Daily links between school problems and youth perceptions of interactions with parents: A diary study of school-to-home spillover

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Abstract

This study examined how academic and peer problems at school are linked to family interactions at home on the same day, using eight consecutive weeks of daily diary data collected from early adolescents (60% female; M age = 11.28, SD = 1.50), mothers and fathers in 47 families. On days when children reported more academic problems at school, they, but not their parents, reported less warmth and more conflict with mothers, and more conflict and less time spent around fathers. These effects were partially explained by same-day child reports of higher negative mood. Peer problems were less consistently associated with parent-child interactions over and above the effects of academic problems that day. A one-time measure of parent-child relationship quality moderated several daily associations, such that the same-day link between school problems and child-report of family interactions was stronger among children who were closer to their parents.

Keywords

parent-child interactions; peer problems; academic problems; mood; diary methods

1. Introduction

At the same time that the social environment at home shapes a wide range of developmental outcomes in children, family interactions may be influenced by parents and children's daily experiences outside the home. Diary studies have indicated that evening interactions between parents and children are shaped by parents' experiences at work during the day (Repetti & Wood, 1997), and children's negative school experiences such as peer rejection and academic failure (e.g., Chung, Flook, and Fuligni, 2011; Repetti, 1996; Timmons & Margolin, 2015). In turn, these negative parent-child interactions may generate more stress in the family. The short-term process by which experiences in one setting (i.e., school) affect an individual's experiences and interactions in another setting (i.e., home) is sometimes referred to as "spillover" (Larson & Almeida, 1999; Repetti & Wang, 2017).

Early adolescence is a transitional period during which important changes take place in family dynamics, academic demands, and peer relationships. A close investigation of the

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links between negative events at school and interactions at home can help to extend our understanding of how youths respond to peer and academic problems during this dynamic developmental period. The current study used 8 weeks of daily diary data collected from mothers, fathers, and their 8–13 year-old children to test whether, how, and for which families, academic and peer problems at school are linked to same-day parent-child interactions. The academic and peer problems examined in this study are relatively minor, yet common in the daily lives of many youths. Examples include making a mistake in class, getting a bad grade on a test, being teased by another child, and feeling rejected by peers. In addition to testing the effects of these school problems on parent-child interactions, we examined daily negative and positive mood as mediators, and assessed whether the strength of these links varied depending on the quality of the parent-child relationship.

1.1. Daily spillover from school to home

Past diary research indicates that stressful experiences at school influence child perceptions about family interactions at home (Chung et al., 2011; Lehman & Repetti, 2007; Repetti, 1996; Timmons & Margolin, 2015). For example, fifth graders reported that they were more demanding and difficult with their parents on days when they experienced more academic and peer problems (Lehman & Repetti, 2007). More recently, Timmons and Margolin (2015) found a bidirectional association between academic problems and parent-child conflict in middle adolescents over a 2-week period. Although most past research has focused on the effect of school problems on negative parent-child interactions, at least one study also found a marginally significant decline in positive parent-child interactions on days when children reported more peer problems at school (Lehman & Repetti, 2007).

The emerging literature on school-to-home spillover indicates that school problems negatively impact the quality of parent-child interactions at home; however, it has been limited by short study durations and a narrow focus on child perceptions of parent-child interaction quality (Chung et al., 2011; Lehman & Repetti, 2007; Salamon, Johnson, & Swendsen, 2011; Timmons & Margolin, 2015). Given that school problems are not frequently experienced by community samples, most children in these studies report very few peer or academic problems over the course of only 1 or 2 weeks. By assessing links between experiences at school and at home across an 8-week period, the current study captures more variability in peer and academic problems, and provides a more reliable test of same-day family interactions. In addition to describing parent-child conflict or warmth each day, this study also asks how academic and peer problems may be linked to time spent around a parent that day.

Diary studies conducted with adults indicate that social withdrawal is a common response to daily job stress; mothers and fathers tend to withdraw from spouses and children on days when they experience heavier workloads or more negative interactions at work (Repetti & Wood, 1997; Schulz, Cowan, Pape Cowan, & Brennan, 2004). Social withdrawal has also been identified as one way that young children cope with stressful peer situations (Rubin, Coplan, & Bowker, 2009), but it is unclear whether this response may persist beyond the immediate peer setting and into the home. Alternatively, early adolescents may seek support

from parents on days when they experience school problems, and consequently spend more time around parents.

Academic problems and peer problems are stressful for children. Diary studies indicate that both types of problems are linked to increases in negative mood, declines in positive mood, and increases in parent-child conflict (Chung et al., 2011; Kiang & Buchanan, 2014; Lehman & Repetti, 2007; Morrow, Hubbard, Barhight, & Thomson, 2014; Nishina & Juvonen, 2005). However, only a few studies have compared the differential effects of academic and peer problems at school on parent-child interactions at home (Lehman & Repetti, 2007; Repetti, 1996). Academic problems may be particularly linked to parent-child conflict during early adolescence, given that academic concerns are one of the most frequently identified topics of parent-child conflict in 10- to 14-year-old youth (Allison & Schulz, 2004). We compared the effects of academic and peer problems on parent-child interactions to extend our understanding of how early adolescents respond to different types of mild negative events in daily life.

1.2. Negative and positive mood mediation

School problems are associated with increases in state negative mood (e.g., depressed, anxious, distressed; Morrow et al., 2014; Nishina & Juvonen, 2005; Reynolds & Repetti, 2008), and these internal changes partially account for the daily links between negative school events and child perceptions of conflict with parents (Chung et al., 2011; Lehman & Repetti, 2007; Timmons & Margolin, 2015). Diary research also suggests that negative mood mediates changes in adult social behavior at home after stressful days at work, including withdrawal from social interactions (Repetti, Wang, & Saxbe, 2009; Story & Repetti, 2006). Thus, negative mood may also explain potential declines in perceptions of warmth and the amount of time a child spends around family members following stressful days at school.

Although prior research has identified negative mood as one mechanism accounting for the effect of negative school events on parent-child interactions, much less work has focused on the potential mediating role of decreased positive mood. Some diary studies suggest that negative school events may also lead to declines in positive mood, and specifically, state self esteem (Kiang & Buchanan, 2014; Lehman & Repetti, 2007; Schneiders et al., 2006). For example, declines in state self-esteem appear to partially account for the same-day association between problems at school and parent-child aversive behaviors at bedtime in fifth grade children (Lehman & Repetti, 2007). In contrast to negative mood, positive mood is theorized to promote action, social connectedness, motivation and cognitive flexibility (Fredrickson, 2001). Given the close link between state positive mood and warm family interactions across the lifespan (Flook, 2011; Ramsey & Gentzler, 2015), a decline in positive mood may lead children to withdraw and disengage from warm interactions with family members. The current study examined whether levels of positive and negative mood mediate the link between school problems and parent-child interactions on the same day.

1.3. Parent-child relationship quality as a moderator of daily school-to-home spillover

Intensive repeated measures allow researchers to distinguish daily fluctuations in the characteristics of family interactions from more stable characteristics of the parent-child relationship. To our knowledge, no study has examined how enduring relationship characteristics may impact children's short-term responses to daily school problems in early adolescence or middle childhood. We addressed this gap by exploring how positive parent-child involvement, defined in the current study as a stable and trait-like measure of openness, closeness and knowledge in a parent-child dyad (Elkins, McGue, & Iacono, 1997), moderates daily links between negative events at school and parent-child interactions.

Over the long term, a warm and supportive parent-child relationship helps to promote adaptive patterns of coping in the face of stressful events such as peer rejection (Bowes, Maughan, Caspi, Moffitt, & Arseneault, 2010). Parent-child relationship quality is also associated with better emotion regulation in disappointing situations in the laboratory (Morris et al., 2011), problem-solving skills and persistence in the classroom (Neitzel & Stright, 2003), and voluntary disclosure of everyday activities to fathers (Bumpus, Crouter, & McHale, 2006). Together, these results indicate that positive parent-child relationships promote healthy development; children in such relationships cope better with stress and show better emotion regulation skills. In everyday life, we expect these children to exhibit more adaptive emotional and behavioral responses to problems at school, perhaps resulting in less evidence of negative mood spillover. It is also possible that children who are closer to their parents seek more support and spend more time around parents on days when they experience problems at school. The current study explored the effect of positive parent-child involvement on the daily association between negative events at school and parent-child interactions at home.

