

Early Puberty, Friendship Group Characteristics, and Dating Abuse in US Girls

Frances R. Chen, PhD,^{a,b} Emily F. Rothman, ScD,^c Sara R. Jaffee, PhD^d

abstract

OBJECTIVES: The current study aimed to investigate the relationship between advanced pubertal development and adolescent dating abuse (ADA) and to test if this relationship is moderated by friendship group characteristics in a nationally representative sample of US girls.

METHODS: Data were drawn from wave 1 and 2 (1995–1996) of the National Longitudinal Study of Adolescent to Adult Health. The sample included 3870 girls aged 13 to 17 years, all of whom were in romantic and/or nonromantic sexual relationships. Relative pubertal development was measured as perceived physical development as compared with peers of the same age and race and age at menarche at wave 1. Participants reported at wave 2 whether they had experienced any verbal or physical abuse in their relationships. Friendship group characteristics included the percentage of boy friends, older friends, and friends' risk behavior level.

RESULTS: Negative binomial regression analyses revealed an interaction between advanced pubertal development and percentage of boy friends on ADA victimization, adjusted for age, race, parents' marital status, household income, number of relationships, self-esteem, self-control, and antisocial behavior history. Advanced pubertal development was associated with more ADA victimization when girls' friendship groups comprised a higher percentage of boys.

CONCLUSIONS: Findings highlight the importance of pubertal timing and friendship group characteristics to ADA victimization. Early pubertal development is a risk marker for ADA victimization, particularly when a higher percentage of girls' friends are boys. Pediatricians and adolescent health specialists should be sensitive to the elevated risk for ADA victimization in early-maturing girls.



^aDepartment of Criminal Justice and Criminology, Georgia State University, Atlanta, Georgia; Departments of ^bCriminology and ^cPsychology, University of Pennsylvania, Philadelphia, Pennsylvania; and ^dDepartment of Community Health Sciences, Boston University, Boston, Massachusetts

Dr Chen conceptualized the study, carried out data analysis, and drafted the initial manuscript; Dr Rothman interpreted the results, edited the manuscript, and critically reviewed the manuscript; Dr Jaffee conceptualized the study, contributed to data analysis, edited the initial manuscript, and critically reviewed the manuscript; and all authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

DOI: <https://doi.org/10.1542/peds.2016-2847>

Accepted for publication Mar 16, 2017

Address correspondence to Sara R. Jaffee, PhD, Department of Psychology, University of Pennsylvania, 425 South University Ave, Philadelphia, PA 19104. E-mail: srjaffee@psych.upenn.edu

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

WHAT'S KNOWN ON THIS SUBJECT: One previous study found that girls' pubertal timing predicted risk for adolescent dating abuse (ADA). Under what contexts early-maturing girls may be at increased risk for ADA victimization is unknown.

WHAT THIS STUDY ADDS: We report that when girls make an early transition to puberty, they are at heightened risk for ADA victimization if their friendship group includes a greater percentage of boys.

To cite: Chen FR, Rothman EF, Jaffee SR. Early Puberty, Friendship Group Characteristics, and Dating Abuse in US Girls. *Pediatrics*. 2017;139(6):e20162847

According to the 2013 Youth Risk Behavior Survey, 20% and 10% of high school-attending girls and boys, respectively, in the United States reported experiencing sexual or physical abuse by a dating partner in the past year.¹ Other studies using nationally representative samples have also found that 31% to 40% of girls and 27% to 30% of boys are victimized by psychological aggression, physical aggression, or both by a dating partner during adolescence.^{2,3} Not only is adolescent dating abuse (ADA) relatively common, but youth who are victimized are subsequently at elevated risk for depression, anxiety, eating disorders, substance use,²⁻⁴ and suicidal behavior.^{2,5,6} Thus, ADA is a significant public health problem. One previous study has shown that girls who make an early transition to puberty are at elevated risk for ADA,⁷ but more research is needed to understand the conditions under which early-maturing girls are at heightened risk.

The current study is designed to inform prevention efforts by assessing the relationship between pubertal timing and ADA in a nationally representative sample of US girls. Our hypothesis was that early puberty would elevate the risk for subsequent ADA, especially when girls' friendship groups included a high percentage of boys, older friends, and when friends participated in high levels of risk behavior.

Off-time pubertal development is defined as making the transition to puberty relatively earlier or later than one's peers.⁸⁻¹⁰ The stage-termination hypothesis proposes that early-maturing individuals have less time to acquire, integrate, and consolidate the coping and adaptive skills needed to successfully master the developmental challenges associated with the transition to adolescence.¹⁰⁻¹² Consistent with this hypothesis, early puberty has

been associated with emotional and behavioral problems, including externalizing and internalizing problems, substance abuse, eating disorders, and poor academic achievement.^{13,14}

Girls who make an early transition to puberty may be at heightened risk for ADA. Girls who are physically mature tend to attract the attention of boys^{13,15} and girls who make an early transition to puberty are often sexually active at a younger age than later-maturers.^{15,16} However, there are relatively few data on the prevalence of ADA among early-maturing girls. Studying a closely related topic, Craig et al¹⁷ found that early-maturing adolescents were at higher risk for same-sex and opposite-sex sexual harassment and opposite-sex relational aggression victimization. Similarly, a study revealed that early maturation was associated with physical violence victimization for both boys and girls, although not necessarily in the context of dating relationships.¹⁸ In the only previous study focused specifically on ADA and pubertal timing, Foster et al⁷ found that adjusting for the impact of various covariates, early-maturing girls were at greater risk for ADA than their on-time and late-maturing peers. However, they did not test how the effect of pubertal timing varied as a function of adolescents' social environment.

