Article

Journal of Early Adolescence
2022, Vol. 42(1) 5–32

DOI: 10.1177/02724316211002265
journals.sagepub.com/home/jea


The Role of Pubertal Timing in the Development of Peer Victimization and Offending From Early- to Mid-Adolescence

Therése Skoog[1] and Sabina Kapetanovic[2,3]

Abstract

We used latent growth curve analysis to extend research on associations between early puberty and adverse peer relations by examining the role of pubertal timing in the developmental trajectories of peer victimization and offending from early- to mid-adolescence. We made use of three-wave longitudinal data collected annually from a cohort of Swedish adolescents (N = 1,515, 51% girls, $\bar{X}_{age}$ at T1 = 13.0 years). The results revealed negative developmental trends for peer victimization and offending. Early pubertal timing was linked to higher initial levels and a steeper decrease of peer victimization and offending. The only effect of pubertal timing that differed between the genders was that the initial level of offending was stronger for boys than girls. In conclusion, the negative impact of early pubertal timing on peer victimization and offending occurs in the early stages of adolescence and disappears thereafter.

Keywords

puberty/pubertal development, victimization, developmental trajectories, peer relationships

[1]University of Gothenburg, Sweden
[2]University West, Trollhattan, Sweden
[3]Jönköping University, Sweden

Corresponding Author:
Therése Skoog, Department of Psychology, University of Gothenburg, Haraldsgatan 1, Gothenburg 405 30, Sweden.
Email: therese.skoog@psy.gu.se

Puberty marks the start of adolescence. The well-established developmental readiness hypothesis (Mendle & Ferrero, 2012; Skoog & Stattin, 2014) posits that adolescents who experience the pubertal changes at relatively early ages, before most of their same-sex, same-age peers, have not had enough time to develop important emotional, cognitive, and behavioral skills and are not psychosocially mature enough to cope with their advanced sexual maturity and others' reactions to their mature appearance. According to the hypothesis, this asynchrony is stressful and increases the risk for negative psychosocial outcomes. In line with this prediction, a large body of empirical research has established that experiencing the changes of puberty before most same-age and same-sex peers (i.e., early pubertal timing) is a risk factor in early- and mid-adolescent psychosocial development (Hamlat, Snyder, Young, & Hankin, 2019; Ullsperger & Nikolas, 2017). One central developmental domain in which early maturing adolescents appear to struggle more than others is peer relationships (Mendle, Harden, Brooks-Gunn, & Graber, 2012; Pomerantz, Parent, Forehand, Breslend, & Winer, 2017).

The importance of peer relations increases markedly in early adolescence (Bornstein, Jager, & Steinberg, 2013). Adolescents are greatly concerned about their role in peer groups and of how peers treat them (Somerville, 2013). Interestingly, early adolescence is also the period when adverse peer relations and different forms of aggression against members of the peer group peak (Noret, Hunter, & Rasmussen, 2018). It has been shown that the effects of adverse peer relations on psychosocial development in adolescence (e.g., mental health) may last well into adulthood (Brendgen, Poulin, & Denault, 2019). In addition to these group mean-level changes, adolescents follow different peer victimization and offending trajectories over the course of adolescence (Haltigan & Vaillancourt, 2014; Sumter, Baumgartner, Valkenburg, & Peter, 2012). This supports the idea that there could be meaningful predictors that explain the variance.

Adolescents' pubertal timing has been found to have implications for at least two aspects of adverse peer relations during early- and mid-adolescence. First, early pubertal timing has been linked to being victimized by peers (e.g., Haltigan & Vaillancourt, 2018; Schreck, Burek, Stewart, & Miller, 2007). We define peer victimization as peer-to-peer interaction that involves being the target of a broad range of negative peer behaviors, including personal and sexual harassment, peer rejection, and physical aggression. The nature of the victimization ranges from being targeted for negative rumors (Reynolds & Juvonen, 2011) and being actively excluded from the peer group (Carter, Halawah, & Trinh, 2018) to experiencing physical violence (Haynie & Piquero, 2006) and sexual harassment (Skoog & Özdemir, 2016a, 2016b); In fact, peer victimization has been identified as an underlying mechanism in

the well-established association between early pubertal timing and depressive symptoms among adolescent girls (Compian, Gowen, & Hayward, 2009; Nadeem & Graham, 2005; Skoog, Özdemir, & Stattin, 2016). Second, a smaller body of literature has linked early pubertal timing to adolescents' involvement in own peer offending. Parallel to our definition of peer victimization, we define peer offending as peer-to-peer interaction that involves subjecting peers to a broad range of negative behaviors, including personal and sexual harassment, peer rejection, and physical aggression. Specifically, early maturing adolescents have been found to more often sexually harass (McMaster, Connolly, Pepler, & Craig, 2002), physically offend (Mrug et al., 2014), and bully (Jormanainen, Fröjd, Marttunen, & Kaltiala-Heino, 2014; Su et al., 2018) their peers.

There are several possible reasons why early pubertal timing puts adolescents at an increased risk for peer victimization and offending. Because of the emergence of secondary sexual characteristics (e.g., breasts and facial hair) and the growth spurt associated with puberty, early maturing adolescents look sexually mature at a time when their same-age peers do not. The change in appearance makes early maturers stand out in the peer group by looking older than they are. Simply standing out in the same-age peer group (by looking more sexually mature) increases the risk of peer victimization (Skoog & Özdemir, 2016a, 2016b; Troop-Gordon, 2017). In addition, early maturers are granted more autonomy by parents and are less supervised by them compared with what is the case for their later maturing peers (Mendle & Ferrero, 2012). Consequently, early maturers affiliate more in unsupervised settings with deviant peers than later maturing adolescents (Negriff, Ji, & Trickett, 2011; Stattin, Kerr, & Skoog, 2011). This increases the risk among early maturers for peer victimization and offending as adverse peer interactions often occur in unsupervised settings in which there are deviant peers engaging in this type of behavior (Hong & Espelage, 2012; Jennings, Piquero, & Reingle, 2012). Moreover, due to their tendencies for norm-breaking behavior (Ullsperger & Nikolas, 2017; for example, disturbing behavior in class), early maturers might come across as more annoying and, as a result, are victimized by peers, as suggested by Schreck and colleagues (2007). In fact, early maturing adolescents have been shown to have worse social skills than other adolescents (Carter et al., 2018). To the extent that early maturers are victimized, they have been assumed to retaliate (Jormanainen et al., 2014; Kaltiala-Heino et al., 2003). The latter proposition is in line with the well-established developmental link between victimization and offending, known as "the victim–offender overlap" (Jennings et al., 2012; Schreck et al., 2007). Against this background, the focus of this study is how the associations between pubertal timing on the one hand, and

peer victimization and offending on the other hand, develop over the course of early- to mid-adolescence.

Two main hypotheses have been used to predict the role of pubertal timing in the developmental trajectories of adverse peer relations throughout adolescence. According to the attenuation hypothesis (Senia, Donnellan, & Neppl, 2018), early maturing adolescents have a higher starting point in early adolescence with respect to adverse peer relations compared with later maturing peers. The effects of pubertal timing disappear over the course of adolescence when later maturing individuals catch up in terms of appearance and behavior. In contrast, the selective persistence hypothesis (Senia et al., 2018) posits that early puberty continues to affect psychosocial development because it continues to increase the risk for "snares", events that increase the risk for unsuccessful development across transitions.

To date, it is unknown which of the hypotheses makes the most valid prediction as the literature comprises just over a handful of longitudinal studies that have examined associations between pubertal timing and aspects of peer victimization or offending (Carter et al., 2018; Haltigan & Vaillancourt, 2018; Haynie & Piquero, 2006; Jormanainen et al., 2014; Mendle et al., 2012; Mrug et al., 2014; Reynolds & Juvonen, 2011). Three of the longitudinal studies focused exclusively on either girls (Mrug et al., 2014; Reynolds & Juvonen, 2011) or on boys (Mendle et al., 2012). The general finding in these studies is that early puberty is linked to more adverse peer relations, but there are some inconsistencies. For instance, Carter et al. (2018) found that early puberty was linked to initial levels (Grade 4) and the development of peer victimization to Grade 6 among girls but not boys. In the well-designed six-wave study by Haltigan and Vaillancourt (2018), the incidence of being victimized by a peer rose among less mature boys between Grades 5 and 6, 7 and 8, and 9 and 10, compared with other boys. For girls, the incidence of being victimized rose among early maturers between Grades 5 and 6, and 9 and 10, and rose among later maturers between Grades 8 and 9. These findings do not support one of the hypotheses over the other. They do, however, indicate that the associations between pubertal timing and peer victimization and offending could differ according to gender.