1.4. Parent perceptions of spillover

Much of the existing spillover research is limited by the exclusive use of adolescent self-reports (e.g., Chung et al., 2011; Salamon et al., 2011). However, two published studies that have assessed parent perceptions of daily interactions suggest that parents may not detect the same patterns that children report (Lehman & Repetti, 2007; Timmons & Margolin, 2015). Lehman and Repetti (2007) found that, while fifth grade children perceived more aversive interactions with parents (i.e., difficult, demanding child behaviors and critical parent behaviors) on days when they experienced more negative events at school, this association was not corroborated by parents' diary reports. In an adolescent sample, youth perceptions of greater parent-child conflict on more academically stressful days at school were substantiated by fathers', but not by mothers', same-day ratings (Timmons & Margolin, 2015). It is possible that school problems color children's perceptions of their interactions with parents, but do not impact their actual behaviors or their parents' recognition and response to such behaviors (Lehman & Repetti, 2007). Null parent-report findings in prior studies may also be attributed to differences in items used to assess parent versus child perceptions of interactions. The current study addressed these concerns by using parallel scales to assess youth, mother and father reports of warmth and conflict in their daily interactions across 8 weeks. We used a novel dyadic multilevel modeling approach to conservatively examine how academic and peer problems are simultaneously linked to child

and parent perceptions of interactions while accounting for the interdependency of ratings within members of the dyad.

1.5. Parent gender differences

Negative events at school may be linked to mother-child and father-child interactions differently. Mothers and fathers often differ in their roles as caregivers, and in the number of opportunities they typically have to interact with their children. Evidence suggests that mothers tend to be the primary providers of rides and homework support, whereas fathers often act as fun playmates (Denham, Basset, & Wyatt, 2010; Saxbe, Repetti, and Graesch, 2011). Mothers appear to be more actively involved in the socialization of emotion regulation than fathers do in early childhood (Denham, Bassett, & Wyatt, 2010), and children more consistently disclose information to their mothers than to their fathers in early adolescence (Bumpus et al., 2006). If mothers play a larger role than fathers do in caregiving, they may also be particularly sensitive to children's experiences at school compared to fathers. To explore possible parent gender differences, the current study tested how peer and academic problems were linked to parent and child perceptions of daily interactions in mother-child and father-child dyads.

1.6. Current study

We investigated daily links between problems at school and parent-child interactions across 8 weeks of diary data collected from 47 early adolescents and their parents, using dyadic multilevel modeling. Three specific aims were addressed. First, we examined the same-day associations between academic and peer problems at school and youth-, mother-, and father-reports of parent-child interactions at home. We hypothesized that negative school events would, on average, be associated with less warmth and more conflict across all reporters, but did not have a specific hypothesis about how they would be associated with time spent around parents. Second, we tested negative and positive mood as potential mediators of significant same-day associations. We hypothesized that the significant associations between school problems and parent-child interactions would be mediated by lower positive mood and higher negative mood on the same day. Third, we explored how same-day links between school problems and parent-child interactions varied according to parent-child relationship quality. We expected the daily associations between school problems and parent-child interactions to be most pronounced among children who reported lower levels of positive parent-child involvement.

2. Methods

2.1. Participants

A diverse sample of two-parent families with at least one child between the ages of 8 and 13 was recruited in the Los Angeles area through newspaper advertisements, flyers distributed in schools, community centers, medical clinics, and direct mailings. Because the larger study focused on daily family life and susceptibility to upper respiratory infections, parents and children were screened for mental and physical health problems (e.g., major depressive disorder, autoimmune disorder), yielding a generally healthy sample free of major chronic illness. Data were collected in three yearly cohorts between the months of September and

May (2009-2012). While both parents were encouraged, only one was required to participate. Our final sample of 47 families included 47 mothers (M age = 43.29, SD = 6.31), 39 fathers (M age = 43.67, SD = 8.10), and 47 youth (19 boys, 28 girls; M age = 11.28, SD = 1.50). The inclusion criteria for child age was 8 to 12 years for cohort 1, and 9 to 13 years in cohorts 2 and 3; 40 of the 47 children were between the ages of 10 to 13. Parents reported a median personal income within a $31,850 to $82,400 bracket, with 57% of mothers (59% of fathers) having attained a 4-year college degree or higher. About 45% of mothers worked full time (80% of fathers), 21% worked part time (13% of fathers), and the remainder reported being homemakers, unemployed, disabled, or "other." Parents self-identified as 45% non-Hispanic white, 22% Latino/Hispanic, 17.5% African-American, 12.5% Asian, 1.5% Native American and 1.5% "Other".

2.2. Procedure

During an initial visit that typically occurred in the home, researchers discussed study procedures with the family and obtained informed parent consent and youth assent (approved by the university's Institutional Review Board). During a second visit, typically within a week of the first, participants were trained on diary procedures and children completed online questionnaires with a researcher present. The 8-week daily diary began on the Saturday following the second visit.

Family members were asked to complete their daily diaries every weekday and weekend day, as close to bedtime as possible each night by using unique usernames and passwords to log into our study web portal. Personalized "home" pages allowed communication with lab staff through private messages, and provided a link to the current-day online diary (blocks of items were randomly ordered across days of the week). In addition to payment for study procedures not covered here, each parent earned $20 and each child earned $10 per week of participation in the diary portion of the study, as well as $5 bonus gift cards per week of 100% diary compliance.

A total of 7,029 daily diaries were completed across all participants, out of which 98% were done on time (i.e., completed on the evening due or before 9:00 A.M. the next morning; Reynolds, Repetti & Robles, 2016). The current study utilizes the Monday through Friday subset of daily diaries: 1,879 were completed by youths, 1,883 by mothers, and 1,559 by fathers.

2.3. Measures

2.3.1. Questionnaire rating of positive parent-child involvement—Children completed the 12-item positive involvement subscale of the Parental Environment Questionnaire, once, prior to the start of the diary phase (PEQ; Elkins et al., 1997). Youths completed two versions of the scale, reporting on positive involvement with mothers and with fathers (e.g., "I share concerns with my mother [father]", "My mother [father] comforts me when I am discouraged"). Response options ranged from 1 (*definitely false*) to 4 (*definitely true*) and ratings were averaged, with higher scores reflecting greater warmth and positive involvement in the parent-child relationship. The PEQ has adequate validity (Elkins

et al., 1997), and internal consistency was acceptable in the current study (see Table 1 for summary statistics).

2.3.2. Youth daily diary—Diary scales for daily academic problems, peer problems, and parent-child interactions were adapted from the Youth Everyday Social Interaction and Mood measure (YES-I-AM; Repetti, 1996). Diary scales for daily positive and negative mood used items drawn from prior daily diary studies (Cohen, Alper, Doyle, Treanor, & Turner, 2006; Doyle, Gentile, & Cohen, 2006; Repetti, 1996). Table 1 presents summary statistics, including intraclass correlation coefficients (ICC), and estimates of between-person (R_{KF}) and within-person (R_C) reliability (see Cranford et al., 2006). Table 2 presents zero-order correlations at the day-level of analysis.

Academic and peer problems: On days when children reported having gone to school, they completed five items assessing academic problems (e.g., "I made a mistake in class today", "I had trouble finishing my schoolwork today") and five items assessing peer problems (e.g., "Another kid teased me today", "I felt that my friends didn't want to be around me today"). Responses (1 = *yes*, 0 = *no*) were summed across five academic problems items and five peer problems items each day to create a daily academic problems score and a daily peer problems score. Academic problems and peer problems scores remained uncentered in our analyses, as the zero point on the response scale was meaningful (i.e., no problems that day). Academic problems or peer problems was coded as missing if there were missing responses on one or more of the school problem items that day. Across all children, school attendance was endorsed on 1,449 days out of the total 1,879 weekday diaries completed. Out of those diaries on which participants reported school attendance, 98% had non-missing academic problems and peer problems scores (n_{days} = 1,418).

