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Pubertal Timing and Substance Use: The Effects of Gender, Parental Monitoring and Deviant Peers

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Abstract

Purpose—Early pubertal timing is associated with early initiation of cigarettes and alcohol; we evaluated parental monitoring and affiliation with deviant peers in a moderated, mediational model of this relationship for both genders.

Methods—We tested a prospective model explaining the process through which pubertal timing is related to early use of cigarettes and alcohol for 360 fourth and fifth graders, following them for four years.

Results—We found a relation between early pubertal maturation and trying cigarettes and alcohol without parents' knowledge for both boys and girls. In addition, for both genders, parental monitoring moderated the association between pubertal timing and trying alcohol, but not trying cigarettes. Affiliation with deviant peers mediated the effect of pubertal timing on both alcohol and cigarette initiation for girls only.

Conclusions—While pathways to substance use differ by gender, both early maturing girls and boys should be regarded as high-risk populations for initiation of substances, and intervention programs may be more effective if they are targeted accordingly.

Keywords

Substance use; Pubertal timing; Adolescence; Gender differences; Parental monitoring; Deviant peers

Substance use by American youth continues to be a major public health issue. National prevalence rates for tobacco and alcohol use remain high, and many children initiate use in seventh grade or before [1,2]. Males have historically used substances earlier and at higher

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rates than females, but in recent years females have closed this gap. By late adolescence, there are no gender differences in rates of cigarette and alcohol use [3].

Given the sharp increase in relative risk for adult dependence and abuse seen as the initial age of substance use decreases, as well as the many health consequences associated with substance use during adolescence and beyond, identifying the factors related to initial exposure to substances during childhood and adolescence is imperative. The purpose of this paper is to investigate the effect of early pubertal maturation in both boys and girls on early initiation of substances, and to examine two specific process variables that may explain this relation – parental monitoring and affiliation with deviant peers.

The timing of pubertal development is one factor that has been repeatedly implicated in both the emergence and degree of substance use [4]. *Pubertal timing* refers to a child's stage of pubertal development relative to the development of same-sex, same-age peers. Much of the research in this area has been conducted with girls only, and there is a strong relation between early pubertal maturation and early use of both alcohol and cigarettes for girls [5-8].

Research on pubertal timing and substance use of boys has been less extensive and less conclusive than that of girls. Early studies concluded that early maturation was socially advantageous for boys, with their peers rating them as more poised, relaxed, good-natured, and more adept physically [e.g., 9]. It is likely that early maturation has different implications for boys and girls; early maturing boys and their peers tend to view their advanced development positively, whereas early maturing girls and their peers tend to view their development negatively [10]. Most studies that include boys have found that early maturers are at risk of earlier initiation and increased consumption of cigarettes, alcohol, and marijuana compared to non-early maturers [4,11], with some exceptions [e.g., 12]. However, although there is a clear relation between early maturation and initiation of substances, particularly for girls, the process variables that may explain this relation are not yet clearly understood.

In this study, we examined two processes through which pubertal timing and substance initiation are linked. The relationship between an independent variable and a dependent variable is often influenced by additional “third” variables, which can be mediators or moderators of the original relationship [13,14]. If a third variable acts as a mediator, this implies a sequence of events in which the independent variable causes the mediating variable, which in turn causes the dependent variable, thus the relation between the independent variable and the dependent variable is fully or partially explained by the mediating variable. If a third variable acts as a moderator (interacts with an independent variable), the relationship between the independent and dependent variable changes depending on the level of the moderating variable.

Parental Monitoring and Affiliation with Deviant Peers

Parental monitoring is defined as parents accurately knowing where their children are and who they are with. It also includes an active role for the child in the relationship, particularly how open the child is to sharing information with his or her parents [15,16]. Monitoring varies by age, gender, ethnicity, and pubertal maturation, and the influence of monitoring decreases as adolescents get older [5,17-20]. Better monitoring has been associated with later initiation and lower consumption of substances, suggesting that it is protective against substance use [17, 21]. Since both poor parental monitoring and early maturation are associated with early substance use, an early maturing child with low monitoring may be at amplified risk for substance use.

Affiliation with deviant peers is one of the largest influences on substance initiation and use during adolescence [21-23] and early maturing girls appear to affiliate more with deviant peer

groups [24]. It is not clear why early maturers affiliate with more deviant peers; researchers speculate that early maturing girls seek out, and are sought out by, older friends and boyfriends who tend to be deviant [5]. There is some support for a mediating link of peer affiliation explaining the relation between pubertal timing and substance use in girls, although peer influences often do not fully account for the relationship between early menarche and substance use [6].

