ARTICLE

Positive Parenting and Early Puberty in Girls

Protective Effects Against Aggressive Behavior

Sylvie Mrug, PhD; Marc Elliott, PhD; M. Janice Gilliland, PhD; Jo Anne Grunbaum, PhD; Susan R. Tortolero, PhD; Paula Cuccaro, PhD; Mark Schuster, MD, PhD

Objective: To determine whether positive parenting practices are associated with less aggressive and delinquent behavior in early-maturing girls.

Design: Cross-sectional survey.

Setting: Interviews with a community sample of children and their caregivers were conducted in their homes or in a research setting.

Participants: An ethnically diverse cohort of 330 fifth-grade girls (mean age, 11.25 years) from 3 metropolitan areas.

Main Exposure: Early onset of menarche, parental nurturance, knowledge of the child's activities, and communication.

Main Outcome Measures: Physical, relational, and nonphysical aggression and delinquent behavior.

Results: A total of 25% of girls could be reliably classified as early maturers. Early maturation was associated with delinquency (b=0.53) but not aggression. Low levels of maternal nurturance were associated with delinquency and relational aggression (both b=–0.04). Early maturation was associated with higher relational aggression only at low levels of nurturance (b=0.94), communication (b=1.36), and knowledge (b=1.06) ($P<.05$ for each interaction). Also, early maturation only predicted physical aggression when combined with low maternal nurturance (b=0.93).

Conclusions: Early puberty is a risk factor for delinquency, and early puberty combined with low parental nurturance, communication, or parental knowledge of the child's activities presents a risk for aggressive behavior in early adolescent girls. Early-maturing girls may benefit from increased parental nurturance, communication, and knowledge.

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Author Affiliations:
Departments of Psychology (Dr Mrug) and Maternal and Child Health (Dr Gilliland), University of Alabama at Birmingham; RAND Corporation, Santa Monica (Drs Elliott and Schuster), and Departments of Pediatrics and Health Services, University of California, Los Angeles (Dr Schuster); Division of Adult and Community Health, Centers for Disease Control and Prevention, Atlanta, Georgia (Dr Grunbaum); and Texas Prevention Research Center, University of Texas Health Science Center, Houston (Drs Tortolero and Cuccaro).

ONE RISK FACTOR FOR EMOtional and behavioral problems in early adolescent girls is early pubertal timing. Early puberty in girls is related to multiple externalizing problems, including conduct problems,[1] delinquency,[2] and substance use.[3,4] Many of these behavior problems in early-maturing girls persist throughout adolescence[2] and into young adulthood.[5] The consequences of early maturation and associated behavior problems are far-reaching. As adults, early-maturing girls demonstrate lower academic and occupational achievement[6] and report lower relationship quality and life satisfaction.[5] It is thus important to identify protective factors that may mitigate negative effects of early maturation on girls' adjustment.

Multiple mechanisms may lead to these higher rates of externalizing problems. Girls who reach puberty early are more likely to associate with older boys, who typically engage in more problem behaviors than the girls' same-age peers.[6] These older associates are likely to model, reinforce, and provide more opportunities for problem behavior. Additionally, early-maturing girls are more psychologically immature and less able to resist negative peer influences than older adolescents.[2] Finally, the co-occurrence of multiple stressors, such as biological changes and school transitions, is more likely in early maturers.[7] Experiencing multiple stressors may lower the girls' coping abilities and further contribute to maladjustment.[1]

Regardless of the specific nature of the mechanisms through which early puberty influences adjustment, additional risk and protective factors may alter the strength of this relationship. Some evidence suggests that several contextual factors affect the likelihood that early-maturing girls will develop behavior problems. For instance, early maturation

was related to norm-breaking and delinquency in girls attending coeducational schools, but not in girls attending all-girl schools.[2] Similarly, residing in disadvantaged communities aggravated the negative effects of early puberty, so that early-maturing girls who lived in neighborhoods characterized by poverty and unemployment formed more deviant peer affiliations[8] and committed more violent offenses[9] than girls who did not reach puberty early or who resided in higher socioeconomic neighborhoods. Because parenting practices play a critical role in the development of externalizing behavior problems in childhood and adolescence,[10-12] we examine the hypothesis that positive parenting protects early maturing girls from deviant behavior.

