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Changes in Friends' and Parental Influences on Cigarette Smoking from Early through Late Adolescence

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Abstract

Purpose—This study examined the changes in friends' and parental influences on cigarette smoking across two developmentally distinct social environments for adolescents: junior high school and high school.

Methods—Longitudinal data consisting of seven repeated measures following 1,001 adolescents from 7th to 12th grade was obtained from the Midwestern Prevention Project. A two-piece Growth Curve Model (GCM) was used to assess the growth trajectory of current cigarette use: one piece for the junior high school period, and the other for the high school period. Perceived friends' and parental cigarette use were each used as a time-varying covariate in separate GCMs.

Results—Effects of friends' and parental cigarette use remained significant on adolescent cigarette smoking across the two developmental periods. The magnitude of friends' effect was in general higher during junior high school than high school. The magnitude of the parental effect remained relatively stable between the two periods. However, decreasing trends in both effects were observed from 10th to 12th grade. Gender differences also emerged. Friends' and parental effects were greater for girls in their early high school years, whereas friends' effect decreased in magnitude among girls and increased among boys during high school.

Conclusions—The transition from junior high school to high school represents an opportunity for interventions to counteract peer influence since such influence appeared to be much weaker during this period. However, interventions should continue to target parents as their behavior remains influential through the end of high school.

Keywords

Adolescence; Smoking; Developmental stages; Peer influences; Parental influences; Longitudinal studies; Growth curve models

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Introduction

Adolescence is a critical time period for various health risk behaviors such as cigarette smoking.¹ Experimentation with cigarettes usually starts during junior high school and the development of regular smoking typically occurs in the early years of high school.^{2,3} Cigarette use initiated during adolescence elevates the likelihood of tobacco dependence and increases the odds of abuse or dependence on other substances such as alcohol and marijuana in young adulthood.⁴ Further, it predicts later respiratory problems and may serve as an independent lifetime risk factor for lung cancer.^{5,6} Cigarette smoking initiated before junior high school has also been linked with psychological problems, especially among girls.⁷

Adolescent cigarette smoking behavior is related to the behaviors of their friends and parents. There are several ways in which friends can influence cigarette use, such as through the modeling of risky behaviors and through normative peer pressures. Nevertheless, the number of friends who smoke is the most common risk factor linked to cigarette use and a stronger predictor than other peer influence measures.⁸ Similarly, parental cigarette use may be a more direct measure of parental influence than other parental measures as it is correlated with other parenting rules and creates a “living smoking context” for adolescents.⁹

According to the social development model proposed by Catalano and Hawkins, youth learn socializing behaviors from family, school, community and peers, and the importance of these influences could change across different developmental periods.¹⁰ Junior high school and high school are two distinct developmental phases separated by major transitions in the adolescent’s social environments. For example, entering junior high school is accompanied with increased exposures to drug use. During this period, peer influence increase as adolescents begin the process of individuation from family. In high school, hierarchical family relations become more egalitarian, and peer influence continues to increase in importance.^{11,12} Longitudinal studies have shown that the number of smoking friends increases as adolescents age.^{13,14} However, the findings on change in friends’ influence on cigarette use are mixed.^{14–18} On the other hand, the effect of parental cigarette use seems to be consistent over time.^{14,17,18} These findings were based on either cross-sectional data or longitudinal data with a limited number of time points. Thus, improved knowledge on how friends’ and parental influences on cigarette smoking change across different developmental periods within adolescence is needed.

Moreover, gender may affect changes in friends’ or parental influences across developmental periods. Biologically speaking, the onset of puberty and the impact of pubertal timing on problem behaviors differ between boys and girls. Compared to those with average to later pubertal onset, early-maturing boys are more likely to engage in antisocial behaviors, including drug and alcohol use, whereas early-maturing girls have more emotional problems and higher rates of depression and anxiety.¹⁹ These gender differences in emotional and behavioral development have also been shown to affect adolescents’ relationships with their parents and peers.²⁰ Therefore, the influence of parents and friends may vary by genders, as well as across developmental periods. Some evidence has shown that influences of friends and parents on smoking was stronger for boys than girls.^{8,21} Yet other studies found the opposite.^{14,22} However, most of these studies either focused on smoking initiation rather than current cigarette use or failed to examine the differences across developmental stages.

