



Published in final edited form as:

Child Dev. 2015 January ; 86(1): 241–258. doi:10.1111/cdev.12300.

Family Conflict, Mood, and Adolescents' Daily School Problems: Moderating Roles of Internalizing and Externalizing Symptoms

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Abstract

Using daily diary data, this study examined cross-day associations between family conflict and school problems and tested mediating effects of daily negative mood and moderating effects of psychological symptoms. For 2 weeks, parents and adolescents ($N = 106$; mean age = 15.4) reported daily conflict; adolescents reported daily negative mood and school problems. Results indicated bidirectional, multi-day spillover between parent-adolescent conflict and school problems with daily negative mood statistically accounting for spillover both within and across days. Externalizing symptoms strengthened links between father-adolescent conflict and school problems, whereas depressive and anxious symptoms strengthened links between parent-adolescent conflict and daily negative mood. By demonstrating cross-domain transmission of daily problems, these findings highlight the salience of everyday events as possible intervention targets.

Keywords

family conflict; mood; school problems

Conflict, although an anticipated dimension of family life, is associated with wide-ranging adverse outcomes (Repetti, Taylor, & Seeman, 2002). According to family systems theory (Cox & Paley, 1997), families are highly interdependent systems such that conflict between two family members also affects other family members. Youth are particularly vulnerable to family conflict; high levels of parent-youth and marital conflict are associated with both internalizing and externalizing mental health symptoms in children and adolescents (Margolin, Oliver, & Medina, 2001; Repetti et al., 2002). Such associations, however, fail to pinpoint the direction of these links or to show temporal connections.

Spillover theory aims to describe the specific pathways of transmission between two family subsystems or between a family subsystem and one family member's wellbeing (Almeida, Wethington, & Chandler, 1999). The identification of spillover relies on frequent and repeated measurements, e.g., daily diary data collection, to capture within-person fluctuations in conflict and individual functioning. Spillover theory, when applied to family and extra-familial contexts, initially was demonstrated by links between parents' work stress and negative parent-child interactions (Repetti, 1994; Repetti & Wood, 1997) and, more

recently, has been extended to links between family conflict and children's and adolescents' school problems (Flook & Fuligni, 2008; Lehman & Repetti, 2007; Salamon, Johnson, & Swendsen, 2011). Although spillover from one domain to another is a usual and expected occurrence, individuals who are predisposed to these links might get caught in escalating patterns of negativity and possibly exacerbate problems for themselves and others. One emergent goal in this literature is to identify underlying mechanisms and individual characteristics of persons who are vulnerable to spillover. In the present study, we examine bidirectional, multi-day spillover between family and school and expand what is known by investigating daily negative mood as an explanatory mechanism and by testing psychological symptoms as factors that might intensify these processes.

Daily Links between Family Conflict and School Problems

Most previous research linking family conflict with academic functioning has relied on global measures of conflict and academic achievement (Dotterer, Hoffman, Crouter, & McHale, 2008; Harold, Aitken, & Shelton, 2007); for example, adolescents from high conflict homes are two to four times more likely to have low grade point averages than their peers (King, 1998). As an alternative approach, examination of daily covariation in family conflict and school problems allows for more precise testing of theoretically-driven hypotheses regarding how short-term fluctuations in one sphere spill over and affect functioning in the other sphere (Almeida et al. 1999), e.g., how stress at home affects adolescents' experience at school and, vice versa, how problems at school affect their home life. Prior family-school spillover research has considered a multidimensional range of school problems (e.g., failing a quiz, cutting class); examining daily school problems on this scale can provide insight into micro-level processes that may contribute to more global, future outcomes such as academic attainment (Laurenceau & Bolger, 2005).

To date, only a handful of studies have documented daily links between family stress and school problems in children (Lehman & Repetti, 2007; Repetti, 1996) or adolescents (Flook & Fuligni, 2008; Salamon et al., 2011). Focusing on high school students, Flook and Fuligni (2008) reported spillover from family stress to school problems that persisted for 2 days and, vice versa, also reported spillover from daily school problems to family stress for up to 2 days. Salamon and colleagues' (2011) examination of within-day associations demonstrated spillover from negative family events to academic-related events outside the school context (e.g., studying) later that evening but no reciprocal effects from academic activities to other domains. Together, these data illustrate that negative events in adolescents' lives are not compartmentalized and that difficulties in one domain increase the likelihood of difficulties in other domains. Still, the spillover of problems does not always occur and thus raises questions about what accounts for transmission across different life domains and whether certain adolescents are more prone to this transmission.

Daily Negative Mood as a Mediator of Spillover Processes

Negative mood has been posited as one possible mediating factor in the daily connection between family conflict and school-related problems (e.g., Lehman & Repetti, 2007; Salamon et al., 2011). That is, negative events in one life domain may elicit negative moods

that adolescents carry to other domains. For example, arguments between adolescents and their parents may leave the adolescents feeling upset or sad, which could interfere with motivation or concentration in school. Conversely, failing an important test might make adolescents worried and irritable, which could then provoke conflict. In a study with fifth-grade children, increases in same-day anxious mood mediated the association between school problems and children's reports of aversive parent-child interactions that same evening (Lehman & Repetti, 2007); this study tested unidirectional within-day spillover from the school day to parent-child interactions later in the day. Another study testing daily negative mood as a mediator found that the association between family and school events remained significant even after adjusting for immediate mood responses; these investigators' conclusion—that emotional processes do not mediate the links across domains—was based strictly on assessments of mood that immediately followed the negative event (Salamon et al. 2011). These two previous studies offer somewhat divergent perspectives on the importance of daily mood and do not test bidirectional influences of mood between family and school events. Additionally, in line with views that mood is diffuse, rather than an immediate reaction to specific events, and evolves over the course of day or even multiple days (Batson, Shaw, & Oleson, 1992), our focus here is to assess not only within-day models of covariation but also across-day models to see whether daily negative mood contributes to either within- or across-day bidirectional links between family conflict and school problems.

Psychological Symptoms as Moderators of Spillover Processes

Theoretical models linking youths' psychological symptoms to family processes often highlight the complex interplay between problematic family relationships, youth responses to stressful events, and their regulatory capacities that influence those responses (e.g., Cummings, Davies, & Campbell, 2000). Heightened reactivity to environmental events perceived as negative tends to be a hallmark of youth's psychological symptoms—reactions turned inward with internalizing symptoms and outward with externalizing symptoms. Adolescents reporting more psychological symptoms report more daily negative events and show more emotional reactivity to those events (Schneiders et al., 2006). Likewise, in daily diary studies with adults, both depressive and anxious symptoms are linked with greater emotional reactivity to daily stress (e.g., Charles, Piazza, Mogle, Sliwinski, & Almeida, 2013; Cohen, Gunthert, Butler, O'Neill, & Tolpin, 2005; O'Neill, Cohen, Tolpin, & Gunthert, 2004). To our knowledge, only one previous study has tested depressive and anxious symptoms as moderators of family-school spillover; no evidence of moderation was found, although that study only tested moderation for the direct association between family and school (Salamon et al., 2011). In contrast, our model emphasizes links between negative events and daily negative mood.

Unlike anxious and depressive symptoms, externalizing symptoms have not yet been implicated in daily family-school spillover research, even though externalizing symptoms show global associations with both family conflict and with school problems (Hinshaw, 1992; Patterson, 1982). Adolescents with externalizing symptoms may respond to negative events in one domain with defiant or disruptive behaviors in another domain, putting into motion an escalating pattern of negativity. For example, when adolescents act out at school

(e.g., being late for class), these events might reflect current or recent difficulties at home or, alternatively, might provoke problems at home in the form of parent-adolescent conflict and parental reprimands. This cycle, of negative events in one domain increasing the likelihood of provoking problems in another domain, might be considered characteristic of those adolescents who have more externalizing symptoms, which could create a negative feedback loop of daily negative events that is sustained or even escalates across time.

Present Study

In order to advance our understanding of links between family conflict and school-related problems, the present study aims not only to describe these connections but also to explain these daily connections and to identify factors that make adolescents more vulnerable to these links. Figure 1 illustrates our hypothesized model with direct effects, mediated effects and moderation; although drawn separately to highlight the bidirectional nature of the model, panels A and B are tested simultaneously. We hypothesized that family conflict and school problems will be associated both within and across days (Hypothesis 1) and that daily negative mood will mediate links between family conflict and school problems (Hypothesis 2). We also hypothesized that that the adolescents reporting more depressive, anxious, or externalizing symptoms will show higher levels of covariation across the daily constructs; depressive and anxious symptoms are anticipated to moderate connections between daily negative mood and both family conflict and school problems (Hypothesis 3) whereas externalizing symptoms are anticipated to moderate the direct daily links between family conflict and school problems (Hypothesis 4).

