# Resisting Smoking When a Best Friend Smokes: Do Intrapersonal and Contextual Factors Matter?

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## Abstract

This longitudinal study examines individual differences in the tendency to initiate ($N = 4,612$) and escalate ($N = 2,837$) smoking when adolescents gain a best friend who smokes. Potential moderating factors include self-esteem, depression, problem behavior, school and family bonds, and household access to cigarettes. In addition to acquiring a smoking best friend, initiation was predicted by trouble at school, household access, poorer grades and delinquency, whereas escalation was predicted by depressive symptoms. There was little evidence that the examined individual difference factors moderate the association between gaining a smoking best friend and increased adolescent smoking. Results point to the challenges of identifying factors that may lead adolescents to be more or less susceptible to the influence of pro-smoking friends.

## Keywords

Having friends who smoke is one of the most consistently identified predictors of adolescent smoking (e.g., Ali & Dwyer, 2009; Duan, Chou, Andreeva, & Pentz, 2009; Flay, Hu, & Richardson, 1998; Peterson et al., 2006; Tucker, Ellickson, & Klein, 2002). However, adolescents likely vary in the extent to which they are swayed by the behavior of their friends. Becoming aware that a friend is smoking, or gaining a friend who smokes, may prompt some adolescents to adopt this behavior whereas others will choose to refrain. Currently, there is little understanding of the psychosocial factors that may moderate the effects of exposure to friend smoking on adolescent smoking behavior, although various possible explanations can be found in the literature. Identifying such moderators is important for at least two reasons. First, it could help explain why studies often find relatively weak peer influence effects on adolescent smoking when selection effects are controlled (e.g., Ennett & Bauman, 1994; Go, Green, Kennedy, Pollard & Tucker, 2010). Second, smoking

prevention programs could benefit from a better understanding of why some adolescents are more influenced than others by the behavior of their smoking friends and peers.

One explanation for why some adolescents are more likely to be influenced by the behavior of their friends has to do with negative self-perceptions. Adolescents who are suffering from low self-esteem or depressive symptoms have more negative views of themselves, including their worth relative to other people. Conformity may stem from their desire for social approval and acceptance, or a fear of being excluded if they behave in a way that is inconsistent with group norms (e.g., Bukowski, Velasquez, & Brendgen, 2008). Numerous studies have shown that adolescents with low self-esteem, depressive symptoms, or negative emotionality are more likely to smoke (e.g., Audrain-McGovern, Rodriguez, & Kassel, 2009; Croghan et al., 2006; Kaufman & Augustson, 2008; Orlando, Ellickson, & Jinnett, 2001). Although there is some evidence that younger adolescents with low self-esteem are more susceptible to influence from a best friend in terms of aggressive behavior (Bukowski et al., 2008), a study of high school students did not find that the association between number of close friends who smoked and adolescent smoking behavior was moderated by the adolescent's level of self-esteem (Stacy, Sussman, Dent, Burton, & Flay, 1992). To our knowledge, studies have not examined whether adolescents with depressive symptoms are more likely to conform to the smoking behavior of their best friends.

Some researchers have posited that delinquent youth are more strongly influenced by the behavior of their friends because they have a harder time inhibiting responses that may be more immediately reinforcing (e.g., going along with what their friends are doing) in favor of longer term goals (e.g., Dishion, Piehler & Myers, 2008). Adolescent delinquency has been associated with an increased risk of smoking across a number of studies (Lynskey & Fergusson, 1995; Tucker, Ellickson, & Klein, 2003) and there are hints in the literature that delinquent youth may be more susceptible to influence from friends who smoke. For example, one cross-sectional study found that peer substance use was more weakly associated with adolescent substance use among those with good self-control (Wills, Ainette, Stoolmiller, Gibbons, & Shinar, 2008). Other studies have indicated that the association of risk-taking with smoking behavior is stronger among adolescents who perceive themselves to be more susceptible to peer influence (Fuemmeler, Taylor, Metz, & Brown, 2002), and the association between rebelliousness and smoking is stronger among those with good friends who smoke (McAlister, Krosnick & Milburn, 1984). Although these studies suggest some type of connection between delinquency and susceptibility to pro-smoking friend influences, the potential moderating role of delinquency has not been directly tested to the best of our knowledge.