We investigated the role of 3 parenting variables, nurturance, communication, and knowledge of the child's activities, as they interact with pubertal timing in relation to early adolescent girls' delinquency and aggression. We selected these parenting variables because of their importance as protective factors against the development of youth behavior problems.[10,12] We hypothesized that these parenting factors are more important for girls who are at an increased risk for externalizing problems because of early puberty, compared with their low-risk, on-time maturing counterparts. Only one study examined the joint influence of early maturation and parenting on deviant behavior; in a sample of African American boys and girls, harsh parenting amplified the negative effect of early maturation on externalizing behaviors, whereas parental nurturance had a positive effect on behavior regardless of pubertal timing.[8] Since early maturation appears to affect boys and girls differently,[1,5] it is unclear whether the results would hold for girls only. Likewise, inclusion of only African American children limited inferences to more ethnically diverse populations. The current study extends previous research by evaluating the joint effects of maternal nurturance and pubertal timing on externalizing problems in an ethnically diverse sample of girls. Additionally, this is the first study to our knowledge to examine the effects of early maturation on externalizing behaviors in conjunction with parental communication and knowledge of the child's activities.

METHODS

STUDY DESIGN AND PARTICIPANTS

Participants took part in phase 1 of Healthy Passages (details appear elsewhere[13]), conducted at 3 institutions: University of Alabama, Birmingham; University of California, Los Angeles/RAND; and University of Texas, Houston. Institutional review boards at all research sites and the Centers for Disease Control and Prevention approved the study. The sampling frame included all fifth-grade students in regular classrooms in public schools with fifth-grade class enrollments of 25 or more students in catchment areas within the Birmingham, Houston, and Los Angeles metropolitan areas. Schools and students were selected using a 2-stage probability sampling procedure. African American and Hispanic children were oversampled to achieve similar numbers of African American, Hispanic, and non-Hispanic white participants. Design and nonresponse weights were constructed such that weighted results represented the population of fifth-graders in the public schools in each area.

Among the 1848 fifth-graders eligible for the study, 57% of primary caregivers (referred to as parents from here on) provided permission to contact; completed parent and child interviews were obtained for 61% of these children. Altogether, 650 students and their parents completed individual interviews. There were no significant differences in the racial/ethnic composition of this sample and the sampled population (32% vs 34% were Hispanic, 24% vs 28% were non-Hispanic white, and 36% vs 31% were African American). Although we were not able to compare these groups on other characteristics, the sampling weights account for differential nonresponse by sex, race/ethnicity, and school, ensuring the representativeness of the weighted sample. Because pubertal timing affects males and females differently,[1,5] our study covers only girls. Among the 349 female participants, 330 provided valid data on menarche status and onset of menarche, so they make up the analytic sample for this article. All reported statistics incorporate sampling weights and, where applicable, adjust standard errors for weighting and clustering of participants within schools.

The mean (SD) child age was 11.3 (0.5) years. Twenty-eight percent were African American; 44%, Hispanic; 22%, non-Hispanic white; and 5%, other. Los Angeles contributed 41% of participants; Birmingham, 30%; and Houston, 30%. Median family income was $30 000 to $34 999/y and median parental education, "some college but no degree." Single-parent families were 33% of the sample.

Parent and child interviews were conducted in separate private spaces by trained staff and consisted of a computer-assisted personal interview and audio computer-assisted self-interview. English and Spanish versions were available. The interviews required a response on each item to move forward to the next; therefore, there were few missing data and we used a single Markov chain Monte Carlo imputation from SAS Proc MI (SAS Institute Inc, Cary, NC).

MEASURES

Physical, Nonphysical, and Relational Aggression

Aggression was measured with an adaptation of the Problem Behavior Frequency Scale.[14] Children reported on their behavior in the last 30 days using a 6-point scale from "never" (1) to "20 or more times" (6). Items were summed to form scales. The physical aggression subscale (7 items) measured completed and threatened physical aggression (eg, hitting, shoving) (Cronbach $\alpha = .81$). The nonphysical aggression subscale (6 items) assessed verbal and nonverbal aggression (eg, instigating fights, teasing others, giving mean looks) ($\alpha = .74$). The relational aggression subscale (6 items) assessed use of social exclusion and spreading rumors to hurt others ($\alpha = .81$). The mean (SD) scores (range) were 8.26 (2.42) (7-42) for physical, 7.59 (2.35) (6-32) for nonphysical, and 7.33 (2.39) (6-36) for relational aggression.

Delinquency

Delinquency was measured with 7 dichotomous (yes/no) items adapted for Healthy Passages: 5 questions on lifetime prevalence of fighting of varying severity (ever in a fight, fighting at school, gang fighting, sustained injuries, and inflicted injuries) and 2 on lifetime prevalence of running away from home and truancy. The total score indicated number of items endorsed ($\alpha = .67$). The mean (SD) score (range) was 0.78 (1.18) (0-7).

