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The Connection Between Academic Failure and Adolescent Drinking in Secondary School

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Abstract

Academic failure and drinking are both problematic aspects of the adolescent stage of the life course, and the connection between these two behaviors can disrupt the basic functioning of individuals and schools. Drawing on theories of problem behavior from multiple disciplines, this study attempted to determine whether academic failure was a risk factor for adolescent drinking, and vice versa, and then to identify the mechanisms underlying these two longitudinal associations. Cross-lagged models of data from 11,927 middle school and high school students in the National Longitudinal Study of Adolescent Health revealed that the number of classes failed in one year predicted alcohol use a year later more than early alcohol use predicted later class failures. Aspects of social bonding (e.g., attachments to adults) and symptoms of general maladjustment (e.g., delinquency) did more than opportunity structures (e.g., peer norms) to explain the connection between these two behaviors over one year of secondary school.

Adolescence entails dramatic changes in behavioral expectations, opportunities, and consequences. As one example, schools become more differentiated, cumulative, and competitive, which increases the risk of academic failure as well as its long-term consequences (Dornbusch, Glasgow, and Lin 1996; Rosenbaum, DeLuca, and Miller 1999). As another, alcohol use becomes more normative, social, and higher status, all of which encourage this problem behavior and introduce a whole new range of health risks and other dangers (Schulenberg and Maggs 2002). These two defining features of adolescence are, of course, related to each other. For young people who are struggling in school, drinking can become a new method for coping and an alternative form of social achievement. For young people who begin drinking heavily, schooling pursuits may become harder but also less important. Thus, the connection between academic failure and adolescent drinking, not just each on its own, is a major social problem that both the educational system and American families are confronting.

The general purpose of this study was to investigate this connection between academic failure and adolescent drinking. Drawing on theories of problem behavior from multiple disciplines, the study examined the association between the two over time and then investigated the theoretical mechanisms that underlie this association with nationally representative data on academics, alcohol use, and multiple contexts from the National Longitudinal Study of Adolescent Health (Add Health). Such research facilitates the identification of who in the student body is at risk for negative outcomes in the short- and long term and, more generally, integrates insights from developmental research and educational research—two youth-focused fields that often talk past each other—to promote a better understanding of the adolescent stage of the life course and the role of education in this stage.

BACKGROUND

Academic Failure and Adolescent Drinking

Extensive empirical research and theory have shed valuable light on the etiology and consequences of both academic failure and adolescent drinking. The study presented here was not about either of the two, however, but instead was about the *connection* between them (Hawkins, Catalano, and Miller 1992; Rosenbaum et al. 1999). Certainly, the two appear to go together. In general, students who do poorly in school drink more than do their fellow students (Bryant, Schulenberg, and O'Malley 2003; Crosnoe 2002; Schulenberg et al. 1994).

It is known that this connection between academic performance and adolescent drinking exists, and, more than that, that it implies something that is difficult for both families and schools. After all, academic and behavioral problems, independently and interdependently, can impair intergenerational relations, create family conflict, distract the school from its educational mission, disrupt the order and stability of the school, and impair the future opportunities of young people (Cairns and Cairns 1994; Coleman 1961; Crosnoe, Muller, and Frank 2004). Given the problematic nature of this connection, understanding why it occurs is of great importance to families and schools. This study attempted to advance such an understanding by determining the exact nature of the dynamic connection between academic failure and drinking during the secondary school years and then identifying some specific mechanisms that drive the connection during this period.

Failure and Drinking as Mutual Risk Factors

With the “given” that academic failure and adolescent drinking are associated with each other over time, the first objective of this study was to determine which of these behaviors is a risk factor—a term that refers to a personal or social factor that raises the probability of negative outcomes (Jessor, Donovan, and Costa 1991)—for the other. Three different scenarios of risk are offered.

In the first scenario, this connection arises because academic failure in high school is a risk factor for adolescent drinking. If so, young people who are struggling in school turn to alcohol. By hurting students' chances of ever improving and disrupting other domains of functioning, this response compounds the initial academic problems, with long-term, postsecondary consequences (Bachman et al. 1997; Elliott, Huizinga, and Menard 1989; Schulenberg et al. 1994). In the second, this connection arises because drinking is a risk factor for failure. Thus, young people who drink are distracted from their academic pursuits, which, when severe, could throw their educational careers off track and disrupt the critical transition into adulthood that is a foundational period for long-term trajectories of educational attainment and substance use (Bachman et al. 2002; Crosnoe, Muller, and Frank 2004). In the third scenario, academic failure and drinking are risk factors for each other. In this case, doing poorly in school and drinking feed off each other over time, adding to the problematic nature of both (Crosnoe 2002). Determining which, if any or all, of these scenarios hold is an important step in disentangling the etiology and consequences of both behavioral problems during adolescence.

Links Between Academic Failure and Drinking

The second objective of this study—identifying mechanisms by which academic failure and adolescent drinking are risk factors for each other—was more complex than the first, complicated by the lack of theory that is specifically focused on the connection between academic failure and adolescent drinking. Thus, the many theoretical traditions that address the etiology and/or consequences of behavioral problems *in general* must be mined and integrated for insights into this connection. The goal is to provide a broad organizational

structure that identifies general categories of theoretical mechanisms and contrasts these mechanisms with each other.