A third explanation, informed by social bonding theory (Hirschi, 1969), is that adolescents with strong attachments to family and school are better able to resist deviant peer pressures because of the constraining effects that these conventional social bonds have on their behavior. Consistent with this idea, adolescents are less likely to smoke cigarettes if they have a supportive relationship with family members (Miller & Volk, 2002; Tucker, Martínez, Ellickson, & Edelen, 2008) and a stronger academic orientation (Bryant, Schulenberg, Bachman, O'Malley, & Johnston, 2000; Tucker et al., 2003; Wang et al., 1999). However, we are aware of only one study that has specifically examined whether adolescents with stronger conventional social bonds are less susceptible to the influence of pro-smoking friends. A study by Urberg and colleagues (Urberg, Luo, Pilgrim, & Degirmencioglu, 2003) operationalized conventional social bonds as the value that adolescents place on academics and time spent with parents. Results indicated that adolescents with weaker conventional social bonds were more likely to choose heavier smokers as their close friends; however, they were not more likely to conform to their close friends' smoking behavior.

Another aspect of the home setting that may be relevant is access to cigarettes at home, although whether it would serve to amplify or dampen the influence of pro-smoking friends on adolescent smoking initiation and escalation is unclear. Adolescents who have access to cigarettes at home may be more susceptible to pro-smoking friends because of their (presumed) exposure to important smoking role models in the home and easy access to cigarettes. However, it may be the case that adolescents with access to cigarettes at home may actually be more resistant to pro-smoking friends because they have already demonstrated their ability to resist opportunities for experimentation afforded by easy access to cigarettes. One study that speaks to this issue investigated whether parental smoking moderates the effect of best friend smoking on adolescent smoking onset (Engels, Vitaro, Blokland, de Kemp, & Scholte, 2004). Similar to the results of Urberg and colleagues (2003) with respect to family bonding, this study did not find that parental smoking status was associated with an adolescent's susceptibility to influence from a pro-smoking best friend. However, we are not aware of any studies specifically examining access to cigarettes at home, which may be a more potent moderator than parental smoking.

Using data from the National Longitudinal Study of Adolescent Health, the present study had two goals. The first goal was to identify intrapersonal and contextual factors that predict smoking initiation and escalation to daily smoking. Based on existing literature, we hypothesized that adolescents would be more likely to initiate or escalate smoking if they had lower self-esteem, greater depressive symptoms, more involvement in problem behaviors, weaker bonds to school and family, and more access to cigarettes at home. We also expected increased smoking among those who gained, over the one-year follow-up period, at least one best friend who smoked daily. The second goal was to examine whether the intrapersonal and contextual factors that had a significant main effect on smoking transitions might moderate the risk associated with gaining a best friend who smoked. Given the presence of significant main effects, we hypothesized that this risk would be lower among adolescents with stronger bonds to school and family, but higher among those with lower self-esteem, greater depressive symptoms, and more involvement in problem behavior. Given the modest success of previous studies in identifying psychosocial factors that strengthen or weaken the influence of best friend smoking on adolescent smoking behavior, our aim was to investigate whether such moderating effects might emerge using a larger and more representative sample, including a fairly broad set of potential moderating variables, and focusing on two distinct smoking transitions.