Parental Knowledge

Parents responded to 7 items measuring the extent to which they knew their child's friends and what the child did in her free time, including exposure to television and computer content.[15] The response format used a 4-point scale ranging from "almost never" (1) to "almost always" (4), with 4 questions including another option indicating no engagement in the activity (eg, does not go to friends' houses). No engagement was coded as 5 because it represents no risk to potentially negative influences and thus higher parental control. The total score represented the sum of the items ($\alpha = .63$). The mean (SD) score (range) was 25.99 (2.84) (14-29).

Maternal Nurturance

This 7-item measure was adapted from the Parental Nurturance Scale.[16,17] Maternal nurturance was used instead of parental nurturance because mothers are typically more involved with children. All students had a maternal figure (not all had a paternal figure). Girls reported how often their mother was supportive and affectionate, how often they shared personal problems and future plans with her, and how often they did things together using a 4-point scale ranging from "almost never" (1) to "almost always" (4). The responses were summed ($\alpha = .78$). The mean (SD) score (range) was 21.88 (4.22) (9-28).

Communication With Parents

Girls answered 18 dichotomous (yes/no) questions developed for Healthy Passages regarding whether parents talked with them about violence (eg, how to act when mad, stay out of fights), tobacco (eg, not to smoke, how to say no when offered cigarettes), and puberty/sex (eg, menstruation, reproduction). The total score indicated the number of items endorsed as yes ($\alpha = .81$). The mean (SD) score (range) was 13.76 (3.06) (2-18).

Early Maturation

Girls indicated whether they had started their period and, if yes, at what age. Based on previous research showing differential age at onset of menarche by race/ethnicity,[18] we defined early maturation as the onset of menarche 1 year before the average age at onset for each racial/ethnic group as reported in a recent national study,[18] with cutoffs of 11.3 years for African American girls, 11.5 years for Hispanic and other girls, and 11.7 for non-Hispanic white girls. Twenty-five percent of girls were classified as early maturers.

Because some girls were interviewed before these cutoffs, some who were premenarcheal at the interview would reach menarche prior to the cutoffs. Classifying them all as early maturers or not or omitting these cases are all potentially biased approaches. Therefore, we assigned each of these girls a probability indicating the likelihood of reaching menarche by the cutoff age for her racial/ethnic group. Specifically, logistic regression was used to model p_1, the probability of menses before interview, as a function of the difference in age at interview and racial/ethnic–specific early maturation cutoffs. We calculated p_2 as the probability of observed menses by the cutoff among those who were interviewed at or after the cutoff age. The probability that a young premenarcheal girl would reach menarche between her actual interview and the cutoff age for early maturation was therefore calculated as $p_{early} = (p_2 - p_1)/(1 - p_1)$. The early maturation variable thus had values of 1 for observed early maturers, 0 for premenarcheal girls interviewed after the threshold, and intermediate probabilities (p_{early}) for young premenarcheal girls ($M = 0.40$).

Covariates

Exact age was computed in years. Ethnicity was recoded into 3 dichotomous variables indicating African American, Hispanic, and other (nonwhite). Non-Hispanic white girls served as the reference group. Site was coded in 2 dichotomous variables indicating Birmingham and Houston (Los Angeles served as reference). Family sociodemographic characteristics included single-parent status (vs married or living with a partner); parent's education on a 7-point scale: "did not finish high school" (1) to "professional or doctoral degree" (7); and family income on a 20-point scale: "less than $5000/y" (1) to "more than $250 000/y" (20). To account for a possible bias due to 17 families declining to provide income information, we included a missing income flag (coded as 1).

STATISTICAL ANALYSES

To evaluate the joint effects of early maturation and parenting practices on delinquency and aggression, we performed hierarchical multiple linear regressions using Mplus.[19] Age, ethnicity, site, and the 4 sociodemographic variables were included as covariates in all analyses. The first step of the regressions included all main effects; interactions between early maturation and each parenting variable were added in separate second steps. To reduce multicollinearity between main effect and interaction terms, centered versions of the parenting variables (differences from the means) were used in computing interaction terms. Statistically significant interactions were followed by estimating and testing simple slopes for early maturation at high and low levels of the parenting practice (1 SD higher than and lower than the mean).[20] This procedure uses data from the whole sample, not just individuals with high or low levels of the parenting variables, to compute simple slopes.