Various sociological and psychological theories of problem behavior and substance use highlight different points of interest. Some theories highlight relationships and societal institutions as factors in problem behavior. As two examples, social bonding theory asserts that strong ties to families and schools discourage problem behavior by raising the costs that are associated with it (see Hirschi 1969 for the original formulation; see Agnew 1993 for a thorough review), and differential association theory asserts that young people learn problem behavior when their peer groups and other interpersonal contexts value such behavior (see Sutherland 1947 for the original formulation; see Warr 2002 or Matsueda and Anderson 1998 for thorough reviews). Other theories highlight the tendency for adjustment problems to multiply in young peoples' lives. As some examples, problem behavior theory (Jessor et al. 1991); the alcohol, drug, mental health (ADM) syndrome perspective (Elliott et al. 1989); and sequential stress theory (Hagan and Foster 2003) all argue that multiple problems can cluster together as different manifestations of an underlying syndrome of maladjustment, and the drinking as self-medication perspective (Aseltine and Gore 2000; Hussong et al. 2001) contends that psychological distress engenders problem behavior as a quick fix for alleviating stress and emotional pain.

Taken together, these theories suggest that relationships with adults, peer-group norms, school contexts, and various forms of maladjustment may explain how academic failure engenders adolescent drinking, drinking leads to failure, or both. As I explained earlier, these insights need to be integrated in a way that identifies meaningful categories of mechanisms on which to focus instead of providing a laundry list of possibilities. Again, the literature on problem behavior provides some guidance for how to do so. Specifically, the social development model is a transactional blueprint of delinquency and substance use. In this model, personal characteristics and social positions expose young people to different interpersonal contexts with different normative structures and value systems, and bonds to these different contexts then determine behavior across long developmental periods. This model, therefore, encompasses all the family, peer, school, and individual factors and all the general theoretical categories (bonds, differential association, and maladjustment) that are highlighted by the multiple theories just mentioned, and it does so in a way that allows these different factors and categories—and, by proxy, different theories—to be compared to and contrasted with each other (Catalano and Hawkins 1996; Guo et al. 2001; Lonczak et al. 2001).

Conceptual Model

This study adapted the structure of the social development model to the risks that academic failure and adolescent drinking pose for each other. Like the social development model, this conceptual model organizes multiple aspects of personal development and social ecology into general theoretical categories that can be evaluated for their independent and relative contributions to these two separate, but related, risks. Unlike the social development model, it focuses on a narrower window of development and, consequently, treats these general categories as equivalent, rather than sequential. The starting point of this model is the possibility that academic failure and adolescent drinking are risk factors for each other. From this starting point, three mechanisms are considered as explanations for why these risks occur.

The first mechanism—opportunity—maps onto theories, such as differential association, that focus on the relationships that provide the means by which problem behavior can be pursued (Sutherland 1947). This mechanism groups the family and peer factors that are often studied in relation to problem behavior. Essentially, the hypothesis is that struggles in school may engender the motivation or desire to drink, but, regardless of motivation, they will lead to engagement in drinking *only if* parents and peers provide access to, or do not block access to,

drinking. Alternatively, drinking may decrease academic motivations, but it will be most likely to affect academic performance in contexts in which academic success and conventional achievement are not strongly, actively, and constructively supported; in other words, drinking makes its mark when the constraints against getting off course in school are weak. The most commonly considered aspects of the opportunity structure are the behavioral norms of peers, time spent in family and peer contexts, and parental supervision activities (Erickson, Crosnoe, and Dornbusch 2000; Guo et al. 2001; Kandel 1996; Warr 2002). This study drew on these aspects and took into account the amount of drinking done by parents, which seems a logical piece of the opportunity structure for drinking and, to a lesser degree, disengagement from schooling.

The second mechanism—bonding—is a direct corollary to the conventional ties that are central to control theories of crime and groups together family and school factors (Hirschi 1969). In short, bonds to conventional institutions are hypothesized to block academic failure from translating into adolescent drinking by providing support for dealing with the stress of such failure and by maintaining a commitment to school and schooling, and they are hypothesized to block drinking from generating academic failure by creating high stakes that increase the motivation of students to keep drinking from spiraling out of control and affecting other areas of their lives. To test this mechanism, this study drew on the most common measures of social bonding in the family and school, including close emotional ties to parents and teachers, attachment to school, and commitment to educational attainment (Cairns and Cairns 1994; Erickson et al. 2000; Lonczak et al. 2001; Warr 2002).

The third mechanism—maladjustment—reflects the clustering of antisocial and maladaptive tendencies in young people that have been discussed in many developmental perspectives on crime and mental health, and it brings together many individual characteristics and behaviors that have been identified as important manifestations of general syndromes of maladjustment (Elliott et al. 1989; Jessor et al. 1991). If bad things tend to go together, then students who do poorly in school are more likely to drink (and vice versa) because (1) once the threshold to nonconventional behavior is crossed, all other nonconventional behaviors become easier and less scary and (2) problems in one domain tend to seep into and infect other domains. The most basic elements of maladjustment in adolescence are emotional distress, delinquency, drug use, and risky behavior (Crosnoe, Muller, and Frank 2004; Hagan and Foster 2003; Hussong et al. 2001; Wilcox and Udry 1986). Each of these elements was considered in the study as part of the cluster of maladjustment that binds academic failure and adolescent drinking.