## Methods

### Data

This analysis is based on data drawn from Waves I and II of the National Longitudinal Study of Adolescent Health (Add Health). Add Health is a nationally representative study of adolescents in grades 7 through 12 in the United States in 1995 who have been followed with multiple interview waves into young adulthood (Bearman, Jones, & Udry, 1997). The sampling frame included all high schools in the United States. Over 90,000 participants from 145 schools were asked to report on their own smoking behavior as well as other behaviors and attitudes. Of the initial 90,000 respondents, a baseline sample of 20,745 adolescents aged 12–19 was interviewed at home between April and December 1995 and again between April and August 1996. The overall sample is representative of United States schools with respect to region of the country, urbanicity, school type (e.g., public, parochial, private non-religious, military), ethnicity, and school size. More detail on the Add Health study design can be found elsewhere (Harris et al., 2010). In all, Wave I participants who completed the in-home survey included 79% of all sampled students (*N*=20,745). Wave II participants included those from Wave I who still met the grade eligibility requirements (maximum 12th

grade). 88% of eligible adolescents who completed the Wave I in-home survey (*N*=14,738) were re-interviewed at Wave II.

### Sample, Missing Data and Attrition

The analyses reported in this paper are based on two distinct samples, an initiation sample and an escalation sample. The initiation sample is comprised of all respondents who reported never smoking at Wave I, did not report that a best friend smoked daily at Wave I, were in Grade 7–11 at Wave I, and had non-missing smoking data at Wave II (*N* = 4,612). The escalation sample is comprised of all respondents who reported smoking, but less than daily at Wave I, did not report that a best friend smoked daily at Wave I, were in Grade 7–11 at Wave I, and had non-missing smoking data at Wave II (*N* = 2,837). As is reflected in the overall Wave I and II samples, respondents in the initiation and escalation samples differed from those who were excluded due to non-response at Wave II on several Wave I characteristics. For example, relative to attriters, respondents in the initiation and escalation samples were less likely to be African American (initiation sample: 27% vs. 33%, escalation sample: 25% vs. 30%) and were younger (initiation sample: *M* = 14.8 vs. 15.0, escalation sample: *M* = 15.1 vs. 15.3).

Among those included in the analytic samples, there was a small amount of missing data for the study variables. Although the missing data rates were lower than 4% on all variables, listwise deletion would have resulted in a 7% loss in the initiation sample and a 5% loss in the escalation sample. To avoid this loss, for each sample we used SAS PROC MI to generate 10 data sets with imputed values for the missing variables and used PROC MIANALYZE to synthesize results from analyses obtained from each multiply imputed data set (Little & Rubin, 2002; SAS Institute, 1990).

### Measures

Below we briefly describe each measure, with more detailed information on the source of items available elsewhere (http://www.cpc.unc.edu/projects/addhealth/data/guides/refer.pdf).

*Best friend smoking* was defined by the one item on friend smoking that was asked of participants at Waves I and II: "Of your 3 best friends, how many smoke at least 1 cigarette a day?" Due to the distribution of this variable, those who said "none" were assigned a value of zero and those who responded one or more were assigned a value of one. We used this variable measured at Wave I to identify the analytic samples (best friend smoking = 0). The Wave II value was included as a predictor in regression analyses. Note that when we refer to "gaining" a smoking best friend between Waves I and II, this could mean that the adolescent either acquired a new best friend who smoked daily or that an existing best friend began smoking daily.

*Depressive symptoms* was assessed with 19 items from the CESD (Radloff, 1977). Respondents rated on a 4-point scale (1 = *never* or *rarely* to 4 = *most of the time* or *all of the time*) how often each statement was true for them during the last week (α = 0.86).

*Self-esteem* was assessed with seven items (sample items: "You have a lot of good qualities" and "You like yourself the way you are"). Items were rated on a 5-point scale (1 = *strongly agree* to 5 = *strongly disagree*) reverse-coded such that higher scores indicated higher self-esteem (α = 0.85).

*Delinquency* was assessed with 15 items asking the number of times during the past year that specific delinquent behaviors were performed (e.g., damage property, steal a car, run away from home). Responses ranged from 0 (= *never*) to 3 (= *5 or more times*). Due to

skewness, responses greater than 1 were set equal to 1 and the measured variable was formed as the proportion of delinquent acts endorsed (α = 0.80).

*Trouble at school* was comprised of four items asking how often the adolescent had experienced trouble paying attention, getting along with the teacher, getting along with other students, and getting homework done during the past year (0 = *never* to 4 = *every day*; α = 0.69).