Although early-maturing girls may be at elevated risk for ADA, it is also true that not all early-maturing girls will be victimized.¹⁹ The contextual amplification hypothesis postulates that certain contextual conditions will accentuate the negative effect of early maturation.²⁰ In the current study, we focused on peer context (ie, friendship) as a potential modifier of the association between early puberty and ADA, because peer context is highly salient in adolescence and relevant to dating, sexual, and romantic encounters.

Adolescents spend increasingly more time with their friends than with their parents, and friends and romantic partners are influential and extremely important sources of social support.²¹ At least 3 aspects of the friendship group could increase the likelihood that girls will be exposed to ADA. First, girls with a higher percentage of boys in their friendship group may be more likely to be dating, which could potentially expose them to ADA. Second, older friends are also more likely to be involved in ADA,²² as victims or perpetrators, and having friends who are involved in ADA is a risk factor for one's own ADA.^{23,24} Thus, as the proportion of older friends in the friendship groups increase, so may girls' risk for ADA. Third, friends who engage in high levels of risk behaviors (eg, underage alcohol consumption, fighting) are likely to be involved in aggressive behavior and delinquency both inside and outside of dating relationships.^{6,25}

Compared with on-time and later-maturing girls, early-maturing girls may be more vulnerable to the effect of these friendship group characteristics^{26,27} because they will have had less time to develop coping skills^{10,12} and may have experienced a variety of hardships that limit their capacity to remove themselves from or resolve situations in sexual or romantic relationships that could become abusive. Thus, early-maturing girls may be at greater risk for ADA relative to later-maturing girls if their network includes a high percentage of boy friends, older friends, or friends who engage in risk behavior. The current study tests these hypotheses.

METHODS

Sample

Participants were drawn from the in-home interview sample of the National Longitudinal Study of Adolescent to Adult Health (Add

Health). Add Health is a longitudinal study of a nationally representative sample of adolescents from the United States who were in grades 7 through 12 in 1994 to 1995 when the study began. Our final analytic sample comprised 3870 girl participants aged 13 to 17 years self-identified as white (61%), African American (22.5%), and Hispanic (16.5%). Detailed information regarding how the final sample was derived can be found in the Supplemental Information.

Measures

ADA

ADA was measured at the wave 2 in-home interview. Each participant identified up to 3 romantic relationships and 3 nonromantic relationships that involved sexual activity in the past 18 months and reported ADA victimization information (but not perpetration) in each relationship. Of the 3870 participants, all of whom had been in romantic and/or nonromantic sexual relationships, 9.15% ($n = 354$) were involved in both romantic and nonromantic sexual relationships, 89.17% ($n = 3451$) were involved only in romantic relationships, and 1.68% ($n = 65$) were involved only in nonromantic sexual relationships. Sixty-seven percent of the participants had only 1 relationship. For each relationship, participants reported whether their partners insulted them in public, swore at them, threatened them with violence, pushed/shoved them in public, or threw something at them (0 = no, 1 = yes). Responses were coded as missing if participants did not have a partner in the past 18 months or if they refused or did not know how to answer the question. The same 5 items have been used to measure ADA in previous studies.^{2,7} A participant was considered to have experienced a particular form of abuse if she reported experiencing that form of abuse ≥ 1 time in

any relationship. Thus, across all relationships, participants could have experienced up to 5 forms of ADA. Thirty percent of participants reported that they experienced at least 1 form of ADA.

Relative Pubertal Development

Both a subjective and an objective measure of relative pubertal development were used. The subjective measure was a single item reported at wave 1 indicating how advanced participants thought their physical development was compared with other girls their age (1 = "I look younger than most" to 5 = "I look older than most"). One-third of the participants reported that they looked average compared with their peers. The objective measure of relative pubertal development was based on participants' reports (from wave 1 or 2) of how old they were when they had their first menstrual period. Menarcheal age was standardized within participants of the same age and race. We multiplied this standardized score by the value of -1 so that higher scores indicated more advanced pubertal development compared with peers. We use the phrase "advanced pubertal development" to refer to girls who either had a relatively earlier age at menarche compared with peers of the same age and race or described themselves as being more physically developed compared with peers of the same age and race.

Friendship Group Characteristics

The Add Health study collected network data at wave 1 from all students who attended each participating school, enabling a comprehensive assessment of a participant's friendship group. Only schools in which $>50\%$ of the student body completed the questionnaire (90% of all participating schools) were used to calculate the network measures. Each participant was asked to nominate up to 5 girl and 5 boy friends from the roster of all

students enrolled in the participant's school and/or in the sister school. Nominations were used in the current study if both the participant (ie, nominator) and the individuals named as the participant's friends (ie, nominees) were uniquely identifiable students who completed an in-school questionnaire. In the current study, we used the ego-send network, which included all individuals the participant nominated as friends, even if these nominated friends did not nominate the participant as a friend in return. The use of peer network data allows us to determine features of the friendship group based on the nominated friends' self-reports of behavior and demographic characteristics rather than on the participant's perceptions of these characteristics.

