000. Available from U.S. Census Bureau Web site, http://www.census.gov/

Valentino K, Cicchetti D, Rogosch FA, Toth SL. Memory, maternal representations, and internalizing symptomatology among abused, neglected, and nonmaltreated children. Child Development 2008;79:705–719. [PubMed: 18489422]

Verbeke, G.; Molenberghs, G. Linear mixed models for longitudinal data. New York: Springer-Verlag; 2000.

Walls, TA.; Schafer, JL. Models for Intensive Longitudinal Data. New York: Oxford University Press; 2006.

Wei, WWS. Time series analysis. Redwood City, CA: Addison-Wesley; 1990.

West, B. An Essay on the Importance of Being Nonlinear. Berlin: Springer-Verlag; 1985.

Appendix

Before analyzing the data using SAS, we used R, a freely available computing platform available from http://www.R-project.org/, to create the lagged data matrix needed for model fitting purposes. The lagged data matrix included separate variables for husbands' and wives' data for time *t* and time *t*−1 for all the marital constructs, the child covariates, and the between-family covariates.

We used SAS to restructure the data set, using the same variable names for husbands and wives stacked on top of each other. To do this, we created dummy codes named D1 and D2 (see code below, in Arial font). D1 equals 1 for wives and 0 for husbands; D2 equals 0 for wives and 1 for husbands. We created new variables by stacking together wives'and husbands'data for time *t* (leading to e.g., "PosAll" for the partners' positivity at time *t*) and their corresponding data for time *t*−1 (e.g., "PosAllL1" for the partners' positivity at time *t*−1).

```
DATA temp;
SET conflict. diary;
Code = 0;
RUN;
DATA temp2;
SET conflict. diary;
Code = 1;
RUN;
DATA conflict. diary2;
SET temp temp2;
```

```
D1 = 0; D2 = 0; NegAll = 0; PosAll = 0; ConAll = 0;
NegAllL1 = 0;PosAllL1 = 0; ConAllL1 = 0;
OthNegL1 = 0; OthPosL1 = 0;OthConL1 = 0;
NegAllL2 = 0; NegAllL2 = 0; ConAllL2 = 0;
Distress = 0;
IF (Code = 0) THEN DO;
  D1 = 1;
  NegAll = NegF; NegAllL1 = NegFlag1; NegAllL2 = NegFlag2;
  OthNegL1 = NegMlag1; OthPosL1 = PosMlag1; OthConL1 = ConMlag1;
  PosAll = PosF; PosAllL1 = PosFlag1; PosAllL2 = PosFlag2;
  ConAll = ConF; ConAllL1 = ConFlag1; ConAllL2 = ConFlag2;
  Distress = F1SMAT;
  END;
IF (Code = 1) THEN DO;
  D2 = 1;
  NegAll = NegM; NegAllL1 = NegMlag1; NegAllL2 = NegMlag2;
  OthNegL1 = NegFlag1; OthPosL1 = PosFlag1; OthConL1 = ConFlag1;
  PosAll = PosM; PosAllL1 = PosMlag1; PosAllL2 = PosMlag2;
  ConAll = ConM; ConAllL1 = ConMlag1; ConAllL2 = ConMlag2;
  Distress = F1SMAT;
  END;
```

In the code below “PosAllL1”represents the individual’s own positivity at the preceding time point, “OthPosL1” represents the spouses’ positivity at the preceding time point, “isNg” represents child negativity, and “isAg” represents child agentic behavior.

*Unconditional model 1 with no between-family predictors;

(a) Initial Model 1 for Positivity

```
TITLE “Unconditional Positivity as VAR(1) with Test of Random Effects”;
PROC MIXED DATA=raw. diary METHOD=REML CL COVTEST;
CLASS time id;
MODEL PosAll = D1*PosAllL1 D2*PosAllL1 D1*OthPosL1 D2*OthPosL1 D1*isNg
D1*isAg
  D2*isNg D2*isAg
/NOINT SOLUTION DDFM=KR;
REPEATED/TYPE=VC GRP = D1 sub = time(id);
RANDOM D1*PosAllL1 D2*PosAllL1 D1*OthPosL1 D2*OthPosL1/SUB = id TYPE=VC;
RUN;
```

Below we show the syntax for fitting Model 2 wherein marital satisfaction and conflict frequency are included as predictors of between-family differences in cross-regression from wives to husbands (reflected in the estimates for D2*OthPosL1*MISMAT and D2*OthPosL1*conFreq, respectively). Parameters that were not statistically significant from the unconditional model (Model 1) are omitted from the model shown below. The syntax DDFM=KR invokes the Kenward-Roger adjustment in the calculation of degrees of freedom.