*School attachment* was measured with three items asking within the past school year whether the respondent felt close to people at school, felt a part of the school, and was happy at school. Items were asked as extent of agreement (1 = *strongly agree* to 5 = *strongly disagree*) and were reversed so that a higher score reflects stronger school attachment (α = 0.77).

*Grade point average (GPA)* was measured as the average past year grades in English/language arts, mathematics, history/social studies, and science (1=A, 2=B, 3=C, 4=D or lower). Responses were reverse-scored so that a higher value reflected higher GPA (α = 0.75).

*Family bonding* was measured as a combination of three subscales. Two reflected closeness with mother (7 items, e.g., how close do you feel to your mother, my mother is warm and loving) and father (5 items, e.g., how much does your father care about you, my father and I have a good relationship). Responses to these items were recorded on one of two 5-point scales (1 = *not at all* to 5 = *very much*; 1 = *strongly agree* to 5 = *strongly disagree*). In each case, items were combined so that a higher score reflected greater closeness. The third subscale was comprised of three family closeness items (how much does your family understand you, pay attention to you, have fun together) assessed on a 5-point scale (1 = *not at all* to 5 = *very much*). The three subscales were combined so that higher scores reflected stronger family bonding (α = 0.79 for family closeness, 0.85 for closeness with mother, 0.88 for closeness with father, and 0.75 for the overall scale).

*Household access to cigarettes* was assessed by a single dichotomous item: whether cigarettes are easily available in the home.

**Outcomes**—We assessed two distinct outcomes for the two samples: smoking initiation and the progression to daily smoking. At Wave I, participants were asked: "Have you ever tried smoking, even just 1 or 2 puffs" and "Have you ever smoked cigarettes regularly, that is, at least 1 cigarette every day for 30 days." At Wave II, participants were asked whether they had tried smoking or smoked regularly since the last interview. In the initiation sample, which includes adolescents who had never smoked at Wave I, *initiation* took the value of 1 for respondents indicating having ever smoked in the Wave II interview, and zero otherwise. For the escalation sample, which includes adolescents who were non-daily smokers at Wave I, *escalation to daily smoking* took the value of 1 for respondents indicating having ever smoked at least one cigarette a day for the past 30 days in the Wave II interview, and zero otherwise.

**Model covariates**—All models included Wave I measures of gender, race/ethnicity, grade, parental education (1 = *<high school*, 2 = *high school or trade school*, 3 = *some college*, 4 = *college graduate*), and an estimate of the proportion of daily smokers in the school, as control variables. In the case of race/ethnicity, we initially coded respondents as White, Black, Hispanic, Asian, or Other. The effects for the minority race/ethnicity dummies (relative to white) were either near zero and non-significant or were negative and significant when considered individually. Given no possibility of off-setting effects, and since we did

not have any hypotheses involving racial/ethnic differences, we elected to combine the race/ethnicity dummies into one variable (White vs. non-White) to produce more parsimonious models.

## Analytic Approach

For each sample, we estimated a series of logistic regression models to examine the extent to which the Wave I risk and protective factors contributed to the prediction of Wave II smoking initiation or escalation, over and above the influence of Wave II best friend smoking and the model covariates. We first examined each intrapersonal and contextual factor individually (with best friend smoking and covariates). Next, because these factors may predict shared variance in initiation and escalation, we considered inclusion of each of them using stepwise regression with forward selection to build the best predictive model. Finally, for those factors that displayed a significant main effect in the combined model, we used stepwise regression to examine whether these variables moderated the association between best friend smoking and initiation or escalation by evaluating the significance of interaction terms involving that predictor variable and best friend smoking. In all cases, predictors were included in the model based on a significance level of $p < .05$. All models controlled for clustering within schools through implementation of the surveylogistic procedure in SAS, and all models included the full set of model covariates and Wave II best friend smoking.