Other studies have examined pubertal development and affiliation with deviant peers in both boys and girls, and some find that early maturing boys are also more likely to affiliate with deviant peers [25], although the evidence for boys is mixed. In one study of urban minority youth that examined the links between early maturation and aggressive and delinquent behaviors, both males and females were at risk for affiliating with delinquent friends in the 6th grade but not in the 7th or 8th grade [26]. Early maturing boys may befriend older peers who resemble them physically, and these older peers may be more deviant than peers their own age. However, early maturation may be somewhat advantageous for boys in specific contexts, such as athletics, because of their increased height and muscularity [9,10].

Current Study

Although the relationships of early pubertal maturation, parental monitoring, affiliations with deviant peers, and substance use have been examined separately or on gender-specific samples, to our knowledge this is the first prospective, longitudinal study examining the combination of these risk factors in both boys and girls, starting in the 4th and 5th grade and following the sample until they were in the 7th and 8th grade.

Our overall model is as follows: Parental monitoring will moderate the effect of pubertal timing on substance use through affiliation with deviant peers, such that early maturing, poorly-monitored children are more likely to affiliate with deviant peers and to subsequently use substances. Thus, we are testing a moderated mediated pathway. Based on extant research, we expect the association between pubertal timing and affiliation with deviant peers to be stronger for girls than for boys. As we are interested in the processes linking early maturation to early initiation of substances, and these processes may differ by gender, we examine gender differences in each analysis.

Method

Participants

Data for this study were from a subsample of participants in the Oregon Youth Substance Use Project (OYSUP), which uses a cohort-sequential design beginning when students were in first through fifth grade, assessing them once a year for nine years. Data for this paper are from the first (T1), third (T3) and fourth (T4) assessment. OYSUP participants were recruited from 15 elementary schools in a working-class community of approximately 50,000 people in Western Oregon; a representative sample of 1075 students (50.3% female; $n = 528$) was recruited using a two-stage stratified random sampling procedure (a full description of the study procedure is given elsewhere [2]). Children, parents, and teachers completed assessments at each time point.

For the current study, data are from a subsample of 360 students of 416 4th and 5th grade participants at T1.¹ Eligible participants had parent ratings of pubertal development at the relevant assessment, parent assessments of parental monitoring, teachers and parents report of affiliation with deviant peers when they were in the 6th or 7th grade (at T3), and self-ratings of

¹The majority of excluded participants did not have pubertal development ratings (79%), others did not have T4 self-reports of substance use (16%), and the remainder were missing parent or teacher reports at T3 (5%).

substance initiation when they were in the 7th or 8th grade (at T4). Forty-eight percent ($n = 174$) were female; at T1, participants were an average of 10.5 years old (with a range of 9.2 – 11.9; $SD = .58$), and at T4 participants were an average of 13.4 years old (with a range of 12.3 – 15.1; $SD = .59$). The sample was primarily European American (91.7%), with 4.7% Hispanic American, 0.8% African American, 1.9% Asian American, and 0.8% American Indian or Alaskan Native. About 40% of the sample was eligible for a free or reduced lunch under Title 1, an indicator of low family income. The subsample was compared to the full study sample on key variables, and there were no significant differences in sex, ethnicity, or lunch eligibility.

Measures

Pubertal Status and Pubertal Timing—An adapted form of the Pubertal Development Scale (PDS), reworded so parents reported on their children, was used to assess pubertal status [27]. Pubertal maturation was assessed by both parents for girls when they were in either the 4th or 5th grade (at T1) and for boys when they were in either the 6th or 7th grade (at T3), to obtain ratings of developmental maturation which vary by gender and age [28,29]. Items to assess girls' pubertal development were growth of body hair, skin change, growth spurt, breast change, and menarche ($\alpha = .65$); items for boys were the first three, plus voice change and facial hair growth ($\alpha = .77$). Responses ranged from 1 = *no pubertal development or change* through 4 = *pubertal development or change completed*. Correlations between parent ratings were high ($r = .77$ for girls; $r = .79$ for boys), so mother and father ratings were averaged when both were available (for 52.5% of children). If only one parent provided a pubertal development rating, that rating was used (43.1% had a mother rating only, 4.4% had a father rating only).

