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## Brief report: Fathers' and mothers' marital relationship predicts daughters' pubertal development two years later

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### Abstract

Parents of 50 4th grade girls reported on their marital relationships and then, two years later, rated their daughters' pubertal development. Fathers' ratings of marital dissatisfaction, mothers' ratings of less emotional support from husbands, and both parents' ratings of aversive marital conflict were correlated with more advanced pubertal development in daughters. Fathers' withdrawal behavior during marital conflict emerged as the strongest predictor. These results are consistent with evolutionary theories of pubertal development and suggest that parents' impressions of the marital relationship may be linked with girls' pubertal development, even in a middle-class sample with both parents present in the household. They also suggest several heretofore underexplored foci for researchers in this area, such as parents' behaviors during marital conflict and fathers' experiences of the marital relationship.

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*Keywords:* Puberty; Pubertal timing; Adolescent development; Father absence; Parental marital conflict; Parent–child relationship

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Multiple factors, including genes, caloric intake, and body fat, have been linked with the timing of pubertal development in girls, and psychosocial stress and family composition may also play a role (Ellis, 2004). Evolutionary psychologists have suggested that the family environment

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may influence girls' reproductive strategy, or the trade-off between allocating resources to one's own physical growth versus childbearing (Belsky, Steinberg, & Draper, 1991). In a higher-risk environment, one with a potential shortage of mates, early pubertal development becomes advantageous because women can bear more children across the lifespan.

Consistent with this framework, fathers' absence from the household has been specifically linked with accelerated pubertal timing in girls, perhaps because fathers' presence signals girls about their mating and coparenting prospects, or because it minimizes the possibility of unrelated males joining the household (e.g. Draper & Harpending, 1982; Ellis, 2004; Surbey, 1990; Graber, Brooks-Gunn, & Warren, 1995; Mendle, Turkheimer, D' Onofrio, Lynch, & Emery 2006). For example, several studies have found father absence in childhood to be linked with an earlier age of menarche (first menstrual period); these effects appear to persist even when body weight and other psychosocial stressors are controlled (e.g. Bogaert, 2005; Moffitt, Caspi, Belsky, & Silva, 1992; Quinlan, 2003). In addition to mere presence or absence, the level of fathers' involvement in the family may be important; for example, Ellis, McFadyen-Ketchum, Dodge, Pettit, and Bates (1999) found that fathers' caretaking in early childhood predicted less advanced pubertal development in girls at 7th grade, even if fathers were consistently present.

Fathers' involvement in the family may also be reflected in the marital relationship, and several studies have found links between parents' marital quality and daughters' puberty. Two retrospective studies found women's recollections of conflict in their parents' marriage (indexed by the happiness of marital relations and the severity of conflict in one study (Kim & Smith, 1998) and by "parental rows" in another (Romans, Martin, Gendall, & Herbison, 2003)) to be associated with younger onset of menarche even when variables assessing the quality of the parent-child relationship were controlled. A longitudinal study of teenagers found mothers' reports of marital conflict to be predictive of girls' menstrual onset (Wierson, Long, & Forehand, 1993). Higher ratings of marital adjustment and supportiveness in the marital dyad, as reported by the mothers of 6th grade daughters, predicted daughters' less advanced pubertal development a year later (Ellis & Garber, 2000). Similarly, mothers' reports of fathers' supportiveness when daughters were 5 predicted daughters' pubertal timing (Ellis et al., 1999).

### **The current study**

Much of the above-cited research has been conducted via large-scale survey studies, often using retrospective measures. The current study is longitudinal and incorporates in-depth measures of the marital relationship provided by both parents, such as parents' behaviors during marital conflict. Previous research suggests that the parental marital relationship may influence girls' puberty, and that fathers' marital behavior and attitudes of the marital relationship may be particularly meaningful. However, the majority of published studies have relied on measurements of the family environment provided only by mothers or daughters. Surprisingly, only one published study (Ellis & Essex, 2007) has considered fathers' own reports.

In keeping with prior research, we expected that more aversive parental marital relationships (e.g., lower marital satisfaction, lower parental support, higher marital conflict) would predict more advanced pubertal development in daughters. Additionally, mothers' and fathers' marital reports were considered both separately and together, allowing us to test whether fathers' reports contributed additional variance in predicting girls' puberty.