Moreover, most published longitudinal research (four out of seven studies) concerns peer victimization only (Carter et al., 2018; Haltigan & Vaillancourt, 2018; Haynie & Piquero, 2006; Reynolds & Juvonen, 2011). One study examined aspects of peer offending (i.e., aggression toward peers), but only among girls (Mrug et al., 2014). In that study, and in support of the attenuation hypothesis (Senia et al., 2018), a positive association was found between pubertal timing and physical aggression toward peers that diminished over time from 11 to 16 years of age. No links to relational and

nonphysical aggression (e.g., giving mean looks) were found. Mendle et al. (2012) used one overall measure of negative peer relations that included aspects of both peer victimization and offending, but only among boys. In support of the selective persistence hypothesis (Senia et al., 2018), they found that, unlike their peers, early maturers experienced increased levels of negative peer relations from 9 to 13 years of age. However, when peer victimization and peer offending are not treated as separate constructs, we do not know whether any effects of pubertal timing are linked to either one or both of the constructs. Nevertheless, it is pivotal to include both of them in research, given their intertwined relation. Also, these findings highlight the fact that gender may be an important link in the associations as the study on girls (Mrug et al., 2014) can be taken as support of the attenuation hypothesis and the study on boys (Mendle et al., 2012) can be taken to support the selective persistence hypothesis. The study by Jormanainen et al. (2014) is the only longitudinal study that examined peer victimization and peer offending (i.e., bullying) as separate outcomes among both adolescent girls and boys. In that study, adolescents were followed from 15 to 17 years of age. In support of the attenuation hypothesis (Senia et al., 2018), they found that all links between early pubertal timing and peer victimization and offending had disappeared by age 17 years. This was true for both girls and boys. Thus, this finding might be taken to indicate that the role of pubertal timing in peer victimization and peer offending changes over the course of adolescence, but we still do not know how. In sum, previous research is limited and conflicted in showing support for either the attenuation or the selective persistence hypothesis. The role played by gender in the links is unclear.

Purpose of the Present Study

Despite the knowledge gained in past research, our literature review reveals that the nature of the association between pubertal timing and the development of peer victimization and offending is yet to be fully understood. A clearer understanding of the role of pubertal timing in the developmental trajectories of peer victimization and offending would advance the field theoretically and contribute toward interventions aimed at preventing adverse peer relations in adolescence. The present study was designed to fill the reported gap of knowledge in the literature and to test the predictions made by the attenuation and the selective persistence hypotheses (Senia et al., 2018). The main aim was to examine associations between pubertal timing and the initial levels and changes in peer victimization and offending across the transition from early- to mid-adolescence. As puberty is a process of sexual differentiation and gender dimorphism, its meaning for psychosocial

development might differ between girls and boys (Marceau, Ram, Houts, Grimm, & Susman, 2011). Thus, we tested whether the effect of pubertal timing on the trajectories of peer victimization and offending was moderated by adolescent gender. We asked two research questions, as follows:

> **Research Question 1 (RQ1):** Is pubertal timing linked to the growth of peer victimization and offending over the transition from early- to mid-adolescence?
> **Research Question 2 (RQ2):** Are the potential effects of pubertal timing on the growth of peer victimization and offending moderated by gender?

In line with theoretical notions (i.e., the developmental readiness hypothesis, Mendle & Ferrero, 2012; Skoog & Stattin, 2014) and prior empirical studies (e.g., Haltigan & Vaillancourt, 2018; Schreck et al., 2007), we expected early pubertal timing to be related to higher levels of peer victimization and offending. Given the shortage of prior work in the field on developmental processes and conflicting hypotheses (the attenuation and the selective persistence hypotheses, Senia et al., 2018), the analyses of the role of pubertal timing in the developmental trajectories of peer victimization and offending, as well as the moderating role of adolescent gender, were explorative.

We made use of three-wave longitudinal data from a cohort of Swedish adolescents and latent variable growth curve modeling (LGM) to examine the research questions. LGM is particularly suitable for studying developmental processes using longitudinal data (Duncan & Duncan, 2009). Three waves of measurement are sufficient to examine linear developmental processes. Moreover, we controlled statistically for the effects of socioeconomic status (SES), immigration status, and age at the first measurement wave in the analyses. We included these as control variables as they are linked to both pubertal development and peer victimization and offending (Biro et al., 2010; Sun, Mensah, Azzopardi, Patton, & Wake, 2017; Wang, Leary, Taylor, & Derosier, 2016) in an attempt to avoid identifying spurious correlations.

Method

Participants

Three waves of data from the Longitudinal Research on Development in Adolescence (Kapetanovic et al., 2020) were used to test our hypotheses. LoRDIA studies transitions in adolescence by collecting information about adolescents' health, school functioning, relations to family, teachers, and peers, as well as the development of risk behaviors such as substance use and

delinquency. The program is designed to follow adolescents in four medium-sized municipalities in southern Sweden from 12/13 to 18 years of age. The data collection started in 2013 with students in the sixth and seventh grade. Out of 2,108 adolescents invited in the first wave, 318 opted out, which resulted in 1,790 adolescents constituting the total sample of the study at Wave 1. Out of the total sample at Wave 1, 275 adolescents were absent from school on the days of the data collection, which resulted in an analytical sample of 1,515 adolescents.

The sample for this study is based on three waves of self-reported data, with 1,515 adolescents (50.6% girls), beginning in sixth grade ($n = 781$) and seventh grade ($n = 734$), respectively. The mean ages were as follows: T1: $\bar{X} = 13.01$ years ($SD = .60$), T2: $\bar{X} = 14.33$ years ($SD = .64$), and T3: $\bar{X} = 15.65$ years ($SD = 1.09$). Most of the adolescents were of Swedish background (80.5%) and lived with both parents (80.6%). A majority of the adolescents (62.8%) reported having as much money as their classmates and, while 20.3% reported that their family had more money than their classmates' families, 16.8% reported that their family had less money than the families of their classmates. The participants included at T1 and those who opted out were compared, using available register data, on demographics (gender and immigration status) and school performance (absenteeism and merit points based on grades) to assess the representativeness of the sample use. There were no significant differences in gender ($p = .22$), immigrant status ($p = .07$), merit points ($p = .15$), or absence from school ($p = .60$), which indicates that the sample is representative for the target sample based on gender, immigrant status, and school performance.

Measures

Peer victimization. Nine items assessed what it was like to be a victim of offending (Trifan & Stattin, 2015) by asking the participants whether they had been subjected to sexual, verbal, physical harassment, or exclusion by their peers at school, or on the way to or from school, in the past semester, with questions such as "Has anyone fondled or touched your body in a sexual way that you didn't like?" and "Have you been beaten, kicked, or assaulted in a nasty way by anyone at school or on the way to or from school?" The items were rated 1 (*no, never*), 2 (*yes, a few times*), and 3 (*yes, many times*), with the following internal consistencies: T1: $\alpha = .76$, T2: $\alpha = .75$, and T3: $\alpha = .75$.

Peer offending. This measure was assessed by five items (Alsaker & Brunner, 1999), asking whether the adolescents had exposed their peers to sexual,

verbal, or physical harassment at school, or on the way to or from school, in the past semester, with questions such as "Have you said nasty things, mocked or teased anyone in an unpleasant way at school?" and "Have you beaten, kicked, or assaulted anyone in an unpleasant way at school or on the way to or from school?" The items were rated 1 (*no, never*), 2 (*yes, a few times*), and 3 (*yes, many times*), with the following internal consistencies: T1: $\alpha = .71$, T2: $\alpha = .60$, and T3: $\alpha = .65$.