(b) Initial Model 2 for Positivity: TITLE “Positivity as VAR(1): Testing **M1SMAT** & conFreqas Predictors of D2*OthPosL1 Only”;

```
PROC MIXED DATA=raw. diary METHOD=REML CL COVTEST;
CLASS time id;
MODEL PosAll = D1*PosAllL1 D2*PosAllL1 D1*OthPosL1 D2*OthPosL1 D1*isNg
D1*isAg
  D2*isNg D2*isAg
  D2*OthPosL1*M1SMAT D2*OthPosL1*conFreq/
NOINT SOLUTION DDFM=KR;
REPEATED/TYPE=VC GRP = D1 sub = time(id);
RANDOM D2*OthPosL1/SUB = id TYPE=VC;
RUN;
```

Next we ran a model that included only the parameters that were significant in Model b, above, for the final Model 2.

(c) Initial Model 3 for Positivity: This model tests for significant variance in the regressions relating child negativity and agentic behavior to wives' and husbands' positivity. There was no significant variance in these regressions, but if there had been, we could have tested whether, for example, conflict frequency explains between-family differences in these regressions by including the terms D1*isNg*conFreq, D2*isNg*conFreq, D1*isAg*conFreq, and D2*isAg*conFreq in the MODEL statement.

```
TITLE "Raw Positivity as VAR(1): Testing ConFreqas a Predictor of -
>D2*OthPosL1 and AddingChild Random Effects";
PROC MIXED DATA=raw. diary METHOD=REML CL COVTEST;
CLASS time id;
MODEL PosAll = D2*PosAllL1 D1*isNg D1*isAg
   D1*isNg D1*isAg
   D2*OthPosL1*conFreq
/NOINT SOLUTION DDFM=KR;
REPEATED/TYPE=VC GRP = D1 sub = time(id);
RANDOM D2*OthPosL1 D1*isNg D1*isAg
  D2*isNg D2*isAg/SUB = id TYPE=VC;
RUN;
```