Parent-child interaction: On days when children indicated that they saw their mother or father, they responded to separate mother and father versions of items assessing daily parent-child warmth (2 items: "My mom [dad] gave me love and attention today", "I had fun with my mom [dad] today") and daily parent-child conflict (3 items: "My mom [dad] got mad at me today", "I was angry at my mom [dad] today", "My mom [dad] punished me today") using a three-point scale: 1 = *not at all*, 2 = *some*, 3 = *a lot*. Responses for warmth and conflict were averaged to create scale scores for each day, for each parent: mother-child warmth, father-child warmth, mother-child conflict, and father-child conflict. Children also responded to separate mother and father versions of one item indicating how much time they spent with each parent (1 item: "I spent time around my mom [dad] today") using a three-point scale. Given that parent-child interaction items were presented only on days when children reported having seen their parent, the distribution for the "time spent around parent" item was skewed, with very few *not at all* responses across participants and days. We therefore dichotomized the item response scales (0 = *not at all* or *some*, 1 = *a lot*), resulting in two binary variables: time spent around mother, time spent around father. See Table 1 for descriptive statistics.

Negative and positive mood: Daily positive mood was assessed with eight items (e.g., "happy", "calm", "lively", "loved") and negative mood was assessed with six items (e.g.,

"sad", "worried", "mean", "unhappy") rated on a four-point response scale, ranging from 0 (*not at all*) to 4 (*all day*). Responses to each item were averaged each day to create scale scores reflecting daily positive mood and daily negative mood. Because negative and positive mood were tested as mediators, they were centered around each child's own mean.

2.3.3. Parent daily diary—Parent daily diary items were drawn from the Parent Home Data Questionnaire (Doumas, Margolin, & John, 2003; Margolin, 1990). For the current study, we selected items parallel to those on the child diary to assess warmth ("Today I showed my child love and affection", "Today I had fun with my child"), and conflict ("Today I punished my child", "Today I was angry with my child", "How angry was your child at you today") between the parent and the target child. Responses to each item (1 = *not at all*, 2 = *some*, 3 = *a lot*) were averaged to create scale scores each day (see Table 1). Warmth and conflict items were coded as missing if the parent reported no contact with the child that day. Unfortunately, no item on the parent diary directly paralleled the child-reported time spent around parent item. Zero-order correlations between child, mother and father reports of interactions are shown in Table 2.

3. Results

Results are presented in three parts corresponding with our three specific aims. First, we describe the within-family associations between school problems and same-day parent-child interaction outcomes. Second, we assessed children's daily reports of positive and negative mood as mediators of statistically significant same-day associations. Third, we examined how the same-day associations between school problems and parent-child interactions vary depending on positive parent-child involvement, a trait-like measure of parent-child relationship quality.

3.1. Aim 1: same-day links between school problems and parent-child interaction

Intensive repeated measurements were collected from multiple family members across 8 weeks of study participation. Due to the interdependent nature of our data, we estimated dyadic multilevel linear regression models using SAS v.4 (PROC MIXED) software. The multilevel model for dyadic diary data treats the three-level design (diaries within persons nested within families) as two levels of random variation (Bolger & Laurenceau, 2013; Laurenceau & Bolger, 2005). It permits the simultaneous estimation of parent- and child-report outcomes while controlling for the interdependency between family members' scores and the autocorrelation of each individual's diary ratings from one day to the next. We used a restricted maximum likelihood estimation method, and specified a first order autoregressive structure for the residuals in all dyadic models.

Our first aim was to test whether school problems spill over into the home, predicting youth and/or parent perceptions of more negative same-day interactions. Separately for mother-child and father-child dyads, we first estimated the independent contributions of peer problems and academic problems as simultaneous predictors of same-day parent and child perceptions of warmth. We then estimated a parallel set of two dyadic models with conflict serving as the outcome. For tests involving time spent around mother or father, we estimated two (non-dyadic) multilevel logistic regression models, as we only had child ratings of this

binary outcome. Because our prior work demonstrated small declines in parent reports of warmth and conflict across the 8-week period (Reynolds, Robles, & Repetti, 2016), we controlled for study day in all analyses.

As shown in Table 3, on days when children reported more academic problems, children, but not mothers, reported significantly less mother-child warmth and more mother-child conflict. Academic problems were not associated with time spent around mothers, and peer problems did not predict any measure of mother-child interaction. On days when children reported more academic problems, children, but not fathers reported significantly more father-child conflict. Academic problems were also associated with time spent around fathers; with every additional academic problem experienced at school, children were about 35% less likely to report that they spent a lot of time around their fathers (odds ratio = 0.65). Academic problems were not linked to father or child reports of father-child warmth, and peer problems did not predict any measure of father-child interaction.

In sum, academic problems were associated with day-level changes in the average child's diary reports of parent-child interactions, but these changes were not reflected in same-day mother or father diary reports. Peer problems were not linked to parent-child interactions over and above the effect of academic problems.

3.2. Aim 2: mediation by daily reports of mood

Our next aim was to test children's reports of positive mood and negative mood as potential mediators of significant associations between school problems and perceptions of parent-child interactions at home. Because all significant effects in dyadic spillover models involved only child reports, we conducted mediation analyses using non-dyadic models. Each mediation model was tested in three steps, shown in Figure 1. First, we established significant associations between academic problems and the four significant parent-child interaction outcomes described above: (a) mother-child warmth, (b) mother-child conflict, (c) father-child conflict, and (d) time spent around fathers. Second, we separately tested the effect of academic problems on negative mood or positive mood (the a paths in Figure 1), over and above the effects of peer problems and study day, in two separate multilevel linear regression models. The association between academic problems and negative mood was significant ($a = 0.02$, SE = 0.01, $t = 2.26$, $p = .024$); however, positive mood was only marginally associated with academic problems ($a=-0.02$, SE = 0.01, $t = -1.76$, $p = .078$) and, therefore, was not further examined as a potential mediator. In the last step, we examined the simultaneous effects of academic problems (the c' paths) and negative mood (the b paths) on the four parent-child interaction outcomes in separate multilevel regression models controlling for peer problems and study day. Point estimates and standard errors of indirect effects were obtained by multiplying the a path and b path coefficients, as recommended by Kenny, Korchmaros, and Bolger, (2003). To obtain significance tests of these indirect effects, we converted the point estimates and standard errors into z-scores.

As shown in Figure 1, three out of four significant daily associations were partially mediated by negative mood. Negative mood partially accounted for the association between academic problems and child-reported mother-child warmth. Both the direct and indirect effects were significant ($c'=-0.04$, SE = 0.02, $t = -2.55$, $p = .011$; $a*b = -0.003$, SE = 0.001, $z = -1.94$, p

= .026). Negative mood also partially mediated the associations between academic problems and child-reported mother-child conflict and father-child conflict. In each mediation model, both the direct effect (mother-child conflict: $c' = 0.04$, SE = 0.01, $t = 2.98$, $p=.003$; father-child conflict: $c'=0.03$, SE = 0.01, $t = 2.31$, $p=.021$) and indirect effect (mother-child conflict: $a*b = 0.01$, SE = 0.003, $z = 2.22$, $p = .013$; father-child conflict: $a*b = 0.01$, SE = 0.002, $z = 2.18$, $p=.014$) were significant. Negative mood did not mediate the association between academic problems and time spent around father ($a*b=-0.004$, SE = 0.008, $z=-0.49$, $p=.313$).

3.3. Aim 3: moderation by positive parent-child involvement

The third aim tested whether same-day links between school problems and parent-child interactions varied according to child ratings on a one-time questionnaire measure of positive parent-child involvement. We returned to the dyadic multilevel and logistic multilevel regression models described in Aim 1, but added positive parent-child involvement as a between-family predictor of each outcome, in addition to its cross-level interactions with academic problems and peer problems. Questionnaire ratings of involvement were centered around the grand mean. Significant interactions were probed by testing simple slopes for prototypical children with higher (+1 SD) versus lower (−1 SD) ratings of involvement (Preacher, Curran, & Bauer, 2006).