The current study used seven waves of longitudinal data that followed adolescents through their junior high and high school years to investigate the time-varying effects of friends’ and

parental cigarette use on adolescents' cigarette use. It was hypothesized that (1) friends' and parental cigarette use would remain significant predictors of adolescents' cigarette use throughout the junior high and high school periods, (2) the effect of parental use would be higher in magnitude during junior high school than high school, and (3) the effect of friends' use would be higher in magnitude during high school than junior high school. The differential effects of friends' and parental use on cigarette use between genders are also examined.

Methods

Data Source

This study used the Indianapolis longitudinal cohort from the Midwestern Prevention Project (MPP), a community-based substance abuse prevention program for adolescents. Details about the MPP study and the Indianapolis cohort can be found elsewhere.^{23,24} In short, the MPP program components included mass media programming, a school-based youth educational program on resistance skills training, parent education and organization, community organization, and health policy change, which were introduced sequentially into the community during a 6-year period. Schools were randomly assigned to the prevention program after the baseline assessment. Participants included in this analysis were 1,001 7th graders from both intervention and control groups at the baseline observation conducted in the fall of 1987. All participating students had active parental and self consent. The first follow-up occurred six months after the baseline, and then annually thereafter through 12th grade. The research procedures were approved by the Institutional Review Board at the University of Southern California.

Measures

Monthly cigarette use was measured by asking, "How many cigarettes have you smoked in the last month (30 days)?" Since the original response categories were different in the junior high school (6-category from "none" to "more than 1 pack") and high school (7-category from "none" to "more than 10 packs") surveys, responses were collapsed into "1=none, 2=one puff to one cigarette, 3=2–20 cigarettes, 4=more than 1 pack" for consistency across all waves.

Perceived friends' use was measured by asking, "How many of your close friends use cigarettes?" Responses were "1=none, 2=one, 3=two, 4=3–4, 5=5–7, 6=8–10, 7=more than 10".

Perceived parental use was measured by asking, "How many of the two important adults in your life use cigarettes?" Responses were "1= none, 2=one, 3=two".

All measures also had high test-retest reliabilities ($>.70$) based on a sample of 396 students in the MPP study who were measured on two occasions 3 weeks apart.^{23,25} These measures were also shown to be valid and reliable across waves.²⁶

Time-invariant covariates used in this study included: program condition, gender, ethnicity (White vs. non-White), socioeconomic status (SES; low vs. high, determined by father's nonprofessional occupation vs. professional/managerial occupation), and junior high school type (public vs. private).

Treatment of Missing Data

Most of the missing data in this study were due to participants' absence at a wave of measurement rather than attrition from the study. Missing rates for the current cohort by

wave are as follows: (a) Wave 1, 0%; (b) Wave 2, 18.6%; (c) Wave 3, 23.7%; (d) Wave 4, 33.7%; (e) Wave 5, 34.4%; (f) Wave 6, 13.7%; and (g) Wave 7, 13.5%. The missing rate and the missing rate by drug use status did not differ between intervention and control groups.²⁷ Multiple imputation was performed using Mplus (Version 6.11). Missing data were imputed from a variance covariance model, where all variables in the data set were assumed to be dependent variables.²⁸ A total of five data sets were imputed using all available data. Then, the means of the missing data values were computed and used as the final value for analysis.

Statistical Analysis

A two-piece Growth Curve Model (GCM) was used to assess the growth trajectory of adolescents' cigarette use (CU): one representing the junior high school period (Wave 1 to Wave 3), and the other representing the high school period (Wave 4 to Wave 7). Because the first two waves were spaced by 6 months and all other waves were distanced annually, the loadings for the indicators of TIME variable in GCM were fixed at 0, 1, and 3 for the junior high school period, and at 0, 2, 4, and 6 for the high school period. Distinct initial status and growth rate were estimated for CU separately for the junior high and high school periods.

To investigate the influences from friends and parents, two separate two-piece GCMs were fitted for monthly CU: one included friends' use (FU) and the other included parental use (PU) as a time-varying covariate in the model. Both GCMs also included program condition, gender, ethnicity, SES, and school type of junior high school as time-invariant covariates (see Figure 1).