Because these effects may differ depending on whether conflict is with mothers, fathers, or is between parents, we conduct exploratory analyses to examine the effects of conflict separately by each dyad. Also as exploratory analyses, we test gender differences in daily levels of family conflict and test gender as a moderator of the links between family conflict, daily negative mood, and school problems. It also should be noted we include data from multiple family members in the reports of family conflict. The importance of multiple informants of family conflict has been discussed in the literature (e.g., De Los Reyes & Kazdin, 2005); however, using multiple informants may be especially important in daily diary research where a positive or negative response bias on a particular day may influence results. For example, a respondent who is in a negative mood on a given day may respond negatively to all items on the questionnaire that day. To obviate these reporting issues, the present study tests cross-reporter associations (e.g., fathers' reports of conflict and adolescents' reports of school problems).

Method

Overview

The present study uses daily data from a longitudinal study designed to examine the relations between conflict, violence, and developmental outcomes among adolescents. The multi-wave study involved two cohorts. In the first cohort, we recruited families with a child aged 9–10 ($n = 119$ families). We recruited a second cohort ($n = 70$), approximately four years later at wave 3, who had to have a child in middle school to be comparable to the

earlier participants. Both cohorts were recruited through advertisements, flyers, and word-of-mouth and met criteria of having two parents (or parent figures) who had lived together with the youth for at least 3 years prior to participation and could complete measures in English (see Margolin, Vickerman, Oliver, & Gordis, 2000 for more details). The data presented here are part of the wave 4 procedures, although are only the second point of data collection for cohort 2. Following a laboratory visit in wave 4, participating families were invited to provide daily data over a 2-week period.

Participants

Out of the total 189 families from both cohorts, we invited 169 to participate in the wave 4 data collection procedures; 20 families who had moved out of the area or had unusable contact information were not invited. Of the 169 families, 126 participated fully in the in-lab procedures and another 14 participated in a more limited way (e.g., completing questionnaires online) due to difficulties simultaneously scheduling all three family members. All 126 adolescents who participated in the in-lab procedures were eligible for the current study, and all 126 provided at least some daily data; however, we restricted our sample to those who attended at least one day of school during the time of assessment, resulting in a sample of 106. Tests for selective attrition showed that families in the present analyses did not differ from the larger sample in parent education, family income, number of children in the household, adolescent age, gender, ethnicity, or psychological symptoms. Comparing the two cohorts on the same variables produced only one significant difference: Adolescents from cohort 2 ($M = 15.57$) were older than adolescents from cohort 1 ($M = 15.29$), $t(104) = 2.27, p < .01$.

The adolescents were 13–17 years old ($M = 15.4, SD = 0.7$) and were in grades 8–11 ($M = 9.9, SD = 0.7$). Of adolescents included in the study (54 female), 31.1% identified as Hispanic or Latino; for race, 50.9% identified as Caucasian, 21.7% as African American, 8.5% as Asian American, 0.9% as Native American, and 17.9% as multiple ethnicities. Mothers ($n = 103$) and fathers ($n = 100$) also provided daily reports of conflict with their spouse and son or daughter. In total, data were provided by both parents in 98 families and by at least one parent in 105 out of 106 families. Three fathers and one mother elected not to provide data and, in five other families, the parents had separated or divorced, resulting in two mothers and three fathers missing from this data set; adolescents still provided data in these cases.

Mothers' age ranged from 35 to 59 years ($M = 45.4, SD = 6.4$), and fathers' age ranged from 33 to 72 ($M = 48, SD = 6.8$). Among the parents, 25% identified as Hispanic or Latino; for race, 56.1% identified as Caucasian, 23.6% as African American, 8.5% as Asian American, 0.5% as Native American, and 11.3% as multiple ethnicities. Parents' years of education ranged from 7 to 20 ($M = 14.9, SD = 2.6$) for mothers and 10 to 20 ($M = 15.0, SD = 2.5$) for fathers. Family income varied considerably: 21.9% \$50,000, 31.3% \$51,000 and \$100,000, 26% \$101,000 and \$150,000, and 20.8% \$151,000 ($Mdn = \$93,500$). This income is consistent with the urban recruitment area, which has a cost of living 36.4% above the national average (U.S. Census Bureau, 2010). Parents had been living together for 14.9 years on average ($SD = 5.9$), and the number of children in the family ranged from 1 to 6 (M

= 2.6, $SD = 1.6$); 93.2% of the couples were married, and 10.7% of the families included one non-biological parent.

Procedure

Families took part in a lab session involving a number of procedures unrelated to the current study. Prior to leaving the lab, each of the three family members was instructed in the daily data collection procedures and completed the first daily questionnaire for the immediate preceding day—ending at bedtime the prior night. The family members were instructed to independently fill out a daily questionnaire at the end of each day for 13 more days with day 2 to be completed on the night of the lab meeting. All families were given the choice to use an online system (for adolescents $n = 49$; for mothers $n = 37$; for fathers $n = 50$) or to complete the questionnaires in paper format (for adolescents $n = 57$; for mothers $n = 66$; for fathers $n = 50$). To encourage the participants to complete the questionnaires at the end of each day, the online questionnaires were separately emailed to each family member (the adolescent and each parent) at 5:00 in the evening on the day of reporting. When the online questionnaires were completed, they were automatically uploaded to a secure online database with a timestamp. Those participants who completed paper questionnaires were instructed to mail the questionnaires within 24 hrs. Each family received \$10 for each day of data provided.

Compliance

On average, adolescents provided 12.3 days of data, mothers provided 12.1 days, and fathers provided 11.6 days ($Mdn = 14$ for all reporters). Parents and adolescents indicated the date for which they were reporting directly on the questionnaires. This date was compared to an electronic timestamp (for those reporting online) and to postmarks (for those reporting on paper). Of those questionnaires that were completed, adolescents finished 89.9% within 24 hrs of the day of reporting (96.5% within 48 hrs), mothers finished 95.9% within 24 hrs (97.6% within 48 hrs), and fathers completed 93.9% within 24 hrs (98.0% within 48 hrs). In total, adolescents provided 1,295 out of 1,484 possible days of data (87.3%), including 618 school days out of the 856 recorded non-holiday weekdays (72.2%). Outside of known holidays (e.g., Thanksgiving), we did not inquire why adolescents did not attend school on a given day; however, a large portion of the sample attends year-round school, where breaks are more frequent and interspersed throughout the year. It is possible that some adolescents transitioned into or out of school during the measurement period and thus provided some proportion of school data across the 2 weeks. Out of the possible days that adolescents reported, mothers provided data on 86.73% of those same days and fathers provided data on 83.02%.

Measures

All daily measures were created for this study. Mothers and fathers completed questionnaires regarding interparental and parent-child conflict. Adolescents' questionnaires had overlapping but fewer items than parents on the conflict constructs and also had mood and school problem items. Within-day reliabilities for the daily constructs represent the

internal consistency of the measure while taking into account statistical dependency resulting from repeated measurements over multiple days (Shrout & Lane, 2012).

Daily Parent-Adolescent Conflict—Adolescents completed four items pertaining to mother-adolescent conflict and an identical four items pertaining to father-adolescent conflict. On the parent questionnaire, mothers and fathers each completed eight items assessing their own conflict with their son or daughter. For both adolescent and parent, half of the items pertained to the parent and half pertained to the adolescent (e.g., parent questionnaire: “My child said something mean to me” and “I said something mean to my child;” child questionnaire: “I said something mean to my mom” and “My mom said something mean to me”). Items ranged from 0 (*not at all*) to 3 (*a lot*). To compute the scores, items were averaged with higher values indicating higher levels of mother-adolescent or father-adolescent conflict. For mother-adolescent conflict, within-day reliability was .90 for adolescent report and .87 for mother report; for father-adolescent conflict, within-day reliability was .77 for adolescent report and .87 for father report.

Daily Parent-Parent Conflict—Adolescents, mothers, and fathers provided daily reports of conflict between the two parents. Adolescents completed four items assessing parent-parent conflict, two for mother as actor and two for father as actor (e.g., “My mom yelled at or criticized my dad” and “My dad yelled at or criticized my mom”), and parents completed eight items total—in four, the parent reported on her or his own behavior (e.g., “I yelled at or criticized my partner/spouse”), and in an identical four, the parent reported on the partner (e.g., “My partner/spouse yelled at or criticized me”). All items on the adolescent and parent questionnaires ranged from 0 (*not at all*) to 3 (*a lot*). To compute scores, items were averaged with higher scores indicating higher parent-parent conflict. Within-day reliability was .88 for adolescent report, .91 for mother report, and .87 for father report.