# Results

Table 1 provides descriptive information about the initiation and escalation samples, each based on one randomly selected imputed data set. The two samples had similar demographic compositions to the full Wave I sample, with about 50% female and the largest ethnic group being White (47.1% and 48.7%). Having at least one best friend who smoked daily at Wave II was reported by 23.1% of participants in the initiation sample and 36.7% of those in the escalation sample.

Table 2 shows the correlations among the Wave I risk and protective factors and acquisition of a smoking best friend by Wave II. As would be expected, the pattern of relationships is similar for the two samples. Most correlations are significant, but tend to be small in magnitude. Exceptions are the relatively strong relationships of self-esteem with family bonding ($r = -.465$ and $r = -.462$ in initiation and escalation samples, respectively) and depressive symptoms ($r = -.454$ and $r = -.495$ in initiation and escalation samples, respectively).

## Initiation

Within the initiation sample, 13.8% of adolescents initiated smoking during the interval between Wave I and II. When considered separately, results from logistic regression analyses revealed that, after controlling for best friend smoking (a highly significant predictor in all models) and model covariates, depressive symptoms ($OR = 1.34$ [95% $CI = 1.05, 1.72$], $p < .02$), delinquent behavior ($OR = 5.56$ [95% $CI = 2.95, 10.48$], $p < .001$), trouble at school ($OR = 1.39$ [95% $CI = 1.25, 1.55$], $p < .001$), and access to cigarettes at home ($OR = 1.62$ [95% $CI = 1.33, 1.97$], $p < .001$) were strongly associated with risk for initiation, whereas GPA ($OR = 0.73$ [95% $CI = 0.65, 0.82$], $p < .001$) and family bonding ($OR = 0.80$ [95% $CI = 0.69, 0.92$], $p < .001$), were strong protective factors for initiation. Self-esteem and school attachment were not associated with smoking initiation.

When considered together, four of the six predictors were included in the stepwise model in the following order: trouble at school, access to cigarettes at home, GPA, and delinquent

behavior. The final model, shown in Table 3, considered inclusion of interactions of these four factors with best friend smoking, but based on the stepwise procedure, added only one interaction term between best friend smoking and delinquency. In this final model, after considering the high risk of acquisition of a smoking best friend, higher GPA was a significant protective factor against initiation, and trouble at school, access to cigarettes at home, and delinquent behavior were significant risk factors. Being White (relative to non-White) and in a lower grade at baseline were also significant risk factors. The interaction effect with delinquent behavior was contrary to expectation: the association between gaining a smoking best friend and smoking initiation was stronger among adolescents lower in delinquency than higher in delinquency. While statistically significant, the plotted interaction was barely visually discernable and quite modest from a practical standpoint.

## Escalation

Within the escalation sample, 9.7% escalated from non-daily smoking to daily smoking during the interval between Wave I and II. When considered separately, results from logistic regression analyses revealed that, after controlling for whether they acquired a smoking best friend (a highly significant predictor in all models) and model covariates, depressive symptoms ($OR = 1.94$ [95% $CI = 1.34, 2.79$], $p < .001$), delinquent behavior ($OR = 2.67$ [95% $CI = 1.33, 5.32$], $p < .01$), and trouble at school ($OR = 1.35$ [95% $CI = 1.13, 1.62$], $p < .01$) were significant risks for escalation; self-esteem ($OR = 0.77$ [95% $CI = 0.60, 0.98$], $p < .04$), GPA ($OR = 0.81$ [95% $CI = 0.67, 0.99$], $p < .04$), and family bonding ($OR = 0.75$ [95% $CI = 0.61, 0.91$], $p < .01$) were protective against escalation. School attachment and access to cigarettes at home were not associated with smoking escalation.

When considered together, only one of the six predictors, depressive symptoms, was added to the model. A final model, shown in Table 4, which considered inclusion of the interaction of depressive symptoms with best friend smoking resulted in the addition of this significant interaction term. In this final model, after considering the high risk of acquisition of a smoking best friend, higher depressive symptoms was a significant risk factor for escalation. Being White (relative to non-White) was also a significant risk factor. Similar to the interaction effect for delinquency in the case of initiation, the interaction effect with depressive symptoms was quite modest from a practical standpoint and contrary to expectation: the association between gaining a smoking best friend and smoking escalation was slightly stronger among adolescents lower in depressive symptoms than higher in depressive symptoms.