## Methods

### *Participants*

The data analyzed in this paper were collected as part of a larger three-year longitudinal study conducted at two public and one parochial West Coast schools. Boys and girls were both included in the original study, but this paper focuses solely on girls, as no meaningful pattern of results emerged for boys (in keeping with other studies of puberty, e.g. Belsky et al., 2007). Informational letters were sent to the households of all of the 4th grade girls enrolled in each school over three years (recruiting three cohorts of girls), and parental consent was obtained from 116 families, 37% of those sent letters. Parents and children completed measures of family functioning for three consecutive years, when children were in the 4th, 5th, and 6th grades. Over 90% of the children initially enrolled participated in all three years of data collection.

The sample, which reflected the SES and ethnic compositions of the students at the three schools sampled and of the neighborhoods where the schools were located, consisted primarily of middle-class and upper middle-class families. Approximately 81% of parents identified as Caucasian, with the rest identifying as Asian/Pacific Islander, Latino, African American, and Other. Parents' ratings of daughters' pubertal development were incorporated into the study partway through data collection, so that families in the second and third cohort (84 families, or 72% of the 116 total families) were mailed pubertal development questionnaires when the girls were in 6th grade. Pubertal ratings were obtained for 58 girls, or 69% of the girls whose parents were sent questionnaires; this study focuses on the 50 girls who lived with both parents in 4th grade. Compared to parents who did not return questionnaires, parents who returned the pubertal ratings did not show any significant differences in education, income, number of children, daughters' health problems, or marital adjustment.

### *Measures*

#### *Parents' pubertal development (PD) ratings*

As part of year 3 (6th grade) data collection, parents completed a measure of the participating child's pubertal development, based on the Pubertal Development Scale (Petersen, Crockett, Richards, & Boxer, 1988). The decision to have parents rather than girls complete this measure was based on past experience with the UCLA Institutional Review Board's concerns about inquiring into personal or potentially sensitive areas of children's lives. Mothers rated girls' development in four areas: growth spurt, skin changes, body hair growth, and breast growth. Fathers rated only their daughters' growth spurt and skin changes. For each question, parents circled a score from 1 to 4 to indicate whether development "has not yet begun," "has barely begun," "has definitely begun," or "has been completed," and total scores were calculated by averaging the items. The PDS is a valid and reliable measure that can be completed by a child or parent and has been shown to correlate with physician reports of pubertal development (Brooks-Gunn & Graber, 1994; Dorn, Dahl, Woodward, & Biro, 2006). In this study, mothers' mean score was 2.25 (range 1–3.25,  $SD = .65$ ) and fathers' mean score was 2.08 (range 1–3,  $SD = .69$ ). Age-controlled pubertal development scores and scores controlling for girls' mothers' ages were also computed but not used, since results were unchanged. Because mothers' and fathers' PD

ratings were highly correlated,  $r(31) = .81$ ,  $p < .01$ , and a paired-sample  $t$ -test revealed no significant differences between them, mothers' and fathers' scores were combined in this paper. Thus, pubertal ratings were computed for 50 girls; if both parents returned the PD questionnaire their scores were averaged (Cronbach's alpha = .89), and if only one parent returned the questionnaire, that parent's score was used (father's score in five cases, mother's score in 14 cases).

#### *Parents' descriptions of the marital relationship*

Parents completed three marital relationship measures during 4th grade data collection.

*Marital satisfaction.* Marital quality was assessed by the 32-item Dyadic Adjustment Scale (DAS; Spanier, 1976), a valid and reliable measure. Means were similar to those reported in the norming sample; means, ranges and standard deviations are shown in Table 1. The DAS showed both high test–retest and inter-rater reliability in this sample: scores from the first and third years of the study were highly correlated ( $>.80$ ) for both wives and husbands, and husbands' and wives' DAS scores in each year were also highly correlated with each other.

*Partner emotional support.* This 5-item subscale of the UCLA Social Support Inventory (Dunkel-Schetter, Feinstein, & Call, 1986) assesses perceived partner support (e.g., “Within

Table 1  
Parents' marital reports: descriptive statistics and correlations with subsequent PD ratings.