Daily Negative Mood—Adolescents completed seven items assessing daily negative mood (e.g., “I felt sad,” “I felt restless or jumpy,” and “I was angry at someone else.”) Participants rated the items on a scale from 0 (*not at all*) to 3 (*a lot*), and items were averaged with higher scores indicating greater daily negative mood. Within-day reliability was .80.

Daily School Problems—Adolescents completed seven items assessing multi-dimensional aspects of school problems (Fredricks, Blumenfeld, & Paris, 2004), including school engagement (e.g., “I cut class/classes”) and performance (e.g., “I got a bad grade or did poorly on homework, a quiz or test”). Items reflected behaviors that occur at school (e.g., “I was late for school or late to a class at school”) or behaviors that could occur either at school or at home (e.g., “I didn’t finish my homework”). Participants rated items on a scale from 0 (*not at all*) to 3 (*a lot*). Within-day reliability was estimated to be .70.

Adolescent Symptoms—Adolescents completed questionnaires assessing depressive, anxious, and externalizing symptoms during their laboratory visit. Depressive symptoms over the past 2 months were assessed through the Children’s Depression Inventory (CDI; Kovacs, 1992), a 27-item self-report questionnaire with items ranging from 0 (*absence of symptom*) to 2 (*definite symptom*); we excluded one item assessing suicidality. Anxious

symptoms were measured using State-Trait Anxiety Inventory for Children (STAIC; Spielberger, 1973). The measure consists of 20 self-report items ranging from 1 (*hardly ever*) to 3 (*often*). Participants were instructed to report on how they “usually feel.” Externalizing symptoms over the past 6 months were assessed with the 30-item externalizing subscale of the Youth Self-Report of the Child Behavior Checklist (YSR; Achenbach, 1991). Items range from 0 (*not true*) to 2 (*very true or often true*). Cronbach’s alpha was .73 for the CDI, .90 for the STAIC, and .87 for the YSR.

Overview of Analyses

Because participants completed the daily questionnaires multiple times, observations were nested within participants. Multilevel modeling was used to correct for the statistical dependency of the nested data without aggregating the daily measures into a single time point. Descriptive and multiple-reporter analyses involving daily data were conducted using multilevel regression; associations not involving daily constructs (e.g., family income and psychological symptoms) were conducted using regression. For the descriptive and multiple-reporter analyses, bivariate associations were tested unless otherwise specified. The main study hypotheses were examined using multilevel path analysis. Cross-lagged panel models were used to test the bidirectional associations between variables while statistically adjusting for associations at the same time point and for autoregressive effects. Because we estimated fully saturated models, model fit is not reported in the following analyses. To maximize power and reduce bias associated with nonrandom missingness, multiple imputation was used (Enders, 2010); values for school problems were not imputed on weekend days. All available cases were analyzed with maximum likelihood estimation using Mplus Version 7.

Prior to the substantive analyses, we first present descriptive data on all study variables and then compare results across different reporters to determine whether to average scores across reporters. Due to the conceptual similarity between mother-adolescent and father-adolescent conflict, we present results of combined parent-adolescent data. However, due to the possible interest in examining dyad-level information, we also provide separate follow-up analyses on mother-adolescent and father-adolescent dyads. All hypotheses were examined twice, first within days (Within-Day Analyses) and then across days (Lagged Analyses). Within-day analyses investigated links between different variables on the same day (e.g., testing whether family conflict and school problems occur on the same day), and the lagged analyses investigated links across days (e.g., testing whether family conflict predicts school problems on the next day). To test across-day associations, we created lagged versions of variables for 1 day later ($t + 1$) and 2 days later ($t + 2$). Then, we tested the bidirectional associations between family conflict and school problems across 2 days and 3 days.

To test mediation, we first tested a 2-day model. We examined daily negative mood as a mediator of across-day spillover from family conflict (t) to school problems ($t + 1$) and from school problems (t) to family conflict ($t + 1$); because both daily negative mood on the same day as the event, as well as the next day, could mediate across-day spillover, both possibilities (t and $t + 1$) were tested as mediators in each direction. We then tested a 3-day sequence with daily negative mood ($t + 1$) mediating the association between family conflict (t) and school problems 2 days later ($t + 2$), as well as the association between school

problems (t) and family conflict 2 days later ($t + 2$). We tested both 2- and 3-day sequences to examine the time frame over which mediation may occur. All tests of mediation were conducted using Monte Carlo simulated confidence intervals (MacKinnon, Lockwood, & Williams, 2004; Selig & Preacher, 2008). This method has greater power than the Sobel (1982) test and can be used with imputed data. To examine cross-level moderation, psychological symptoms were added to the models as level 2 predictors of level 1 slopes. All moderation models simultaneously included main effects for the relation between overall psychological symptoms and levels of daily constructs.

Results

Descriptive Analyses

Means and standard deviations for all study constructs appear in Table 1 and correlations among the constructs appear in Table 2. Boys and girls did not differ in their mean levels of any study variables. Father-adolescent conflict occurred less often than mother-adolescent conflict ($\beta = -.12, p < .001$), and the two types of parent-adolescent conflict were moderately correlated. That is, if conflict occurred between the adolescent and mother on a given day, it was also more likely to occur between the adolescent and father on that day. Both daily mother-adolescent and father-adolescent conflict were correlated with parent-parent conflict. Parent-parent conflict, however, was not related to adolescents' daily mood or daily school-related problems.

As anticipated, overall symptoms were associated with some daily variables. For example, negative mood was significantly associated with depressive and anxious symptoms and daily school problems were associated with externalizing symptoms. Shared variance between daily variables and symptoms ranged from 5–34%, suggesting that daily variables are related to but not synonymous with overall psychological symptoms.

Analyses further indicated that family income, adolescent age, study cohort, and parent education were not significantly associated with family conflict, daily negative mood, school problems, or adolescent symptoms (all p -values $> .12$). Additional analyses showed that endorsement of mother-adolescent conflict ($\beta = -.08, p = .05$), daily negative mood ($\beta = -.13, p < .01$), and school problems ($\beta = -.12, p = .03$) decreased over time and that there was more mother-adolescent conflict ($\beta = .11, p < .01$) and father-adolescent conflict ($\beta = .09, p < .01$) on weekends than on weekdays. Thus, numerical day of reporting (1 to 14) and weekend were included as covariates in subsequent analyses.

Multiple-Reporter Data: Consistency in Level and Cross-Report Associations

With adolescents, mothers, and fathers all reporting on family conflict, we examined the extent to which there were: (a) consistencies across reporters in overall levels of different sources of family conflict and (b) associations between parent-reports of conflict and adolescents' reports of school problems and daily negative mood. Overall, different family members reported similar levels of conflict, with the exception that adolescents endorsed parent-parent conflict less often than did mothers ($\beta = -.37, p < .001$) and fathers ($\beta = -.43, p < .001$; all other p -values $> .23$), likely because adolescents do not witness all of the

conflict that parents engage in. Across the three reporters of parent-parent conflict, adolescents' reports were positively correlated with mothers' reports ($r = .24, p < .001$) and fathers' reports ($r = .27, p < .001$), and mothers' and fathers' reports were positively correlated ($r = .50, p < .001$). Moreover, adolescents' and mothers' reports of mother-adolescent conflict were positively correlated ($r = .29, p < .001$), as were adolescents' and fathers' reports of father-adolescent conflict ($r = .23, p < .001$).

Even when we looked across reporters, most hypothesized associations between constructs of interest were significant. For example, fathers' reports of father-adolescent conflict were positively associated with both adolescents' reports of daily negative mood ($\beta = .13, p = .01$) and school problems ($\beta = .18, p = .02$); mothers' reports of mother-adolescent conflict were positively associated with adolescents' report of daily negative mood ($\beta = .12, p < .001$) but not with adolescents' report of school problems ($\beta = .05, p = .34$); adolescents' reports of mother-adolescent conflict were positively associated with their own reports of daily negative mood ($\beta = .26, p < .001$) and school problems ($\beta = .24, p < .001$); adolescents' reports of father-adolescent conflict similarly were associated with their own reports of daily negative mood ($\beta = .24, p < .001$) and school problems ($\beta = .13, p = .01$).