Pubertal timing. The measures of pubertal timing in both girls and boys concerned aspects of central puberty, or gonadarche (Shirtcliff, Dahl, & Pollak, 2009), taking place in mid- to late puberty (Dorn & Biro, 2011; Lee & Kerrigan, 2004). To assess girls' pubertal timing, we used age of menarche, by asking "How old were you when you had your first period?" Their response was categorized as follows: Early pubertal timing (before 12 years of age), On time (between 12 and 13 years of age), and Late pubertal timing (after 13 years of age). To assess boys' pubertal timing, we asked a question about two aspects of mid-pubertal events: "How old were you when you had your first spermarche or when your voice deepened?" The boys' responses were categorized as follows: Early pubertal timing (before 12 years of age), On time (between 12 and 13 years of age), and Late pubertal timing (after 13 years of age).

Background variables. The Questionnaire items assessed about adolescent age, subjective SES and immigration status at T1. The age of the adolescents in the sample ranged from 11 to 14 years and were entered as 0 = *younger adolescents (11 and 12 years of age)* and 1 = *older adolescents (13 and 14 years of age)*. Adolescent subjective SES (Quon & McGrath, 2014) was calculated by averaging two items: "Do you perceive having less, as much, or more money than your classmates?" and "Does your family have less, as much, or more money than other families in your neighborhood?" with inter-item correlation ($r = .42$). Using a median split, the measure was dichotomized and entered as 0 = *low SES* and 1 = *high SES*. Immigration status was determined by asking the adolescents whether they studied Swedish as a second language in school and entered as 0 = *Swedish background* and 1 = *non-Swedish background*.

Procedure

LoRDIA received ethical approval from the regional research review board in Gothenburg, Sweden, before each data collection wave. In 2013, contact was established with all primary schools and parents of the students in the

participating municipalities. Students, teachers, and parents were informed about the study, its confidentiality, and the voluntary basis of participation. Parents and students had the opportunity to decline consent for students' participation. The data were collected by adolescents responding to paper and pen questionnaires in their classrooms. The questionnaires were collected by the research team.

Missing Data Analysis and Attrition

Before proceeding with the analyses, we tested whether the missing data were missing at random. Missing data analysis showed that Little's missing completely at random (MCAR) was significant, however, the normed chi-square (χ^2/df) was moderate (241.839/63 = 3.85), implying a moderate violation of the MCAR assumption. Although the violation of MCAR may increase the standard errors of estimates, it does not seriously distort parameter estimates or introduce bias (Collins, Schafer, & Kam, 2001; Dong & Peng, 2013). Further attrition analyses showed that 67% of the analytical sample at Wave 1 (N = 1,515) continued to provide data at T3. The attrited adolescents were more likely to be boys ($\bar{X}_{Attrited}$ = 42.8% boys vs. 29.6% girls, $p < .001$) and reported higher levels of peer victimization ($\bar{X}_{Attrited} = 1.32$, $\bar{X}_{Retained} = 1.27$, $p = .021$, $d = .15$) and offending ($\bar{X}_{Attrited} = 1.16$, $\bar{X}_{Retained} = 1.13$, $p = .022$, $d = .15$) at baseline. Attrited adolescents did not significantly differ from the retained adolescents on pubertal timing, immigration status, or SES. As Cohen's d effect sizes were small (.2 can be interpreted as a small effect, .5 a medium effect, and .8 as a large effect; Cohen, 1992), we included all variables in the analyses and utilized full information maximum likelihood (FIML) estimation procedure to account for missing data. With FIML, it is possible to produce unbiased parameter estimates and bias-corrected confidence intervals (Byrne, 2010).

Data Analysis

Latent growth curve (LGC) analysis was used to assess the changes in adolescent peer victimization and offending over the course of early- to mid-adolescence. Using the framework of structural equation modeling (SEM), LGC employs changes on three-wave panel data by demonstrating an individual's score on the outcome variable (i.e., the intercept) as well as the individual's rate of change over time (i.e., the slope; Byrne, 2010; Duncan & Duncan, 2009). Notably, this type of modeling comprises intra- (i.e., within-person) change and inter-individual (i.e., between-person) differences with respect to the outcome variables (Byrne, 2010). In addition, time-invariant

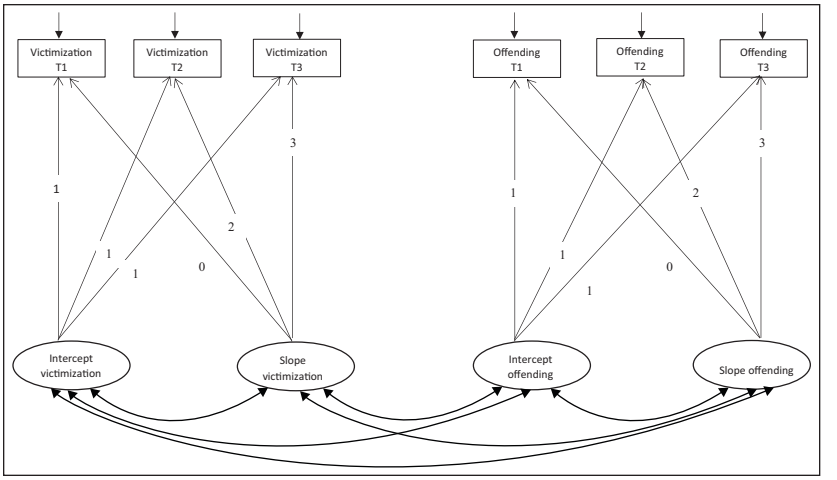

Figure 1. Conceptual dual-domain unconditional LGC model with peer victimization and offending.
Note. LGC = Latent growth curve.

covariates can be included in the LGC to estimate the effect of the covariates on the developmental trajectories.

To address the hypotheses in this study, in the first step, we estimated a dual-domain unconditional (without covariates) LGC model to determine the developmental trajectories of peer victimization and offending (see Figure 1 for a conceptual model). In the unconditional LGC model, a significant variance in the intercept would reveal significant individual differences in victimization and offending at baseline. In addition, a significant variance in the slope would reveal significant individual differences in the change of victimization and offending over time. The path loadings from the latent intercept to each of the outcome measures were fixed at 1. The fixed loadings from the latent slope factor to each of the three outcome measures were 0, 2, and 3, reflecting the time interval measured by year. In the next step, a conditional dual-domain growth model was used to evaluate the effect of pubertal timing, controlling for adolescent age, SES, and immigration status, as time-invariant covariates, on the latent intercept and slope of peer victimization and offending. A significant path coefficient from the covariate to the latent intercept would indicate that the covariate was associated with the initial level of the individual's victimization or offending. In addition, a significant path coefficient from the covariate to the latent slope would indicate that the

covariate was associated with the progression of the individual's victimization or offending over time.

Finally, the unconditional and conditional models were further investigated with a focus on adolescent gender. First, multigroup analyses were performed to test the moderating effect of gender on growth parameters in peer victimization and offending in the unconditional model. Thereafter, we conducted multigroup comparisons in the conditional model to test the moderating effect of gender on the effect of pubertal timing, with time-invariant covariates, on the latent intercept and slope of peer victimization and offending. The initial model, where the parameters were freely varying, was compared with the constrained model, where effects were set equivalent across gender, using a χ^2 difference test. A significantly better fit of the unconstrained model (indicated by significant $\Delta\chi^2$ statistics) would indicate moderation. We ran all models in AMOS 23. Goodness of fit was based on recommended fit index cutoff values that indicated excellent model fit, chi-square ($\chi^2 > .05$), Tucker–Lewis index (TLI $>.95$), comparative fit indices (CFIs $>.90$), and root mean square error of approximation (RMSEA $<.08$), Hair, Black, Babin, & Anderson, 2010.

Results

Preliminary Analyses

Table 1 shows Pearson's bivariate correlations between adolescent gender, pubertal timing, age, SES, and immigration status at T1, and peer victimization and offending at all three time points. Pubertal timing was negatively associated with T1 and T2 victimization and offending. The earlier the adolescents experienced puberty, the higher the levels of peer victimization and offending they reported at T1 and T2. These bivariate correlations were not found at T3. Age was positively associated with T1 victimization and negatively associated with T3 victimization and offending. Adolescent gender was negatively associated with T1, T2, and T3 victimization, and negatively associated with T1, T2, and T3 offending. SES was negatively associated with T1, T2, and T3 victimization, and T1 and T2 offending and immigration status was positively associated with T2 and T3 offending.