3.3.1. Parent-child warmth—Positive involvement moderated within-person associations between school problems and child-reported warmth in both mother-child and father-child dyadic models (see Table 4). As shown in Figure 2, the negative within-person association between academic problems and youth perceptions of mother-child warmth was stronger at higher levels of positive mother-child involvement. Tests of simple slopes revealed that more academic problems predicted lower same-day child ratings of mother-child warmth at higher levels of positive involvement ($B=-0.11$ SE = 0.02, 95% CI [−0.16, −0.07], $p<.001$), but not at lower levels of positive involvement ($B=-0.01$, SE = 0.02, 95% CI [−0.05, 0.03], $p=.623$). Positive mother-child involvement did not moderate associations between peer problems and mother-child warmth.

Positive father-child involvement, on the contrary, moderated the association between peer problems and child perceptions of same-day father-child warmth (see Figure 3). More peer problems predicted lower same-day child ratings of father-child warmth at higher levels of positive involvement ($B=-0.07$, SE = 0.03, 95% CI [−0.13, −0.007], $p=.030$), but higher ratings of father-child warmth at lower levels of positive involvement ($B = 0.06$, SE = 0.03, 95% CI [0.005, 0.11], $p=.033$). Positive father-child involvement did not moderate associations between academic problems and father-child warmth.

3.3.2. Parent-child conflict—Questionnaire ratings of positive involvement moderated the same-day association between academic problems and child-reported father-child conflict, as displayed in Figure 4 and Table 4. Tests of simple slopes revealed that more academic problems were associated with higher child ratings of father-child conflict at higher levels of positive involvement ($B = 0.06$, SE = 0.02, 95% CI [0.02, 0.10], $p=.001$), but not at lower levels of positive involvement ($B = 0.02$, SE = 0.01, 95% CI [−0.01, 0.04], $p=.$

288). Positive parent-child involvement did not moderate associations between academic problems and mother-child conflict, nor did it moderate associations between peer problems and conflict with either parent.

3.3.3. Time spent around parent—Positive parent-child involvement was a significant moderator in one of the two multilevel logistic regression models for time spent around parent (see Figure 5 and Table 4). Among children who reported higher levels of positive mother-child involvement on the one-time questionnaire, each additional academic problem experienced at school was associated with an approximately 46% decrease in the odds of a youth reporting that he or she spent a lot of time around his or her mother that day (OR=.54, SE=.11, 95% CI [.37, .81], p=.002). Academic problems were not associated with time spent around mother for those who reported lower levels of positive mother-child involvement (OR=.99, SE=.19, 95% CI [.67, 1.44], p<.942). Positive parent-child involvement did not moderate the association between academic problems and time spent around fathers, nor did it moderate the association between peer problems and time spent around either parent. Taken together, moderation results indicated that children who reported higher levels positive parent-child involvement tended to show a stronger link between negative events at school and parent-child interactions at home.

4. Discussion

This study examined how academic and peer problems affect child- and-parent reports of parent-child interactions in daily life, using data from eight consecutive weeks of daily diaries completed by 8-to 13-year-old children, their mothers, and their fathers. Results suggested that academic problems, but not peer problems, were linked to youth perceptions of same-day interactions with their parents. On days when children reported more academic problems at school, they perceived more conflict with both parents, less warmth in their interactions with mothers, and less time spent around fathers. Most of these effects were partially explained by higher levels of negative mood. Whereas academic problems were linked to children's subjective reports of parent-child interactions at home, they were not associated with parent reports. Finally, several daily associations were moderated by the quality of the parent-child relationship, such that children who reported more positive involvement with their mothers and fathers also showed stronger links between negative events at school and parent-child interactions at home.

4.1. Daily links between school problems and parent-child interactions

Our results suggested that daily academic problems color children's perceptions of interactions with mothers and fathers. Corroborating prior findings of school-to-home spillover (Lehman & Repetti, 2007; Repetti, 1996; Timmons & Margolin, 2015), children in the current study reported more conflict in their interactions with both mothers and fathers on days when they experienced more academic problems. The average child also reported less warmth in interactions with mothers and less time spent around fathers on these days.

Relatively few studies in existing literature have examined the effect of school problems on positive aspects of parent-child interactions. Lehman and Repetti (2007) found that peer problems, not academic problems, predicted marginally less positive interactions among

fifth graders and their parents. In the current study, we found that more academic problems were linked to less warmth in mother-child but not father-child dyads. Differences in study design could contribute to the discrepancy between current and past findings. Rather than assigning children to report on their interactions with either mothers or fathers as done in prior work, all children described their interactions with both parents in the current study. By describing them separately, children might be better able to distinguish the quality of their interaction with mothers, from that with fathers. In addition, with 8 weeks of daily diaries as opposed to five days, we had greater power to test day-level effects.

To our knowledge, this is the first study to consider how school problems affect the amount of time that children spend around their parents. Our results suggested that children may be spending less time around fathers, and perhaps withdrawing from them, on days when they experience more academic problems. A similar pattern was found for time spent around mothers, but only for youth who reported a closer, more positively involved relationship with their mother. That academic problems were not associated with time spent around less positively involved mothers could be due to the role mothers play in childcare. Day-to-day caretaking needs are more often fulfilled by mothers than fathers (Saxbe et al., 2011). This basic level of interaction may be the norm for mother-child dyads who are less positively involved, regardless of the child's experiences outside the home. In contrast, more positively involved mother-child dyads are likely to engage in voluntary leisure time together on top of more circumscribed caregiving activities. It is from these voluntary interactions that children have the most leeway for withdrawal. Relative to the average mother, the amount time fathers spend with their children may be more voluntary, flexible, and amendable to the influence of school and work experiences (Bumpus et al., 2006). Thus, across all parent-child relationships, when given the choice, a child may desire to spend less time around family members on days when they experience more negative events at school. Obtaining objective ratings of time spent together and child reports of their *desire* to withdraw – regardless of their actual ability to do so – may help clarify these findings in future research.

For most children, peer problems were not associated with parent-child interactions over and above the effect of academic problems. This is inconsistent with past findings in middle adolescents, which suggest that more peer problems predict more child-reported parent-child conflict (Chung et al., 2011; Flook, 2011). Despite the 8-week long diary period in the current study, peer problems may not have occurred frequently enough or at high enough intensities to allow us to reliably capture their same-day effects on parent-child interactions. Age may also explain why we did not find a link between peer problems and parent-child interactions in our sample of early adolescents. Because peer interactions become increasingly salient throughout adolescence, the children in our sample may have been less impacted by minor peer problems in comparison to the middle adolescents in prior work (Chung et al., 2011; Flook, 2011).

Our results highlight the advantages of using reports from multiple informants when assessing daily spillover processes. Replicating findings from Lehman and Repetti's (2007) study on fifth graders, academic problems were prominently linked to children's – but not parents' – perceptions of social interactions at home. Whereas children perceive their interactions with parents to be more conflictual and less warm, their behaviors may not

differ noticeably or contribute to overt conflict that is detectable to mothers or fathers. However, these findings contradict those of another recent study, which suggested that academic problems may affect fathers' perceptions of interactions with middle adolescents (Timmons & Margolin, 2015). Again, this inconsistency may be due to age differences between samples. Perhaps fathers of older adolescents are more aware of, or play a larger role in discipline related to academic problems compared to fathers of younger children. Measurement differences may also help explain the discrepant findings. The students in our sample completed items about academic performance, whereas the adolescents in Timmons and Margolin's (2015) study reported on a wider range of school-related problems, including delinquent behaviors (e.g., cutting class). Parents may be more aware of, or take greater disciplinary action in response to behavioral problems compared to struggles with academic performance.

4.3. Mediating role of negative mood

Consistent with past research and theory (Larson & Almeida, 1999; Repetti & Wang, 2017), negative mood appeared to, in part, account for associations between problems at school and interactions at home. Youths reported more than usual levels of negative mood on days when they experienced more academic problems, and this partially mediated the associations between academic problems and same-day parent-child interaction quality. Still, a direct association between academic problems and parent-child warmth and conflict persisted over and above the effects of negative mood and peer problems, suggesting that the effect of academic problems on parent-child interaction quality is not merely an artifact of study design (i.e., shared method variance, state-dependent recall). Rather, the direct effect indicates that additional mechanisms may account for children's reports of more negative interactions with parents on days when they experience more academic problems. For example, disclosing poor grades to parents or seeking help with homework may temporarily strain parent-child interactions at night. Although parents may view these types of interactions as necessary and helpful for improving academic functioning, children may experience them as stressful and frustrating in the short-term.