Based on general patterns of similarity in the data from different reporters and to increase parsimony in the analyses, we present all further results from scores averaged across reporters (see the Appendix for all cross-reporter, within-adolescent report, and averaged reporter associations).

Hypothesis 1: Spillover between Family and School

Within-day analyses—Parent-adolescent conflict was significantly associated with same-day school problems ($\beta = .34, p < .001$). Separate analyses showed that both mother-adolescent ($\beta = .15, p = .01$) and father-adolescent ($\beta = .20, p < .01$) conflict were associated with school problems on the same day. In contrast, parent-parent conflict was not associated with school problems ($\beta = -.05, p = .37$).

Lagged analyses—Figure 2 presents the results for the 2-day (Panel A) and 3-day (Panel B) models when parents are combined. Results indicated bidirectional effects; school problems predicted next-day parent-adolescent conflict, and parent-adolescent conflict predicted next-day school problems. These across-day associations remained significant 2 days later. In the separate parent models, associations between school problems and mother-adolescent conflict 1 day later ($\beta = .08, p = .04$) and 2 days later ($\beta = .09, p = .02$) were significant whereas associations between mother-adolescent conflict and school problems 1 day later ($\beta = .10, p = .06$) and 2 days later ($\beta = .12, p = .06$) were marginally significant. Similar results emerged for the father-adolescent conflict model; associations between school problems and father-adolescent conflict 1 day later ($\beta = .11, p = .01$) and 2 days later ($\beta = .07, p = .01$) were significant whereas associations between father-adolescent conflict and school problems 1 day later ($\beta = .07, p = .14$) and 2 days later ($\beta = .12, p = .10$) were not significant. Parent-parent conflict was not significantly associated with school problems 1 day or 2 days later in either direction (all p -values $> .36$). Thus, parent-parent conflict was dropped from subsequent analyses.

Hypothesis 2: Negative Mood as a Mediator of Family-School Spillover

Within-day analyses—Figure 3 presents results for parent-adolescent conflict and then separately for mother-adolescent and father-adolescent conflict. Results indicated that daily negative mood statistically accounted for the within-day link between parent-adolescent conflict and school problems ($\beta = .14$, 95% CI [.14–.15]). Similarly, daily negative mood statistically accounted for the links between mother-adolescent conflict and school problems ($\beta = .05$, 95% CI [.03–.08]) and father-adolescent conflict and school problems ($\beta = .05$, 95% CI [.03–.09]).

Lagged analyses—Figure 4 displays the results of the 2-day mediation model. Daily negative mood (t) statistically accounted for the relation between parent-adolescent conflict (t) and school problems 1 day later ($t + 1$; $\beta = .04$, 95% CI [.01–.08]), and daily negative mood ($t + 1$) statistically accounted for the relation between school problems (t) and parent-adolescent conflict 1 day later ($t + 1$; $\beta = .03$, 95% CI [.01–.07]). Separate mother and father models were consistent with these findings. Daily negative mood (t) statistically accounted for links from family (t) to school 1 day later ($t + 1$; mother-adolescent conflict: $\beta = .05$, 95% CI [.04–.05]; father-adolescent conflict: $\beta = .06$, 95% CI [.05–.06]), and daily negative mood ($t + 1$) statistically accounted for the links from school (t) to family 1 day later ($t + 1$; mother-adolescent conflict: $\beta = .03$, 95% CI [.02–.03]; father-adolescent conflict: $\beta = .03$, 95% CI [.02–.03]). None of the other tested mediation effects in the 2-day model were significant, and no significant results were found for the 3-day mediational sequence (all p -values $> .40$).

Hypotheses 3 and 4: Psychological Symptoms as Moderators of Spillover Processes

Within-day analyses—Results showed that depressive and anxious symptoms moderated the association between parent-adolescent conflict and daily negative mood such that those adolescents with more overall depressive ($b = 0.25$, $p < .001$) and anxious ($b = 0.17$, $p = .03$) symptoms showed stronger links between parent-adolescent conflict and same-day negative mood, statistically adjusting for the overall associations between psychological symptoms and daily negative mood. These results were consistent in both the separate mother-adolescent (depressive symptoms: $b = 0.14$, $p = .02$; anxious symptoms: $b = 0.11$, $p = .04$) and father-adolescent (depressive symptoms: $b = 0.14$, $p = .02$; anxious symptoms: $b = 0.13$, $p = .04$) conflict models. In addition, externalizing symptoms emerged as a significant moderator in the father-adolescent conflict model but not the mother-adolescent model or the combined parent model. Specifically, those adolescents with more externalizing symptoms had stronger links between father-adolescent conflict and school problems ($b = 0.27$, $p = .04$), statistically adjusting for the overall relation between externalizing symptoms and daily school problems.

Figure 5 presents the moderation results for depressive (Panel A), anxious (Panel B), and externalizing (Panel C) symptoms and the simple slopes one SD above and below the mean. Probing the significant interactions showed that the simple slopes were positive and significantly different than zero. Anxious, depressive, and externalizing symptoms did not moderate any other paths (e.g., school problems and negative mood), and gender was not a significant moderator of any of the paths in the mediational sequence (all p -values $> .11$).

Lagged analyses—No across-day analyses testing the moderation effects of psychological symptoms or gender were significant (all p -values $> .17$).

Discussion

Our findings suggest that adolescents experience reciprocal spillover between family and school domains in their daily lives. Specifically, both mother-adolescent and father-adolescent conflict were associated with more school-related problems on the same day, and parent-adolescent conflict was bidirectionally associated with more school-related problems up to 2 days later; however, parent-parent conflict was not significantly associated with daily school problems (Hypothesis 1). Daily negative mood statistically accounted for associations between parent-adolescent conflict and school problems within 1 day and across 2 days, though not across 3 days (Hypothesis 2). Those adolescents reporting more anxious and depressive symptoms showed stronger within-day links between parent-adolescent conflict and daily negative mood (Hypothesis 3). In addition, adolescents reporting more externalizing symptoms showed stronger within-day links between school problems and father-adolescent, but not mother-adolescent, conflict (Hypothesis 4). Psychological symptoms did not moderate across-day links between parent-adolescent conflict, school problems, and daily negative mood, and gender was not a significant moderator of within- or across-day associations.

This study replicates findings from a nascent literature showing that, for adolescents, family conflict and school problems tend to co-occur within the same day (Lehman & Repetti, 2007; Repetti, 1996; Salamon et al., 2011) and, based on one previous study, also occur bidirectionally across 2 and 3 days (Flook & Fuligni, 2008). This study aimed to extend those findings by providing a rigorous test of the direction of these influences, as well as by identifying mechanisms underlying associations between family conflict and school problems. The results here support bidirectional effects across 2 and 3 days in models that combined mother-adolescent and father-adolescent conflict. When we looked separately at mother-adolescent and father-adolescent conflict, the associations from school problems to family conflict 1 day and 2 days later were significant but influences in the opposite direction were not significant. The separate models on each parent probably were not as statistically robust, i.e., fewer overall days of mother- or father-adolescent conflict, compared to the combined model of total parent-adolescent conflict. Nonetheless, it is worth noting that, even in the separate mother and father models, there is a significant effect from school to conflict with each parent, perhaps suggesting the salience of school problems—with their spillover implications—in this age group.

Overall, results showing associations between school and family, particularly the across-day findings, highlight an important aspect of risk in adolescence. Although adolescents' home and school lives may seem like disparate worlds, those adolescents who experience adverse events in one domain might be at heightened risk for adverse experiences in the other domain. Evidence of spillover for as long as 2-to-3 days further suggests that some adolescents might get caught in a reverberating cycle of negative events. An important component to understanding this risk is identifying underlying mechanisms and factors that

make some adolescents more vulnerable to negative spillover and less able to exit these reverberating patterns.

Daily Negative Mood as a Mechanism Underlying Family-School Spillover

Our findings on mood offer one clue explaining the links across domains of adolescents' lives. In contrast to one previous finding that immediate mood responses do not account for spillover between family and school (Salamon et al., 2011), we found that daily negative mood statistically accounts for family-school spillover across 1 and 2 days. We tested multiple possible mediational sequences based on the hypothesized role of mood with respect to family conflict and school problems and found that daily negative mood may be a mechanism that connects parent-adolescent conflict and school problems within days and bidirectionally across 2 days. The 2-day model indicated that family-school spillover was accounted for by across-day links between daily negative mood and school problems whereas daily negative mood and parent-adolescent conflict were linked within days. In contrast, we did not find effects across 3 days, which would have provided stronger evidence of mediation. Perhaps the effects of daily negative mood are limited to 2 days; mood likely resets over time, and as the time span increases, other, more proximal daily events may intervene to affect mood.