In summary, this study tested a theoretical model of the connection between academic failure and adolescent drinking in the middle and high school years that compares and contrasts the role of behavioral opportunity structures, social bonds, and symptoms of maladjustment as contributors to this connection. This test elucidates whether academic failure or drinking is the most powerful risk factor for the other and determines whether the means to, motivation for, and circumstance of these behaviors contribute most to such a risk.

METHODS

Sample

Add Health is a nationally representative longitudinal study of American adolescents who were in Grades 7–12 in 1994 (Bearman, Jones, and Udry 1997). With a multistage, stratified design, Add Health selected 80 high schools on the basis of their region, urbanicity, sector, racial composition, and size. Each selected school was then matched to one of its feeder schools, typically a middle school, with the probability of the feeder school being selected proportional to its contribution to the high school's student body. Because some selected high schools were comprehensive schools (e.g., they included the 7th and 8th grades, too), they served as their

own feeder schools. The final school sample included 80 high schools and 52 middle/junior high schools. Nearly all students in each school (approximately 90,000) completed a paper-and-pencil questionnaire, the In-School Survey, in the 1994–95 school year. A representative subsample of this student universe, selected evenly across school pairs, participated in the more extensive In-Home Interview at Wave I in 1995 ($n = 20,475$). Finally, the Wave I sample, minus the Wave I seniors, was followed up in the Wave II In-Home Interview in 1996 ($n = 14,736$). A third In-Home Interview was conducted in 2001–02, but these data are not used here.

The sample for this study was created by the application of three selection filters. First, because of the need to examine changes in behavior over time, the sample was restricted to the longitudinal In-Home Sample. Because Add Health did not follow-up Wave I seniors in Wave II, this filter automatically eliminated these students. Second, because of the need to draw on parents' reports, the sample was restricted to students with parents who were interviewed at Wave I. Third, because of the need to correct for the complex sampling frame of Add Health, only students who had been assigned a grand sample weight were included, which excluded some of the students who were recruited to fill planned over-samples, as well as students in two high schools for whom weights were not calculated (see Chantala and Tabor 1999).

The application of these selection filters left a final study sample of 11,927 students in 128 schools. Table 1 presents descriptive statistics for each stage of this selection process. In demographic terms, the students in the sample were slightly younger (see the note about the exclusion of the Wave I seniors in the previous paragraph), had more educated parents, and were more likely to be white than were those in the full Wave I sample. The rate of drinking decreased across the various stages of sampling, but the rate of academic failure remained the same. Thus, the selection process introduced some bias into the sample, but this bias was not large and was balanced by the many advantages of using the Add Health data.

Measures

Univariate statistics for all the variables in the study are in Table 2.

Adolescent Drinking—Following the convention in Add Health research (see Resnick et al. 1997), I used students' reports to create a continuous measures of alcohol use in the past year: 0 = none in the past year, 1 = 1 or 2 days in the past year, 2 = once a month or less, 3 = 2 or 3 days a month, 4 = 1 or 2 days a week, 5 = 3 to 5 days a week, and 6 = nearly every day. The Wave II measure served as the outcome in this study, and the Wave I measure was a focal independent variable. Because these measures encompass recall over a year, they likely reveal a lower prevalence of alcohol use than do measures that focus on the past month or week.

Academic Failure—In Waves I and II, students reported their grades (1 = D/F, 2 = C, 3 = B, and 4 = A) in math, science, English, and social studies in the past year ($\alpha = .78$). For each class, I created a binary item to differentiate students who had received a D or F in the past year (coded 1) from all others (coded 0) and then summed these four items to create a failure index. Again, the Wave II version served as the outcome variable, and the Wave I version served as a focal independent variable. Compared to a standard measure of grade point average, the accumulation of course failures better identifies students who are most at risk for grade retention and dropping out and, as such, is particularly well suited to the study of problematic psychological and behavioral outcomes (Kaplan, Peck, and Kaplan 1994; Needham, Crosnoe, and Muller 2004). The use of self-reports for academic failure, as well as the drinking measures described earlier, deserves special comment because the accuracy of this method has long been debated. Empirical evidence suggests that adolescents' self-reports, especially those of older adolescents, are generally adequate indicators of academic and behavioral factors. Still, these

reports should be used with the disclosure of some important caveats—adolescents tend to inflate their grades and to deflate their estimations of problem behaviors (Dornbusch et al. 1990; Hindelang, Hirschi, and Weis 1981). Thus, this study probably underreports rates of both failure and drinking.

Opportunity Factors—Nine measures were constructed to tap opportunity structures for academic failure and drinking. The first four concerned the family environment. First, the students responded to three items about each parent: how often that parent was at home when the student left for school, returned from school, and went to bed (1 = never, 2 = almost never, 3 = some of the time, 4 = most of the time, and 5 = always). A scale was created for both the mother and father by averaging these three items. The students also reported how often at least one parent was at home with them when they ate dinner. The responses were recoded into a new measure, ranging from 1 (no days in the past week) to 5 (six or seven days in the past week). The final scale of family organization consisted of the mean of the maternal, parental, and family eating items ($\alpha = .78$). Second, to measure parents' restrictiveness, I summed the students' responses to seven items (1 = no, 0 = yes): whether the parents let the students make their own decisions about what time to come home on week-nights, with whom to hang out, what to wear, how much television to watch, what television programs to watch, what time to go to bed, and what to eat ($\alpha = .65$). Third, for the measure of parents' peer regulation, the parents reported how many of the parents of their children's friends they had spoken to in the past month. Fourth, the parents reported how often they drank alcohol (0 = never in the = past year, 6 nearly every day). In single-parent families, this report served as the measure of parental alcohol use. In two-parent families, this report was averaged with parents' reports of how much their partners drank alcohol to create the final measure.