RESULTS

BIVARIATE CORRELATIONS

Zero-order correlations between the 3 parenting practices were weak to moderate. Nurturance and communication were positively related ($r = 0.41$; $P < .001$), but neither scale was significantly correlated with parental knowledge of the child's activities. The 3 types of aggression were correlated ($r = 0.69$-0.74; $P < .001$), and their correlations with delinquency were positive but modest ($r = 0.21$-0.23; $P < .001$). Altogether, the lack of strong correlations supported the inclusion of the 3 parenting variables and the 4 externalizing variables as separate predictors and outcomes, respectively.

REGRESSION ANALYSES

The results of the main analyses are summarized in the **Table**. Lower parental education was associated with more nonphysical and relational aggression. Early maturation was related to higher delinquency. Higher levels of maternal nurturance predicted lower rates of delinquency and relational aggression, and greater parental knowledge of the child's activities predicted less delinquency. The main effects of early maturation were small; early maturers scored on average about 0.5 point higher on all problem behaviors than non–early maturers (eg, 0.59 vs 0.06 on delinquency).

Table. Hierarchical Multiple Linear Regressions Predicting Externalizing Behaviors From Covariates, Early Maturation, and Parenting Practices in the Healthy Passages Study[a]

Predictor	Delinquency		Physical Aggression		Nonphysical Aggression		Relational Aggression	
	b (SE)	*P* Value	*b* (SE)	*P* Value	*b* (SE)	*P* Value	*b* (SE)	*P* Value
			Step 1					
Intercept	−1.30 (1.76)	.46	5.37 (2.65)	.04	5.89 (2.62)	.02	2.60 (3.10)	.40
Age	0.17 (0.16)	.29	0.23 (0.22)	.30	0.14 (0.24)	.55	0.41 (0.25)	.11
Site (Birmingham, Alabama)	0.16 (0.24)	.51	0.43 (0.38)	.25	0.11 (0.43)	.80	0.22 (0.41)	.59
Site (Houston, Texas)	0.22 (0.21)	.28	0.11 (0.36)	.75	0.56 (0.58)	.33	0.29 (0.46)	.53
Single parent	−0.05 (0.14)	.70	0.36 (0.25)	.15	0.43 (0.36)	.23	0.41 (0.28)	.14
Family income	−0.01 (0.01)	.23	0.04 (0.03)	.29	0.05 (0.03)	.09	0.06 (0.03)	.08
Income missing	0.12 (0.19)	.52	−0.15 (0.24)	.54	0.49 (0.60)	.40	−0.26 (0.37)	.49
Parental education	0.01 (0.05)	.75	−0.19 (0.10)	.05	−0.19 (0.09)	.02	−0.29 (0.09)	.002
Ethnicity								
Hispanic	−0.34 (0.30)	.24	−0.10 (0.38)	.79	−0.77 (0.46)	.10	−0.20 (0.40)	.61
African American	0.25 (0.17)	.14	0.56 (0.47)	.23	0.16 (0.57)	.78	0.49 (0.38)	.20
Other minority	−0.39 (0.35)	.26	−0.13 (0.62)	.83	−0.56 (0.60)	.35	−0.61 (0.35)	.08
Early maturation	0.53 (0.22)	.02	0.47 (0.25)	.06	0.54 (0.31)	.08	0.60 (0.38)	.12
Maternal nurturance	−0.04 (0.02)	.04	−0.03 (0.02)	.18	−0.04 (0.02)	.11	−0.04 (0.02)	.04
Communication	−0 (0.02)	.92	0.06 (0.04)	.16	−0 (0.04)	.94	0.02 (0.05)	.65
Knowledge	−0.04 (0.02)	.046	−0.01 (0.04)	.76	−0.01 (0.03)	.87	0.01 (0.04)	.71
			Step 2					
Early maturation × nurturance	−0.10 (0.07)	.17	−0.13 (0.06)	.02	−0.12 (0.07)	.08	−0.09 (0.05)	.04
Early maturation × communication	−0.10 (0.06)	.11	−0.11 (0.08)	.17	−0.03 (0.14)	.85	−0.24 (0.11)	.04
Early maturation × knowledge	−0.14 (0.07)	.06	−0.12 (0.06)	.06	−0.09 (0.09)	.30	−0.19 (0.08)	.02

[a] Results are adjusted for sampling weights. *b* = raw regression coefficient. R^2 for the full models ranges from 0.14 to 0.16 for delinquency, 0.05 to 0.06 for physical aggression, 0.07 to 0.08 for nonphysical aggression, and 0.07 to 0.09 for relational aggression.