Daily negative moods generally comprise both cognitive (i.e. rumination and distraction) and affective (i.e., sad and irritable) components. An adolescent's negative mood on the same day as family conflict may influence school functioning through difficulties concentrating, reduced motivation, and irritability with schoolmates and teachers. Alternatively, adolescents who experience negative school events may feel angry or embarrassed, which could increase the likelihood of becoming annoyed and fighting with parents. Adolescents in negative moods might also become overly reactive to even ambiguous situations in other domains. Because we did not measure how the conflict was initiated, it is unclear whether adolescents' irritability spills over to interactions with parents or whether adolescents' worry about the school problems increases their sensitivity to parents' behavior. It is also worth noting that the daily negative mood assessed here contained a variety of dimensions, for example, both angry and sad reactions, which potentially function differently in spillover processes. Such effects could be distinguished in future research.

Psychological Symptoms as Moderators of Spillover Processes

Though some spillover between family and school domains is likely to occur for most adolescents, our results highlight psychological symptoms as intensifying these links. In general, adolescents suffering from depressive and anxious symptoms have a tendency to ruminate over what is wrong or to worry about what could go wrong—all of which can make them more vulnerable to the effects of negative daily events. Thus, it is not surprising that family conflict is more strongly associated with daily negative mood among adolescents with more internalizing symptoms. In addition, this study is the first to our knowledge to test externalizing symptoms as a moderator of daily spillover between family and school and provides evidence that general tendencies to act out in hostile or defiant ways may increase the likelihood of daily family-school spillover in adolescence.

It is interesting to note that anxious and depressive symptoms were associated with stronger links between parent-adolescent conflict and daily negative mood but not between school problems and daily negative mood. These findings suggest that interpersonal conflict, compared to other types of negative daily events, may be especially stressful for those adolescents with anxious and depressive symptoms. These results are consistent with other research indicating that reactivity to interpersonal stressors is associated with depressive symptomology (O'Neill et al., 2004). In addition, the associations among daily constructs were significant even at levels of psychological symptoms one *SD* below the mean. Thus, the moderation findings, while suggesting heightened risk among adolescents with more symptoms, also point to the global nature of daily connections across different life domains.

Though not directly tested in this study, it also is possible that spillover could contribute to the development or maintenance of psychological symptoms over time. Daily stressors are associated with increases in depressed mood among those adolescents with high levels of psychological symptoms (Schneiders et al., 2006). Similar research with adults indicates that daily emotional reactivity to stress is associated with increases in depressive symptoms over time but that depressive symptoms are not associated with increased emotional reactivity to daily stress (Cohen et al., 2005). In combination with these other studies, the present study contributes to a picture of an iterative process between negative daily experiences and psychological symptoms with psychological symptoms heightening adolescents' reactivity to daily negative events and increasing the likelihood of experiencing future negative events in other life domains. Such adolescents may then become locked in a negative feedback cycle involving daily negative mood, negative life events, and the maintenance or intensification of psychological symptoms. Moreover, just as negative feedback cycles could alter the psychological trajectories of adolescents, these cycles might also alter the trajectory of academic achievement if adolescents experience repeated difficulties at school and fall further behind in academics. To date, one study has linked negative family-school spillover to poorer academic outcomes over time (Flook & Fuligni, 2008). Additional longitudinal research examining how daily spillover processes during adolescence contribute to both psychological and academic outcomes is an important future step.

Sources of Conflict in Adolescents' Daily Lives

In addition to examining the specific hypotheses, this study provides contextual information about conflict in families' daily lives and indicates that different sources of family conflict may have differential effects on adolescent functioning. Consistent with past work (e.g., Almeida et al., 1999), different sources of family conflict (i.e., mother-adolescent, father-adolescent, and parent-parent) co-occurred on the same day, suggesting that conflict in one family subsystem increases the likelihood of conflict in other family subsystems. Results also showed differences in daily levels of family conflict across different dyads; as found elsewhere (e.g., Wierson, Armistead, Forehand, Thomas, & Fauber, 1990), mother-adolescent conflict occurred more frequently than father-adolescent conflict

Overall, mother-adolescent and father-adolescent conflict showed a similar pattern of results across all hypotheses, with the exception that externalizing symptoms moderated only the association between father-adolescent conflict and school problems. One possible

explanation is that fathers are more involved with and reactive to the school problems of adolescents exhibiting more generalized patterns of externalizing symptoms. Somewhat unexpectedly, parent-parent conflict did not predict daily school problems, perhaps due to adolescents not observing all of the daily parent-parent conflict that parents themselves report. Although conflict between parents can be very threatening to children's security (e.g., Cummings, George, McCoy, & Davies, 2012), parent-adolescent conflict may be a particularly important factor in adolescents' daily functioning, especially given that the emotional intensity of parent-adolescent conflict increases during this developmental stage (Laursen, Coy, & Collins, 1998).

Study Strengths

This study contributes to the small but growing number of studies that aim to understand the everyday experiences of adolescents through daily diary methods. In addition to reducing retrospective reporting, daily diary methodology allows us to capture fluctuations in adverse events across days, covariation between different types of adverse events, and how events relate to mood (Laurenceau & Bolger, 2005). Rather than examining family process and school problems as static measurements, the examination of within-person processes allows us to test whether problems in one domain contribute variability to problems in the other domain and, in a related vein, whether daily variability in a third variable (i.e., mood) accounts for this linkage.

These questions ultimately have important implications for interventions with families and adolescents, where we typically target micro-level, daily behaviors (e.g., paying attention in class) toward the ultimate goal of improving macrolevel outcomes (e.g., overall grades). Our data suggest that preventing negative events in one domain of functioning could prevent negative events from occurring in other domains. Moreover, helping adolescents learn to recover from daily negative moods may be a particularly effective point of intervention for preventing spillover. Conflict with parents and problems at school are, in themselves, not unusual experiences for adolescents; however, interrupting feedback loops between these events might reduce their frequency and overall impact. Information from daily diary research could inform both individual adolescent interventions involving mood regulation, as well as family interventions in terms of how parents and adolescents interact around school problems. In addition, idiographic monitoring of daily events and mood as part of client-based assessments could inform evidence-based treatment planning.

Beyond the use of daily diaries, the present study has several other methodological strengths. By using multilevel path analysis, specifically cross-lagged panel models, we were able to test bidirectional influences, which provided a stronger test of directional hypotheses than has been used in previous work. Another methodological strength was the inclusion of multiple reporters of family conflict. In this study, we have evidence of cross-reporter associations, which indicates that findings are not simply due to reporter bias. However, some inconsistencies across reporters still exist, suggesting that reporter differences can impact daily diary results. One possibility is that discrepancies in reporting reflect divergent viewpoints about what constitutes conflict. For example, in other research, reporter discrepancies in youth victimization have been linked to poorer youth adjustment

outcomes (Goodman, De Los Reyes, & Bradshaw, 2010). However, the implications of informant discrepancies in diary data and their associations with adolescent functioning have not, to our knowledge, been examined.

Study Limitations

Several limitations of this study must be noted. First, despite using cross-lagged panel models, causal relations cannot be proven, especially given the recursive influences between daily variables over time with no one identifiable eliciting event. Second, conflict, daily negative mood, and school problems were assessed once per day thereby obscuring information about the sequencing of events within a day. For example, we cannot determine whether parent-adolescent conflict elicited adolescents' daily negative mood or, alternatively, whether adolescents' daily negative mood increased the likelihood of parent-adolescent conflict. Third, daily negative mood was tested as a mediator but could also serve as a moderator such that adolescents who get into negative moods experience both more conflict with parents and more school problems in short succession. Fourth, although we examined both mother-adolescent and father-adolescent conflict, we did not test those effects in the same model and any differences in results for mothers and fathers must be interpreted cautiously. Fifth, though we examined two important domains (family and school) in adolescents' lives, an equally or perhaps more important domain during adolescence is peer interactions (Larson, & Richards, 1991); recent studies have begun to examine daily peer processes and demonstrate its relation to other domains in adolescents' daily lives (e.g., Chung, Flook, & Fuligni, 2011). Sixth, we used a volunteer community sample and thus caution that the results may not be representative of the population from which the sample was drawn. Relatedly, because we specifically recruited two-parent families, the results cannot be generalized to single-parent families, where parent-adolescent conflict might be more or less salient in spillover processes. However, by recruiting a sample of two-parent families, we were able to examine the effects of father-adolescent conflict, which has typically been understudied.