Multiple group comparisons were conducted to examine whether the effects of FU and PU on CU differed by gender. Several nested models were evaluated and compared to examine the equivalence of parameters between genders. A base model was first developed with all the regression weights from FU to CU constrained to be equal between genders for all waves. Next, equality constraints on regression weights between genders from FU to CU for each wave were released one at a time, and the corresponding model fit chi-square test statistics were obtained. The model being evaluated was then compared with the base model to determine whether the regression weights from FU to CU should be freed or constrained to be equal across genders for each wave based on likelihood ratio tests. The same multi-group comparison process was repeated for PU. All GCMs were estimated using Mplus.

Results

Descriptive Characteristics

Students included in the analysis were 50% male, 75% Caucasian, 71% from public schools, and 30% from low SES families. Table 1 summarizes the prevalence rates of CU, FU, and PU at each wave. Bivariate correlations are also presented. Figure 2 shows the plot of means over time for CU, FU, and PU. In general, CU and FU increased from Wave 1 to Wave 7 while PU remained relatively stable across the years. CU and FU, and CU and PU were correlated at each wave. Controlling for these correlations in the GCMs enabled us to clarify the growth profile of CU. FU and PU were also correlated at each wave, although the magnitudes of these correlations were relatively weak ($r > .20$ only at Wave 1).

Growth Curve Models

Table 2 summarizes the initial statuses and growth rates for the 2-piece GCM trajectories, the effects of the time-invariant covariates, and the corresponding model fit statistics. In general, a significant increase in CU during the high school period (Piece 2) was observed while the increase in CU during the junior high school period (Piece 1) was not significant

after including FU and PU in the model. It should be noted that participants in the program group had a significantly lower initial status of CU than those in the control group at Piece 2 ($p<.05$).

Table 3 shows the standardized parameter estimates for FU and PU of the 2-piece GCMs for the whole sample and by gender. Both FU and PU had positive and significant effects on CU from Wave 1 to Wave 7 ($p<.01$). The effect of FU appeared to increase from Wave 1 to Wave 2 and then decrease at Wave 3, while the effect of PU increased steadily from Wave 1 to Wave 3. However, a decreasing trend was observed for effects of both FU and PU from Wave 5 to Wave 7. Overall, the magnitude of FU was higher during junior high school (Beta ranged from 0.391 to 0.448) than high school (Beta ranged from 0.263 to 0.301). The magnitude of PU was similar between the junior high school (Beta ranged from 0.072 to 0.107) and high school periods (Beta ranged from 0.068 to 0.103). A post-hoc analysis using the control participants only ($N=504$) showed similar trends, with the exception of a marginal effect of PU at Wave 4 ($p=.06$).

During the junior high school period, effects of FU and PU did not differ between genders. During the high school period, however, FU had stronger effects for girls in both Wave 4 and Wave 5 ($p<.05$). PU also had a stronger effect for girls at Wave 5 ($p<.05$). Among boys, an increasing trend in PU effects was observed from Wave 4 to Wave 6. Among girls, decreasing trends in FU and PU effects were found from Wave 5 to Wave 7.

Discussion

The current study applied two-piece GCMs to examine the growth trajectories of adolescent cigarette use with friends' and parental cigarette use as time-varying covariates across junior high and high school periods to represent two different social contexts. Our results showed that cigarette use remained relatively low and stable during junior high school and then began to increase significantly during high school. Consistent with previous findings, our results showed that the number of friends who smoked increased over time while the rate of parental cigarette use remained relatively stable. It is possible that adolescents tend to select friends based on similar smoking behaviors. The effect of friend selection is beyond the scope of the current study, but there is evidence that the effect of friend selection on smoking is relatively consistent over time.²⁹

As hypothesized, both friends' and parental cigarette use had significant effects on adolescents' cigarette use across all waves. However, the effect of friends' cigarette use was generally higher during junior high school compared to high school. Developmental models posit that the influence from friends' behavior starts to increase from junior high school and continue to increase during high school as youth begin to spend more time with their friends and place greater value on their friends' opinions and acceptance.^{10,30} One possible explanation for our findings may be that friends' cigarette use behavior may have a stronger influence on youth who start to smoke at a younger age (i.e., at least once a month by junior high school). When in high school, cigarette use might represent the maintenance of their behavior rather than a result of peer influence. The increasing interactions with friends during this period may influence other behaviors (e.g., initiation of cigarette use for new smokers, use of alcohol or other substances), which were not the focus of the current study. As expected, parental cigarette use remained a significant influence over time. The increasing trend in the junior high school period suggests the important role of parents for early cigarette smokers at this developmental stage. The magnitude of parental effect started to decrease at 10th grade. This finding is consistent with the social development model in that, during high school, although parents are still one of the socializing agents for youth,

other social units (e.g., school, community) may begin to exert more influence on youth behavior.