The remaining five opportunity factors tapped aspects of the peer context. The first measure concerned students' time with peers. In the In-School Survey, the students were asked a battery of questions about specific friends, a maximum of five female and five male friends. Involvement with friends was the sum of four items (1 = yes, 0 = no): whether, in the past week or weekend, the adolescent had gone to the friend's house, hung out somewhere with the friend, talked on the telephone with the friend, and spent time with the friend ($\alpha = .64$). This value was then averaged across all nominated friends (Cavanagh 2004).

Students' peer nominations were also used to construct summary measures of friends' behavior. Because most nominated friends were part of the In-School Survey and therefore reported on their grades and drinking behavior, I could identify the proportion of nominated friends who had drunk alcohol in the past year or failed at least one class in the past year. For a variety of reasons, approximately one-third of the respondents were missing on these peer measures. Some were missing because they attended the few schools that did not allow the In-School Survey to be administered even though the schools allowed their students to participate in the In-Home Interviews. For these students for whom In-School data were missing, I used their Wave I data to create the two peer measures. Some Add Health respondents were missing data on the peer measures because they did not nominate any friends in the In-School Survey. These students were scored 0 on these measures because they had no friends who drank or failed classes. The remaining 10 percent of the students with missing data on these peer measures nominated friends who were either not Add Health respondents or nominated friends who were Add Health respondents but did not report information on grades or alcohol use. The mean level of the two peer measures were imputed for these cases. I also created binary markers that identified those who had imputed data on these measures for these two reasons and then used these markers as controls in all the multivariate analyses. These measures were rarely statistically significant, suggesting that any bias that was introduced by imputation was minimal.

Finally, to cast a wider net on the peer world than close friends, I also created summary measures of the student body of the school attended by each adolescent. Recall that the In-School Survey was a near-census of each school. Thus, calculating binary measures of alcohol use and academic failure and then averaging these measures across all students in each school allowed me to measure the proportion of the student body who drank or failed classes.

Bonding Factors—I constructed one bonding measure from the family context and three from the school context. First, students' assessments of the degree to which they felt close to their fathers, felt that their fathers were warm, felt that they communicated well with their fathers, and were satisfied with their relationships with their fathers (responses ranged from 1 to 5) were averaged ($\alpha = .89$). The same construct was created for the mothers ($\alpha = .89$). The final construct for parent-adolescent closeness was the mean of the maternal and paternal constructs ($\alpha = .88$) if information was not missing for both parents; otherwise, the score for the nonmissing parent served as the value. Second, school attachment, a commonly used Add Health measure (Moody and White 2003), was the mean of three items ($\alpha = .78$): how close students felt to people at school, felt a part of school, and felt happy to be at school (1 = strongly disagree to 5 = strongly agree). After reverse coding, higher values indicated less attachment. Third, drawing on a measure from the National Education Longitudinal Study of 1988–92 (Sanders and Jordan 2000), I created a measure of teacher bonding that was based on students' reports of whether they had trouble getting along with teachers, believed that their teachers treated students fairly, and felt that their teachers cared about them. Responses, which ranged from 1 to 5 (“almost every day” to “never” for the first item, “never” to “very much” for the second item, and “strongly disagree” to “strongly agree” for the third), were reverse coded and then averaged ($\alpha = .68$). Fourth, a single item measured low educational aspirations. The students rated, on a scale of from 1 to 5, how much they wanted to go to college.

Maladjustment Factors—The third and final mechanism was measured in four ways. In a modified version of the Center for Epidemiological Studies Depression scale (Radloff and Locke 1986), the students reported how often they experienced 15 symptoms of depression, including loneliness and anxiety. The responses ranged from 0 (never or rarely) to 3 (most or all the time). The mean of these responses measured depression ($\alpha = .86$). On the basis of Add Health conventions (Resnick et al. 1997), I used students' reports on their engagement in several risky behaviors to construct measures of (1) delinquency, the sum of whether or not, in the past year, the students had painted graffiti, damaged others' property, lied to their parents about where they had been, taken something without paying, driven a car without the owner's permission, stolen something worth more than \$50, stolen something worth less than \$50, or broken into a building to take something ($\alpha = .75$); (2) marijuana use (0 = student had never smoked marijuana, 1 = smoked before but not in the past month, 3 = smoked at least once in the past month, 4 = smoked 2 or 3 times in the past month, 5 = smoked 4 or 5 times in the month, and 6 = past smoked 6 or more times in the past month); and (3) risky sexual behavior (1 = the student did not use any contraception in the most recent sexual activity and 0 = the student used contraception or was not sexually active).

Sociodemographic Controls—Five factors, all based on Wave I students' reports, were controlled in all the analyses to account for demographic variability in the associations between academic failure and adolescent drinking: gender (1 = female), age (in years), race/ethnicity (dummy variables for non-Hispanic white, African American, Hispanic American, Asian American, and Other), family structure (1 = adolescents lived with two married biological parents and 0 = other family forms), and parental education (maximum level in the household, where 1 = less than high school, 2 = high school graduate, 3 = some college, 4 = college graduate, and 5 = graduate education). To account for school location, the analyses also

controlled for school sector (1 = private and 0 = public) and level (1 = high school and 0 = middle school).