Conclusion

Overall, this study provides important information about reciprocal influences between family and school domains in adolescents' daily lives. Results suggest that family conflict and school problems are bidirectionally linked and that adolescents' daily negative moods may be a conduit in the transmission of problems across different life domains. In addition, psychological symptoms may heighten risk of spillover processes. Future work should examine how daily emotional reactivity and spillover processes contribute to more global outcomes such as the development of psychological symptoms and low achievement in school. Interrupting negative feedback patterns across family and school domains and reducing emotional reactivity to daily negative events could be important factors in promoting positive development in adolescence. daily negative mood and problems in school.

Acknowledgments

This material is based on work supported by NIH-NICHD Grants R01 HD 046807 and R21 HD 072170 (Margolin, PI), David and Lucile Packard Foundation Grant 00-12802 (Margolin, PI), and NSF GRFP Grant DGE-0937362

(Timmons, PI). We thank Darby Saxbe for valuable input on this manuscript, as well as the families who participated in the study and the USC Family Studies Project research team. An abbreviated version of this paper was presented at the 2013 SRCD conference.

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Appendix

Within-Day Associations between Family Conflict, Daily Negative Mood, and Problems in School by Reporter

	β	SE	β/SE	p
Adolescent report				
Daily negative mood on mother-adolescent conflict	.26	.04	6.71 <	.001
Daily negative mood on father-adolescent conflict	.24	.04	5.96 <	.001
Daily negative mood on parent-parent conflict	.07	.03	2.23	.03
Problems in school on daily negative mood	.22	.04	5.10 <	.001
Problems in school on mother-adolescent conflict	.24	.06	3.87 <	.001
Problems in school on father-adolescent conflict	.13	.05	2.48	.01
Problems in school on parent-parent conflict	-.02	.06	-.33	.74
Mother report				
Daily negative mood on mother-adolescent conflict	.12	.03	4.18 <	.001
Daily negative mood on parent-parent conflict	.05	.04	1.40	.16
Problems in school on mother-adolescent conflict	-.02	.05	-.37	.71
Problems in school on parent-parent conflict	-.08	.07	-1.38	.17
Father report				
Daily negative mood on father-adolescent conflict	.13	.05	2.77	.01
Daily negative mood on parent-parent conflict	.04	.04	.05	.34
Problems in school on father-adolescent conflict	.18	.07	2.40	.02
Problems in school on parent-parent conflict	.06	.06	.89	.38
Averaged across reporters				
Daily negative mood on mother-adolescent conflict	.25	.03	7.40 <	.001
Daily negative mood on father-adolescent conflict	.23	.04	6.09 <	.001
Daily negative mood on parent-parent conflict	.07	.04	1.76	.08
Problems in school on daily negative mood	.22	.04	5.10 <	.001
Problems in school on mother-adolescent conflict	.15	.06	2.63	.01
Problems in school on father-adolescent conflict	.20	.09	2.87 <	.01
Problems in school on parent-parent conflict	-.02	.06	-.35	.73

Note. Analyses were initially run in separate regression models. Only adolescents reported on

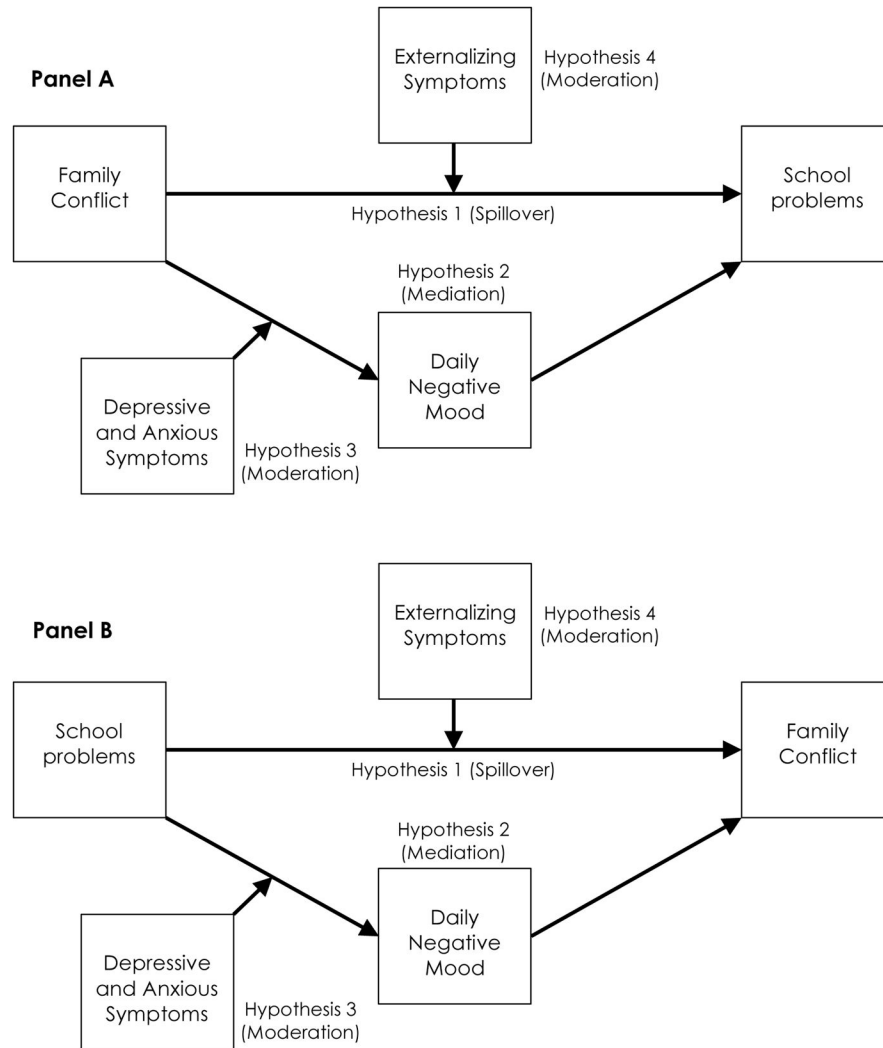


Figure 1. The theoretical framework for the associations between study variables. Panel A represents the daily association from family conflict to school problems, and Panel B represents daily association in the opposite direction. In the analyses, bidirectional associations are modeled simultaneously; directions are separated here for easier interpretation. Associations were modeled first within-days and then across days.