We identified 3 characteristics of participants' friendship groups. The first was the percentage of older friends, defined as the percentage of nominated friends who were at least 1 year older than the participant. The second was the percentage of boy friends, which was defined as the percentage of boy friends in a participant's friendship group. The third was risk behaviors among friends, which was based on the nominated friends' reports of how often (0 = never; 1 = once or twice; 6 = nearly every day) they engaged in 5 risk behaviors in the past 12 months including (1) smoking cigarettes, (2) drinking beer, wine, or liquor, (3) getting drunk, (4) lying to parents or guardians, (5) skipping school without an excuse, and how often (0 = never; 4 = >7 times) they were in physical fights. To adjust for the density of the friendship groups, the item score was divided by the number of friends nominated. Risk behavior items were z-transformed and then summed to represent the level of risk behavior among friends. The measure of risk behavior among friends had good internal consistency (Cronbach's $\alpha = 0.79$).

TABLE 1 Bivariate Correlation Between Main Variables and Descriptive Statistics

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. ADA	1												
2. Relative pubertal development (objective)	0.06**	1											
3. Relative pubertal development (subjective)	0.07**	0.25**	1										
4. Risk behavior among friends	0.11**	0.08**	0.07**	1									
5. Percentage of boy friends	0.03	0.05**	0.03	0.14**	1								
6. Percentage of older friends	0.06**	0.04*	0.05**	0.10**	0.18**	1							
7. No. relationships	0.24**	0.02	0.07**	0.03	0.04	0.01	1						
8. Age, W1	0.05**	-0.001	-0.09**	0.19**	-0.01	-0.12**	-0.03	1					
9. Parents married, W1	-0.03	-0.04*	0.01	-0.04*	0.01	-0.02	0.02	0.01	1				
10. Household income, W1 (\$1000)	-0.04*	-0.03	0.06**	-0.04	0.01	-0.04	0.06**	-0.03	0.42**	1			
11. Self-control, W1	-0.11**	0.01	-0.02	-0.09**	0.02	-0.01	-0.08**	0.04*	-0.03	-0.03	1		
12. Self-esteem, W1	-0.11**	-0.03	-0.03	-0.13**	0.01	-0.002	-0.05**	-0.04**	-0.01	-0.01	0.38**	1	
13. Antisocial behavior, W1	0.18**	-0.03*	0.10**	0.19**	-0.02	0.02	0.13**	-0.04*	-0.05**	-0.03	-0.30**	-0.26**	1
Mean	0.57	12.05 ^a	3.39	0.03	0.37	0.33	1.45	15.81	69.25%	0.02	15.79	46.18	2.36
SD	1.06	1.31	1.07	4.13	0.24	0.29	0.71	1.28	—	3.94	2.69	49.47	2.19

W1, wave 1.

^a The mean age at menarche is reported, the relative pubertal development (objective) has a mean of 0 because of the standardization reported in the Methods section.* $P < .05$.** $P < .01$.

Covariates

We included a range of covariates in the analysis (Table 1). All covariates were drawn from the wave 1 in-home interview. Demographic covariates at wave 1 were age, participants' race, whether parents were married, and the household income. We also included the number of relationships, self-esteem, self-control, and antisocial behavior at wave 1 because of their association with ADA in the literature.^{28–30} All but parents' marital status was correlated with ADA, and all covariates were significantly correlated with at least 1 of the main variables of interest (ie, friendship group characteristics and relative pubertal development). Detailed information about the covariates are reported in the Supplemental Information.

Analysis Plan

We used negative binomial regression to test the hypothesis that the association between advanced

pubertal development and ADA at wave 2 would be strongest when the friendship groups included a greater percentage of older friends and boy friends and when friends engaged in more risk behaviors at wave 1. Friendship group characteristics and relative pubertal development were mean-centered to facilitate interpretation. First, we tested the main effects of advanced pubertal development and the 3 friendship group characteristics on ADA, adjusting for the effects of covariates. Next, we included the three 2-way interaction terms between relative pubertal development and each of the 3 friendship group characteristics. We ran the analyses separately for the objective and the subjective measure of relative pubertal development. Analyses were conducted in Mplus 6³¹ by using maximum likelihood estimation with robust SE, and missing data were handled with the full information maximum likelihood method. Analyses were adjusted

for the stratified and clustered sampling design of Add Health and incorporated sampling weights that adjusted for differential response and attrition rates over time.

RESULTS

Girls with more advanced pubertal development were more likely to be dating (see Supplemental Information) and reported more ADA (Table 1). The correlations between the 2 measures of relative pubertal timing and ADA were statistically significant but small in effect sizes ($r = 0.06$ and 0.07 for objective and subjective pubertal timing, respectively). Having more relationships, being older, living in a family with a lower household income, having lower self-esteem, engaging in more antisocial behaviors at wave 1, and being white versus Hispanic were associated with higher levels of ADA across all 4 models (Table 2). As seen in Table 2 (model 1), the main

TABLE 2 Negative Binomial Regression Results for the Effects of Relative Pubertal Development and Friendship Group Characteristics on ADA (*N* = 3870)