Pubertal timing was defined based on the frequency distributions of our sample. The most advanced quartile was classified as early maturers, a ratio that is consistent with the national distribution [30] and classifications done in several other studies [4,7,11]. Of 174 fourth- and fifth-grade girls, 45 (25.9%) were classified as early maturers, and of 186 sixth- and seventh-grade boys, 46 (24.7%) were early maturers.

Parental Monitoring—Parental monitoring was provided by parents at T3 using nine items from the poor monitoring/supervision subscale of the Alabama Parenting Questionnaire (e.g., “Your child goes out with friends you do not know”) [31]. Responses ranged from 0 = *Never* to 4 = *Always* ($\alpha = .73$ for mother reports and $\alpha = .71$ for father reports). When possible, parent reports were averaged (the correlation between parents was moderate at .54).

Affiliation with Deviant Peers—Affiliation with deviant peers was measured at T3 using variables based on reports from children, their parents, and their teachers. Children and parents each completed six items based on externalizing items from the Youth Self Report and Child Behavior Checklist [32], which were adapted to refer to the child's friends (e.g., “Lies or cheats”). Responses ranged from 1 = *Not true* through 3 = *Very true*. Cronbach alphas for mother, father, and child reports ranged from .77 to .78. When two parent reports were available, they were averaged to obtain parental report of deviant peer affiliation (parent reports were highly correlated at .67).

Teachers completed three unpublished items rating how often the child associates with “kids who misbehave in school,” “kids who get into fights” and “kids who are well-behaved in school” ($\alpha = .84$). The latter item was reverse scored to create a peer deviancy index from teachers. Deviant peer affiliation measures from children, parents, and teachers were

moderately correlated (ranging from .22 to .28).² Measures were standardized and averaged to create one peer deviancy index; higher scores indicate more deviant peer affiliations.

Substance Use—Children reported whether they had ever tried cigarettes or alcohol without their parents knowing (*no* or *yes*) at both T1 and T4.³

Results

At T1, when children were in the 4th and 5th grade, substance use without parental knowledge was low: Nine children (2.5%) reported trying cigarettes and three children (0.8%) reported trying alcohol.⁴ By T4, when children were in the 7th and 8th grade, 64 (17.8%) reported trying cigarettes and 60 (16.7%) reported trying alcohol.

In preliminary analyses, we assessed the relation of the demographic variables of ethnicity and grade to pubertal timing and trying substances at T4. Grade and trying substances at T1 were significantly related to trying substances at T4, so were included as control variables in all analyses, even when not stated. Correlations and descriptive statistics for study variables are shown in Table 1. For all analyses, we used binary logistic regression analysis when the dependent variable was dichotomous (i.e., whether or not they tried a substance), and multiple regression analysis when the dependent variable was continuous (i.e., affiliation with deviant peers). Since standardized (beta) weights are not given in logistic regression, we report unstandardized (B) weights for these analyses. Significant interactions were decomposed using techniques proposed by Aiken and West [33].

We tested the mediating effect of affiliation with deviant peers using the criteria specified by Baron and Kenny [13]. According to these authors, to satisfy the criteria for mediation, the predictor must be related to both the criterion and the mediating variable, the mediating variable must be related to the criterion, and after controlling for the mediating variable, the previously significant predictor is significantly reduced or is no longer a significant predictor of the criterion. If these criteria were satisfied, we used the Sobel test, which examines the joint significance of the pathways from the predictor to the mediating variable and from the mediating variable to the outcome [34].

Pubertal Timing and Substance Initiation

Before testing the overall models, we examined the direct effect of pubertal maturation on substance initiation. As shown in Table 2, both boys and girls who were classified as early maturers were more likely to try substances compared to their non-early maturing counterparts, and girls were more likely than boys to try substances in general. Next we assessed the relation between pubertal timing (early versus non-early) and trying alcohol or cigarettes at T4, examining the moderating effect of gender. Both pubertal timing ($B = .69$, $OR = 1.99$; 95% C.I. = 1.08-3.67) and gender ($B = -.84$, $OR = 0.43$; 95% C.I. = 1.28-4.19) predicted trying cigarettes by T4 and the interaction between gender and pubertal timing was non-significant. Similarly, both pubertal timing ($B = 1.26$, $OR = 3.53$; 95% C.I. = 1.91-6.52) and gender ($B = -.79$, $OR = 0.45$; 95% C.I. = 1.21-4.04) predicted trying alcohol by T4 and the interaction between pubertal timing and gender was non-significant. Thus, pubertal timing was significantly related to both trying cigarettes and alcohol at T4 for boys and girls, satisfying Baron and Kenny's first criterion for mediation [13].