Gender differences in the effects of friends' and parental use were only observed in the early high school years (9th and 10th grade). A separate analysis showed that in 10th grade, the past month cigarette use was significantly higher among girls in our sample ($t = -2.54$, $p = .011$), while no differences between genders were found in other surveyed years. A causality test of whether this higher rate of cigarette use among girls was due to the stronger friends' and parental effects at that wave is outside the scope of the current study. Nevertheless, it is worthwhile to speculate on what might have contributed to the gender difference in friends' and parental influences during this period. Developmentally speaking, girls start to reach the end of puberty around 10th grade while boys are still in their mid-puberty stage.³¹ This is also the period when gender differences in the developmental trajectories of depression become salient, with girls exhibiting an increase in depressive mood.³² Cigarette smoking has been associated with elevated depressive symptoms only among girls.³³ It is possible that girls are using cigarettes as a coping method for depression, especially when they see their parent(s) and close friend(s) smoking cigarettes. Interestingly, boys showed an increasing trend in friends' effect from 9th to 11th grade, whereas girls showed a decreasing trend in both friends' and parental effects from 10th to 12th grade. Boys tend to foster friendship by engaging in shared behaviors, whereas girls are more focused on emotional sharing.¹⁹ As boys are more likely to be affiliated with deviant peer groups, it is possible that boys are adopting their friends' risky behaviors (e.g., smoking) as the groups grow tighter over time.³⁴ Another explanation of the decreasing trend in girls may be that by the end of 10th grade, most adolescents have boyfriends/girlfriends, and girls may be more likely to be influenced by their boyfriends' smoking behaviors.^{8,11} However, our survey question did not distinguish romantic relationships from other types of close friendships.

It is important to note that the effect of friends' cigarette use decreased steeply from 8th grade to 9th grade, which is the transition from junior high to high school. A transitional period may present opportunities for behavioral changes as the familiar social environment is likely to be replaced by a new one. In addition, a transitional period may increase an adolescent's sense of vulnerability and caution for engaging in risky behaviors, at least in the short term. The first year of high school provides optimal timing for interventions to counteract the influences from friends' risky behaviors, such as cigarette use, as these influences were weaker in this period. Intervention programs on refusal skills training during junior high school (e.g., the MPP program) could also be effective in decreasing cigarette use at the beginning of high school (as shown from the growth curve model in the current study). On the other hand, parental impact remains significant throughout the junior high and high school periods. Parenting skills and practices (e.g. parent-child communication, parental rules) could have protective effects against the development of adolescent smoking regardless of whether parents are smokers or not,^{29,35} and may moderate deviant peer influences.^{36,37} Interventions that promote parenting skills have demonstrated protective effects of up to three years in young teenagers.³⁸ Similar approaches may be considered for programs that target high school students because parental effect remains influential during this period.

The current study is one of few longitudinal studies to measure annual cigarette use and perceived friends' and parental cigarette use from junior high school to the end of high school. Despite this rich data and sophisticated statistical methods applied to examine the time-varying effects, several limitations should be noted. The use of past month cigarette use frequency as the outcome variable may not be as sensitive to change as other measures (e.g., weekly cigarette use). We chose to use monthly cigarette use due to concerns of low cigarette use prevalence in junior high school years. Also, our monthly cigarette use rate was

comparable to those reported in national studies.⁴ The survey item did not strictly pertain to parents when measuring perceived parental use. We can only assume that, for most adolescents, “the two most important adults in their lives” would be their parents, although these two adults could be their grandparents, older siblings, other relatives or guardians. The measure of perceived friends’ use may be confounded with the size of an individual’s network of friends. Unfortunately, our survey did not assess how many close friends the participants had. We were also unable to evaluate friend selection and socialization effects. Although perceived friends’ use may be overestimated compared to the actual use, the focus of our study is not to estimate the prevalence of friends’ cigarette use. In addition, it is often the perceived friends’ behaviors, rather than friends’ actual behaviors, that affect adolescents more strongly.²⁹ Furthermore, the perceived friends’ and parental use are widely applied in substance use studies with adolescents, and are relatively easy to measure across years. We acknowledge that there are other potential cofounders for the effects of friends’ and parental influences on adolescent cigarette use that we were unable to control for in this study (e.g., adjustment problems, genetics, etc.).