Plan of Analysis

The path analyses for this study proceeded in three steps. First, I estimated a cross-lagged model in which the Wave II measures of academic failure and alcohol use were *simultaneously* regressed on the Wave I measures of academic failure and alcohol use. Second, I controlled for sociodemographic factors. Third, I added the opportunity, bonding, and maladjustment factors to the model and assessed changes in the longitudinal associations between Wave I academic failure and Wave II alcohol use and between Wave I alcohol use and Wave II academic failure resulting from these additions.

All path models were estimated in Mplus 2.0. This procedure allowed the estimation of cross-lagged models with poisson regression (necessary because both Wave II outcomes were count or countlike variables). It also controlled for the school-based clustering of the Add Health data to estimate robust standard errors (accounting for the nonindependence of the observations) and included sampling weights to deal with the Add Health sampling design.

RESULTS

A First Glance at Failure and Drinking

Table 3 presents the results from cross-lagged models that simultaneously estimated, poisson regression, both the longitudinal association between academic failure and later alcohol use and the longitudinal association between alcohol use and later academic failure. The coefficients in Table 3 are unstandardized b coefficients, and so represent the change in the dependent variable that is associated with a one-unit change in the independent variable. Because these models were estimated with poisson regression, I have also exponentiated some of the coefficients when discussing them in the text. An exponentiated coefficient represents the percentage change in the expected frequency of the outcome that is associated with a one-unit change in the independent variable.

In Table 3, Model 1 contains only the Wave I versions of the two outcomes as predictors. In this model, alcohol use and academic failure were both stable over time, as evidenced by the significant coefficients for Wave I alcohol use on Wave II alcohol use ($b = .37, p < .001$) and for Wave I academic failure on Wave II academic failure ($b = .51, p < .001$). As for the cross-lagged coefficients in Model 1, Wave I academic failure significantly predicted Wave II alcohol use, even after the continuity in alcohol use between Wave I and Wave II was taken into account. This coefficient ($b = .05, p < .05$), when exponentiated, indicates that the expected frequency of alcohol use rose by 5 percent with every additional class failed. The reverse direction in this cross-lagged model is less important, as seen by the nonsignificant coefficient of Wave I alcohol use on Wave II academic failure.

Model 2 adds the sociodemographic controls, which slightly reduces the magnitude of the lagged associations (e.g., Wave $\rightarrow$ Wave II alcohol use, Wave I $\rightarrow$ II academic failure) and strengthens slightly the cross-lagged associations (e.g., Wave I alcohol use $\rightarrow$ Wave II academic failure, Wave I academic failure $\rightarrow$ Wave II alcohol use). In fact, the association between early alcohol use and later academic failure, nonsignificant in Model 1, is marginally significant in Model 2. When Wave I alcohol use and academic failure were controlled, Wave II alcohol use was lower among younger, African American, and Asian American adolescents with less educated parents, and scores on the Wave II failure index were higher among younger, African American, and Hispanic American adolescents from non-two-parent family structures with less educated parents.

The results of these first two modeling steps, therefore, suggest that academic failure was a risk factor for increases in drinking. At the same time, adolescent drinking was not really a risk factor for increases in academic failure over time.

Mechanisms Connecting Failure and Drinking

The next modeling step was to evaluate different theoretical mechanisms through which academic failure served as a risk factor for later adolescent drinking (and vice versa). Model 3 in Table 3 presents the results of this step.

Five of the nine opportunity factors significantly predicted Wave II alcohol use, net of sociodemographic controls and Wave I alcohol use, and two of the nine significantly predicted Wave II academic failure, again net of sociodemographic controls and Wave I academic failure. Students were less likely to drink alcohol when their families were well organized ($b = -.05$, $p < .05$) and, what is interesting and unexpected, when they attended schools with high rates of academic failure ($b = -.66$, $p < .01$), and they were more likely to drink when their parents drank ($b = .03$, $p < .05$), when they spent a good deal of time with friends ($b = .07$, $p < .01$), and when they attended schools with high rates of drinking ($b = 1.20$, $p < .001$). In addition, they were more likely to fail classes when they attended schools with high rates of failure ($b = .95$, $p < .01$) and less likely to do so when their parents regulated their peer activities ($b = -.04$, $p < .05$). With regard to the bonding mechanism, two of the four bonding factors in Model 3 significantly predicted Wave II alcohol use and Wave II academic failure. Low school attachment was inversely associated with both outcomes ($b = -.06$, $p < .10$ for alcohol use and $b = -.08$, $p < .05$ for academic failure), and low teacher bonding was directly associated with both ($b = .12$, $p < .001$ for alcohol use and $b = .13$, $p < .001$ for academic failure). Maladjustment was the final mechanism. Only delinquency predicted Wave II alcohol use ($b = .07$, $p < .001$). It also predicted Wave II academic failure ($b = .04$, $p < .05$), as did depression ($b = .15$, $p < .05$).