Moreover, as shown in Table 2, the mean level of peer victimization and offending decreased throughout early- and mid-adolescence. Independent sample *t* tests showed that, over time, girls exhibited significantly higher levels of peer victimization than boys, whereas boys exhibited significantly higher levels of peer offending than girls.

Table 1. Pearson Correlation Coefficients Between Adolescent Gender, Pubertal Timing, Age, Subjective Socioeconomic Status, and Immigration Status at T1 and Peer Victimization and Offending at T1, T2, and T3.

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Gender	—										
2. Pubertal timing	.09**	—									
3. Age	–.02	–.09**	—								
4. Subjective SES	–.01	–.01	.05*	—							
5. Immigrat. status	.03	–.10**	–.00	–.05	—						
6. T1 victimization	–.08**	–.16**	.07**	–.15**	.01	—					
7. T2 victimization	–.16**	–.12**	–.02	–.10**	.03	.49**	—				
8. T3 victimization	–.15**	–.07	–.13**	–.07*	.02	.34**	.50**	—			
9. T1 offending	.18**	–.09**	.04	–.09*	.00	.44**	.20**	.11**	—		
10. T2 offending	.15**	–.08**	–.04	–.08*	.08*	.21**	.40**	.20**	.35**	—	
11. T3 offending	.17**	–.02	–.13*	–.03	.08*	.14**	.18**	.41**	.22**	.28**	—

Note. SES = socioeconomic status.
*$p < .05$. **$p < .001$.

Table 2. Means and Standard Deviations of Peer Offending and Victimization.

	T1					T2					T3				
	Boys		Girls			Boys		Girls			Boys		Girls		
Variable	*N*	$\bar{X}$ (*SD*)	*N*	$\bar{X}$ (*SD*)	*t* test	*N*	$\bar{X}$ (*SD*)	*N*	$\bar{X}$ (*SD*)	*t* test	*N*	$\bar{X}$ (*SD*)	*N*	$\bar{X}$ (*SD*)	*t* test
Offending	716	1.19 (.29)	752	1.08 (.19)	–6.96**	534	1.11 (.21)	582	1.06 (.13)	–4.87**	428	1.13 (.26)	540	1.06 (.14)	–5.02**
Victimization	717	1.20 (.30)	748	1.31 (.33)	2.91*	533	1.15 (.22)	583	1.23 (.27)	5.32**	428	1.13 (.20)	540	1.20 (.26)	4.74**

*$p < .05$. **$p < .001$.

Trajectories of Peer Victimization and Offending among Adolescents

The overall fit indices for the model were acceptable, $\chi^2(4) = 9.793$, $p = .044$; TLI = .992; CFI = .998; and RMSEA = .031. The intercepts for victimization ($i = 1.284$, $SE = .008$, $p < .001$) and offending ($i = 1.138$, $SE = .006$, $p < .001$), and the linear slope parameter for peer victimization (mean slope = –.040, $SE = .002$, $p < .001$) and offending (mean slope = –.020 $SE = .002$, $p < .001$) were significant. On average, both victimization and offending decreased over time. In addition, the growth variances of victimization ($i = .058$, $SE = .005$, $p < .001$; mean slope = .003, $SE = .001$, $p < .001$) and offending ($i = .030$, $SE = .003$, $p < .001$; mean slope = .002, $SE = .000$, $p < .001$) were significant. This shows that there was significant variability between adolescents in their initial levels and change of peer victimization and offending.

Moreover, the intercept and the slope of victimization ($r = –.719$, $SE = .002$, $p < .001$) and offending ($r = –.861$, $SE = .001$, $p < .001$) were negatively correlated. The rate of change for adolescents with high initial scores on offending or victimization was higher than for adolescents with low initial scores on these variables. In other words, adolescents scoring high on offending or victimization at 13 years of age exhibited steeper declines in these variables at 15 years of age. In addition, the growth variances between intercepts of victimization and bullying were positively correlated ($r = .423$, $SE = .003$, $p < .001$). At 13 years of age, adolescents scoring high on offending also scored high on victimization. The positive association between the slopes for offending and victimization ($r = .369$, $SE = .001$, $p = .032$) indicated a positive association between offending and victimization trajectories.

The conditional model, in which not only pubertal timing, but also age, SES, and immigration status were entered as covariates, provided good model fit, $\chi^2(15) = 62.788$, $p < .001$; TLI = .949; CFI = .983; RMSEA = .046. As shown in Figure 2, controlling for covariates, pubertal timing was negatively related to initial levels of both peer victimization ($\beta = –.247$, $SE = .013$, $p < .001$) and offending ($\beta = –.139$, $SE = .011$, $p < .001$). Adolescents with early pubertal timing had higher initial levels of peer victimization and offending than their counterparts. In addition, adolescent pubertal timing was positively related to changes in peer victimization ($\beta = .239$, $SE = .004$, $p < .001$) and offending ($\beta = .112$, $SE = .004$, $p = .002$). Adolescents with early pubertal timing had a steeper decrease in peer victimization and offending.

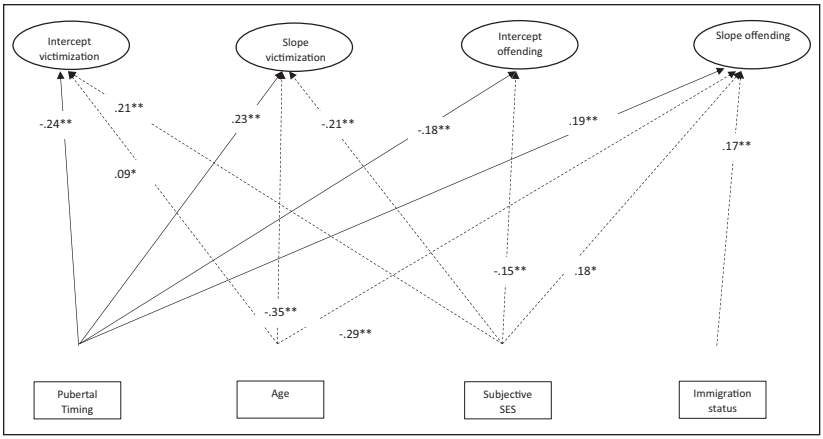

Figure 2. The effect of pubertal timing (straight lines) on growth parameters of peer victimization and offending, controlling for age, subjective SES, and immigration status (dashed lines).
Note. Only significant effects are depicted. SES = socioeconomic status.
*$p < .05$. **$p < .001$.

Moderation by Adolescent Gender

Finally, we tested whether the LGC models differed between girls and boys. First, we tested whether the growth variances in peer victimization and offending in the unconditional model differed between adolescent boys and girls. Sequential multigroup analyses showed that the intercept for peer victimization, $\Delta\chi^2(1) = 10.961$, $p < .001$, and offending, $\Delta\chi^2(1) = 47.918$, $p < .001$, as well as the slope for offending, $\Delta\chi^2(1) = 11.708$, $p = .001$, were moderated by adolescent gender. The intercept for peer victimization was significantly higher for girls ($i = 1.309$, $SE = .010$, $p < .001$) than for boys ($i = 1.258$, $SE = .012$, $p < .001$), whereas the intercept for offending was significantly higher for boys ($i = 1.181$, $SE = .010$, $p < .001$) than for girls ($i = 1.096$, $SE = .007$, $p < .001$). The slope for offending was stronger for boys (mean slope = –.028, $SE = .004$, $p < .001$) than for girls (mean slope = –.012, $SE = .002$, $p < .001$). Thus, boys had higher initial levels of offending than girls, but their offending decreased to a greater extent than the girls' did over the period of 3 years. Girls experienced more peer victimization than boys initially.

Next, we tested whether the effect of pubertal timing on growth parameters of peer victimization and offending, while controlling for time-invariant covariates, was moderated by gender. The multigroup analysis showed that

adolescent pubertal timing, $\Delta\chi^2(1) = 4.856$, $p = .002$, had a stronger effect on the intercept of boys' offending ($\beta = -.172$, $SE = .018$, $p < .001$) than girls' offending ($\beta = -.142$, $SE = .018$, $p < .001$). No other parameters related to pubertal timing were significant in the multigroup analyses. Thus, pubertal timing was more relevant for the initial levels of boys' offending than girls.' The effect of pubertal timing on the initial levels of victimization or the slopes of victimization and offending did not differ by gender.