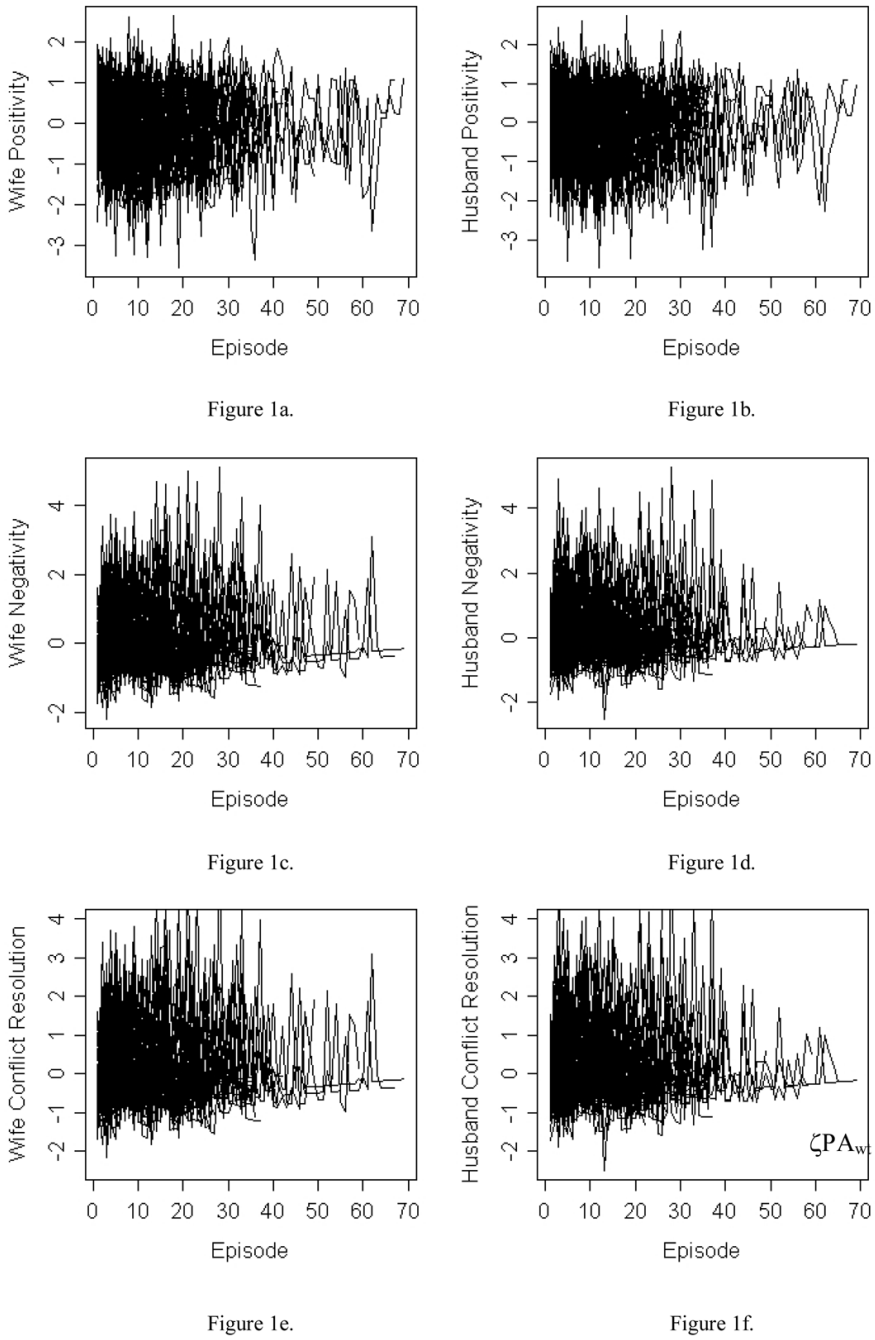

Figure 1a. Figure 1b.

Figure 1c. Figure 1d.

Figure 1e. Figure 1f.

Figure 1.
Trajectories of wife positivity (1a), husband positivity (1b), wife negativity (1c), husband negativity (1d), wife conflict resolution (1e), and husband conflict resolution (1f) by family.