# Discussion

A large and consistent literature indicates that having friends who smoke is associated with smoking behavior throughout adolescence (Kobus, 2003). In the present study, gaining a best friend who smoked daily was associated with a 3-fold increase in the likelihood of smoking initiation and a 5-fold increase in the likelihood of escalation to daily smoking over a one-year period. Nonetheless, it was far from inevitable that adolescents who acquired such a friend would exhibit an escalation in their own smoking. Among the adolescents with a smoking best friend, 72% of the initial non-smokers did not start smoking and 80% of the initial experimenters did not escalate to daily use. A goal of this study was to gain a better understanding of the intrapersonal and contextual factors that might affect the likelihood that adolescents will initiate or escalate smoking when a strong pro-smoking role model is introduced into their social environment.

In addition to the expected impact of gaining a smoking best friend on smoking behaviors, we hypothesized that adolescents with lower self-esteem, higher depressive symptoms, and greater involvement in problem behaviors would also be more likely to initiate or escalate

smoking. If this was indeed the case, we further expected that gaining a smoking best friend would have a stronger impact on the smoking behavior of these youth due, for example, to their concerns about fitting in with their peer group in the case of those with low self-esteem or depressive symptoms (e.g., Bukowski et al., 2008) or an inability to inhibit behavior that is reinforcing in the short term in the case of those with behavioral problems (Dishion et al., 2008). Our results indicated that behavioral problems both in general and at school increased the likelihood of smoking initiation, and depressive symptoms increased the likelihood of escalation to daily smoking. However, it was not the case that adolescents with behavioral problems or depressive symptoms were more likely than their peers to increase their smoking after gaining a best friend who smoked. Rather, the interaction effects involving delinquency and depression were in a direction opposite of what would be expected based on the existing literature. Given the small magnitude of these interaction effects, combined with a lack of corroborating evidence in the literature, we do not believe that they provide convincing evidence of an important moderating effect and would caution against placing too much emphasis on their interpretation.

In examining the role of home and school environments, we hypothesized that adolescents would be less likely to initiate or escalate smoking if they had a stronger attachment to school and better grades, as well as stronger family bonds and no easy access to cigarettes in the home. In cases where such associations were found, we generally expected that these factors would buffer the effects of gaining a best friend who smoked on the adolescents' own smoking behavior. In terms of main effects, school attachment and strength of family bonds were both unrelated to smoking behavior and thus were not tested as potential moderators. In the case of family bonds, the lack of association with smoking emerged only after accounting for other intrapersonal and contextual factors in the stepwise models, which may at least partially explain differences between our results and previous studies that have reported associations of family support with less adolescent smoking (e.g., Miller & Volk, 2002; Tucker et al., 2008). Better academic performance and lack of easy access to cigarettes in the home have been identified as protective factors against adolescent smoking in previous studies (e.g., Bricker et al., 2006; Paul, Blizzard, Patton, Dwyer, & Venn, 2008; Tucker et al., 2003), and we found this as well in the case of smoking initiation. However, the effects of gaining a best friend who smoked on initiation did not vary depending on the adolescents' level of academic performance or whether they had easy access to cigarettes at home.

Strengths of this study include the large and nationally representative sample, longitudinal design, consideration of a broad range of potential moderating factors, and focus on two key smoking transitions during adolescence. As such, it provides one of the more thorough attempts to date to identify psychosocial factors that may amplify or dampen the effects of best friend smoking on adolescent smoking. Nonetheless, results from this study should be interpreted in light of several study limitations. First, the available data on smoking behavior was limited in terms of not allowing for finer-grained distinctions in: (a) the quantity of best friend smoking; (b) the number of best friends who smoked; and (c) the smoking transitions we could examine as outcomes. Second, we relied on adolescent reports of their best friends' smoking, rather than information obtained directly from the friends themselves. Although the friendship network data collected in a subset of 16 schools indicates a significant correspondence between whether the adolescent reports that a best friend smokes daily and whether any of the adolescent's nominated friends reports smoking regularly, it does appear that adolescents had a tendency to overestimate the frequency of their best friends' smoking given that the rates of daily smoking by best friends in this study are higher than national estimates of daily smoking among adolescents (Johnston, O'Malley, Bachman, & Schulenberg, 2009). Third, our results may not be applicable to more casual friendships or to larger groups of peers. Fourth, our design involving only 2 waves of data