Additionally, 4 significant interaction effects emerged, supporting the importance of considering the joint effects of early maturation and parenting. Maternal nurturance, communication, and parental knowledge moderated the relationship between early maturation and relational aggression, and maternal nurturance also moderated the effect of early maturation on physical aggression (**Figure**). In each case, the association was consistent with positive parenting protectively moderating the risk of early-maturing girls engaging in problem behaviors.

To clarify the interpretation of the interaction effects, we computed simple slopes of early maturation on the outcomes at high and low levels (1 SD higher than and lower than the mean) of parenting practices. Parental practices were analyzed as continuous variables, and the slopes for early puberty were fixed at specific (high and low) levels of parenting only for the purpose of illustrating the meaning of the interactions. Early maturation predicted physical and relational aggression when maternal nurturance was low (regression coefficients, b=0.93 and 0.94; P=.007 and .03) but not when maternal nurturance was high (b=−0.13 and 0.15; P=.69 and .70). Likewise, early puberty predicted relational aggression at low levels of communication (b=1.36; P=.01) and low parental knowledge (b=1.06; P=.01), but not when communication or parental knowledge was high (b=−0.17 and −0.01; P=.69 and .97). The mean differences between early and non–early maturers at low levels of nurturance, communication, and knowledge were larger than the overall differences between the 2 groups but still relatively small, ranging from 1.0 to 1.3 points (Figure).

COMMENT

In this cross-sectional study of fifth-grade girls, maternal nurturance, communication with parents, and parental knowledge of the child's activities attenuated the association between early puberty and relational aggression; nurturance also attenuated the relationship between early puberty and physical aggression. Specifically, early maturation was a risk factor for aggressive behavior only when combined with low levels of maternal nurturance, communication, or parental knowledge. In families characterized by high levels of these parental factors, early puberty was not associated with increased aggressive behaviors. For delinquent behavior, early maturation, maternal nurturance, and parental knowledge had additive effects. Early puberty presented a risk for delinquency for all girls, regardless of caregivers' nurturance, communication, and knowledge. Likewise, low levels of nurturance and knowledge predicted delinquency regardless of pubertal timing. These direct associations replicate previous reports of early puberty[1,2] and low parental nurturance[21] and knowledge of the child's activities[10] as risk factors for delinquency. Most of parenting's protective effects were observed for relational aggression, which has particular relevance for girls.[22]

Our findings of interactive effects are consistent with the hypothesis that positive parenting practices play an important protective role for girls at higher risk for behavior problems because of early puberty. Considering the possible mechanisms through which early maturation may operate can shed light on the protective role of specific parent-

ing practices. The risk for aggressive behavior conferred by early puberty appears partly mediated by deviant peer associations.[23] Girls who reach puberty early are more physically developed and thus more likely to be accepted by older boys,[6] who generally engage in more undesirable behaviors than younger children.[24] Such peers are likely to provide more opportunities for deviant behaviors as well as model and reinforce such behaviors.[25] Additionally, early-maturing girls may be more susceptible to negative influences because their cognitive and social-emotional development may not have moved at the same pace as their physical development.[2] It is also possible that aggressive behavior in early-maturing girls may represent a maladaptive way of coping with the stress of early puberty and additional stressors (social and psychological changes, contextual transitions). This assertion is supported by research demonstrating the effects of cumulative stress on escalation of aggression over time.[26]

Parental nurturance, which is generally an important protective factor against aggressive and disruptive behavior,[8,27] may be especially important for early-maturing girls. Parental nurturance may decrease girls' susceptibility to negative peer influence.[28] Also, parental nurturance may help girls cope with challenges associated with early puberty. By listening to their daughters' difficulties and providing support and encouragement, nurturing parents can help them develop better coping skills and diffuse negative emotions that might otherwise manifest as aggression. Warm, supportive parenting improves children's coping,[29] which in turn translates into lower rates of externalizing problems.[30] Effective coping may be important for dealing with stressors and resisting negative peer influences. Parental nurturance may be less important for reducing aggression in prepubertal girls, who are at lower risk for aggressive behavior because they experience fewer stressors and less negative peer influence.