	Model 1	Model 2	Model 3	Model 4
	B (95% CI)	B (95% CI)	B (95% CI)	B (95% CI)
Intercept	-0.87*** (-0.19 to -0.65)	-0.87*** (-1.09 to -0.65)	-0.84*** (-1.06 to -0.62)	-0.85*** (-1.07 to -0.63)
Dispersion	1.56** (1.27 to 1.85)	1.54*** (1.25 to 1.83)	1.58** (1.29 to 1.87)	1.55*** (1.26 to 1.84)
Covariates				
No. relationships	0.45*** (0.37 to 0.53)	0.45*** (0.37 to 0.53)	0.45*** (0.37 to 0.53)	0.45*** (0.37 to 0.53)
Age, W1	0.07* (0.01 to 0.13)	0.07* (0.01 to 0.13)	0.08* (0.02 to 0.14)	0.08** (0.02 to 0.14)
Race (reference: white)				
African American	-0.12 (-0.32 to 0.08)	-0.12 (-0.32 to 0.08)	-0.11 (-0.31 to 0.09)	-0.10 (-0.30 to 0.10)
Hispanic	-0.22* (-0.42 to -0.02)	-0.22* (-0.42 to -0.02)	-0.23* (-0.43 to -0.03)	-0.22* (-0.42 to -0.02)
Parents married, W1	0.07 (-0.17 to 0.31)	0.07 (-0.17 to 0.31)	0.05 (-0.19 to 0.29)	0.05 (-0.19 to 0.29)
Self-control, W1	-0.01 (-0.03 to 0.01)	-0.01 (-0.03 to 0.01)	-0.01 (-0.03 to 0.01)	-0.01 (-0.03 to 0.01)
Self-esteem, W1	-0.53*** (-0.88 to -0.18)	-0.52** (-0.87 to -0.17)	-0.54** (-0.89 to -0.19)	-0.53*** (-0.86 to -0.20)
Household income, W1 (\$1000)	-0.15** (-0.25 to -0.05)	-0.15** (-0.25 to -0.05)	-0.16** (-0.26 to -0.06)	-0.15** (-0.25 to -0.05)
Antisocial behavior, W1	0.10*** (0.06 to 0.14)	0.07*** (0.03 to 0.11)	0.07*** (0.03 to 0.11)	0.07*** (0.03 to 0.11)
Relative pubertal development				
Objective measure ^a	0.13** (0.05 to 0.21)	0.12** (0.04 to 0.20)	—	—
Subjective measure ^b	—	—	0.09* (0.01 to 0.17)	0.09* (0.01 to 0.17)
Friendship group characteristics				
Risk behavior among friends	0.03** (0.01 to 0.05)	0.03** (0.01 to 0.05)	0.03* (0.01 to 0.05)	0.03** (0.01 to 0.05)
Proportion of boy friends	0.18 (-0.17 to 0.53)	0.17 (-0.18 to 0.52)	0.20 (-0.17 to 0.57)	0.20 (-0.17 to 0.57)
Proportion of older friends	0.27 (-0.02 to 0.56)	0.27 (-0.02 to 0.56)	0.23 (-0.06 to 0.52)	0.22 (-0.07 to 0.51)
Interaction				
Risk behavior among friends by relative pubertal development	—	-0.007 (-0.03 to 0.01)	—	-0.001 (-0.02 to 0.02)
Proportion of boy friends by relative pubertal development	—	0.39* (0.08 to 0.70)	—	0.40* (0.09 to 0.71)
Proportion of older friends by relative pubertal development	—	-0.22 (-0.49 to 0.05)	—	-0.04 (-0.31 to 0.23)

CI, confidence interval; W1, wave 1; B, unstandardized coefficient; —, variable not included in the model.

^a Age at menarche was standardized within participants of the same age and race and then multiplied by the value of -1 so that higher scores indicated more advanced pubertal development compared with peers.

^b A 1-item measure ("How advanced is your physical development compared to other girls your age?").

* *P* < .05.

** *P* < .01.

*** *P* < .001.

effects of the objective measure of relative pubertal development and risk behaviors among friends were statistically significant. One unit increase in relative pubertal development was associated with a 14% increase in ADA. In addition, 1 unit increase in risk behaviors among friends was associated with a 3% increase in ADA. A similar pattern of results emerged for the subjective measure of relative pubertal development (Table 2, model 3).

The effects of the objective and subjective measures of relative pubertal development were moderated by the percentage of boys in girls' friendship groups (Table 2, model 2 and 4). Figure 1A reveals the region of significance for the slope of the objective measure of relative

pubertal development on ADA. When the proportion of boys in a friendship group was <29%, the association between relative menarcheal age and ADA was not statistically significant. However, when the percentage of boys in a girls' friendship group was ≥29%, having a relatively earlier menarcheal age was associated with ADA, and the magnitude of this association increased as the percentage of boy friends increased. Figure 2A illustrates the simple slope effects. Results involving the subjective measure of relative pubertal development were similar to those involving the objective measure (Table 2, model 4; Figs 1B and 2B).

To test the robustness of our findings, we repeated analyses using an

alternative ADA score that summed across adolescents' reports of all forms of ADA across all relationships. Negative binomial regression revealed similar results to those reported in Table 2 when using this alternative ADA score. The observed relationship between pubertal timing and ADA did not differ significantly between younger and older girls (see Supplemental Information).

DISCUSSION

Using a nationally representative sample of US girls, we found that girls who made an early transition to puberty relative to their peers of the same age and race were at elevated risk for ADA. Early-maturing girls whose friendship groups included a greater percentage of boys were at

exacerbated risk, even accounting for the fact that girls who were relatively more physically advanced had a higher number of romantic or sexual relationships than girls who were less physically advanced. Findings were replicated with both objective and subjective ratings of relative pubertal development, the first reflecting girls' age at menarche, and the second reflecting their perceptions of their physical development relative to girls their age and race.