Discussion

The ability to form and maintain positive social relationships is central to healthy adolescent development. Adverse peer relations, on the other hand, is a serious threat to adolescent psychosocial development (Bornstein et al., 2013; Brendgen et al., 2019). Early pubertal timing is a risk factor for many negative psychosocial outcomes in adolescence (Hamlat et al., 2019; Ullsperger & Nikolas, 2017), including, but not limited to, troubled peer relations (Mendle et al., 2012; Pomerantz et al., 2017). In this study, we used LGC analysis to extend previous research on associations between early pubertal timing and adverse peer relations in adolescence (e.g., Carter et al., 2018; Haltigan & Vaillancourt, 2018; Jormanainen et al., 2014; Su et al., 2018) by examining the role of pubertal timing in the developmental trajectories of peer victimization and offending from early- to mid-adolescence, and the role played by gender in these links.

The Development of Peer Victimization and Offending and Their Association

First, we examined the development of peer victimization and offending during the transition from early- to mid-adolescence. At the group level, we found negative developmental trends for both peer victimization and offending. As early adolescents grew older and entered mid-adolescence, they were less victimized by their peers and they themselves offended their peers less. This finding corroborates previous research (Noret et al., 2018) and might reflect the continuous development of social skills (Eisenberg, Fabes, & Spinrad, 2006) and the increase in empathy from early- to mid-adolescence (Allemand, Steiger, & Fend, 2014). At the same time, it is important to note that the analyses revealed significant variability not only in the initial levels but also in the individual developmental trajectories of peer victimization and offending. Thus, there was some instability found in the trajectories. Such a heterogenic developmental pattern is a typical finding in the literature on peer

victimization and offending (Haltigan & Vaillancourt, 2014; Sumter et al., 2012). Furthermore, we explored the role played by gender in the initial levels and development of peer victimization and offending. Boys reported higher initial levels of peer offending than girls. This gender difference is well-established in the literature (Tsitsika et al., 2014). However, we also found that boys' level of peer offending decreased more over time compared with girls. This developmental pattern is less researched. It could be that this gender difference reflects the general tendency for boys to attain psychosocial maturity at a later stage than girls (Lim, Han, Uhlhaas, & Kaiser, 2015). Finally, in line with previous research (Barker et al., 2008), we found that the initial levels and developmental trajectories of peer victimization and offending were related. The identification of a positive association between the offending and victimization trajectories can be linked to the concept of bully-victims (Espelage & Holt, 2007; Veenstra et al., 2005). The bullying literature has identified a distinct group of adolescents who both bully and are bullied by their peers. This group of adolescents is a well-known high-risk group in terms of negative functioning and adjustment in the range of developmental domains including school (Veenstra et al., 2005). It has also been argued that this group might be exposed to higher levels of adversities within and outside of the family compared with other adolescents (Espelage & Holt, 2007), which might drive and explain the link between bullying and victimization over time. The positive association between the offending and victimization trajectories demonstrates the intertwined association between peer victimization and offending, and highlights the importance of considering both sides of the negative-peer-relation coin in developmental studies. The individual differences in the initial levels and development of peer victimization and offending suggest that there could meaningful predictors that explain the variance.

The Role of Pubertal Timing in the Development of Peer Victimization and Offending

We continued the analyses by exploring the role of pubertal timing in these developmental trends. In the analyses, we controlled for the effects of SES, immigration status, and age due to their links to both the peer measures and pubertal development (Sun et al., 2017). To our knowledge, this is the first study to simultaneously explore the role of pubertal timing in developmental trajectories of peer victimization and offending among both girls and boys during the transition from early- to mid-adolescence. In line with our expectation and prior studies (Carter et al., 2018; Haltigan & Vaillancourt, 2018;

Haynie & Piquero, 2006; Jormanainen et al., 2014; Mrug et al., 2014; Su et al., 2018), findings revealed that early pubertal timing predicted higher levels of peer victimization and offending at baseline. Thus, early maturers were more victimized than their peers in early adolescence. At the same time, they engaged in offending more than their peers. These findings are in line with the developmental readiness hypothesis (Mendle & Ferrero, 2012; Skoog & Stattin, 2014) and add to the body of knowledge suggesting that early puberty is a risk factor in adolescent psychosocial development (Hamlat et al., 2019; Ullsperger & Nikolas, 2017).

Previous research is limited and conflicted in showing support for either the attenuation or the selective persistence hypothesis as the best explanation of the role of pubertal timing in adverse peer relations during adolescence. In this study, we found support for the predictions made by the attenuation hypothesis (Senia et al., 2018) as pubertal timing predicted the slopes of both peer victimization and offending negatively. Early pubertal timing predicted a stronger decline in peer victimization and offending among adolescents over time. In this perspective, the relatively negative effect of pubertal timing for adolescents' development attenuated over the transition from early- to mid-adolescence. In fact, the correlations between pubertal timing and peer victimization and offending at T3 ($\bar{X}_{age} = 15.65$ years) were nonsignificant, indicating that the negative effect of early puberty for these aspects of adverse peer relations eventually disappear.

There could be several reasons why the effect of pubertal timing disappear over time. Among other things, it could be that, as adolescents get older, sooner or later they all reach the final stages of puberty and achieve full sexual maturity. Consequently, early maturers do no longer stand out in this respect, and are no longer treated differently or behave differently, in the peer group. In addition, the difference in being granted autonomy by parents and being less supervised by them as a result of how mature adolescents look (Mendle & Ferrero, 2012) has likely disappeared at older stages of adolescence and the tendency for early maturers to have more deviant peer networks than later maturers, which exists in early adolescence, is no longer present (Lynne, Graber, Nichols, Brooks-Gunn, & Botvin, 2007). These changes could mean that the exposure to non-supervised and deviant contexts—a known risk factor for peer victimization and offending (Hong & Espelage, 2012; Jennings et al., 2012)—become more similar as late maturers catch up to their early maturing peers' sexual maturity stance.

The current finding concerning peer victimization contradicts earlier research, which identified effects of early pubertal timing on the increase in adverse peer relations, including peer victimization (Carter et al., 2018; Haltigan & Vaillancourt, 2018; Mendle et al., 2012). At the same time, the

current finding regarding peer offending corroborates another previous study, which found that the effect of early pubertal timing on aggressive behavior toward others weakened from 11 to 16 years of age (Mrug et al., 2014). It also supports the findings by Jormanainen et al. (2014), which suggested that the effects of pubertal timing disappear over time. There are some key methodological differences between our study and previous longitudinal studies that could help explain the seemingly somewhat inconsistent findings that should be noted. Our measure tapped into broader, general aspects of peer victimization and offending compared with some past research, which has used specific measures of bullying (Jormanainen et al., 2014) or aggression (Mrug et al., 2014). Compared with most previous longitudinal studies in the field, which tracked development from late childhood to early adolescence (Carter et al., 2018; Mendle et al., 2012), our sample was followed from early- to mid-adolescence. Finally, whereas we studied girls and boys both together and separately, some others studied only one gender (Mendle et al., 2012; Mrug et al., 2014; Reynolds & Juvonen, 2011). The heterogeneity of the studied populations and measures in the field is a general threat to drawing firm conclusions.

Furthermore, the current findings are in line with those from developmentally sensitive research in other domains (e.g., psychological distress and substance use), which have shown that the effects of pubertal timing attenuate and disappear over time (Berenbaum, Beltz, & Corley, 2015; Senia et al., 2018). For instance, in the case of substance use, it has been found that early maturers start out on higher levels compared with peers in early adolescence, but that other adolescents have a steeper adolescent growth of substance use thereafter (Cance, Ennett, Morgan-Lopez, Foshee, & Talley, 2013). Thus, the current findings add to the general literature of the meaning of pubertal timing in adolescent psychosocial development (Hamlat et al., 2019; Ullsperger & Nikolas, 2017). There is ample support for the notion that early puberty is a risk factor in early adolescent psychosocial development. But, for some, thus far unknown reasons, early maturers seem to manage to avoid long-lasting adverse peer relations. It appears that at the time when early maturers differ the most from their peers in pubertal status, they suffer the most from adverse peer relations. In sum, we found that the effect of pubertal timing on the development of peer victimization and offending weakened over the transition from early- to mid-adolescence.