Contrary to our hypothesis, positive mood did not mediate these within-person associations. We found that variability in positive mood was mostly attributable to between-person differences, rather than day-to-day experiences; thus positive mood was less amenable to effects of academic or peer problems that spontaneously arose. Increases in negative mood, not declines in positive mood, appear to help bridge children's daily experiences at school to perceptions of family interactions at home.

4.4. Moderating role of positive parent-child involvement

Daily associations between school problems and perceptions of parent-child interactions tended to be more pronounced in children who reported higher levels of positive parent-child involvement. Children who were closer to their mothers reported less warmth and less time around their mothers on days when they experienced more academic problems at school. Likewise, children who were closer to their fathers reported more conflict on days when they experienced more academic problems, and less warmth on days when they experienced more peer problems at school.

There are several explanations for these results, which ran contrary to our hypothesis. Children who share a closer relationship with their parents may be more likely to seek parents' social support when they have experienced problems at school. For example, in an observational study of parent-child dyads, children tended to express their feelings about a negative event more freely when they had parents who were more accepting and encouraging of their emotions (Gentzler, Contreras-Grau, Kerns, & Weimer, 2005). Although these children show more adaptive coping skills (Gentzler, Contreras-Grau, Kerns, & Weimer, 2005), they may also experience more frustration as they share their negative feelings about their days with their parents. Relatedly, addressing or discussing an academic problem - especially with a parent - is not always pleasant; those who are closer to their parents may be particularly sensitive to declines in parental warmth or expressions of disappointment. Although school problems may be linked with less warmth, more conflict, and less time spent around parents in the short-term, these associations may also reflect adaptive family processes, such as child help-seeking behavior, and parental monitoring and involvement; especially when observed in response to a relatively infrequent stressor.

4.5. Limitations and directions for future research

Several limitations must be considered when interpreting our findings. First, although our sample size is not small relative to other daily diary studies, we had limited statistical power to assess the effect of individual-level moderators, including youth age and gender. Given parent and child gender differences in the socialization of emotions (Cassano, Zeman, & Sanders, 2014), it is possible that school-to-home associations differ according to both parent and child gender. Future research with larger samples should explore how the gender match between parents and children may moderate these patterns, and how these associations differ by child age. We are particularly intrigued by the role of gender and age in helping to explain our only significant result involving peer problems: peer problems were associated with more father-child warmth for youth who reported a less positively involved relationship with their fathers, but less warmth in children who reported a closer relationship.

Second, children in our community sample of two-parent households generally reported low levels of family distress and problems at school. The daily effects of school problems on parent-child interactions may differ in more distressed families. Third, children completed daily diary questions about school events, mood and characteristics of interactions with parents at the same time each day. Thus, we cannot ascertain temporal precedence in our mediation analyses, and it is possible that within-reporter associations are inflated by state dependent recall or shared method variance. Nonetheless, we detected a significant link between academic problems and parent-child interaction quality, even when controlling for peer problems. In addition, the similar pattern of results observed in studies that assessed school events and parent-child interaction at different time points during the day and in different settings (Lehman & Repetti, 2007; Repetti, 1996) lend further credence to these results. Future studies incorporating two or more diaries across the day and parent ratings of time spent with the target child will further minimize shared method variance. Despite these limitations, the length of the data collection and the assessment of several aspects of parent-child interactions distinguish this study from past research.

Results suggesting differences between child and parent perceptions of parent-child interactions raise interesting questions about the concurrent and long-term predictive validity of youth versus parent reports. We do not know whether child perceptions of parent-child interactions following stressful days at school are more accurate indicators of coping and better predictors of long-term adjustment outcomes than are parent perceptions. Future research should examine how youth responses to daily school stress relate to their adjustment over the long term.

The current study adds to a small body of literature examining the daily interplay between child experiences within and outside of the home. Results shed light on the complex short-term processes linking parenting to youth coping and provide a micro-level, within-person perspective on how parent-child relationship quality impacts children's responses to everyday stressors experienced outside the home. Future studies incorporating intensive repeated measures such as daily diaries will allow researchers to examine influences of everyday stressors from the perspectives of multiple family members, better understand short-term socialization processes that underlie adaptation to school-related stress in the long term, and identify specific parent and youth behaviors that can be targeted for interventions.

Acknowledgments

References

Allison BN, Schultz JB. Parent-adolescent conflict in early adolescence. Adolescence. 2004; 39:101–119. [PubMed: 15230069]

Bolger, N., Laurenceau, JP. Intensive Longitudinal Methods: An Introduction to Diary and Experience Sampling Research. New York, NY: The Guilford Press; 2016.

Bowes L, Maughan B, Caspi A, Moffitt TE, Arseneault L. Families promote emotional and behavioural resilience to bullying: Evidence of an environmental effect. Journal of Child Psychology and Psychiatry. 2010; 51:809–817. [PubMed: 20132419]

Bumpus MF, Crouter AC, McHale SM. Linkages between negative work-to-family spillover and mothers' and fathers' knowledge of their young adolescents' daily lives. The Journal of Early Adolescence. 2006; 26:36–59.

Cassano MC, Zeman JL, Sanders WM. Responses to children's sadness: Mothers' and fathers' unique contributions and perceptions. Merrill-Palmer Quarterly. 2014; 60:1–23.

Chung GH, Flook L, Fuligni AJ. Reciprocal associations between family and peer conflict in adolescents' daily lives. Child Development. 2011; 82:1390–1396. [PubMed: 21793820]

Cohen S, Alper CM, Doyle WJ, Treanor JJ, Turner RB. Positive emotional style predicts resistance to illness after experimental exposure to rhinovirus or influenza A virus. Psychosomatic Medicine. 2006; 68:809–815. [PubMed: 17101814]

Cranford JA, Shrout PE, Iida M, Rafaeli E, Yip T, Bolger N. A procedure for evaluating sensitivity to within-person change: Can mood measures in diary studies detect change reliably? Personality & Social Psychology Bulletin. 2006; 32:917–929. [PubMed: 16738025]

Denham SA, Bassett HH, Wyatt TM. Gender differences in the socialization of preschoolers' emotional competence. New Directions for Child and Adolescent Development. 2010; 2010:29–49. [PubMed: 20552658]

Doumas DM, Margolin G, John RS. The relationship between daily marital interaction, work, and health-promoting behaviors in dual-earner couples: An extension of the work-family spillover model. Journal of Family Issues. 2003; 24:3–20.

Doyle WJ, Gentile DA, Cohen S. Emotional style, nasal cytokines, and illness expression after experimental rhinovirus exposure. Brain, Behavior, and Immunity. 2006; 20:175–181.

Elkins IJ, McGue M, Iacono WG. Genetic and environmental influences on parent–son relationships: Evidence for increasing genetic influence during adolescence. Developmental Psychology. 1997; 33:351–363. [PubMed: 9147842]

Flook L. Gender differences in adolescents' daily interpersonal events and well-being. Child Development. 2011; 82:454–461. [PubMed: 21410907]

Fredrickson BL. The role of positive emotions in positive psychology. The broaden-and-build theory of positive emotions. American Psychologist. 2001; 56:218–226. [PubMed: 11315248]

Gentzler AL, Contreras-Grau JM, Kerns KA, Weimer BL. Parent–child emotional communication and children's coping in middle childhood. Social Development. 2005; 14:591–612.

Kenny DA, Korchmaros JD, Bolger N. Lower level mediation in multilevel models. Psychological Methods. 2003; 8:115–128. [PubMed: 12924810]

Kiang L, Buchanan CM. Daily stress and emotional well-being among Asian American adolescents: Same-day, lagged, and chronic associations. Developmental Psychology. 2014; 50:611–621. [PubMed: 23815704]

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

Lehman BJ, Repetti RL. Bad days don't end when the school bell rings: The lingering effects of negative school events on children's mood, self-esteem, and perceptions of parent–child Interaction. Social Development. 2007; 16:596–618.