One reason that having a greater percentage of boys in a friendship group may specifically increase risk for ADA for early-maturing girls is because early-maturing girls are more likely to be in romantic, dating, or sexual relationships with their friends than later-maturing girls are.¹⁵ Boys may find early-maturing girls attractive because they are more physically developed than their on-time/late-maturing peers^{15,32,33} and early-maturing girls may be more likely than their later-maturing peers to seek out boy friends to develop romantic or sexual relationships because of their relative sexual maturity. Thus, early-maturing girls are at heightened risk for ADA than their later-maturing peers because of the higher exposure. Second, compared with on-time or late-maturing girls, those who make an early transition to adolescence engage in higher levels of externalizing behavior.³⁴ The spectrum of risky behaviors that includes externalizing problems is hypothesized to result from the maturational gap between the brain's reward system (which is activated by pubertal hormones³⁵) and the cognitive control system (which is not fully mature until individuals are in their mid-to-late 20s).^{36,37} Thus, early maturing girls may be at increased risk for ADA when their friendship group comprises a higher percentage of boys not only because they have more opportunities to be

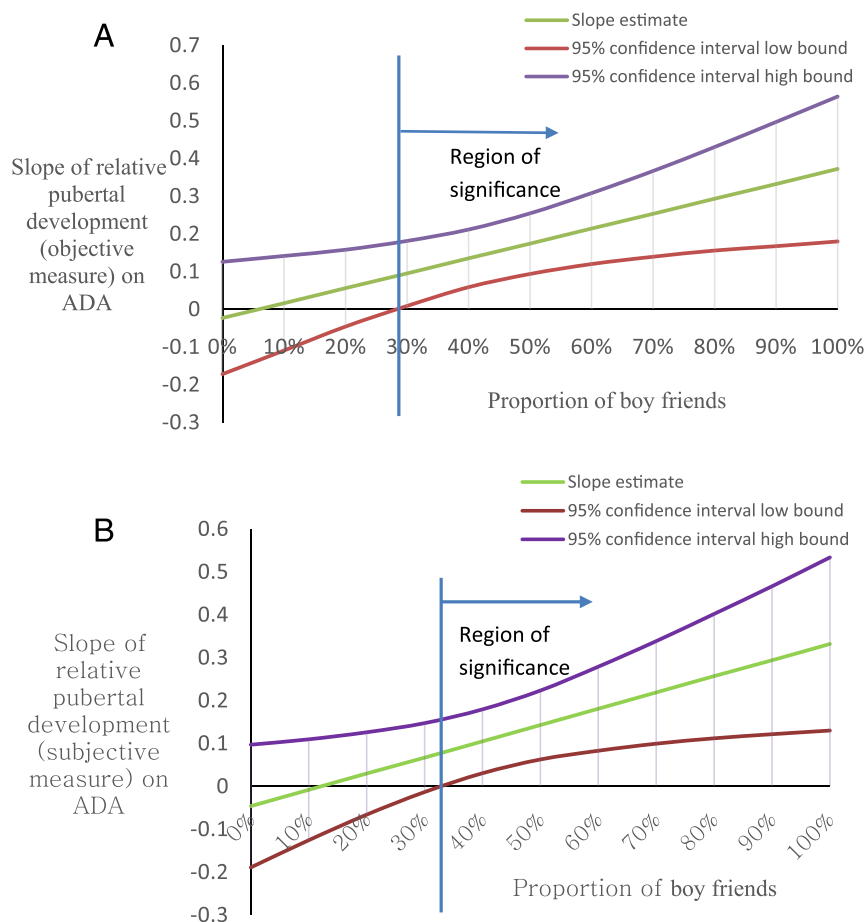


FIGURE 1 Region of significance for the slope of relative pubertal development on ADA. A, Objective measure of relative pubertal development. B, Subjective measure of pubertal development.

in romantic or sexual relationships, but also because they may perpetrate abuse that subsequently elevates the chances that they will be victimized.³⁸

Risk behaviors among friends did not moderate the association between relative pubertal development and ADA, but it had a statistically significant main effect. Individuals who engage in risk behaviors are at elevated risk for perpetrating ADA.^{6,39} Adolescents with many peers who engage in delinquent and aggressive behavior might perceive such behavior, including ADA, as normative. If girls are dating these risk-taking friends, they would be at elevated risk for ADA. Thus, risk behaviors among friends may increase girls' risk of ADA in general,

and on-time/late-maturing girls were just as susceptible to this impact as their early-maturing counterparts.

The current study highlighted the importance of early puberty and friendship group characteristics in ADA victimization. A recent study showed that only 55% of parents talked to their children about dating abuse, and that parents were significantly less likely to discuss dating abuse than other sensitive topics, such as drugs or family finance.⁴⁰ Our findings suggest that parents need to talk to their children about ADA before puberty and that they should be aware of who their children's friends are. In addition, schools can provide developmentally appropriate healthy dating curricula for elementary and

middle school, so that girls who make an early transition to puberty are better prepared to differentiate abusive dating behaviors from normative dating behaviors. Finally, pediatricians can also play an active role in ADA prevention/intervention by being aware of the risks that early-maturing girls face and being alert for signs of ADA.

Limitations of this study include the fact that pubertal timing was assessed by using self-report. The measure of pubertal timing could be improved by having a trained third party (eg, nurses) assess pubertal development according to the Tanner stages.⁴¹ Nevertheless, the current findings held across an objective (ie, age at menarche) and a subjective measure of relative pubertal development, bolstering confidence in the results. Second, ADA was assessed in up to 3 romantic relationships and up to 3 nonromantic sexual relationships, which means that ADA could have been underdetected if some girls had abusive experiences in a seventh or eighth relationship that was not assessed. This seems unlikely, however, because none of the participants reported having had 6 relationships, only 1 reported having had 5 relationships, and 67% reported that they had only 1 romantic or sexual relationship. Third, the data analyzed in this study were from 20 years ago. The reason is that Add Health is the only study that collected peer network data as part of a nationally representative sample; there are not more recent data we could use.