The Moderating Role Played by Gender

Adolescent gender moderated some of the findings in this study. Most importantly, the effects of pubertal timing on the initial levels of peer offending

differed between girls and boys. Pubertal timing had a stronger effect on boys' offending than girls'. This gender difference is in line with another Nordic study (Jormanainen et al., 2014) that found that pubertal timing was related to involvement in bullying at age 15 years among boys but not among girls. There could be several reasons for the gender difference. Some have suggested that there are different processes underlying the associations between pubertal timing and behavioral outcomes among girls and boys (Marceau et al., 2011). The processes could in part be hormonal and be related to the relative difference in the rise of the sex hormones that drives pubertal maturation. An alternative explanation for the gender differences is that we and the others (e.g., Jormanainen et al., 2014) used different measures of pubertal development among girls and boys. It is important to note that no other effects of pubertal timing were moderated by gender. This suggests that the effects of pubertal timing are mainly universal. This conclusion is supported by recent meta-analyses (including age ranges from 9 to 48 years) that found that gender does not moderate the effect of pubertal timing on emotional and behavior problems (Dimler & Natsuaki, 2015; Ullsperger & Nikolas, 2017).

A final finding to note, which is in line with previous research (Bräuner et al., 2020), is that early pubertal timing was linked to immigration status. The reason for the identified association is unknown, but it is assumed to operate through the endocrinological contexts and processes (Bräuner et al., 2020).

Limitations and Strengths

The study has limitations that need to be considered when interpreting the findings. Despite the longitudinal design, we cannot determine the causal relations between pubertal timing and adolescents' involvement in peer victimization and peer offending. It is unlikely that peer victimization and offending affect adolescents' pubertal maturation, but there could be third variables that drive the associations. We controlled for the effects of SES, age, and immigration status in the statistical analyses, but we did not control for other factors that are related to both pubertal timing and the quality of peer relations. Two potential third variables to consider in the association between pubertal timing and the quality of peer relations in future research are adolescent delinquency and parent–adolescent relationships (Troop-Gordon, 2017). Another limitation is that all data were self-reported by the participating adolescents. As such, there is a risk of shared-method variance, which could produce biased estimates. It should be noted that conclusion validity is not considered to be seriously jeopardized by this limitation

(Malhotra, Kim, & Patil, 2006). On a related note, it is possible that different measures of pubertal maturation correlate somewhat differently with psychosocial development (Beltz, Corley, Bricker, Wadsworth, & Berenbaum, 2014; Dorn & Biro, 2011). In this study, we used different measures of puberty for girls and boys. This is, in a way, necessary as central pubertal changes differ between girls and boys. However, it is possible that the different findings for girls and boys concerning the role of pubertal timing in the initial levels of peer offending can be explained by the use of different measures of puberty. Moreover, the fact that puberty occurs earlier among girls than boys, on average, might also have affected the findings.

The study's strengths include a large sample, the use of longitudinal data and LGC analysis to document prospectively the role of pubertal timing in the stability and change in peer victimization and offending, and that important potential confounders—SES, immigration status, and age—were controlled for in the analyses.

Implications for Future Research

Future research is needed to confirm the current findings and to address the limitations of this study. Specifically, future studies are needed to explore the role of pubertal timing for the development of specific forms of peer victimization and offending (e.g., sexual harassment) and to understand the role of context (e.g., family and school context) in the associations. Given that the effect of pubertal timing was present already in early adolescence, we encourage studies that start monitoring girls and boys as early as from late childhood to be able to detect any effects at earlier ages. We also encourage the use of more measurement occasions to be able to detect nonlinear developmental patterns. Finally, group processes are a central part of peer victimization and offending in childhood and adolescence (Salmivalli, 2010). Including information on who the victims of early maturers are, and who it is that they are offended by—that is, who victimizes whom—will be fruitful for the designing of intervention. Therefore, we encourage researchers to study pubertal timing among girls and boys in relation to reciprocal peer victimization processes, for instance, using a social network approach (Veenstra, Dijkstra, Steglich, & Van Zalk, 2013).

It is important to bear in mind that although the effects of pubertal timing on conflicted peer relations disappeared across adolescence, it could be that the peer victimization and offending experienced by early maturers in early adolescence hamper the course of development in other domains. This idea of a spillover effect is in line with the growing literature on developmental cascades (Almy & Cicchetti, 2018). Thus, the current findings should not be

taken as reason to not intervene against negative peer relations among early maturers in early adolescence. Rather, professionals and policy makers need to be aware of the social risks associated with early puberty among both girls and boys and future research is needed to understand whether the negative peer experiences in early adolescence among early maturers translates into problematic outcomes in other domains, for instance, self-esteem or delinquency (Gattario, Lindwall, & Frisén, 2020; Wong & Schonlau, 2013).

Conclusion

The quality of adolescent peer relations plays a salient role in psychosocial development all the way from the early stages of adolescence (Bornstein et al., 2013) to adulthood (Brendgen et al., 2019). Past research has demonstrated that early pubertal timing puts adolescents at an increased risk of being victimized by their peers and for offending peers themselves (e.g., Carter et al., 2018; Haltigan & Vaillancourt, 2018; Jormanainen et al., 2014; Su et al., 2018). However, it has not been known how pubertal timing relates to the stability and change of peer offending in particular over the first half of adolescence. By capturing the role of pubertal timing in developmental changes not only in peer offending, but also peer victimization, among boys and girls in the transition from early- to mid-adolescence, this study makes a significant contribution to the developmental literature. By using individually focused, trajectory-based analyses, the findings suggest that the negative impact of early pubertal timing on peer victimization and offending occurs in the early phases of adolescence, supporting the attenuation hypothesis (Senia et al., 2018). Gender did not moderate this main finding, suggesting that the effects of pubertal timing on peer victimization and offending are invariant across genders. By mid-adolescence, pubertal timing no longer predicted peer victimization or peer offending.

Author's Note

These findings were presented as a paper presentation at the 17th EARA (European Association for Research on Adolescence) conference, Porto, Portugal.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Data collection was sponsored by a

combined grant (No. 259–2012-25) from four Swedish research foundations: Swedish Research Council (VR); Swedish Research Council for Health, Working Life, and Welfare (FORTE); Sweden's Innovation Agency (VINNOVA); and The Swedish Research Council Formas.

ORCID iD

Therése Skoog https://orcid.org/0000-0001-7456-2397

References

Allemand, M., Steiger, A. E., & Fend, H. A. (2014). Empathy development in adolescence predicts social competencies in adulthood. *Journal of Personality*, *83*, 229-241. https://doi.org/10.1111/jopy.12098

Almy, B., & Cicchetti, D. (2018). Developmental cascades. In M. Bornstein (Ed.), *The SAGE encyclopedia of lifespan human development* (pp. 567-568). SAGE. doi:10.4135/9781506307633.n212

Alsaker, F. D., & Brunner, A. (1999). Switzerland. In P. K. Smith, Y. Morita, J. Junger-Tas, D. Olweus, R. Catalano, & P. Slee, P. (Eds.), *The nature of school bullying: A cross-national perspective* (pp. 250-263). London, UK: Routledge.

Barker, E. D., Arseneault, L., Brendgen, M., Fontaine, N., & Maughan, B. (2008). Joint development of bullying and victimization in adolescence: Relations to delinquency and self-harm. *Journal of the American Acadaemy of Child & Adolescent Psychiatry*, *47*, 1030-1038. doi: 10.1097/CHI.ObO13e31817eec98

Beltz, A. M., Corley, R. P., Bricker, J. B., Wadsworth, S. J., & Berenbaum, S. A. (2014). Modeling pubertal timing and tempo and examining links to behavior problems. *Developmental Psychology*, *50*, 2715-2726. doi:10.1037/a0038096

Berenbaum, S. A., Beltz, A. M., & Corley, R. (2015). The importance of puberty for adolescent development: Conceptualization and measurement. *Advances in Child Development and Behavior*, *48*, 53-92. doi:10.1016/bs.acdb.2014.11.002

Biro, F. M., Galvez, M. P., Greenspan, L. C., Succop, P. A., Vangeepuram, N., Pinney, S. M., . . .Wolff, M. S. (2010). Pubertal assessment method and baseline characteristics in a mixed longitudinal study of girls. *Pediatrics*, *126*, e583-e590. doi:10.1542/peds.2009-3079

Bornstein, M. H., Jager, J., & Steinberg, L. D. (2013). Adolescents, parents, friends/peers: A relationships model (with commentary and illustrations). In I. Weiner, R. M. Lerner, M. A. Easterbrooks, & J. Mistry (Eds.), *Handbook of psychology, volume 6: Developmental psychology* (2nd ed., pp. 393-434). New York, NY: John Wiley.