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

Margolin, G. Parent home data questionnaire. Los Angeles, CA: University of Southern California; 1990.

Morris AS, Silk JS, Morris MDS, Steinberg L, Aucoin KJ, Keyes AW. The influence of mother-child emotion regulation strategies on children's expression of anger and sadness. Developmental Psychology. 2011; 47:213–225. [PubMed: 21244160]

Morrow MT, Hubbard JA, Barhight LJ, Thomson AK. Fifth-grade children's daily experiences of peer victimization and negative emotions: Moderating effects of sex and peer rejection. Journal of Abnormal Child Psychology. 2014; 42:1089–1102. [PubMed: 24668164]

Neitzel C, Stright AD. Mothers' scaffolding of children's problem solving: Establishing a foundation of academic self-regulatory competence. Journal of Family Psychology. 2003; 17:147–159. [PubMed: 12666470]

Nishina A, Juvonen J. Daily reports of witnessing and experiencing peer harassment in middle school. Child Development. 2005; 76:435–450. [PubMed: 15784092]

Preacher KJ, Curran PJ, Bauer DJ. Computational tools for probing interactions in multiple linear regression, multilevel modeling, and latent curve analysis. Journal of Educational and Behavioral Statistics. 2006; 31:437–448.

Ramsey MA, Gentzler AL. An upward spiral: Bidirectional associations between positive affect and positive aspects of close relationships across the life span. Developmental Review. 2015; 36:58–104.

Repetti RL. The effects of perceived daily social and academic failure experiences on school-age children's subsequent interactions with parents. Child Development. 1996; 67:1467–1482. [PubMed: 8890495]

Repetti R, Wang S, Saxbe D. Bringing it all back home: How outside stressors shape families' everyday lives. Current Directions in Psychological Science. 2009; 18:106–111.

Repetti R, Wang S. Effects of job stress on family relationships. Current Opinion in Psychology. 2017; 13:15–18. [PubMed: 28813286]

Repetti RL, Wood J. Effects of daily stress at work on mothers' interactions with preschoolers. Journal of Family Psychology. 1997; 11:90–108.

Reynolds BM, Repetti RL. Contextual variations in negative mood and state self-esteem: What role do peers play? The Journal of Early Adolescence. 2008; 28:405–427.

Reynolds BM, Robles TF, Repetti RL. Measurement reactivity and fatigue effects in daily diary research with families. Developmental Psychology. 2016; 52:442–456. [PubMed: 26689757]

Rubin KH, Coplan RJ, Bowker JC. Social withdrawal in childhood. Annual Review of Psychology. 2009; 60:141–171.

Salamon R, Johnson EI, Swendsen J. Daily life mechanisms of stress spillover among early adolescents experiencing academic difficulty. European Journal of Psychology of Education. 2011; 26:453–463.

Saxbe DE, Repetti RL, Graesch AP. Time spent in housework and leisure: Links with parents' physiological recovery from work. Journal of Family Psychology. 2011; 25:271–281. [PubMed: 21480706]

Schneiders J, Nicolson NA, Berkhof J, Feron FJ, van Os J, deVries MW. Mood reactivity to daily negative events in early adolescence: Relationship to risk for psychopathology. Developmental Psychology. 2006; 42:543–554. [PubMed: 16756444]

Schulz MS, Cowan PA, Pape Cowan C, Brennan RT. Coming home upset: Gender, marital satisfaction, and the daily spillover of workday experience into couple interactions. Journal of Family Psychology. 2004; 18:250–263. [PubMed: 14992625]

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

Timmons AC, Margolin G. Family conflict, mood, and adolescents' daily school problems: Moderating roles of internalizing and externalizing symptoms. Child Development. 2015; 86:241–258. [PubMed: 25346538]
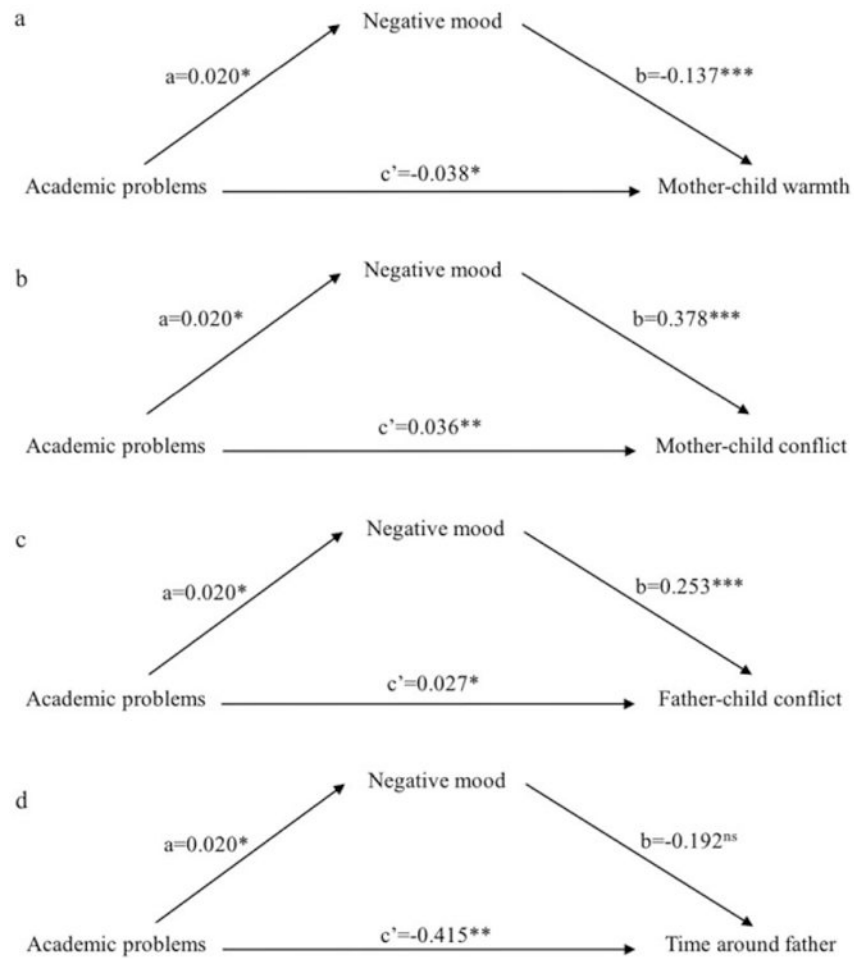
Figure 1.
Tests of negative mood as mediator of association between academic problems and child-report of parent-child interaction. *$p < 0.05$, **$p < 0.01$, *** $p < 0.001$. All values indicate unstandardized coefficients. a path - effect of the predictor variable on the mediator; b path - effect of the mediator on the outcome variable, controlling for the independent variable; c' path - the direct effect of the predictor on the outcome variable, over and above the mediated effect

Figure 2.
Moderation effect of positive mother-child involvement on same-day association between academic problems and child report of mother-child warmth. *** $p < 0.001$