CONCLUSIONS

ADA is prevalent and consequential. In recent years, more prevention programs have been tested for middle school youth,^{42,43} because it has become clear that ADA is already prevalent by the time youth reach high school.^{44,45} However, the

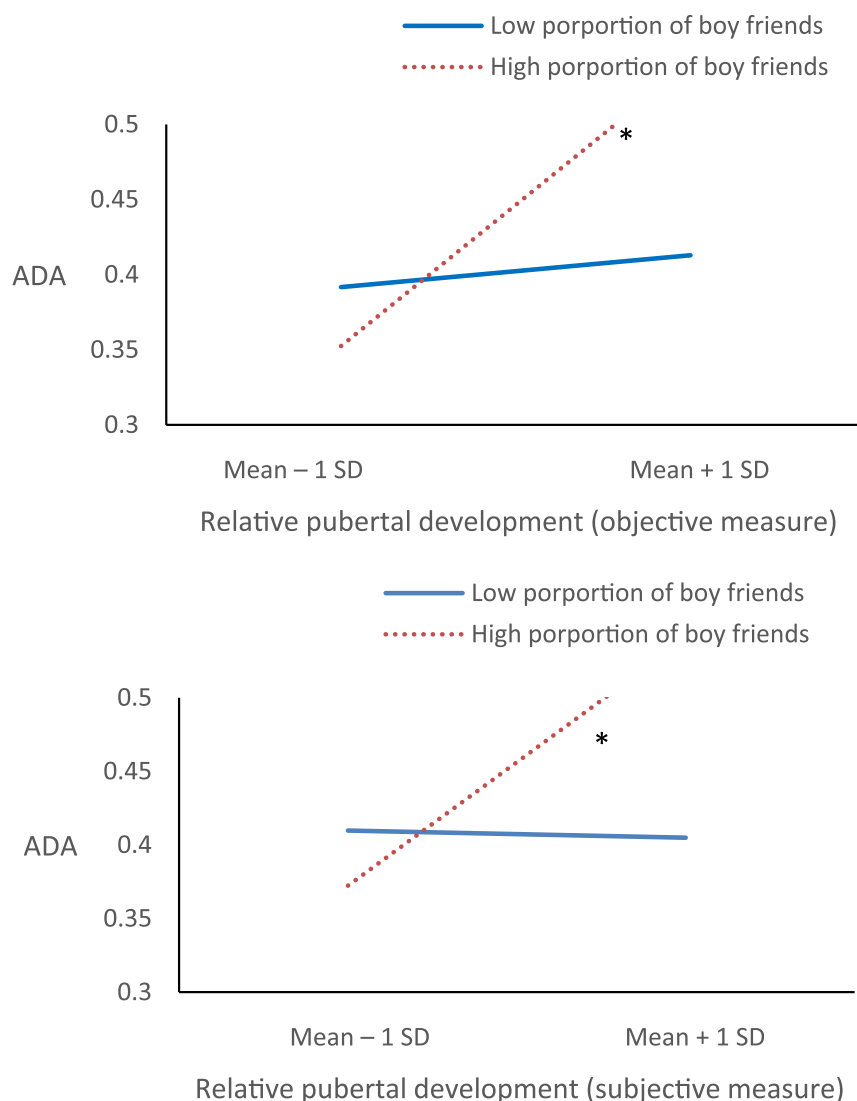


FIGURE 2

The effects of proportion of boy friends and relative pubertal development on ADA. A, Objective measure of relative pubertal development. B, Subjective measure of pubertal development. * $P < .05$.

effects of these prevention programs are typically small and difficult to sustain. Biological indicators that a girl may be at increased risk for ADA are important for the field because they give pediatricians, parents, and others who work with youth a marker that should prompt extra conversation about the importance of healthy relationships. Our study provides 1 marker for increased risk for ADA among US girls that should be included in lists of risk factors and educational materials. Adolescents and their parents should be reassured that only some girls who

make an early transition to puberty (32% as compared with 28% of the on-time and 27% of the late-maturing girls based on the subjective rating of pubertal timing; see Supplemental Information) experience dating abuse, but that it is nevertheless worthwhile to be vigilant with this group, particularly when these girls have a greater percentage of boys in their friendship groups. Continued study of the mechanisms underlying the linkage of early puberty, boy friends, and ADA may additionally enhance prevention efforts.

ACKNOWLEDGMENTS

This research uses data from Add Health, a program project directed by Kathleen Mullan Harris and designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill, and funded by grant P01-HD31921 from the Eunice Kennedy Shriver National

Institute of Child Health and Human Development, with cooperative funding from 23 other federal agencies and foundations. We thank Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Information on how to obtain the Add Health data files is available on the Add Health Web site (www.cpc.unc.edu/addhealth). No direct

support was received from grant P01-HD31921 for this analysis.

ABBREVIATIONS

ADA: adolescent dating abuse
Add Health: National Longitudinal Study of Adolescent to Adult Health

Copyright © 2017 by the American Academy of Pediatrics

FINANCIAL DISCLOSURE: The authors have indicated they have no financial relationships relevant to this article to disclose.

FUNDING: No external funding.

POTENTIAL CONFLICT OF INTEREST: The authors have indicated they have no potential conflicts of interest to disclose.