Bräuner, E. V., Busch, A. S., Eckert-Lind, C., Koch, T., Hickey, M., & Juul, A. (2020). Trends in the Incidence of Central Precocious Puberty and Normal Variant Puberty Among Children in Denmark, 1998 to 2017. *JAMA Network Open*, *3*(10), 1-12. doi:10.1001/jamanetworkopen.2020.15665

Brendgen, M., Poulin, F., & Denault, A.-S. (2019). Peer victimization in school and mental and physical health problems in young adulthood: Examining the role

of revictimization at the workplace. *Developmental Psychology*, *55*, 2219-2230. doi:10.1037/dev0000771

Byrne, B. M. (2010). *Structural equation modeling with AMOS* (2nd ed.). New York, NY: Routledge.

Cance, J. D., Ennett, S. T., Morgan-Lopez, A. A., Foshee, V. A., & Talley, A. E. (2013). Perceived pubertal timing and recent substance use among adolescents: A longitudinal perspective: Perceived pubertal timing and substance use. *Addiction*, *108*, 1845-1854. doi:10.1111/add.12214

Carter, R., Halawah, A., & Trinh, S. L. (2018). Peer exclusion during the pubertal transition: The role of social competence. *Journal of Youth and Adolescence*, *47*, 121-134. doi:10.1007/s10964-017-0682-8

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*, 155-159. doi:10.1037/0033-2909.112.1.155

Collins, L. M., Schafer, J. L., & Kam, M. (2001). A comparison of inclusive and restrictive strategies in modern missing data procedures. *Psychological Methods*, *6*, 330-351. doi:10.1037/1082 989X.6.4.330

Compian, L. J., Gowen, L. K., & Hayward, C. (2009). The interactive effects of puberty and peer victimization on weight concerns and depression symptoms among early adolescent girls. *Journal of Early Adolescence*, *29*, 357-375. doi:10.1177/0272431608323656

Dimler, L. M., & Natsuaki, M. N. (2015). The effects of pubertal timing on externalizing behaviors in adolescence and early adulthood: A meta-analytic review. *Journal of Adolescence*, *45*, 160-170. doi:10.1016/j.adolescence.2015.07.021

Dong, Y., & Peng, C. Y. (2013). Principled missing data methods for researchers. *Springerplus*, *2*, Article 222. doi:10.1186/2193-1801-2-222

Dorn, L. D., & Biro, F. M. (2011). Puberty and its measurement: A decade in review. *Journal of Research on Adolescence*, *21*, 180-195. doi:10.1111/j.1532-7795.2010.00722.x

Duncan, T. E., & Duncan, S. C. (2009). The ABC's of LGM: An introductory guide to latent variable growth curve modeling. *Social & Personality Psychology Compass*, *3*, 979-991. doi:10.1111/j.1751-9004.2009.00224.x

Eisenberg, N., Fabes, R. A., & Spinrad, T. L. (2006). Prosocial development. In N. Eisenberg, W. Damon, & R. M. Lerner (Eds.), *Handbook of child psychology: Social, emotional, and personality development* (6th ed., pp. 646-718). New York, NY: John Wiley.

Espelage, D., & Holt, M. (2007). Dating violence & sexual harassment across the bully-victim continuum among middle and high school students. *Journal of Youth and Adolescence*, *36*, 799-811. doi:10.1007/s10964-006-9109-7

Gattario, K. H., Lindwall, M., & Frisén, A. (2020). Life after childhood bullying: Body image development and disordered eating in adulthood. *International Journal of Behavioral Development*, *44*, 246-255. doi:10.1177/0165025419877971

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Upper Saddle River, NJ: Pearson.

Haltigan, J. D., & Vaillancourt, T. (2014). Joint trajectories of bullying and peer victimization across elementary and middle school and associations with symptoms of psychopathology. *Developmental Psychology*, *50*, 2426-2436. doi:10.1037/a0038030

Haltigan, J. D., & Vaillancourt, T. (2018). The influence of static and dynamic intrapersonal factors on longitudinal patterns of peer victimization through mid-adolescence: A latent transition analysis. *Journal of Abnormal Child Psychology*, *46*, 11-26. doi:10.1007/s10802-017-0342-1.

Hamlat, E. J., Snyder, H. R., Young, J. F., & Hankin, B. L. (2019). Pubertal timing as a transdiagnostic risk for psychopathology in youth. *Clinical Psychological Science*, *7*, 411-429. doi:10.1177/2167702618810518.

Haynie, D. L., & Piquero, A. R. (2006). Pubertal development and physical victimization in adolescence. *Journal of Research in Crime & Delinquency*, *43*, 3-35. doi:10.1177/0022427805280069

Hong, J. S., & Espelage, D. L. (2012). A review of research on bullying and peer victimization in school: An ecological system analysis. *Aggression and Violent Behavior*, *17*, 311-322. doi:10.1016/j.avb.2012.03.003

Jennings, W. G., Piquero, A. R., & Reingle, J. M. (2012). On the overlap between victimization and offending: A review of the literature. *Aggression and Violent Behavior*, *17*, 16-26. doi:10.1016/j.avb.2011.09.003

Jormanainen, E., Fröjd, S., Marttunen, M., & Kaltiala-Heino, R. (2014). Is pubertal timing associated with involvement in bullying in middle adolescence? *Health Psychology & Behavioural Medicine*, *2*, 144-159. doi:10.1080/21642850.2014.881259

Kapetanovic, S., Skoog, T., Bohlin, M., & Gerdner, A. (2020). Does One Size Fit All? - Linking Parenting with Adolescent Risk Behaviors and Adolescent Temperament. *Journal of Research on Adolescence*, *30*, 443-457. doi:10.1111/jora.12489

Kaltiala-Heino, R., Marttunen, M., Rantanen, P., & Rimpelä, M. (2003). Early puberty is associated with mental health problems in middle adolescence. *Social Science & Medicine*, *57*, 1055-1064. doi:10.1016/S0277-9536(02)00480-X

Lee, P. A., & Kerrigan, J. R. (2004). Precocious puberty. In O. H. Pescovitz & E. A. Eugster (Eds.), *Pediatric endocrinology: Mechanisms, manifestations, and management* (pp. 316-333). Philadelphia, PA: Lippincott.

Lim, S., Han, C. E., Uhlhaas, P. J., & Kaiser, M. (2015). Preferential detachment during human brain development: Age- and sex-specific structural connectivity in diffusion tensor imaging (DTI) data. *Cerebral Cortex*, *25*, 1477-1489. doi:10.1093/cercor/bht333

Lynne, S. D., Graber, J. A., Nichols, T. R., Brooks-Gunn, J., & Botvin, G. J. (2007). Links between pubertal timing, peer influences, and externalizing behaviors among urban students followed through middle school. *Journal of Adolescent Health*, *40*, 181.e7-181.e13. doi:110.1016/j.jadohealth.2006.1009.1008

Malhotra, N. K., Kim, S. S., & Patil, A. (2006). Common method variance in IS research: A comparison of alternative approaches and a reanalysis of past research. *Management Science*, *52*, 1865-1883. doi:10.1287/mnsc.1060.0597

Marceau, K., Ram, N., Houts, R., Grimm, K., & Susman, E. J. (2011). Individual differences in boys' and girls' timing and tempo of puberty: Modeling development with nonlinear growth models. *Developmental Psychology*, *47*, 1389-1409. doi:10.1037/a0023838

McMaster, L., Connolly, J., Pepler, D. J., & Craig, W. M. (2002). Peer to peer sexual harassment among early adolescents. *Developmental Psychopathology*, *14*, 91-105. doi:10.1017/S0954579402001050