Besides nurturance, parental communication and knowledge of the girls' activities may also protect early-maturing girls from engaging in aggressive behavior. The link between effective communication and low levels of aggression has been demonstrated previously.[31] Open communication with caregivers probably helps children develop effective and socially acceptable strategies for coping with stresses and negative peer influence. By discussing difficult peer situations (eg, provocation, peer pressure) and ways of dealing with them, parents may help their daughters develop a repertoire of adaptive responses that will minimize the need for inappropriate (ie, aggressive) behavior. In addition, knowing about how their daughters spend free time may help parents identify and prevent negative peer and other influences. As indicated earlier, parental communication and knowledge may not be as important for prepubertal girls who are at a lower risk for negative peer influence, accumulation of stressors, and behavior problems.

Although our results are consistent with the hypothesis that positive parenting serves a protective function for early-maturing girls, other interpretations are plausible. Many girls in the sample had not yet experienced menarche, so we cannot distinguish between the effects of pubertal status and pubertal timing. Nevertheless, our interpretations of timing effects are supported by other

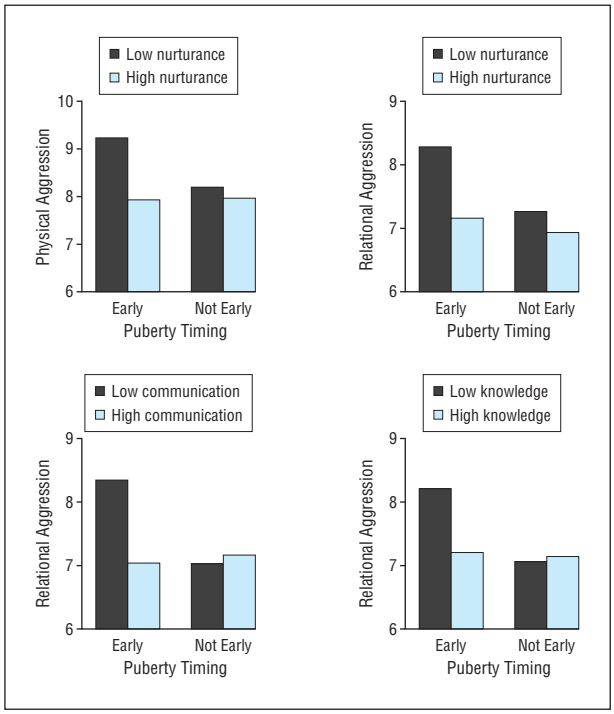

Figure. Maternal nurturance, communication with caregivers, and parental knowledge moderate the relationship between early puberty in girls and aggressive behavior in the Healthy Passages study. Low and high levels of parenting practices correspond to 1 SD lower than and higher than the mean, respectively. For outcome scaling, refer to the "Methods" section.

investigations documenting that pubertal timing, rather than undergoing puberty, affects girls' adjustment.[32,33] A related limitation is that some of the sample had not yet reached the cutoff age for early maturation and thus could not be unambiguously classified. Although our approach of using probabilities of being an early maturer removes the bias inherent in erroneously classifying these girls as non–early maturing or omitting them,[34] it would be valuable to replicate the current results with older samples that allow dichotomous classification of all girls. Also, the cross-sectional nature of the data permits alternative causal interpretations. It would be important in future research to use longitudinal or interventional studies to examine the effects of parenting and early maturation on adjustment. Other limitations include reliance on the girls' self-reports of menarche onset and externalizing problems. It would be valuable to include other informants in future studies. Finally, the average levels of externalizing behaviors were low in this sample, even though there was sufficient variability among individual girls. Accordingly, the obtained main and interaction effects were of small magnitude (which is typical for correlational studies).[35]

CONCLUSIONS

For early-maturing girls, parenting may play an important protective role in behavioral adjustment. Specifically, high maternal nurturance, open communication about sensitive topics, and knowledge of the child's activities and friends may prevent the development of ag-

gressive and delinquent behavior for which early puberty is a risk factor. The implications of these findings are 2-fold. First, although clinicians are generally encouraged to address communication, parental knowledge and monitoring, and nurturance with parents, they might want to be especially attentive to addressing it with parents of early-maturing girls. Second, families identified as having low levels of nurturance, knowledge, and communication may benefit from education or counseling to help them improve their parenting skills and learn new strategies.[36] It may be particularly beneficial to develop group programs for such families with early-maturing girls. Helping parents develop positive parenting skills may help early-maturing girls to grow into healthy, well-adjusted adolescents and adults.

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Correspondence: Sylvie Mrug, PhD, University of Alabama at Birmingham, 912 18th St South, Birmingham, AL 35294-1200 (sylva@uab.edu).
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