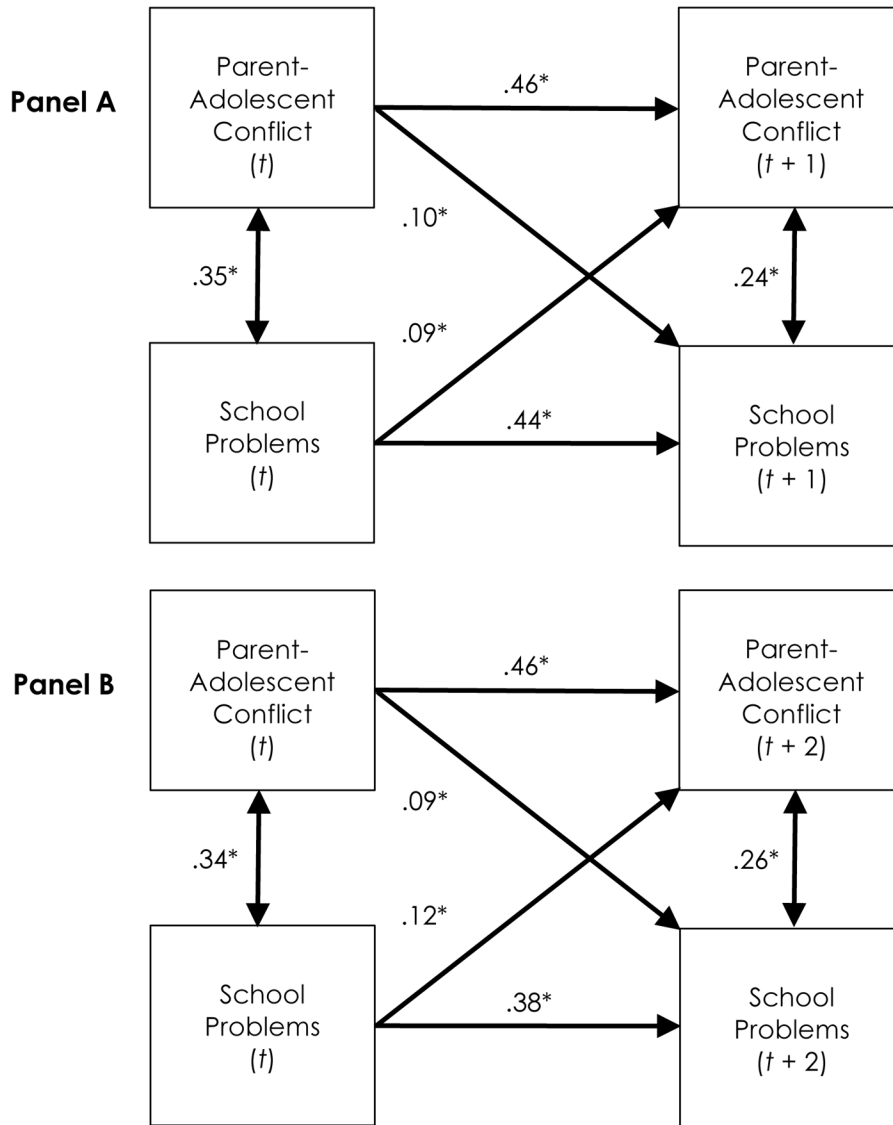


Figure 2. Models of bidirectional associations between parent-adolescent conflict and school problems across 2 days and 3 days. Panel A represents the bidirectional across-day associations between parent-adolescent conflict and school problems at time t and time $t + 1$. For parent-adolescent conflict ($t + 1$): $R^2 = .21$, and for school problems ($t + 1$): $R^2 = .27$. Panel B represents the bidirectional across-day associations between parent-adolescent conflict and school problems at time t and time $t + 2$. For parent-adolescent conflict ($t + 2$): $R^2 = .15$, and for school problems ($t + 2$): $R^2 = .21$. Standardized coefficients are shown. For simplicity, the covariates are not depicted. * $p < .05$

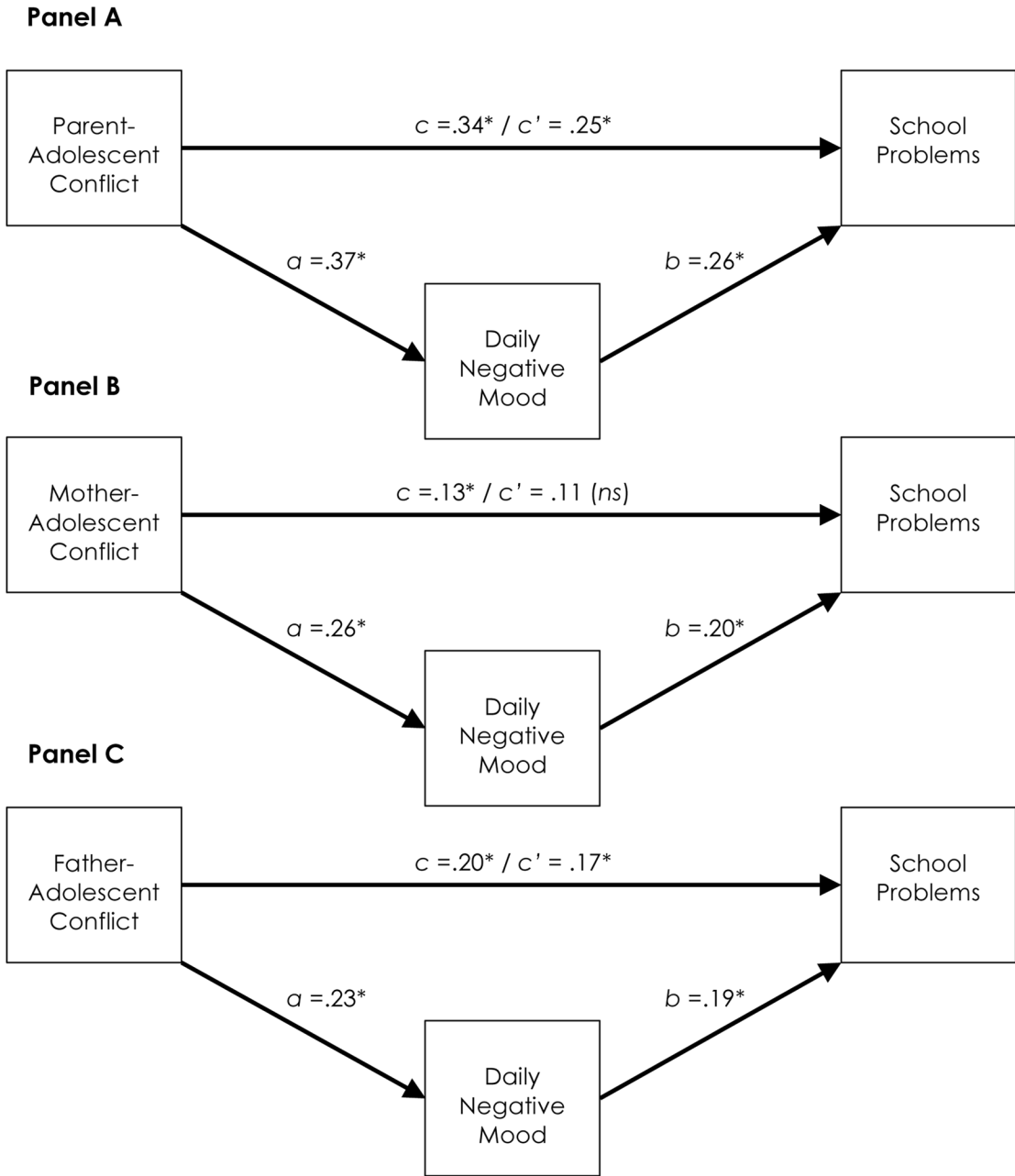


Figure 3. Within-day model testing daily negative mood as a mediator of family-school spillover. Panels A, B, and C present results for parent-, mother-, and father-adolescent conflict, respectively. Path *a* is the association between conflict and daily negative mood; path *b* is the association between daily negative mood and school problems; path *c* is the direct association between parent-adolescent conflict and school problems prior to adding daily negative mood to the model, and path *c'* represents the association after daily negative mood is added. * $p < .05$