Mendle, J., & Ferrero, J. (2012). Detrimental psychological outcomes associated with pubertal timing in adolescent boys. *Developmental Review*, *32*, 49-66. doi:10.1016/j.dr.2011.11.001

Mendle, J., Harden, K. P., Brooks-Gunn, J., & Graber, J. A. (2012). Peer relationships and depressive symptomatology in boys at puberty. *Developmental Psychology*, *48*, 429-435. doi:10.1037/a0026425

Mrug, S., Elliott, M. N., Davies, S., Tortolero, S. R., Cuccaro, P., & Schuster, M. A. (2014). Early puberty, negative peer influence, and problem behaviors in adolescent girls. *Pediatrics*, *133*, 7-14. doi:10.1542/peds. 2013-0628

Nadeem, E., & Graham, S. (2005). Early puberty, peer victimization and internalizing symptoms in ethnic minority adolescents. *Journal of Early Adolescence*, *25*, 197-222. doi:10.1177/0272431604274177

Negriff, S., Ji, J., & Trickett, P. K. (2011). Exposure to peer delinquency as a mediator between self-report pubertal timing and delinquency: A longitudinal study of mediation. *Development and Psychopathology*, *23*, 293-304. doi:10.1017/S0954579410000805

Noret, N., Hunter, S. C., & Rasmussen, S. (2018). The relationship between peer victimization, cognitive appraisals, and adjustment: A systematic review. *Journal of School Violence*, *17*, 451-471. doi:10.1080/15388220.2017.1423492

Pomerantz, H., Parent, J., Forehand, R., Breslend, N. L., & Winer, J. P. (2017). Pubertal timing and youth internalizing psychopathology: The role of relational aggression. *Journal of Child and Family Studies*, *26*, 416-423. doi:10.1007/s10826-016-0598-z

Quon, E. C., & McGrath, J. J. (2014). Subjective socioeconomic status and adolescent health: A meta-analysis. *Health Psychology*, *33*, 433-447. doi:10.1037/a0033716

Reynolds, B. M., & Juvonen, J. (2011). The role of early maturation, perceived popularity, and rumors in the emergence of internalizing symptoms among adolescent girls. *Journal of Youth and Adolescence*, *40*, 1407-1422. doi:10.1007/s10964-010-9619-1

Salmivalli, C. (2010). Bullying and the peer group: A review. *Aggression and Violent Behavior*, *15*, 112-120. doi:10.1016/j.avb.2009.08.007

Schreck, C. J., Burek, M. W., Stewart, E. A., & Miller, J. M. (2007). Distress and violent victimization among young adolescents: Early puberty and the social interactionist explanation. *Journal of Research in Crime & Delinquency*, *44*, 381-405. doi:10.1177/0022427807305851

Senia, J. M., Donnellan, M. B., & Neppl, T. K. (2018). Early pubertal timing and adult adjustment outcomes: Persistence, attenuation, or accentuation? *Journal of Adolescence*, *65*, 85-94. doi:10.1016/j.adolescence.2018.03.003

Shirtcliff, E. A., Dahl, R. E., & Pollak, S. D. (2009). Pubertal development: Correspondence between hormonal and physical development. *Child Development*, *80*, 327-337. doi:10.1111/j.1467-8624.2009.01263.x

Skoog, T., & Özdemir, S. B. (2016a). Explaining why early-maturing girls are more exposed to sexual harassment in early adolescence. *Journal of Early Adolescence*, *36*, 490-509. doi:10.1177/0272431614568198

Skoog, T., & Özdemir, S. B. (2016b). Physical appearance and sexual activity mediate the link between early puberty and sexual harassment victimization in male adolescents. *Sex Roles*, *75*, 339-348. doi:10.1007/s11199-016-0619-9

Skoog, T., Özdemir, S. B., & Stattin, H. (2016). Understanding the link between pubertal timing in girls and the development of depressive symptoms: The role of sexual harassment. *Journal of Youth and Adolescence*, *45*, 316-327. doi:10.1007/s10964-015-0292-2

Skoog, T., & Stattin, H. (2014). Why and under which contextual conditions do early maturing girls develop problem behaviors? *Child Development Perspectives*, *8*, 158-162. doi:10.1111/cdep.12076

Somerville, L. H. (2013). The teenage brain: Sensitivity to social evaluation. *Current Directions in Psychological Science*, *22*, 121-127. doi:10.1177/0963721413476512

Stattin, H., Kerr, M., & Skoog, T. (2011). Early pubertal timing and girls' problem behavior: Integration of two hypotheses. *Journal of Youth and Adolescence*, *40*, 1271-1287. doi:10.1007/s10964-011-9696-9

Su, Q., Chen, Z., Li, R., Elgar, F. J., Liu, Z., & Lian, Q. (2018). Association between early menarche and school bullying. *Journal of Adolescent Health*, *63*, 213-218. doi:10.1016/j.jadohealth.2018.02.008

Sumter, S. R., Baumgartner, S. E., Valkenburg, P. M., & Peter, J. (2012). Developmental trajectories of peer victimization: Off-line and online experiences during adolescence. *Journal of Adolescent Health*, *50*, 607-613. doi:10.1016/j.jadohealth.2011.10.251

Sun, Y., Mensah, F. K., Azzopardi, P., Patton, G. C., & Wake, M. (2017). Childhood social disadvantage and pubertal timing: A national birth cohort from Australia. *Pediatrics*, *139*, Article e20164099. doi:10.1542/peds.2016-4099

Trifan, T. A., & Stattin, H. (2015). Are adolescents' mutually hostile interactions at home reproduced in other everyday life contexts? *Journal of Youth & Adolescence*, *44*, 598-615. doi:10.1007/s10964-014-0204-x

Troop-Gordon, W. (2017). Peer victimization in adolescence: The nature, progression, and consequences of being bullied within a developmental context. *Journal of Adolescence*, *55*, 116-128. doi:10.1016/j.adolescence.2016.12.012

Tsitsika, A. K., Barlou, E., Andrie, E., Dimitropoulou, C., Tzavela, E. C., Janikian, M., & Tsolia, M. (2014). Bullying behaviors in children and adolescents: "An ongoing story." *Frontiers in Public Health*, *2*, Article 7. doi:10.3389/fpubh.2014.00007

Ullsperger, J. M., & Nikolas, M. A. (2017). A meta-analytic review of the association between pubertal timing and psychopathology in adolescence: Are there sex differences in risk? *Psychological Bulletin*, *143*, 903-938. doi:10.1037/bul0000106

Veenstra, R., Dijkstra, J. K., Steglich, C., & Van Zalk, M. H. W. (2013). Network–behavior dynamics. *Journal of Research on Adolescence*, *23*, 399-412. doi:10.1111/jora.12070

Veenstra, R., Lindenberg, S., Oldehinkel, A. J., De Winter, A. F., Verhulst, F. C., & Ormel, J. (2005). Bullying and victimization in elementary schools: A comparison of bullies, victims, bully/victims, and uninvolved preadolescents. *Developmental Psychology*, *41*, 672-682. doi:10.1037/0012-1649.41.4.672

Wang, F., Leary, K. A., Taylor, L. C., & Derosier, M. E. (2016). Peer and teacher preference, student teacher relationships, student ethnicity, and peer victimization in elementary school. *Psychology in the Schools*, *53*, 488-501. doi:10.1002/pits.21922

Wong, J. S., & Schonlau, M. (2013). Does bully victimization predict future delinquency? A propensity score matching approach. *Criminal Justice and Behavior*, *40*, 1184-1208. doi:10.1177/0093854813503443

Author Biographies

Therése Skoog is associate professor of psychology in the Department of Psychology at Gothenburg University, Sweden. She is a developmental psychologist and her research focuses primarily on adolescent development and adjustment. She also conducts studies on preventive and promotive interventions, mainly in childhood and adolescence. She earned her PhD from Örebro University, Sweden. Previously, she has been affiliated with the Norwegian University of Science and Technology and Jönköping University, Sweden.

Sabina Kapetanovic earned a PhD in welfare and social sciences at Jönköping University, Sweden, with a thesis that deals with the topic of parent–child communication and relationships and teenagers' psychosocial development, including the development of delinquency and substance use. She currently works as a senior lecturer in psychology at University West, Sweden, and is a member of the Center of Child and Youth Studies at the university. She directs an intervention study on parent support programs.