Figure 3.
Moderation effect of positive father-child involvement on same-day association between peer problems and child report of father-child warmth. *$p < 0.05$
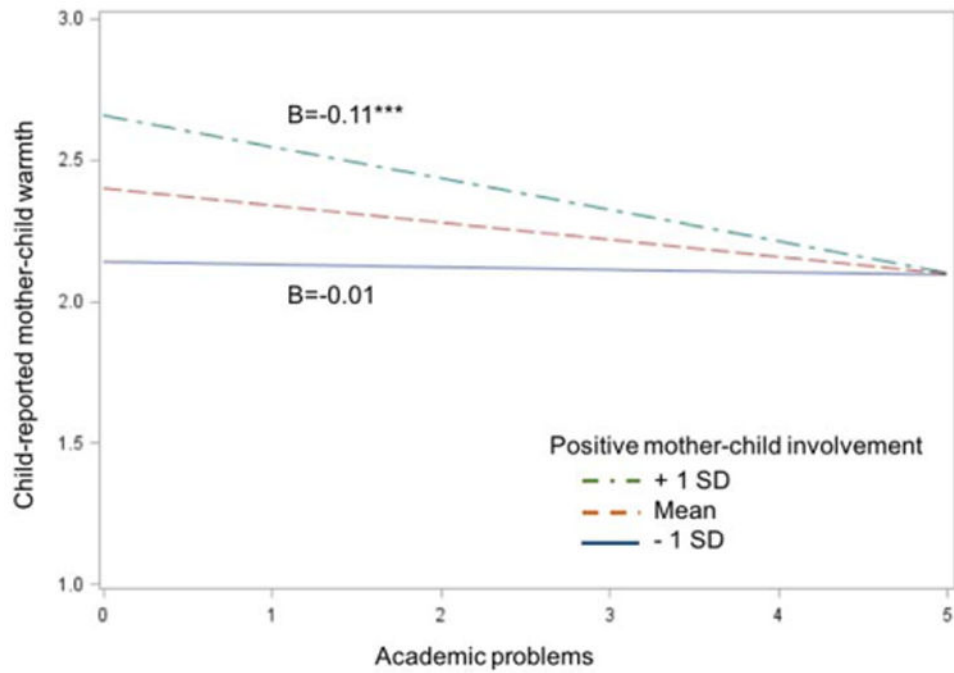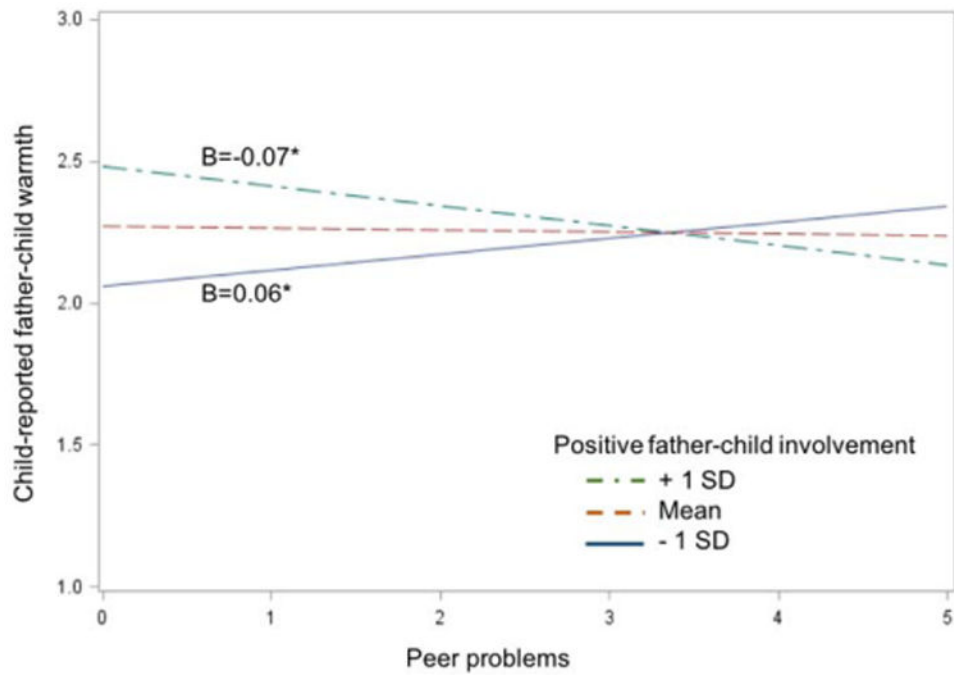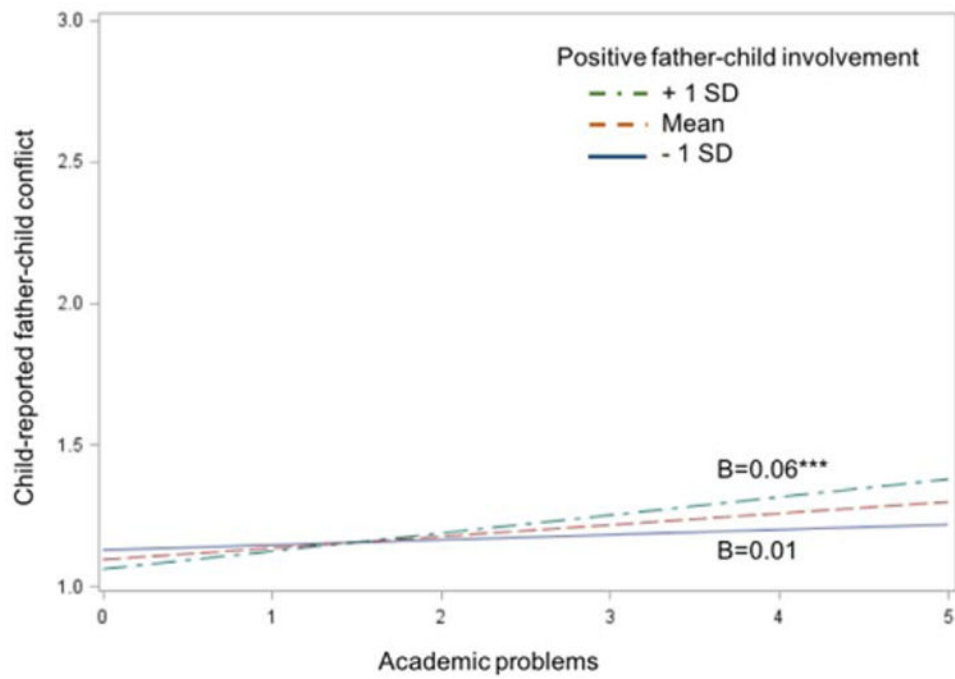
Figure 4.
Moderation effect of positive father-child involvement on same-day association between academic problems and child report of father-child conflict. *** $p<0.001$
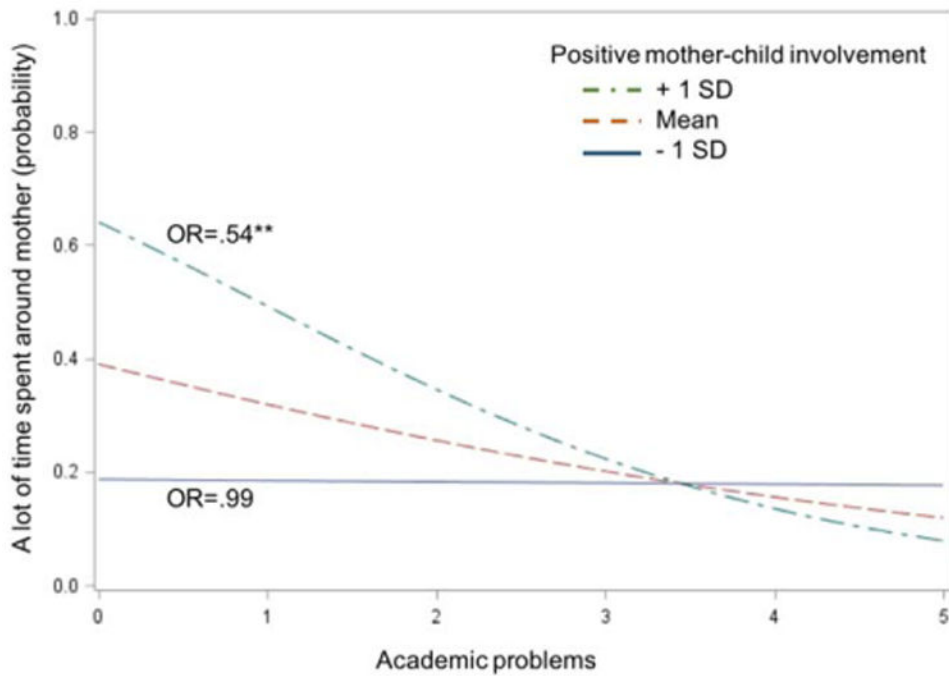
Figure 5.
Moderation effect of positive mother-child involvement on same-day association between academic problems and child perception of time spent around mother. **$p < 0.01$

Table 1

Descriptive statistics for questionnaire ratings of parental involvement across reporters, and daily diary variables across days