Of course, this study was less interested in the predictors of either academic failure or alcohol use than in mechanisms that connect the two. Consequently, I made two more assessments of the longitudinal association between Wave I academic failure and Wave II alcohol use (the association between Wave I alcohol use and Wave II failure was not investigated more because it was so weak). First, I reestimated Model 3 in several iterations, adding the block of factors for each of the three mechanisms sequentially and assessing the change in the coefficient for Wave I academic failure that occurred with each of these three additions. These analyses indicated which *mechanism* had the most explanatory power for this longitudinal association. Second, I again reestimated Model 3 multiple times, adding one by one each of the significant predictors of Wave II adolescent alcohol use already discussed and assessing the change in the coefficient for Wave I academic failure that occurred with each of these eight additions. The analyses indicated which *factor* had the most explanatory power for the longitudinal association between Wave I academic failure and Wave II alcohol use.

Beginning with the three mechanisms, adding the opportunity factors to Model 2 in Table 3 independently of the bonding and maladjustment factors did *not* reduce the coefficient for Wave I academic failure on Wave II alcohol use. Adding only the bonding factors reduced this coefficient by nearly 50 percent and rendered it nonsignificant. Finally, adding only the maladjustment factors attenuated this coefficient by roughly 30 percent and rendered it nonsignificant. With regard to the factors within each mechanism, three factors were by far the most important. Teacher bonding accounted for 47 percent of the risk status of academic failure for later adolescent alcohol use, delinquency accounted for 27 percent of this risk status, and family organization accounted for 12 percent of this risk status.

Opportunity factors, therefore, were important to both academic failure and adolescents' alcohol use, but they did not play an important role in linking academic failure to alcohol use over time. On the other hand, the bonding and maladjustment factors predicted both behaviors and helped to explain why academic failure was a risk factor for later alcohol use. Thus, each mechanism made some contribution to the association between academic failure and adolescents' alcohol use, but the bonding and maladjustment mechanisms outweighed the opportunity mechanism even though the opportunity factors tended to predict better the constituent behaviors in this association.

Another Dimension of Adolescent Drinking

Alcohol use, which in this study referred to whether and how often adolescents drank, is only one dimension of adolescent drinking. A more problematic drinking behavior is binge drinking. This behavior, in which large quantities of alcohol are consumed in short periods, is more physically dangerous and, consequently, has been a major cause of concern in relation to young people. I therefore reestimated the models just described, replacing the alcohol-use measure with a measure capturing the frequency of binge drinking—defined as having five or more drinks in one sitting—during the year (0 = past no episodes of binge drinking in the past year, 1 = episodes on 1 or 2 days in the past year, 2 = once a month or less, 3 = 2 or 3 days a month, 4 = 1 or 2 days a week, 5 = 3 to 5 days a week, and 6 = binge drinking episodes nearly every day in the past year).

These models, not shown in tabular form, replicated the models presented in Table 3 to a remarkable degree. The only exceptions were that (1) binge drinking did not predict later academic failure in either Model 1 or Model 2; (2) two opportunity factors that predicted Wave II alcohol use, family organization and rate of failure in the school, did not predict Wave II binge drinking; and (3) one maladjustment factor that did not predict Wave II alcohol use, marijuana use, predicted Wave II binge drinking. For the most part, therefore, the longitudinal association between academic failure and adolescent drinking behavior and the mechanisms explaining this association were the same no matter what dimension of drinking was examined.

CONCLUSION

A rich interdisciplinary literature has documented how adolescence serves as a linking stage in the life course, flowing out of childhood experiences and acting as a springboard into adulthood (Elder, 1998; Shanahan 2000). This linking process has serious implications for the long-term prospects of young people. For example, secondary school offers new opportunities and standards for academic performance and different social behaviors, thereby greatly increasing the likelihood that some young people will begin to struggle academically and to drink, both of which can derail their educational careers and general health and well-being in the present in ways that filter into later stages of the life course. Parents and educators, therefore, must deal with the potential for these two types of problems during the secondary school years and consider their potential to feed off each other. Following the lead of integrative perspectives on problem behavior (e.g., the work of Elliott et al. 1989 and others), this study drew on insights from multiple theories to shed some light on the nature of, and reasons for, the interplay between academic failure and adolescent drinking.

The results revealed that, for the most part, academic failure was a greater risk factor for later adolescent drinking than adolescent drinking was for later academic failures. Given some equal level of drinking at one point, the more classes failed, the more drinking that occurred in the future. Given some equal number of classes failed at one point, however, the more drinking that occurred did not lead to more failures in the future. These results, therefore, suggest that families and schools need to focus more attention on facilitating students' success school, in general, and offering supports to students who are struggling in school, in particular. Reflecting

the recent provocative work of Arum et al. (2003), the significance of academic failure extends well beyond truncated educational trajectories. It can also spur greater involvement in risk behaviors and other aspects of maladjustment that increase the likelihood of accidents, health problems, interpersonal conflict, and criminal behavior. On the other hand, efforts to curtail drinking, while needed for the basic protection of students, may not have the added benefit of reducing school failure *once* such failure has already begun to emerge. More academic-focused interventions, therefore, would likely have further reaching effects.