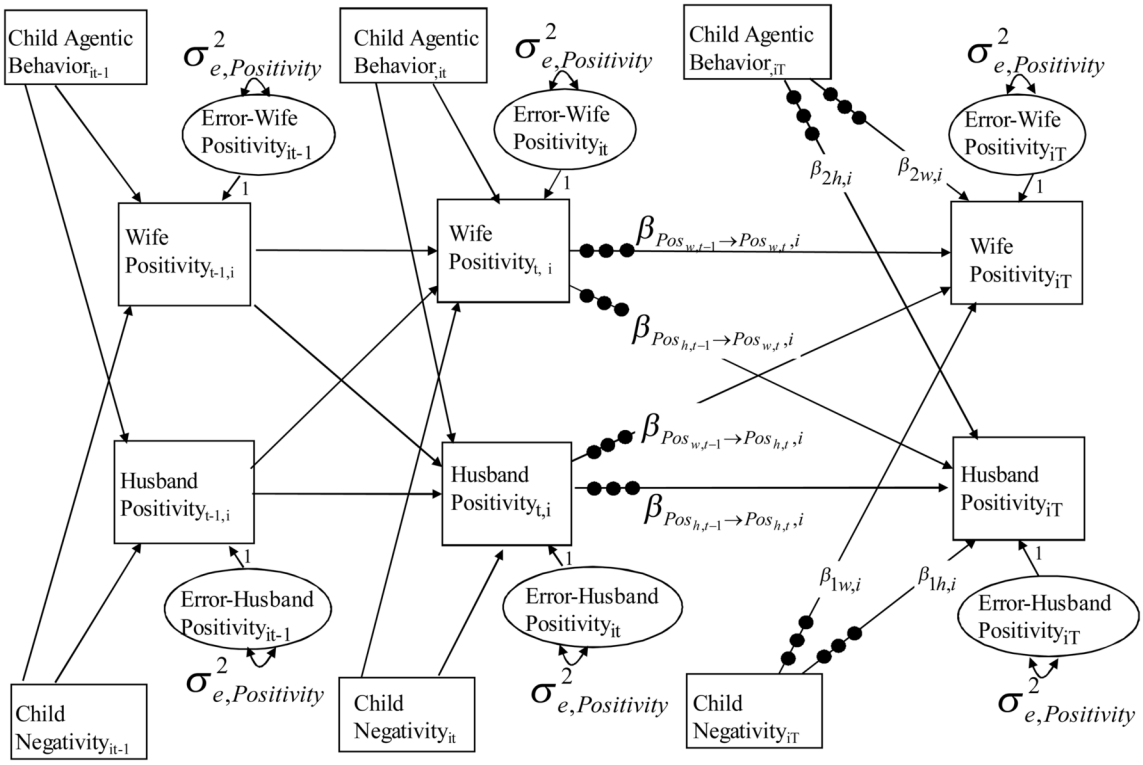

Figure 2.

Path diagram of Model 1. *t* denotes the current conflict, $t - 1$ denotes the preceding conflict, T denotes all of the conflicts, and i represents the individual family. $\beta_{1w,i}$ and $\beta_{1h,i}$ represent the family-specific influences of child negative emotional or behavioral responding on the maternal and paternal manifest positivity, respectively; $\beta_{2w,i}$ and $\beta_{2h,i}$ represent the family-specific influences of child agentic responding on the maternal and paternal positive manifest variable, respectively. $\beta_{Pos_{w,t-1}\rightarrow Pos_{w,t},i}$ represents the lag-1 autoregressive influence of wife positivity at the previous conflict ($t - 1$) on wife positivity during the conflict at time *t* for family *i*, $\beta_{Pos_{h,t-1}\rightarrow Pos_{h,t},i}$ represents the influence of husband positivity at conflict $t - 1$ on husband positivity for family *i* at conflict *t*, $\beta_{Pos_{h,t-1}\rightarrow Pos_{w,t},i}$ represents the cross-regressive influence of husband positivity at conflict $t - 1$ on wife positivity for family *i* at conflict *t*, and $\beta_{Pos_{w,t-1}\rightarrow Pos_{h,t},i}$ represents the cross-regressive influence of wife positivity at conflict $t - 1$ on husband positivity for family *i* at conflict *t*. The family-specific deviation terms (e.g., Error-Wife Positivity$_{it}$, Error-Husband Positivity$_{it}$) constitute the random effects components, and $\sigma^2_{e,Positivity}$ represents the variance of the random effects components.

Table 1

Descriptive Statistics and Intercorrelations among the Marital and Child Constructs

	1	2	3	4	5	6	7	8	9	10	11	12
1 C agentic	--											
2 C negativity	.49***	--										
3 W positivity	.10	−.15	--									
4 H positivity	.14	−.11	.91***	--								
5 W negativity	.03	.20*	−.44***	−.36***	--							
6 H negativity	.09	.24*	−.44***	−.50***	.76***	--						
7 W resolution	.14	−.07	.76***	.69***	−.42***	−.42***	--					
8 H resolution	.12	−.11	.76***	.73***	−.32***	−.42***	.94***	--				
9 C age	.01	−.17†	−.07	−.13	.11	.18†	−.10	−.10	--			
10 W satisfaction	.12	−.10	.26**	.20*	−.31***	−.18†	.17†	.13	.01	--		
11 H satisfaction	.19*	−.03	.31**	.28**	−.29**	−.28**	.31***	.30**	.05	.50***	--	
12 No. conflicts	−.08	−.10	.21*	.22*	−.15	−.19*	.17†	.14	.14	−.05	−.05	--
M	.11	.19	2.81	2.90	.80	.76	5.12	5.29	10.83	111.47	110.54	19.48
SD	.12	.15	.73	.73	.54	.53	1.40	1.41	2.15	23.51	22.28	13.11

Note. $N = 111$. Means, standard deviations, and correlations were computed on the unstandardized data prior to detrending. C = Child; W = wife; H = husband. Agentic = agentic behavior; satisfaction = SMAT marital satisfaction; No. conflicts = number of conflict episodes.