REFERENCES

- Vagi KJ, O'Malley Olsen E, Basile KC, Vivolo-Kantor AM. Teen dating violence (physical and sexual) among us high school students: findings from the 2013 national youth risk behavior survey. *JAMA Pediatr.* 2015;169(5):474–482
- Exner-Cortens D, Eckenrode J, Rothman E. Longitudinal associations between teen dating violence victimization and adverse health outcomes. *Pediatrics.* 2013;131(1):71–78
- Haynie DL, Farhat T, Brooks-Russell A, Wang J, Barbieri B, Iannotti RJ. Dating violence perpetration and victimization among U.S. adolescents: prevalence, patterns, and associations with health complaints and substance use. *J Adolesc Health.* 2013;53(2):194–201
- Foshee VA, Reyes HLM, Gottfredson NC, Chang L-Y, Ennett ST. A longitudinal examination of psychological, behavioral, academic, and relationship consequences of dating abuse victimization among a primarily rural sample of adolescents. *J Adolesc Health.* 2013;53(6):723–729
- Ackard DM, Eisenberg ME, Neumark-Sztainer D. Long-term impact of adolescent dating violence on the behavioral and psychological health of male and female youth. *J Pediatr.* 2007;151(5):476–481
- Bossarte RM, Simon TR, Swahn MH. Clustering of adolescent dating violence, peer violence, and suicidal behavior. *J Interpers Violence.* 2008;23(6):815–833
- Foster H, Hagan J, Brooks-Gunn J. Age, puberty, and exposure to intimate partner violence in adolescence. *Ann N Y Acad Sci.* 2004;1036(1):151–166
- Dorn LD, Nottelmann ED, Susman EJ, Inoff-Germain G, Cutler GB Jr, Chrousos GP. Variability in hormone concentrations and self-reported menstrual histories in young adolescents: menarche as an integral part of a developmental process. *J Youth Adolesc.* 1999;28(3):283–304
- Graber JA, Seeley JR, Brooks-Gunn J, Lewinsohn PM. Is pubertal timing associated with psychopathology in young adulthood. *J Am Acad Child Adolesc Psychiatry.* 2004;43(6):718–726
- Peskin H. Influence of the developmental schedule of puberty on learning and ego functioning. *J Youth Adolesc.* 1973;2(4):273–290
- Adelson J. *Handbook of Adolescent Psychology.* New York, NY: Wiley; 1980
- Brooks-Gunn J, Petersen AC, Eichorn D. The study of maturational timing effects in adolescence. *J Youth Adolesc.* 1985;14(3):149–161
- Mendle J, Turkheimer E, Emery RE. Detrimental psychological outcomes associated with early pubertal timing in adolescent girls. *Dev Rev.* 2007;27(2):151–171
- Mrug S, Elliott MN, Davies S, Tortolero SR, Cuccaro P, Schuster MA. Early puberty, negative peer influence, and problem behaviors in adolescent girls. *Pediatrics.* 2014;133(1):7–14
- Cavanagh SE. The sexual debut of girls in early adolescence: the intersection of race, pubertal timing, and friendship group characteristics. *J Res Adolesc.* 2004;14(3):285–312
- Negriff S, Susman EJ, Trickett PK. The developmental pathway from pubertal timing to delinquency and sexual activity from early to late adolescence. *J Youth Adolesc.* 2011;40(10):1343–1356
- Craig WM, Pepler D, Connolly J, Henderson K. Development context of peer harassment in early adolescent: the role of puberty and the peer group. In: Juvonen J, Graham S, eds. *Peer Harassment in Schools: The Plight of the Vulnerable and Victimized.* New York, NY: Guilford Press; 2001:242–262
- Haynie DL, Piquero AR. Pubertal development and physical victimization in adolescence. *J Res Crime Delinq.* 2006;43(1):3–35
- Skoog T, Stattin H. Why and under what contextual conditions do early-maturing girls develop problem behaviors? *Child Dev Perspect.* 2014;8(3):158–162
- Ge X, Brody GH, Conger RD, Simons RL, Murry VM. Contextual amplification of pubertal transition effects on deviant peer affiliation and externalizing behavior among African American children. *Dev Psychol.* 2002;38(1):42–54