The risk status of academic failure was driven by general processes that encompassed multiple social conditions and personal characteristics. Academic failure appeared to lead to increased rates of drinking over time through weakened bonds to institutions that traditionally control problem behavior. What really mattered were close emotional ties to adults, which, of course, are hallmarks of children's competence (see Masten and Coatsworth 1998). It is interesting that bonds with teachers were not necessarily more closely related to academic failure or adolescent drinking than were bonds with parents, but the former were a more important factor in the connection between failure and drinking. This finding echoes other Add Health research that demonstrated the powerful conditioning role of teacher bonding for many risk factors (see Crosnoe, Johnson, and Elder 2004). At the same time, academically struggling students tended to drink more when their general maladjustment facilitated the translation of one stress or problem into another, which suggests, as does the research of many psychologists (e.g., Elliott et al. 1989; Hawkins et al. 1992), that treating one symptom of maladjustment is likely to be useless if the root causes of this maladjustment are not addressed. Finally, academic failure and adolescent drinking are largely predicated on opportunities—in the form of constraints and encouragements—for each behavior, but the connection between the two is less dependent on these opportunities. This finding is a lesson that identifying the causes of certain behaviors does not necessarily go far in identifying the causes of the interplay of these behaviors. After all, peer influences are perhaps the most commonly cited predictor of drinking (Kandel 1996), but they were not important reasons why academic failure predicted drinking.

One other mechanism was not considered explicitly in this study but still deserves mention. It concerns the potential for the association between academic failure and adolescent drinking to be spurious. In other words, both academic failure and adolescent drinking may be caused by the same underlying sets of factors in ways that produce observed associations between the two. These underlying factors may be sociodemographic. If so, the sociodemographic controls that were included in the analyses in this study would at least partially account for such spuriousness. These underlying factors could also involve opportunity, social bonding, and maladjustment. In this case, the three sets of factors that I examined would have reduced or eliminated the longitudinal association between academic failure and adolescent drinking not because they mediated the effect of the former on the latter, but because they affected both the former and the latter in similar ways. This possibility could not be addressed in this study because Add Health contained only two time points during the secondary school years, but future research should definitely attempt to tease out the true nature of these mechanisms. Whether these mechanisms worked through mediation or spuriousness, they still demand attention for their role in the clustering of problem behaviors in secondary school.

Overall, the results of this study suggest that the connection between academic failure and adolescent drinking has the potential to exacerbate the long-term harm of academic failure on the level of individual students, as well as on the level of families and schools. On the basis of these results, efforts to block this connection should focus first on the academic side and, in doing so, draw on the power of teachers and parents to help students avoid problem behaviors, in general, and to help struggling students avoid risky outlets, such as drinking or other forms of substance use and antisocial behavior, for their feelings of frustration and alienation.

Before these efforts can be pursued, this preliminary line of research on the connection between academic failure and adolescent drinking in secondary school needs to be improved and extended. In contrast to the social development model, this study could not explore the sequential links among opportunities, bonds, and maladjustment because of the limited time frame of Add Health that was already mentioned. This design limits the ability to pick up phenomena that may be years in the making and have origins in the pre-secondary school years, so the basic conceptual model put forward here needs to be investigated more carefully with long-term longitudinal data. Unfortunately, Add Health also does not allow the consideration of other important theoretical mechanisms, namely, cognition and biology, which means that this study can in no way claim to test an exhaustive list of theoretical mechanisms. These alternative mechanisms eventually need to be brought into the picture. Finally, research using this conceptual model should pay special attention to population-level differences (e.g., by race, class, and gender). Taking these steps will advance knowledge about the connection between academic failure and adolescent drinking that will ultimately inform attempts to combat both.

Studying the connection between academic failure and adolescent drinking is an important endeavor because of the serious implications both have for the futures of young people. Such research recognizes how blurry the lines between the general development of young people and their academic careers really are. Problems in one area can filter into the other, and, alternatively, successes in one may benefit the other. The increasing cross-pollination between educational and developmental research is thus an important step in attempts to understand adolescence and to help adolescents.

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Table 1

Descriptive Statistics for Each Stage of the Sample-Selection Process

Variable	Means (SD)			
	Sample 1 ^a	Sample 2 ^b	Sample 3 ^c	Sample 4 ^d
Female	.50 (.50)	.51 (.50)	.51 (.50)	.51 (.50)
Non-Hispanic white	.50 (.50)	.51 (.50)	.53 (.50)	.54 (.50)
Age (in years)	16.16 (1.72)	15.82 (1.60)	15.74 (1.59)	15.75 (1.57)
Family structure (two parent)	.50 (.50)	.52 (.50)	.52 (.50)	.54 (.50)
Parental education	2.91 (1.24)	2.93 (1.24)	2.94 (1.25)	2.95 (1.23)
Wave I academic failure index	.49 (.86)	.50 (.86)	.49 (.85)	.49 (.85)
Wave I adolescent alcohol use	1.09 (1.48)	1.01 (1.42)	1.00 (1.40)	1.00 (1.41)
<i>n</i>	20,475	14,736	12,951	11,927

^aFull Wave I In-Home Sample.^bLimited Sample 1 to adolescents in both Waves I and II of In-Home Interview.^cLimited Sample 2 to adolescents who had at least one parent who was interviewed.^dLimited Sample 3 to adolescents with a valid sampling weight.