	Mean	SD	Range	Correlations with PD ratings
<i>Fathers' marital reports</i>				
Marital satisfaction ( $n = 41$ )	109.1	16.7	57–145	–.35*
Marital conflict behavior ( $n = 42$ )				
Fathers' threatening marital change, own report	.13	.22	0–.75	.12
Fathers' humiliation, own report	.29	.34	0–1	.31*
Fathers' verbal aggression, own report	.49	.26	0–1	.27 <sup>+</sup>
Fathers' withdrawal, own report	.56	.34	0–1	.52***
Mothers' threatening marital change, spouse report	.18	.25	0–1	.21
Mothers' humiliation, spouse report	.25	.33	0–1	.09
Mothers' verbal aggression, spouse report	.40	.27	0–1	.27 <sup>+</sup>
Mothers' withdrawal, spouse report	.54	.34	0–1	.45***
Mothers' emotional support, spouse report ( $n = 40$ )	3.49	.95	1.2–5	–.20
<i>Mothers' marital reports</i>				
Marital satisfaction ( $n = 48$ )	108.3	21.5	30–140	–.18
Marital conflict behavior ( $n = 50$ )				
Mothers' threatening marital change, own report	.13	.22	0–.75	.22 <sup>+</sup>
Mothers' humiliation, own report	.23	.32	0–1	.22 <sup>+</sup>
Mothers' verbal aggression, own report	.46	.26	0–1	.30*
Mothers' withdrawal, own report	.52	.32	0–1	.28*
Fathers' threatening marital change, spouse report	.21	.29	0–1	.27*
Fathers' humiliation, spouse report	.40	.39	0–1	.33*
Fathers' verbal aggression, spouse report	.43	.30	0–1	.18
Fathers' withdrawal, spouse report	.50	.35	0–1	.24 <sup>+</sup>
Fathers' emotional support, spouse report ( $n = 49$ )	3.51	.97	1.4–5	–.32*

<sup>+</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

the past three months, how often did your spouse convey respect, approval, and/or acceptance?") on a scale from 1 (never) to 5 (very often). Means and SDs are shown in Table 1. Cronbach's alpha was .93 for both husbands and wives.

*Marital conflict.* On the 51-item Domestic Conflict Index (DCI; Margolin, Burman, John, & O'Brien, 2000) adapted from the CTS-Form N (Straus, 1979), spouses reported whether ("yes" = 1 or "no" = 0) they had "ever" engaged in a variety of behaviors, ranging from "ignoring spouse" to "beat up spouse." Spouses responded to the DCI questions twice, once regarding their own behaviors and once regarding partners' behaviors. The DCI, a valid and reliable measure, has been used in numerous studies of the marital relationship (Fauchier & Margolin, 2004). It consists of eight multi-item scales, each representing a type of conflict behavior: responses to items comprising each scale were averaged. Since fewer than 35% of parents reported "ever" engaging in any behaviors included on four of the conflict behavior scales (cruelty, damaging possessions, physical aggression, and monitoring/isolating), these were dropped from analyses. Of the remaining scales, "threatening marital change" (4 items) asked about threats to end the relationship. "Humiliation" (3 items) assessed ridiculing or insulting the spouse. "Verbal aggression" (9 items) asked about behaviors like yelling and swearing. "Withdrawal" (9 items) measured disengaged conflict behavior, such as leaving the house or giving the spouse a "cold shoulder." The sample's means and SDs, shown in Table 1, are consistent with those found in a sample of university employees (Burman & Margolin, unpublished). In this study, the DCI scales had high test–retest and inter-rater reliability: all scales from the first year of the study were significantly correlated with the same scales given two years later (correlation coefficients ranging from .32 to .75), as were husbands' and wives ratings of the same conflict behaviors, with coefficients ranging from .27 to .50.

## Results

Sample sizes for individual analyses vary because of missing data; eight fathers did not complete enough of the questionnaires during 4th grade data collection to be scored. For analyses including fathers' 4th grade data, total possible  $n = 42$ ; for analyses including mothers' 4th grade data, total possible  $n = 50$ .

Table 1 presents correlations between mothers' and fathers' marital ratings, reported when their daughters were in 4th grade, and the pubertal development (PD) ratings made two years later. Intercorrelations between the 4th grade measures ranged from .21 to .83 (mothers) and from .21 to .75 (fathers), but the full correlation matrix is not shown here to conserve space.