Another important social influence for adolescents would be siblings, although few studies have examined this effect longitudinally. Our survey only assessed older siblings’ cigarette use during the junior high school period. A post-hoc analysis adding the siblings’ use as a time-varying covariate to the first piece of the GCM models was performed for a subset of the sample who indicated having older siblings at baseline (N=581). After adding the siblings’ use into the model, the effect of friends’ use remained unchanged while the effect of parental use became non-significant. This suggests that siblings’ use may have a stronger effect than parental use in early adolescence, which is consistent with some recent findings.³⁹ Sibling behavior could be a more important and direct source of influence than parents since siblings share more similarities (e.g., common friends).^{11,40} Our data are limited to the sibling effect during the junior high school period. It would be useful for future studies to investigate how such effects change as adolescents get older. Further, future studies might also examine the time-varying influences of friends, parents, and siblings for other substances, such as alcohol and marijuana, or the co-use of these substances.

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Implications and Contribution

This study found that friends' influence on cigarette smoking was higher during junior high school than high school. Parental influence remained relatively stable across these two periods. The transitional period from junior high to high school provides an opportunity for interventions to counteract friends' influence on adolescent cigarette use.

Figure 1.

Two-piece GCM using perceived friends'/parental cigarette use (FU/PU 1 – FU/PU 7) as time-varying covariates to predict adolescent cigarette use (CU 1 – CU 7). Program condition (Program), gender, ethnicity (White vs. non-White), SES (low vs. high), and junior school type (public vs. private) were used as time-invariant covariates. Intercept for piece 1 (i_1) and slope for piece 1 (s_1) were estimated from the first three waves. Intercept for piece 2 (i_2) and slope for piece 2 (s_2) were estimated from the last four waves.

Figure 2.

Means for adolescent past month cigarette use (Cig), perceived friends' cigarette use (Friend), and perceived parental cigarette use (Parent) from Wave 1 to Wave 7. X-axis scale for Cig: 1 = none, 2 = one puff to one cigarette, 3 = 2–20 cigarettes, 4 = more than 1 pack. X-axis scale for Friend: 1 = none, 2 = one, 3 = two, 4 = three or four, 5 = 5–7, 6 = 8–10, 7 = more than 10. X-axis scale for Parent: 1 = none, 2 = one, 3 = two.

Table 1
Rate and bivariate correlation of self cigarette use, friends' use and parental use at each wave

	Prevalence Rate			Correlation Coefficient		
	Self Use ^a	Friend Use ^b	Parent Use ^c	Self Use & Friend Use	Self Use & Parent Use	Friend Use & Parent Use
Junior High School						
Wave 1 (7 th Grade, Mean Age: 12.5)	8.15%	44.99%	60.13%	.524**	.162**	.249**
Wave 2 (7 th Grade, Mean Age: 13.5)	12.02%	47.27%	54.98%	.575**	.129**	.178**
Wave 3 (8 th Grade, Mean Age: 14.0)	15.34%	46.29%	56.51%	.584**	.182**	.192**
High School						
Wave 4 (9 th Grade, Mean Age: 14.8)	17.38%	61.22%	55.06%	.622**	.196**	.193**
Wave 5 (10 th Grade, Mean Age: 16.1)	22.03%	68.08%	53.61%	.552**	.198**	.121**
Wave 6 (11 th Grade, Mean Age: 17.2)	32.71%	75.39%	51.86%	.545**	.143**	.119**
Wave 7 (12 th Grade, Mean Age: 18.2)	37.06%	77.12%	49.16%	.570**	.188**	.152**

Notes:

^a Percent of participants who had more than one cigarette in the past 30 days.

^b Percent of participants who had at least one friend who smoked.

^c Percent of participants who had at least one parent who smoked.