Table 2 Descriptive Statistics for All the Study Variables ($N = 11,927$)

Variable	Mean (SD) or%
<i>Adolescent Outcomes (M/SD)</i>	
Wave I adolescent alcohol use	1.00 (.141)
Wave II adolescent alcohol use	1.09 (.151)
Wave I academic failure index	.49 (.85)
Wave II academic failure index	.39 (.75)
<i>Opportunity Factors (M/SD)</i>	
Family organization	3.65 (.70)
Parent restrictiveness	5.04 (1.57)
Parent peer regulation	2.11 (1.90)
Parental alcohol use	2.52 (1.50)
Involvement with friends	2.11 (1.07)
Proportion of friends who drink ^a	.24 (.26)
Proportion of friends who fail classes ^a	.22 (.25)
Rate of drinking in school	.27 (.12)
Rate of failure in school	.25 (.11)
<i>Bonding Factors (M/SD)</i>	
Parent-adolescent closeness	4.28 (.64)
Low school attachment	2.24 (.86)
Low teacher-bonding	2.28 (.77)
<i>Maladjustment Factors (M/SD)</i>	
Depression	.47 (.39)
Delinquency	1.56 (1.78)
Marijuana use	.97 (1.96)
Risky sexual behavior	.10 (.27)
<i>Sociodemographic Controls (%)</i>	
Female	51.09
White	54.41
African American	20.73
Hispanic American	16.55
Asian American	5.42
Other race/ethnicity	2.85
Family structure (two parent)	53.86
School sector (private)	7.70
School level (high school)	74.38
<i>Sociodemographic Controls (M/SD)</i>	
Age (in years)	15.74 (1.57)
Parental education	2.95 (1.23)
Low educational aspirations	1.55 (1.02)

^aThe sample mean was imputed for those with missing data on the peer measure. Binary markers of different types of missingness on network variables were included in all multivariate analyses.

Table 3
Unstandardized Poisson Coefficients from Path Models Predicting Wave II Alcohol Use and Academic Failure

Variable	Model 1		Model 2		Model 3	
	Alcohol	Failure	Alcohol	Failure	Alcohol	Failure
<i>Wave I Behavior</i>						
Alcohol use	.37*** (.03)	.01 (.02)	.34*** (.03)	.04+ (.02)	.27*** (.03)	.01 (.03)
Failure index	.05* (.02)	.51*** (.05)	.06** (.02)	.45*** (.04)	.02 (.02)	.40*** (.04)
<i>Sociodemographic Controls</i>						
Female	—	—	-.02 (.04)	-.27*** (.08)	.01 (.04)	-.28*** (.07)
Age (years)	—	—	.09*** (.02)	-.14*** (.04)	.09*** (.03)	-.13*** (.03)
African American	—	—	-.37*** (.08)	.33*** (.09)	-.31*** (.08)	.20* (.10)
Hispanic American	—	—	-.03 (.07)	.18* (.09)	.04 (.07)	.18*** (.09)
Asian American	—	—	-.38* (.15)	-.18 (.22)	-.28* (.14)	-.20 (.27)
Other race/ethnicity	—	—	-.02 (.11)	.09 (.13)	.00 (.11)	.02 (.15)
Family structure (two parent)	—	—	-.05 (.04)	-.14* (.06)	-.04 (.04)	-.13*** (.06)
Parent education	—	—	.05** (.02)	-.12*** (.03)	.02 (.02)	-.10*** (.03)
School sector (private)	—	—	-.02 (.08)	-.43* (.21)	-.13* (.06)	-.30 (.20)
School level (high school)	—	—	.03 (.09)	-.01 (.09)	.26* (.11)	-.15 (.14)
<i>Opportunity Factors</i>						
Family organization	—	—	—	—	-.05* (.03)	.03 (.04)
Parent restrictiveness	—	—	—	—	.03 (.02)	-.01 (.02)
Parent peer regulation	—	—	—	—	.01 (.01)	-.04* (.02)
Parental alcohol use	—	—	—	—	.03* (.01)	.00 (.02)
Involvement with friends	—	—	—	—	.07** (.02)	-.01 (.03)
Prop. friends who drink ^a	—	—	—	—	.12 (.10)	-.03 (.11)
Prop. friends fail classes ^a	—	—	—	—	.04 (.08)	.12 (.15)
Rate of drinking school	—	—	—	—	1.20*** (.34)	.61 (.63)
Rate of failure in school	—	—	—	—	-.66** (.21)	.95** (.40)

Variable	Model 1		Model 2		Model 3	
	Alcohol	Failure	Alcohol	Failure	Alcohol	Failure
<i>Bonding Factors</i>						
Parent-adolescent closeness	—	—	—	—	-.04 (.04)	.00 (.04)
Low school attachment	—	—	—	—	-.06+ (.03)	-.08* (.04)
Low teacher-bonding	—	—	—	—	.12*** (.03)	.13*** (.04)
Low educational aspirations	—	—	—	—	.00 (.02)	.04 (.03)
<i>Maladjustment Factors</i>						
Depression	—	—	—	—	-.05 (.05)	.15* (.07)
Delinquency	—	—	—	—	.07*** (.01)	.04* (.02)
Marijuana use	—	—	—	—	.02 (.01)	-.01 (.11)
Risky sexual behavior	—	—	—	—	-.02 (.05)	-.12 (.11)
Δ Log Likelihood	—	—	-2418	—	-1739	—
<i>n</i>	11,805	—	10,969	—	10,348	—

Note: Unstandardized poisson coefficients are presented with standard errors in parentheses. All models controlled for the school-base clustering of data.

^a Binary markers of different types of missingness on network variables are included in all the analyses.

* $p < .05$

** $p < .01$

*** $p < .001$.