²We did not expect a high correlation between child, parent, and teacher sources on the deviant peers construct, as each source has a different perspective and information regarding the child's peers. We included all available sources to increase reliability.

³We used this item as our outcome measure because we are interested in tracking illicit consumption of substances, not in sanctioned use such as a sip of alcohol offered by a parent.

⁴Of the 12 children who had tried substances by T1, four were classified as early maturers.

Trying Cigarettes by T4

We used logistic regression to assess if monitoring moderated the effect of pubertal timing on trying cigarettes without parental knowledge. All two- and three-way interactions between monitoring, pubertal timing and gender were non-significant. For both boys and girls, pubertal timing ($B = .79$, $OR = 2.21$; 95% $CI = 1.17-4.18$), parental monitoring ($B = .57$, $OR = 1.77$; 95% $CI = 1.34-2.34$), and gender ($B = -.96$, $OR = 0.38$; 95% $CI = 1.41-4.83$) independently predicted trying cigarettes by T4. Thus, parental monitoring did not moderate the effect of pubertal timing on trying cigarettes for either boys or girls, but was an independent predictor.

We tested the second criteria for mediation by predicting affiliation with deviant peers from pubertal timing and the interaction of gender and pubertal timing. The gender by pubertal timing interaction term was significant ($B = -1.22$, $p < .03$). Further examination revealed that the effect of pubertal timing on affiliation with deviant peers was significant for girls ($B = .94$, $p < .02$), but not for boys ($B = .28$, ns). Early maturing girls were significantly more likely to affiliate with deviant peers, while early maturing boys were not. To assess the third criteria, we predicted trying cigarettes by T4 from affiliation with deviant peers and the interaction between gender and deviant peers. In the prediction of trying cigarettes, the interaction between gender and affiliation with deviant peers was not significant. In addition to grade and gender, affiliation with deviant peers ($B = .88$, $OR = 2.41$; 95% $C.I. = 1.76-3.30$) significantly predicted cigarette use.

Thus, for girls, the first three criteria were met; for boys, pubertal timing was not related to affiliation with deviant peers. We tested the final criteria by predicting trying cigarettes by T4 from gender, pubertal timing, parental monitoring, and affiliation with deviant peers. With affiliation with deviant peers in the model, the effect of pubertal timing was reduced but remained significant ($B = .71$, $OR = 2.03$; 95% $C.I. = 1.04-3.99$; see Table 3) and the Sobel test was significant (2.19 ; $p < .05$). Thus, all of the mediational criteria were met for girls, suggesting that affiliation with deviant peers partially mediated the relation between pubertal timing and trying cigarettes.

The final model for boys is depicted in Figure 1a, and shows that pubertal timing, affiliation with deviant peers, and monitoring were all independent predictors of trying cigarettes. For girls, the model is similar, but the relation between pubertal timing and trying cigarettes was partially mediated by affiliation with deviant peers (Figure 1b).

Trying Alcohol by T4

To test the overall model predicting trying alcohol by T4, we first examined the two- and three-way interactions between monitoring, pubertal timing and gender to assess the moderating effect of monitoring. The only significant interaction was the two-way interaction between pubertal timing and monitoring ($B = .76$, $OR = 2.15$; 95% $CI = 1.07-4.32$). As shown in Figure 2, further analysis of this interaction showed that for those with high parental monitoring, pubertal timing did not predict alcohol use ($B = .49$, $OR = 1.64$; 95% $CI = 0.62-4.35$), but for those with low ($B = 2.02$, $OR = 7.54$; 95% $CI = 3.03-18.76$) and average ($B = 1.26$, $OR = 3.51$, 95% $CI = 1.86-6.64$) parental monitoring, pubertal timing was a significant predictor of alcohol use. Thus, parental monitoring moderated trying alcohol by T4.

Next we proceeded through the steps for mediation. The first step was already satisfied, and we tested the second step in the model for cigarette initiation and found that pubertal timing was significant for girls but not for boys. To test the third step, we predicted trying alcohol by T4 from affiliation with deviant peers and the interaction between gender and affiliation with deviant peers. The interaction was not significant, and affiliation with deviant peers ($B = .72$,

OR = 2.06; 95% C.I. = 1.52-2.79), gender and grade significantly predicted alcohol use. Thus, affiliation with deviant peers was related to trying alcohol for both boys and girls.