**
 $p < .01$.

Table 2Parameter estimates of each GCM trajectory and model fit statistics^a

	Time-Varying Covariates		
	Base Model ^b	Friend Use ^c	Parent Use ^d
Junior High School (Piece 1)			
<i>Initial status</i>	1.193 (.052) **	.906 (.047) **	1.084 (.062) **
Program	-.032 (.039)	.002 (.033)	-.028 (.039)
Girl	.041 (.040)	.015 (.034)	.040 (.039)
Non-White	-.182 (.048) **	-.123 (.040) **	-.184 (.047) **
Low SES	-.150 (.045) **	-.068 (.038) †	-.132 (.044) **
Public School	.197 (.045) **	.094 (.039) *	.182 (.045) **
<i>Growth rate</i>	.093 (.024) **	.029 (.028)	.048 (.033)
Program	-.031 (.019)	-.026 (.019)	-.026 (.020)
Girl	-.012 (.020)	-.024 (.019)	-.011 (.020)
Non-White	-.083 (.027) **	-.055 (.022) *	-.087 (.025) **
Low SES	.002 (.021)	.014 (.021)	.006 (.022)
Public School	.048 (.021) *	.026 (.021)	.049 (.021) *
High School (Piece 2)			
<i>Initial status</i>	1.610 (.101) **	1.145 (.093) **	1.340 (.115) **
Program	-.200 (.080) *	-.137 (.068) *	-.195 (.077) *
Girl	.184 (.073) *	.108 (.067)	.135 (.076) †
Non-White	-.543 (.094) **	-.362 (.083) **	-.545 (.104) **
Low SES	-.108 (.084)	-.072 (.079)	-.055 (.087)
Public School	.274 (.084) **	.213 (.078) **	.290 (.093) **
<i>Growth rate</i>	.185 (.022) **	.089 (.027) **	.179 (.027) **
Program	-.003 (.018)	-.009 (.017)	-.001 (.018)
Girl	-.023 (.017)	-.012 (.016)	-.017 (.017)
Non-White	-.109 (.021) **	-.080 (.020) **	-.105 (.026) **
Low SES	.000 (.018)	.001 (.018)	-.005 (.018)
Public School	-.002 (.019)	.013 (.018)	-.010 (.019)
Model Fit^e			
χ^2	259.520	426.083	243.600
df	34	76	76
p	<.05	<.05	<.05
CFI	.933	.884	.933
RMSEA	.082	.068	.047

Notes:

^a MPP program condition, gender, race, SES, and junior high school type were used as time-invariant covariates in each GCM model.^b No time-varying covariates were included in the base model.

^cEstimates represent adding perceived friends' cigarette use as a time-varying covariate in the GCM model.

^dEstimates represent adding perceived parental cigarette use as a time-varying covariate in the GCM model.

^eComparative Fit Index (CFI) and the Root-Mean-Square Error of Approximation (RMSEA) were used as the alternative criteria for estimating model fit since it is difficult to get a non-significant p -value for the chi-square test of model fit due to our large sample size.

[†] $p < .10$,

* $p < .05$,

** $p < .01$.

Table 3
Standardized estimates (standard error) of friends' use and parental use on cigarette use at each wave and by gender

	Friend Use [§]			Parent Use [¶]		
	All	Boys	Girls	All	Boys	Girls
Junior High School						
Wave 1 (7 th Grade)	.391** (.026)	.394** (.028)	.402** (.028)	.072** (.025)	.074** (.026)	.073** (.026)
Wave 2 (7 th Grade)	.448** (.022)	.430** (.026)	.445** (.025)	.098** (.021)	.108** (.021)	.108** (.021)
Wave 3 (8 th Grade)	.429** (.028)	.401** (.033)	.427** (.034)	.107** (.028)	.104** (.024)	.115** (.025)
High School						
Wave 4 (9 th Grade)	.266** (.034)	.188** (.045) ^a	.336** (.045) ^a	.089** (.026)	.104** (.025)	.097** (.023)
Wave 5 (10 th Grade)	.302** (.020)	.232** (.032) ^b	.348** (.027) ^b	.103** (.021)	.074** (.027) ^c	.116** (.026) ^c
Wave 6 (11 th Grade)	.301** (.026)	.295** (.022)	.291** (.022)	.096** (.017)	.083** (.022)	.085** (.022)
Wave 7 (12 th Grade)	.263** (.029)	.257** (.023)	.252** (.022)	.068** (.020)	.047* (.022)	.050* (.024)

Notes:

[§] Estimates from the GCM model where perceived friends' cigarette use was used as a time-varying covariate.

[¶] Estimates from the GCM model where perceived parental cigarette use was used as a time-varying covariate. MPP program condition, gender, ethnicity, SES, and junior high school type were used as time-invariant covariates in each model.

* $p < .05$,

** $p < .01$.

Differences between values with common superscripts are statistically significant ($p < .05$).