does not allow us to know with certainty whether adolescents increased their smoking because they gained a smoking best friend or sought out a best friend who smoked after they had increased their smoking (Go et al., 2010; Jaccard, Blanton, & Dodge, 2005). However, restricting the sample to adolescents who initially did not have a best friend who smoked daily helps to isolate the effects of this type of peer influence. Finally, the data were collected in the mid-1990s when rates of adolescent smoking were higher than they are now. Although there is no reason to expect that historical changes would affect the direction of the associations examined in this study, it is possible that their magnitude may change over time.

This study shows that adolescents who gain a best friend who smokes daily are at substantially higher risk for smoking initiation and escalation, as well as identifies several other risk and protective factors for these smoking transitions. However, our results provide little evidence that the intraindividual and contextual factors examined in this study play an important role in moderating the influence of best friend smoking on adolescent smoking transitions. Although the lack of moderating effects is not without precedent in the literature (e.g., de Leeuw, Scholte, Sargent, Vermulst, & Engels, 2010; Engels et al., 2004; Stacy et al., 1992), their absence in the Add Health cohort serves to underscore the challenges of understanding why some adolescents are more influenced than others by the behavior of their smoking friends and peers. Nonetheless, it is possible that characteristics of the adolescent, the immediate social setting surrounding them, or larger social systems not examined in this study are more relevant, and it may be fruitful for future research to examine some promising candidates. For example, parental attitudes towards smoking may be a stronger buffer against friend influences than parental support (Kristjansson et al., 2010). There is reason to expect that other factors such as social anxiety (Neighbors et al., 2007) and self-efficacy beliefs (Stacy et al., 1992) may be relevant as well. Given that adolescent prevention programs focus heavily on peer influences and how to resist them, the field would benefit from further investigation of the factors that may dampen or amplify the influence of friends on smoking and other forms of substance use.

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**Table 1**

Means (SDs) and Percents on Demographic and Risk and Protective Characteristics for the Two Study Samples: Those Eligible to Initiate Smoking and Eligible to Escalate to Daily Smoking Between Waves I and II

| Wave I characteristics | | Initiation sample (*N* = 4,612) | Escalation sample (*N* = 2,837) |
|---|---|---|---|
| Gender (%) | Male | 46.4 | 49.6 |
| | Female | 53.6 | 50.4 |
| Ethnicity (%) | White | 47.1 | 48.7 |
| | Black | 26.9 | 25.2 |
| | Hispanic | 16.2 | 18.8 |
| | Asian | 8.5 | 5.6 |
| | Other | 1.3 | 1.7 |
| Grade in school (*M*, *SD*) | | 8.90 (1.44) | 9.21 (1.37) |
| Parental education (*M*, *SD*) | | 3.03 (1.03) | 2.91 (1.04) |
| Daily smokers in school (average percentage) | | 15.7% | 17.9% |
| Best friend smokes daily at Wave II (%) | | 23.1 | 36.7 |
| Depression *(M SD)* | | 0.48 (0.34) | 0.57 (0.38) |
| Self-esteem (*M*, *SD*) | | 4.21 (0.55) | 4.10 (0.57) |
| Delinquent behavior (*M*, *SD*) | | 0.11 (0.13) | 0.21 (0.18) |
| Trouble at school (*M*, *SD*) | | 0.83 (0.66) | 1.04 (0.68) |
| School attachment (*M*, *SD*) | | 2.92 (0.78) | 2.80 (0.81) |
| Grade point average *(M, SD)* | | 3.03 (0.72) | 2.80 (0.74) |
| Family bonding (*M*, *SD*) | | 4.26 (0.56) | 4.08 (0.60) |
| Access to cigarettes at home (%) | | 19.3% | 29.5% |
| Initiated/escalated by Wave II (%) | | 13.8% | 9.7% |

*Note.* Standard deviations are based on a single imputed data set.