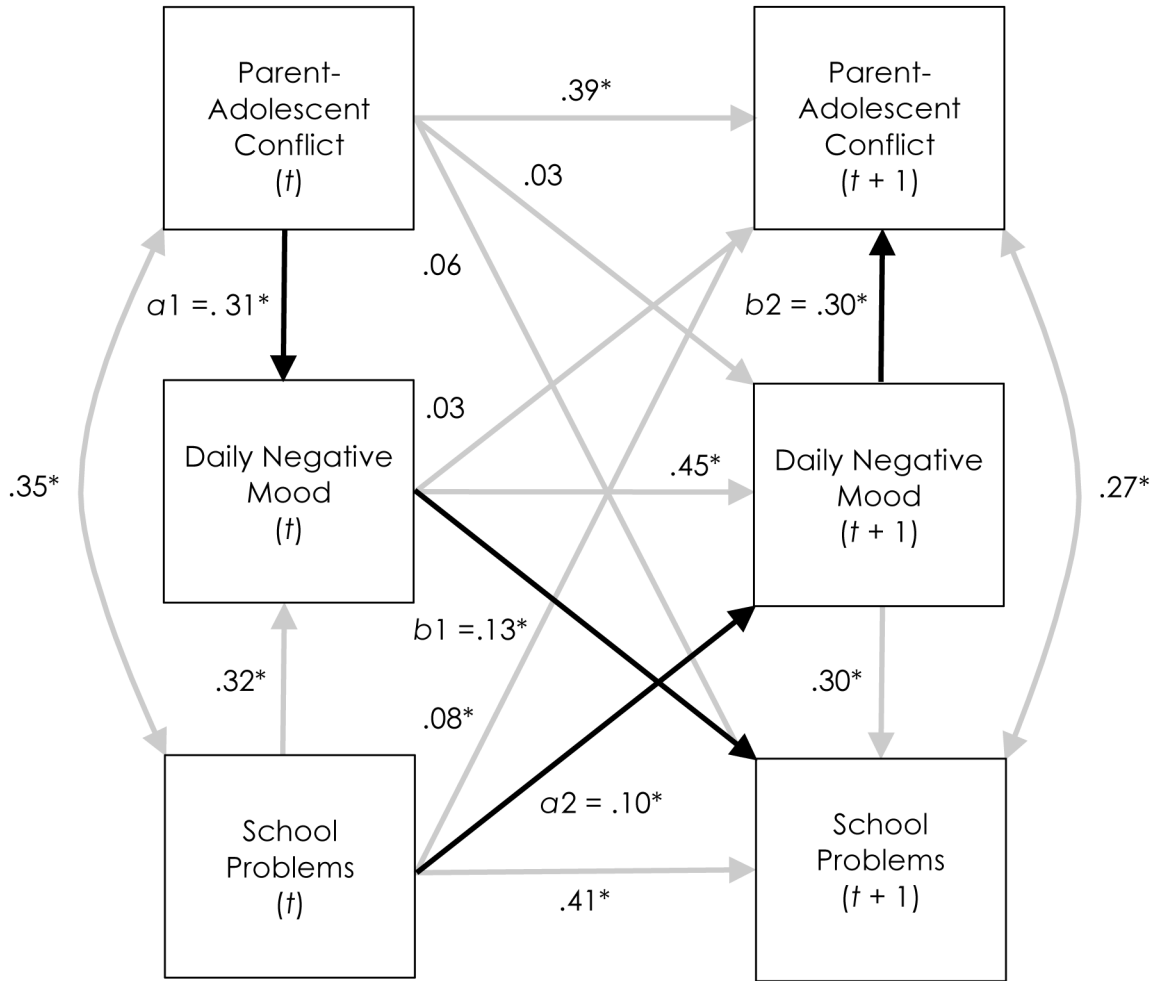
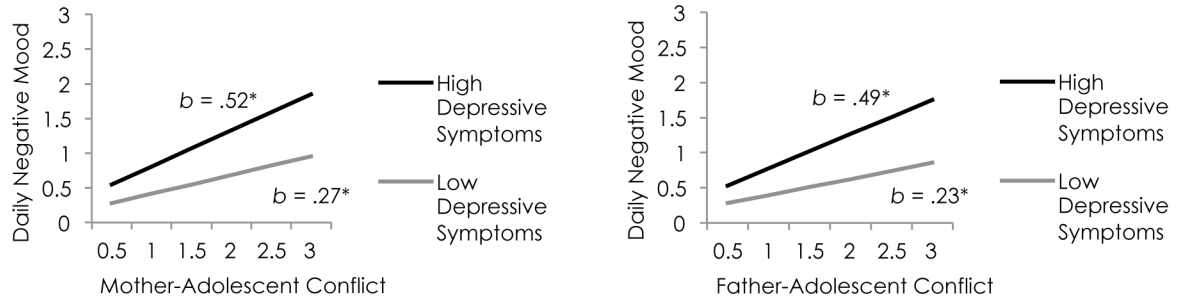
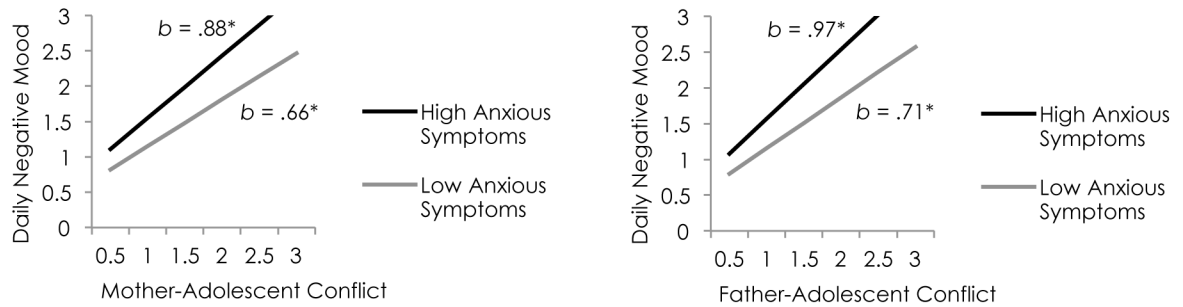


Figure 4. Daily negative mood as a mediator of the bidirectional associations between parent-adolescent conflict and school problems across 2 days. This figure represents the mediation model of (1) daily negative mood (t) mediating the association between parent-adolescent conflict (t) and next-day school problems ($t+1$) and (2) of daily negative mood ($t+1$) mediating the association between school problems (t) and next-day parent-adolescent conflict ($t+1$). Gray lines represent all modeled paths. Black lines represent the two significant mediation effects, denoted by paths $a1$ and $b1$ for the first mediation effect and $a2$ and $b2$ for the second mediation effect. For parent-adolescent conflict ($t+1$): $R^2 = .27$, for daily negative mood ($t+1$): $R^2 = .27$, and for school problems ($t+1$): $R^2 = .26$. Standardized coefficients are shown. For simplicity, non-significant mediation effects and covariates are not depicted. * $p < .05$

Panel A: Depressive Symptoms as a Moderator of the Associations between Parent-Adolescent Conflict and Daily Negative Mood



Panel B: Anxious Symptoms as a Moderator of the Associations between Parent-Adolescent Conflict and Daily Negative Mood



Panel C: Externalizing Symptoms as a Moderator of the Associations between Parent-Adolescent Conflict and School Problems

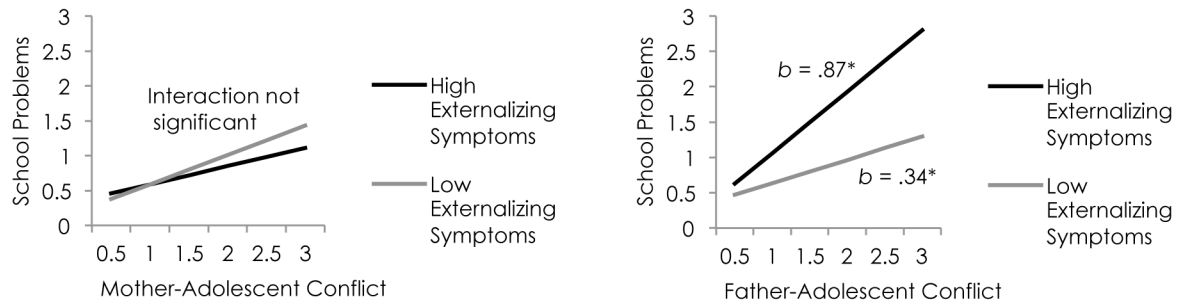


Figure 5.

Psychological symptoms as moderators of within-day associations between family conflict, daily negative mood, and school problems. Panel A represents the relation between parent-adolescent conflict and daily negative mood moderated by depressive symptoms. Panel B represents the relation between parent-adolescent conflict and daily negative mood moderated by anxious symptoms. Panel C represents the relation between parent-adolescent conflict and school problems moderated by externalizing symptoms. All interactions are

significant except for mother-adolescent conflict in Panel C. High symptoms = $M + 1 SD$;
Low symptoms = $M - 1 SD$. Coefficients represent simple slopes. * $p < .05$

Table 1

Means (Standard Deviations) of Study Variables

Construct	Entire Sample	Males	Females
Daily parent-parent conflict ^{ab}	.16 (.28)	.14 (.25)	.18 (.31)
Daily mother-adolescent conflict ^{ab}	.22 (.35)	.23 (.33)	.21 (.37)
Daily father-adolescent conflict ^{ab}	.14 (.26)	.16 (.26)	.12 (.25)
Daily negative mood ^{ac}	.29 (.40)	.31 (.43)	.28 (.38)
Daily school problems ^{ac}	.44 (.38)	.44 (.42)	.43 (.35)
Depressive symptoms ^c	5.36 (4.88)	5.09 (4.58)	5.63 (5.19)
Anxious symptoms ^c	31.68 (6.82)	31.70 (6.66)	31.66 (7.04)
Externalizing behaviors ^c	10.92 (7.22)	10.57 (7.14)	11.77 (7.47)

Note.

^a Within-day means representing the average per item;^b Averaged across reporters;^c Adolescent report only.

Table 2

Bivariate Correlations between Study Variables

	1.	2.	3.	4.	5.	6.	7.
1. Daily parent-parent conflict							
2. Daily mother-adolescent conflict	.15*						
3. Daily father-adolescent conflict	.27*	.34*					
4. Daily negative mood	.07	.26*	.23*				
5. Daily school problems	-.01	.15*	.20*	.22*			
6. Depressive symptoms	.01	.09	.25*	.53*	.25*		
7. Anxious symptoms	-.02	.13	.18	.58*	.22*	.67*	
8. Externalizing symptoms	-.06	.30*	.36*	.39*	.35*	.47*	.52*

Note. Multilevel correlations are calculated for associations involving daily-level variables;

* $p < .05$