Finally, we tested all variables in the model by predicting trying alcohol by T4 from gender, pubertal timing, parental monitoring, affiliation with deviant peers, and the interaction of pubertal timing with monitoring. The interaction between monitoring and pubertal timing was no longer significant when affiliation with deviant peers was included in the model (see Table 3). The Sobel test showed that the path from pubertal timing to alcohol use through affiliation with deviant peers was significant for those who were poorly monitored (2.59, $p < .01$) or with average monitoring (2.28, $p < .05$), supporting this model. Thus, for girls, all four criteria for mediation were met, supporting a moderated-mediated model (shown in Figure 1d) whereby affiliation with deviant peers partially mediates the effect of pubertal timing on trying alcohol, and this relation is moderated by parental monitoring. For boys, our results suggest a model wherein pubertal timing, moderated by parental monitoring, and affiliation with deviant peers independently predict trying alcohol (Figure 1c).

Discussion

This prospective study showed that, compared to non-early maturers, early maturers were twice as likely to try cigarettes and were three-and-a-half times as likely to try alcohol. We tested models to explain the relation between pubertal timing and trying cigarettes and alcohol for both boys and girls. For boys, parental monitoring, pubertal timing, and affiliation with deviant peers were independent predictors of trying cigarettes. For girls, the effect of pubertal timing on trying cigarettes was partially mediated by affiliation with deviant peers, and parental monitoring was an independent predictor. For boys, parental monitoring moderated the relation between pubertal timing and trying alcohol, and affiliation with deviant peers was an independent predictor. For girls, the model was similar to that of boys, but affiliation with deviant peers was also a partial mediator of the link between pubertal timing and trying alcohol.

Our findings support previous research on the protective effect of parental monitoring on adolescent substance use, which has been shown to impact substance initiation and use both directly [23] and indirectly by limiting exposure to deviant peers [21]. We extended these findings by showing that parental monitoring moderated the effect of early maturation on alcohol use for both boys and girls, such that among early maturers, poorly monitored children were more likely to try alcohol. For cigarettes we found a direct effect of monitoring; for all children, the more they were monitored, the less likely they were to try cigarettes. The protective aspect of parental monitoring may be due at least in part to children who are more willing to open up to parents about their daily activities having a better overall parent-child relationship [15,16]. Further examination of monitoring that includes family functioning may disentangle this construct.

We also supported previous research on the association between pubertal timing and affiliation with deviant peers for girls, as early maturing girls were more likely to affiliate with deviant peers compared to non-early peers [6]. Early maturing girls may be more likely to affiliate with deviant peers because they seek out older peers and boyfriends, as they are more physically advanced than most peers their own age. For boys, affiliation with deviant peers did not vary as a function of their timing, in contrast to findings from some previous studies [25,26]. Those studies were on different populations than the present study; specifically on urban, minority children, in contrast to our more rural, Caucasian sample. The impact of early maturation may differ in various social settings.

Girls were more likely to have tried both cigarettes and alcohol by the 8th grade, and our results show different pathways to cigarette and alcohol use. Early maturing girls were more likely to

affiliate with deviant peers than were early maturing boys. Conversely, early maturing boys may achieve a higher status within their current peer group due to their advanced physical maturity and athletic ability [9]. Early maturing boys may experiment with substances, especially alcohol, as a result of being popular peer group members and leaders; alcohol use tends to occur in groups as a social activity. Although both early maturing boys and girls were more likely to use alcohol and cigarettes, early maturing girls in particular used cigarettes at a much higher rate, and this relation was only partially mediated by affiliation with deviant peers. This high use of cigarettes may be related to body image concerns related to early pubertal onset, as girls may utilize cigarettes as diet aids [35]. Our disparate findings for boys and girls underscore the need to examine gender and substances separately, as they appear to have distinct initiation and use processes and patterns. In addition, pubertal timing, parental monitoring, and affiliation with deviant peers all had effects on trying substances that were not explained by mediation or moderation, so further exploration of these and other variables is warranted.

There were several strengths of this study. First, the prospective, cohort-sequential study design, beginning at a young age, enabled us to predict trying substances from risk factors measured at a younger age. Second, the stratified random sampling of participants from multiple schools increases the generalizability of our findings. Third, we obtained information from multiple sources (children, parents, and teachers). Fourth, the inclusion of boys and girls allows us to examine gender differences in the early maturation hypothesis. This study also had several limitations. First, although our sample was representative of the community in which it was gathered, participants were primarily Caucasian, limiting the generalizability of the findings to this racial/ethnic group. Second, our measure of pubertal timing was completed by parents, so we assessed the perception of pubertal development rather than actual pubertal development. However, the PDS is widely used, and for these particular research questions the perception of puberty may be more relevant than actual pubertal timing [36]. Third, our substance use measures were self-report only, and it is possible that participants over- or underreported their use. However, report of lifetime use was consistent across assessments [2], and participants were assured of their confidentiality. Finally, we may have underestimated parental monitoring by averaging parent reports when they were available from two parents, when one parent may be largely responsible for monitoring the child in each household (i.e., we did not account for family structure which could be related to monitoring). We averaged parent reports for two reasons. First, using two measures increases reliability, and second, in the case of divorced parents, children split their time between two households (and we often have reports from both parents).