	$N_{subjects}$	n_{days}	Mean	SD	Min	Max	ICC	α/R_{KF}	R_C
One-time questionnaire									
Mother–child involvement	46	—	3.62	0.41	2.58	4.00	—	.79	—
Father–child involvement	46	—	3.40	0.46	2.42	4.00	—	.79	—
Daily diary variables									
Youth daily diary									
Academic problems	47	1418	0.34	0.86	0	5.00	.57	.99	.65
Peer problems	47	1418	0.23	0.72	0	5.00	.39	.99	.66
Mother–child warmth	47	1392	2.43	0.58	1.00	3.00	.67	1.00	.64
Father–child warmth	47	1263	2.33	0.59	1.00	3.00	.65	1.00	.63
Mother–child conflict	47	1392	1.16	0.34	1.00	3.00	.32	1.00	.74
Father–child conflict	47	1262	1.12	0.30	1.00	3.00	.22	.99	.74
Positive Mood	47	1413	2.99	0.79	1.00	4.00	.82	1.00	.81
Negative Mood	47	1413	1.26	0.38	1.00	3.17	.56	1.00	.72
Mother daily diary									
Mother–child warmth	47	1342	2.20	0.50	1.00	3.00	.47	.99	.53
Mother–child conflict	47	1342	1.09	0.24	1.00	3.00	.16	.97	.61
Father daily diary									
Father–child warmth	39	1013	1.92	0.47	1.00	3.00	.46	1.00	.63
Father–child conflict	39	1015	1.06	0.20	1.00	2.67	.10	.99	.53

	$N_{subjects}$	n_{days}	None/some n_{days} (%)	A lot n_{days} (%)	Min	Max	ICC		
Youth daily diary									
Time with mother	47	1388	711 (51.22)	677 (48.78)	0	1.00	.76	—	—
Time with father	47	1257	784 (62.37)	473 (37.63)	0	1.00	.77	—	—

Note: R_{KF} is an estimate of between-person reliability and is calculated across participants and days; R_C is an estimate of within-person reliability (see Cranford, et al, 2006).

Table 2

Zero-order correlations between school problems, parent-child interactions, and child mood at the day level

	1	2	3	4	5	6	7	8	9	10	11	12	13
School problems													
1 Academic													
2 Peer	.24***												
Child self-reported mood													
3 Negative	.14***	.19***											
4 Positive	−.15***	−.17***	−.30***										
Mother-child warmth													
5 Child report	−.09***	−.06*	−.10***	.25***									
6 Mother report	.03	.03	−.02	.08**	.21***								
Father-child warmth													
7 Child report	−.06*	.01	−.06*	.20***	.30***	.08**							
8 Father report	−.04	−.01	−.05	.03	.07*	.14***	.22***						
Mother-child conflict													
9 Child report	.11***	.04	.34***	−.21***	−.28***	−.08**	−.07*	−.07*					
10 Mother report	.06*	.02	.26***	−.14***	−.15***	−.05	−.06*	−.08*	.47***				
Father-child conflict													
11 Child report	.06*	−.04	.24***	−.19***	−.12***	−.06*	−.22***	−.06*	.29***	.26***			
12 Father report	.02	.00	.21***	−.14***	−.11***	−.02	−.17***	−.08**	.27***	.37***	.52***		
Child reported time spent													
13 w/mother	−.04	−.02	−.02	.09***	.28***	.08**	.11***	.00	−.02	.00	−.04	−.01	
14 w/father	−.07**	−.05	−.02	.12***	.13***	.04	.33***	.11***	−.01	.00	−.02	−.01	.62***

*
$p<.05$,

**
$p<.01$,

***
$p<.001$.

Note: Day-level variables were centered around each child's own mean; N days ranged from 954 to 1418 for each correlation.

Table 3

Multilevel models testing effect of school problems on youth and parent daily reports of parent-child interaction

Outcome	Mother-child interaction models		Father-child interaction models	
Predictors	**Child report B (SE)**	**Mother report B (SE)**	**Child report B (SE)**	**Father report B (SE)**
Parent-child warmth[a]				
Intercept	2.39 (0.07)***	2.20 (0.06)***	2.27 (0.07)***	1.94 (0.06)
Academic problems	−0.04 (0.01)**	0.009 (0.02)	−0.03 (0.02)	−0.04 (0.02)
Peer problems	−0.03 (0.02)	0.02 (0.02)	0.002 (0.02)	0.002 (0.02)
Study day	0.01 (0.005)**	−0.01 (0.005)*	0.01 (0.005)*	−0.01 (0.006)
Parent-child conflict[a]				
Intercept	1.15 (0.03)***	1.10 (0.02)***	1.10 (0.03)***	1.08 (0.02)***
Academic problems	0.05 (0.01)***	0.01 (0.01)	0.04 (0.01)**	0.006 (0.01)
Peer problems	0.02 (0.01)	0.004 (0.01)	−0.01 (0.01)	0.0003 (0.01)
Study day	−0.002 (0.004)	−0.003 (0.003)	0.004 (0.004)	−0.004 (0.003)
Time around parent[b]				
Intercept	−0.49 (0.44)	–	−1.18 (0.45)*	–
Academic problems	−0.27 (0.14)	–	−0.43 (0.16)**	–
Peer problems	−0.18 (0.16)	–	−0.31 (0.18)	–
Study day	0.09 (0.04)	–	0.10 (0.04)*	–

*
$p < .05$,

**
$p < .01$,

***
$p < .001$;

[a]Analyses were conducted using dyadic multilevel linear regression models;

[b]Analyses were conducted using non-dyadic multilevel logistic regression models;

SE = standard error.

Note: All models include random intercept effect; Study day (originally coded 0-55) was divided by 7 to equate a 1-unit change to a 1-week interval.

Table 4

Multilevel models testing moderator effect of positive parent-child involvement on the same-day links between school problems and daily reports of parent-child interaction

Predictors	Mother-child interaction models		Father-child interaction models	
	Child report *B* (SE)	Mother report *B* (SE)	Child report *B* (SE)	Father report *B* (SE)
Parent-child warmth[a]				
Intercept	2.40 (0.06)***	2.20 (0.05)***	2.27 (0.07)***	1.92 (0.05)***
Academic problems	−0.06 (0.02)***	0.003 (0.02)	−0.03 (0.02)	−0.03 (0.02)
Peer problems	−0.05 (0.02)*	0.007 (0.02)	−0.007 (0.02)	0.004 (0.02)
PEQ	0.63 (0.15)***	0.46 (0.11)***	0.46 (0.15)**	0.40 (0.11)***
Acad × PEQ	−0.12 (0.04)***	−0.04 (0.04)	0.01 (0.03)	0.04 (0.05)
Peer × PEQ	−0.07 (0.04)	−0.05 (0.05)	−0.13 (0.05)**	0.03 (0.06)
Parent-child conflict[a]				
Intercept	1.15 (0.03)***	1.11 (0.02)***	1.10 (0.03)***	1.07 (0.02)***
Academic problems	0.05 (0.01)***	0.01 (0.01)	0.04 (0.01)**	0.007 (0.01)
Peer problems	0.02 (0.01)	0.001 (0.01)	−0.01 (0.01)	−0.002 (0.01)
PEQ	−0.20 (0.06)**	−0.07 (0.04)	−0.08 (0.05)	0.005 (0.03)
Acad × PEQ	0.04 (0.03)	−0.03 (0.02)	0.05 (0.03)*	−0.01 (0.02)
Peer × PEQ	0.03 (0.03)	−0.008 (0.03)	−0.05 (0.04)	−0.03 (0.03)
Time around parent[b]				
Intercept	−0.45 (0.43)	–	−1.19 (0.45)*	–
Academic problems	−0.31 (0.16)*	–	−0.43 (0.16)**	–
Peer problems	−0.28 (0.18)	–	−0.37 (0.18)*	–
PEQ	2.50 (0.98)*	–	1.64 (0.95)	–
Acad × PEQ	−0.72 (0.32)*	–	−0.26 (0.38)	–
Peer × PEQ	−0.42 (0.37)	–	−0.46 (0.49)	–

*
$p<.05$,

**
$p<.01$,

***
$p<.001$;

[a]Analyses were conducted using dyadic multilevel linear regression models;

[b]Analyses were conducted using non-dyadic multilevel logistic regression models;

PEQ = Positive parental involvement; SE = standard error.

Note: All models include random intercept effect; All models control for study day.