Table 2

Parameter Estimates for the Final Models

	Final Model 2			Final Model 3		
	Positivity	**Negativity**	**Resolution**	**Positivity**	**Negativity**	**Resolution**
β_{1w}	−.40 (.08)***	.22 (.04)***	−.77 (.18)***	−.40 (.08)***	.22 (.04)***	−.77 (.18)***
β_{1h}	−.42 (.08)***	.22 (.05)***	−.79 (.17)***	−.42 (.08)***	.21 (.05)***	−.79 (.17)***
β_{2w}	.21 (.10)*	= 0	.58 (.23)*	.21 (.10)*	= 0	.58 (.23)*
β_{2h}	.25 (.10)*	= 0	.76 (.23)***	.25 (.10)*	= 0	.76 (.23)***
$\beta_{X_{w,t-1}\rightarrow X_{w,t}}$	= 0	−.06 (.02)*	= 0	= 0	−.06 (.02)*	= 0
$\beta_{X_{h,t-1}\rightarrow X_{w,t}}$	= 0	= 0	= 0	= 0	= 0	= 0
$\beta_{X_{h,t-1}\rightarrow X_{h,t}}$	−.05 (.03)†	= 0	= 0	−.05 (.03)†	= 0	= 0
$\beta_{X_{w,t-1}\rightarrow X_{h,t}}$	= 0	= 0	= 0	= 0	= 0	= 0
No Conflict $*\beta_{X_{w,t-1}\rightarrow X_{w,t}}$	= 0	= 0	= 0	= 0	= 0	= 0
No Conflict $*\beta_{X_{h,t-1}\rightarrow X_{w,t}}$	= 0	= 0	= 0	= 0	= 0	= 0
No Conflict $*\beta_{X_{h,t-1}\rightarrow X_{h,t}}$	= 0	= 0	= 0	= 0	= 0	= 0
No Conflict $*\beta_{X_{w,t-1}\rightarrow X_{h,t}}$	.09 (.03)**	= 0	= 0	.09 (.03)**	= 0	= 0
No Conflict $*\beta_{1w}$	= 0	= 0	= 0	= 0	= 0	= 0
No Conflict $*\beta_{1h}$	= 0	= 0	= 0	= 0	= 0	= 0
No Conflict $*\beta_{2w}$	= 0	= 0	= 0	= 0	= 0	= 0
No Conflict $*\beta_{2h}$	= 0	= 0	= 0	= 0	= 0	= 0

Note. The unstandardized regression coefficients are reported, followed by the standard errors in parentheses. The "X" in the equations for the dynamic model (e.g., $\beta X_{w,t-1}\rightarrow X_{w,t}$) represents positivity, negativity, or conflict resolution, depending on the marital construct being modeled. $\beta 1w$ = influence of child negativity on the wife; $\beta 1h$ = influence of child negativity on the husband; $\beta 2w$ = influence of child agentic behavior on wife; and $\beta 2h$ = influence of child agentic behavior on husband; $\beta X_{h,t-1}\rightarrow X_{h,t}$ = autoregressive path for husbands; $\beta X_{w,t-1}\rightarrow X_{w,t}$ = autoregressive path for wives; $\beta X_{w,t-1}\rightarrow X_{h,t}$ = cross-regressive path for wives at time $t-1$ to husbands at time t; $\beta X_{h,t-1}\rightarrow X_{w,t}$ = cross-regressive path for husbands at time $t-1$ to wives at time t. *No Conflict* = total number of conflict episodes; the rows that include *No Conflict* represent the tests of number of conflicts as a predictor of between-family differences in the auto-, cross-, and child-related regression parameters. Marital satisfaction is not depicted in the table because it was not a significant predictor of any of the between-family differences.

*$p < .05$.

**$p < .01$.

** $p < .001$.

Effect sizes: The proportion of reduction in variance at the between-family level resulting from adding number of conflicts as a predictor of the wife → husband positivity cross-regression was .14.