Fathers' marital satisfaction score was negatively correlated with PD rating, while mothers' marital satisfaction was not. Of the 16 comparisons made between PD ratings and parents' marital conflict behavior (self-rated and spouse-rated), seven reached a conventional level of statistical significance and five reached marginal significance; fathers' ratings of their own and their wives' withdrawal behavior were the two scales more highly correlated with PD ratings. All associations were positive, suggesting that more aversive marital conflict behavior was linked with greater pubertal development. Mothers' rating of husbands' emotional support was negatively correlated with PD rating, but fathers' rating of wives' support was not. In summary, fathers who were maritally dissatisfied, parents who reported more aversive marital conflict,

and mothers who considered their husbands to be less emotionally supportive were all more likely to rate daughters' later development as more advanced.

Since multiple marital indices were associated with pubertal development, multiple regression analyses were conducted in order to identify which indices most strongly predicted daughters' pubertal development, with all results shown in Table 2. First, all of fathers' reports that were significantly correlated with 6th grade PD ratings (ratings of own humiliation and withdrawal behaviors and wives' withdrawal behavior, plus fathers' Dyadic Adjustment Scale) were entered simultaneously in a regression model (Model 1). Fathers' withdrawal behaviors during marital conflict emerged as the only significant predictor of girls' PD ratings after other marital indices were controlled. As with the zero-order correlation, the beta was positive, suggesting that if fathers showed more withdrawal behavior during marital conflict, their daughters' pubertal development would appear more advanced two years later.

Next, mothers' marital reports that were significantly correlated with PD ratings (self-reported verbal aggression and withdrawal behaviors, mothers' reports of fathers' threatening marital change and humiliation behaviors, and mothers' reports of spouse emotional support) were entered simultaneously into a regression model (Model 2). None of the predictors were significantly associated with subsequent PD ratings. However, as expected, all betas corresponding to marital conflict behaviors were positive, suggesting that more of each type of marital conflict behavior predicted girls' more advanced pubertal development, while the beta corresponding to spouse's emotional support was negative.

Finally, to contrast the relative impact of mothers' and fathers' marital conflict behaviors, a regression model (Model 3) was constructed to include all of the self-reported conflict behaviors that were significantly correlated with PD ratings, fathers' humiliation and withdrawal and

Table 2

Multiple regression analysis predicting parents' pubertal development (PD) rating from parents' marital indices.

Marital conflict behavior Predictors	Beta	SEB	$\beta$
Model 1: fathers' marital reports predicting PD ratings, $F(4, 36) = 4.43^{**}$			
Fathers' withdrawal, own report	.93	.37	.50*
Fathers' humiliation, own report	-.09	.34	-.05
Mothers' withdrawal, fathers' report	.09	.41	.05
Fathers' Dyadic Adjustment Scale	-.01	.01	-.18
Model 2: mothers' marital reports predicting PD ratings, $F(5, 43) = 1.43$			
Mothers' verbal aggression, own report	.24	.50	.10
Mothers' withdrawal, own report	.18	.42	.09
Fathers' humiliation, mothers' report	.26	.30	.15
Fathers' threatening marital change, mothers' report	.10	.45	.04
Mothers' report of spouse emotional support	-.07	.11	-.10
Model 3: parents' self-rated marital conflict behaviors predicting PD ratings, $F(4, 37) = 3.82^{**}$			
Mothers' verbal aggression, own report	.33	.51	.14
Mothers' withdrawal, own report	.03	.42	.01
Fathers' humiliation, own report	.08	.31	.04
Fathers' withdrawal, own report	.82	.32	.45*

<sup>+</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

mothers' verbal aggression and withdrawal. Once again, only fathers' withdrawal behavior significantly predicted subsequent PD ratings.

## **Discussion**

This study found that parents' descriptions of their marital relationship were associated with their subsequent ratings of their daughters' pubertal development, such that fathers reporting lower marital satisfaction, mothers reporting less emotional support from their spouses, and parents reporting more aversive marital conflict behavior were more likely to have daughters whose development appeared more advanced two years later. Not only did the marital relationship appear to be meaningful for girls' pubertal development, but also fathers' contribution to that relationship seemed to be particularly important. For example, fathers' overall marital adjustment was correlated with daughters' PD ratings, while mothers' adjustment was not, and husbands' emotional supportiveness (as rated by wives) was associated with less advanced pubertal development while wives' emotional supportiveness was not. Additionally, the two marital conflict behaviors with the highest zero-order correlations with daughters' pubertal development, fathers' self-rated withdrawal and mothers' spouse-rated withdrawal, were both described by fathers. When spouses' ratings of marital conflict behaviors were entered together into a regression analysis, only fathers' descriptions of their own withdrawal behavior during marital conflict significantly predicted daughters' subsequent pubertal development.