**Table 2**

Correlations Among the Main Predictor Variables [Correlations Above the Diagonal Are Based on Initiation Sample (N = 4,612) and Those Below the Diagonal Are Based on Escalation Sample (N = 2,837)]

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| 1. Best friend smokes daily | -- | .066** | -.037* | .111** | .088** | -.046** | -.090** | -.033* | .024 |
| 2. Depressive symptoms | .051** | -- | -.454** | .223** | .331** | -.280** | -.206** | -.394** | .065** |
| 3. Self-esteem | -.041* | -.495** | -- | -.113** | -.191** | .327** | .075** | .465** | -.058** |
| 4. Delinquent behavior | .054** | .219** | -.089** | -- | .322** | -.128** | -.165** | -.260** | .092** |
| 5. Trouble at school | .071** | .347** | -.168** | .373** | -- | -.295** | -.271** | -.255** | .069** |
| 6. School attachment | -.044* | -.356** | .335** | -.161** | -.297** | -- | .174** | .280** | -.041** |
| 7. Grade point average | -.094** | -.197** | .135** | -.184** | -.279** | .198** | -- | .092** | -.047** |
| 8. Family bonding | -.059** | -.391** | .462** | -.203** | -.229** | .293** | .088** | -- | -.115** |
| 9. Access to cigarettes at home | .037* | .045* | -.061** | -.048* | .042* | -.033 | -.017 | -.087** | -- |

Note.

*
$p < .05$.

**
$p < .01$

**Table 3**

Final Regression Model Predicting Initiation from W1 to W2 as a Function of Risk and Protective Factors and their Interactions with Best Friends' Smoking

| Predictors | Initiation (*N* = 4,612) | | |
| --- | --- | --- | --- |
| | *OR* | *95% CI* | *p =* |
| Male | 1.03 | [0.84–1.25] | .803 |
| White | 1.21 | [1.01–1.45] | .037 |
| Grade | 0.85 | [0.80–0.90] | <.001 |
| Parental education | 1.05 | [0.95–1.15] | .326 |
| Daily smokers in school | 2.07 | [0.66–6.46] | .212 |
| Smoking friend at W2 | 4.49 | [3.59–5.61] | <.001 |
| Trouble at school | 1.18 | [1.04–1.33] | .009 |
| Access to cigarettes at home | 1.49 | [1.23–1.82] | <.001 |
| Grade point average | 0.80 | [0.71–0.90] | <.001 |
| Delinquent behavior | 8.92 | [4.34–18.3] | <.001 |
| Delinquent behavior*Smoking friend at W2 | 0.13 | [0.05–0.33] | <.001 |

**Table 4**

Final Regression Model Predicting Escalation to Daily Smoking from W1 to W2 as a Function of Risk and Protective Factors and their Interactions with Best Friends' Smoking

| Predictors | Escalation (*N* = 2,837) | | |
| --- | --- | --- | --- |
| | *OR* | *95% CI* | *p =* |
| Male | 1.07 | [0.80–1.43] | .647 |
| White | 1.83 | [1.39–2.40] | <.001 |
| Grade | 0.94 | [0.85–1.05] | .281 |
| Parental education | 0.99 | [0.87–1.12] | .841 |
| Daily smokers in school | 1.57 | [0.39–6.27] | .523 |
| Smoking friend at W2 | 9.35 | [5.54–15.8] | <.001 |
| Depressive symptoms | 3.28 | [1.91–5.61] | <.001 |
| Depressive symptoms*Smoking friend at W2 | 0.46 | [0.24–0.88] | <.02 |