Our findings indicate that intervention programs may be especially effective if they are targeted at and designed for early maturing children. Delaying initiation of substances can potentially change an individual's substance use trajectory over the life span [37]. Recognizing that early pubertal maturation can place both boys and girls at increased risk for early substance use may be useful for researchers, parents, and teachers, reminding them to pay special attention to early maturers. Further research is necessary to understand the processes leading early maturing girls to affiliate with deviant peers, and to explain the relation between pubertal timing and cigarette use and alcohol use, particularly for boys.

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Figure 1.
Final models for trying cigarettes (top) and alcohol (bottom).

Figure 2.
Alcohol use without parental knowledge by parental monitoring and early and non-early pubertal maturers.

Table 1
Correlations and Descriptive Statistics for Study Variables ($n = 360$)

Variable	1	2	3	4	5	6	7	8	9
1. T3 Grade	--								
2. Gender	-.02	-.02	-.05	.03	.06	-.04	-.02	.08	.18***
3. Pubertal Timing	-.05	--	-.01	.25***	.07	.05	.03	-.13*	-.13*
4. T3 Affiliation with Deviant Peers	.03	-.01	--	.05	-.05	.03	.02	.11*	.20***
5. T3 Poor Parental Monitoring	.06	.25***	.05	--	.28***	.18***	.07	.30***	.21***
6. T1 Tried Cigarettes	-.04	.07	-.05	.28***	--	.10 [†]	.00	.23***	.09 [†]
7. T1 Tried Alcohol	-.02	.03	.02	.18***	.10 [†]	--	-.01	.25***	.04
8. T4 Tried Cigarettes	.08	-.13*	.11*	.30***	.00	-.01	--	-.04	.04
9. T4 Tried Alcohol	.18***	-.13*	.20***	.21***	.23***	.25***	-.04	.45***	.45***
<i>M</i>	6.46	.52	.25	.03	4.45	.02	.01	.18	.17
<i>SD</i>	.50	.50	.44	2.34	3.61	.16	.09	.38	.37

Note. Coding for categorical variables: Gender: female = 0, male = 1; pubertal timing: non-early = 0, early = 1; substance use: nonuser = 0, ever user = 1.

[†] $p < .10$.

*

$p < .05$.

**

$p < .01$.

*** $p < .001$.

Table 2

Tried Substances at T4 Assessment by Gender and Pubertal Timing

		% of Group Reporting Ever Tried	
		Cigarettes	Alcohol
Boys	Early Maturers	15.2%	21.7%
	Non-early Maturers	12.1%	8.6%
Girls	Early Maturers	35.6%	37.8%
	Non-early Maturers	18.6%	16.3%

Note. For boys, total N = 186; Early Maturing group = 46. For girls, total N = 174; Early Maturing group = 45.

Table 3
Regressions for the Prediction of T4 Substance Initiation ($n = 360$)

Predictors of T4 Substance Initiation	Cigarette Initiation				Alcohol Initiation			
	B		OR		B		OR	
	95% CI		95% CI		95% CI		95% CI	
T4 Substance Initiation	2.68**		14.64		0.64		1.89	
Grade	0.56 [†]		1.75		1.28***		3.59	
Gender	-1.39***		0.25		-1.14***		0.32	
Pubertal Timing	0.71*		2.03		1.23***		3.41	
Parental Monitoring	0.44**		1.55		-0.04		0.96	
Monitoring X Timing			<i>Not applicable</i>		.64 [†]		1.89	
Deviant Peers	0.78***		2.19		0.67		1.95	

Note. Coding for categorical variables: Gender: female = 0, male = 1; pubertal timing: early = 0, non-early = 1; substance use: nonuser = 0, user = 1. Parental Monitoring and Deviant Peers are scored such that higher values indicate poorer monitoring and more affiliation deviant peers. OR = Odds Ratio. CI = Confidence Interval.

[†] $p < .10$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.