These results are striking given that parents reported on their marital relationships a full two years before rating daughters' pubertal development, yet a number of significant associations emerged. They are consistent with evolutionary theory in the sense that, if daughters' mating strategies are influenced by environmental cues that convey information about the availability of future partners, girls should be sensitive to signs of fathers' potential desertion of their mothers. To that end, the conflict behavior most strongly linked with pubertal development, withdrawal, measures attempts to disengage from the partner, as well as behaviors that might suggest abandonment, like walking away from the spouse, ignoring the spouse, or leaving the room during a conflict. In addition to fathers' withdrawal, girls might be attuned to a converse behavior, fathers' support of mothers, which may explain why mothers' ratings of spouses' supportiveness, was linked with pubertal development while mothers' overall marital satisfaction was not (and while, in contrast, fathers' marital satisfaction appeared more predictive of girls' pubertal development than their impressions of mothers' supportiveness). Finally, fathers' marital conflict behaviors, particularly withdrawal, appeared to be more strongly linked to girls' pubertal development than a more global measure of fathers' marital satisfaction; parents' conflict behavior might provide girls with particularly overt or relevant relationship cues, even though marital conflict has only rarely been studied in conjunction with girls' puberty.

This study had several limitations. For example, the sample was small, and included only two-parent families. However, the results may be more persuasive given that our participants came from stable middle-class households. Low variability in socioeconomic status and family composition should lead to conservative estimates of family effects on girls' development, but parents' attitudes and behaviors still predicted pubertal development ratings two years later. An additional weakness is that mothers' age of menarche was not collected. Mothers' ages were controlled in initial analyses in an attempt to account for potential differences between the daughters of older and younger

mothers, and results were unchanged, but including mothers' actual menarcheal ages would have improved the validity of the results, since previous research has found that the links between family structure and girls' puberty may be explained by mothers' age of menarche (e.g. Mendle, et al., 2006).

Because all of the measures used in this study were based on parent reports, it is possible that a common respondent bias, persisting over two years, inflated the findings. However, it is not clear why this bias would have applied more to some subscales than others. A related issue concerns the direction of causality: early signs of puberty in 4th grade may have affected parents' marital functioning. At the 6th grade assessment, parents' PD ratings averaged around "2," or "has barely begun," suggesting that most girls were in the early stages of puberty. It is nonetheless possible that early developing girls would have shown signs of puberty two years earlier but, because pubertal ratings were not collected then, we cannot test this hypothesis.

Despite its limitations, this study contributes to the literature on puberty and the family social environment. Our results suggest that fathers may have a unique influence on girls' pubertal development, one that exerts itself not only through their presence in the household, but also through their behavior toward their spouses. No published study on puberty has used the Domestic Conflict Index to assess the family environment, but in this study, multiple DCI subscales, both self- and spouse-rated, predicted pubertal development. Our work also indicates that associations between marital functioning and puberty may emerge even within small samples of girls with limited socioeconomic variation. While pubertal measures are not often incorporated into longitudinal studies of family life, these results suggest that they may yield fruitful results.

More research is warranted into the mechanisms that may drive these provocative associations. For example, common genetic factors might underlie parents' temperament and behavior and their daughters' pubertal timing. The X-linked androgen receptor gene, passed from fathers to daughters, has been identified as one possible mechanism (Comings, Muhleman, Johnson, & MacMurray, 2002), as has mothers' own pubertal timing (Mendle et al., 2006), and the marital behaviors assessed by our questionnaires (like withdrawal during conflict) may have captured some of those inherited factors. Links between the family environment and girls' puberty may also be mediated by stress hormones like cortisol (e.g. Pendry & Adam, 2007). Given the significance of pubertal timing for girls' future psychological and physical health, the influence of the family environment on girls' development deserves further exploration.

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