21. Furman W, McDunn C, Young B. The role of peer and romantic relationships in adolescent affective development. In: Allen NB, Sheeber L, eds. *Adolescent Emotional Development and the Emergence of Depressive Disorders*. New York, NY: Guilford Press; 2008:299–317
22. Rennison CM, Welchans S. Intimate partner violence. Bureau of Justice Statistics Special Report. NCJ 178247. May 2000. Available at: www.popcenter.org/problems/domestic_violence/PDFs/Rennison%26Welchans_2000.pdf. Accessed June 22, 2016
23. Vagi KJ, Rothman EF, Latzman NE, Tharp AT, Hall DM, Breiding MJ. Beyond correlates: a review of risk and protective factors for adolescent dating violence perpetration. *J Youth Adolesc*. 2013;42(4):633–649
24. Foshee VA, Reyes HLM, Ennett ST. Examination of sex and race differences in longitudinal predictors of the initiation of adolescent dating violence perpetration. *J Aggress Maltreat Trauma*. 2010;19(5):492–516
25. Felson RB, Lane KJ. Does violence involving women and intimate partners have a special etiology?*. *Criminology*. 2010;48(1):321–338
26. Burt SA, McGue M, DeMarte JA, Krueger RF, Iacono WG. Timing of menarche and the origins of conduct disorder. *Arch Gen Psychiatry*. 2006;63(8):890–896
27. Harden KP, Mendle J. Gene-environment interplay in the association between pubertal timing and delinquency in adolescent girls. *J Abnorm Psychol*. 2012;121(1):73–87
28. Ehrensaft MK, Cohen P, Brown J, Smailes E, Chen H, Johnson JG. Intergenerational transmission of partner violence: a 20-year prospective study. *J Consult Clin Psychol*. 2003;71(4):741–753
29. Foshee VA, Benefield TS, Ennett ST, Bauman KE, Suchindran C. Longitudinal predictors of serious physical and sexual dating violence victimization during adolescence. *Prev Med*. 2004;39(5):1007–1016
30. Vézina J, Hébert M. Risk factors for victimization in romantic relationships of young women: a review of empirical studies and implications for prevention. *Trauma Violence Abuse*. 2007;8(1):33–66
31. Muthén LK, Muthén BO. *Mplus User's Guide*. 6th ed. Los Angeles, CA: Muthén & Muthén; 1998
32. Flannery DJ, Rowe DC, Gulley BL. Impact of pubertal status, timing, and age on adolescent sexual experience and delinquency. *J Adolesc Res*. 1993;8(1):21–40
33. Skoog T, Özdemiş SB. Explaining why early-maturing girls are more exposed to sexual harassment in early adolescence. *J Early Adolesc*. 2016;36(4)490–509
34. Lynne SD, Graber JA, Nichols TR, Brooks-Gunn J, Botvin GJ. Links between pubertal timing, peer influences, and externalizing behaviors among urban students followed through middle school. *J Adolesc Health*. 2007;40(2):181.e7–181.e13
35. Sisk CL, Zehr JL. Pubertal hormones organize the adolescent brain and behavior. *Front Neuroendocrinol*. 2005;26(3–4):163–174
36. Steinberg L. A social neuroscience perspective on adolescent risk-taking. *Dev Rev*. 2008;28(1):78–106
37. Paus T. Mapping brain maturation and cognitive development during adolescence. *Trends Cogn Sci*. 2005;9(2):60–68
38. Jennings WG, Higgins GE, Tewksbury R, Gover AR, Piquero AR. A longitudinal assessment of the victim-offender overlap. *J Interpers Violence*. 2010;25(12):2147–2174
39. Johnson WL, Giordano PC, Manning WD, Longmore MA. The age-IPV curve: changes in the perpetration of intimate partner violence during adolescence and young adulthood. *J Youth Adolesc*. 2015;44(3):708–726
40. Rothman EF, Miller E, Terpeluk A, Glauber A, Randel J. The proportion of U.S. parents who talk with their adolescent children about dating abuse. *J Adolesc Health*. 2011;49(2):216–218
41. Morris NM, Udry JR. Validation of a self-administered instrument to assess stage of adolescent development. *J Youth Adolesc*. 1980;9(3):271–280
42. Foshee VA, Bauman KE, Ennett ST, Linder GF, Benefield T, Suchindran C. Assessing the long-term effects of the Safe Dates program and a booster in preventing and reducing adolescent dating violence victimization and perpetration. *Am J Public Health*. 2004;94(4):619–624
43. Taylor BG, Stein ND, Mumford EA, Woods D. Shifting Boundaries: an experimental evaluation of a dating violence prevention program in middle schools. *Prev Sci*. 2013;14(1):64–76
44. Avery-Leaf S, Cascardi M, O'Leary KD, Cano A. Efficacy of a dating violence prevention program on attitudes justifying aggression. *J Adolesc Health*. 1997;21(1):11–17
45. Lavoie F, Vézina L, Piché C, Boivin M. Evaluation of a prevention program for violence in teen dating relationships. *J Interpers Violence*. 1995;10(4):516–524

Early Puberty, Friendship Group Characteristics, and Dating Abuse in US Girls

Frances R. Chen, Emily F. Rothman and Sara R. Jaffee
Pediatrics 2017;139;; originally published online May 8, 2017;
DOI: 10.1542/peds.2016-2847

Updated Information & Services	including high resolution figures, can be found at: /content/139/6/e20162847.full.html
Supplementary Material	Supplementary material can be found at: /content/suppl/2017/05/05/peds.2016-2847.DCSupplemental.html
References	This article cites 40 articles, 2 of which can be accessed free at: /content/139/6/e20162847.full.html#ref-list-1
Subspecialty Collections	This article, along with others on similar topics, appears in the following collection(s): Developmental/Behavioral Pediatrics /cgi/collection/development:behavioral_issues_sub Psychosocial Issues /cgi/collection/psychosocial_issues_sub Endocrinology /cgi/collection/endocrinology_sub Puberty /cgi/collection/puberty_sub
Permissions & Licensing	Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at: /site/misc/Permissions.xhtml
Reprints	Information about ordering reprints can be found online: /site/misc/reprints.xhtml

PEDIATRICS is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. PEDIATRICS is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2017 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 0031-4005. Online ISSN: 1098-4275.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™



PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Early Puberty, Friendship Group Characteristics, and Dating Abuse in US Girls

Frances R. Chen, Emily F. Rothman and Sara R. Jaffee

Pediatrics 2017;139;; originally published online May 8, 2017;

DOI: 10.1542/peds.2016-2847

The online version of this article, along with updated information and services, is located on the World Wide Web at:

[/content/139/6/e20162847.full.html](http://content/139/6/e20162847.full.html)

PEDIATRICS is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. PEDIATRICS is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2017 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 0031-4005. Online ISSN: 1098-4275.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

