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High School Substance Use as a Predictor of College Attendance, Completion, and Dropout: A National Multi-cohort Longitudinal Study

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Abstract

National data from Monitoring the Future were used to examine patterns and predictors of college attendance. Samples of American 12th-grade students from 1977-2003 were followed for seven years (modal ages 18-25; *N*=10,020). College attendance and graduation patterns varied considerably over historical time and based on family background. Substance use during high school predicted a greater likelihood of never attending (for cigarettes, illegal drugs), of graduating from a 2-year rather than a 4-year school (for cigarettes), and of dropping out versus graduating from a 4-year school (for cigarettes, marijuana, and other illegal drugs). High school binge drinking predicted lower college dropout, but only in models also controlling for cigarette, marijuana, and other illicit drug use. This study provides a needed overview of adolescent predictors of patterns of college attendance among American young adults over the past three decades.

Keywords

college dropout; 2-year college; 4-year college; substance use

For the large majority of young people, a first visible sign of leaving adolescence and beginning the transitions to adulthood is entry into college. Seven out of ten high school graduates attend post-secondary education (i.e., 2- or 4-year colleges) in the fall after high school (NCES, 2012a). This massive post-high school migration to college campuses, however, ultimately results in much smaller numbers of college degrees. Among first-time, full-time students who attend a 4-year institution full-time, only 58% complete a degree at that institution within 6 years; among those who attend a 2-year institution, 30% complete within about three years (NCES, 2012b). Therefore, pursuing post-secondary education is a typical experience, with considerable variation in the patterns and success of the experience. Students who leave school without a degree suffer negative effects of slimmer career prospects and lost time and money, institutions suffer from lower graduation rates and lost

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tuition dollars, and society also bears the burdens of unemployed or unemployable young people and a less educated workforce (DeBerard, Spielmans, & Julka, 2004; Shaienks, Gluszynski, & Bayard, 2008). There are several gaps in the relevant literature regarding the patterns and predictors of attending college, completing a 2-year versus a 4-year degree, and dropping out of college that have made it difficult to get a clear picture of the problem. Given that transitions out of adolescence into adulthood (and the research aimed at understanding these transitions) are structured by the experience of postsecondary education, it is essential to understand the patterns of college attendance.

Identifying and Predicting Patterns of College Attendance and Graduation

Research on college attendance is plagued by inconsistent definitions of “college” and “noncollege” status, resulting in variations in research findings (Carter, Brandon, & Goldman, 2010). In some studies, only 4-year college attenders are counted as college students, while in others 2-year college attenders are included. In addition, the nuances of patterns of attendance are sometimes not fully described. For example, students who are “stopouts” (i.e., attend school, leave school, but return to complete their degree; Stratton, O'Toole, & Wetzel, 2008) and “stay-ins” (i.e., attend continuously until graduation) are sometimes both simply coded as graduates (Shaienks et al., 2008), while in other studies those who stop out and drop out are both considered dropouts (Lehmann, 2007). Therefore, much of the interesting and needed information about variations in experiences of post-secondary education is lost. In addition, research on college transfer and dropout is often done from an institutional perspective, such that data regarding whether students stay in school (e.g., transfer institutions), take time off from school before returning, or drop out permanently is unavailable (Goldrick-Rab, 2006; Herzog, 2005). Large-scale national data allow for consideration of heterogeneous college attendance patterns, which is needed to better describe and understand the issues related to college dropout (Leppel, 2002). In this study we use multi-cohort national panel data from over 10,000 American 12^{th}-graders followed for seven years after high school as part of the Monitoring the Future (MTF) study (Johnston, O'Malley, Bachman, & Schulenberg, 2012b) to examine patterns of college attendance at the individual level.

Identification of pertinent predictors of educational success is of particular importance to understanding college attendance patterns. Documenting the high school predictors of later successes or difficulties in college is needed to advance the literature as well as to help educators target individuals with the greatest need for assistance across the transition to college. Only about 15% of college dropout has been attributed to academic failure (Leppel, 2002; Tinto, 1993), leaving considerable room for non-academic predictors (Stratton, O'Toole, & Wetzel, 2005). In this study, we focus on three domains of high school predictors of college patterns, including demographic characteristics (cohort, gender, and race/ethnicity), family background (2-parent family, parental education), and individual functioning and adjustment indicators (including high school grades and high school substance use). As discussed below, constructs in each of these domains have been shown to be important for understanding academic success and failure, although there is very little research regarding how they are prospectively related to success in post-secondary education.

Demographic Characteristics

Notable historical variation in college attendance has occurred in the last several decades. More and more students are attending college (NCES, 2012c). At the same time, the length of time to degree and the number of employment hours among students have both increased in recent years (Bound, Lovenheim, & Turner, 2007). Consistent with what has been occurring more generally with pathways through the transition to adulthood (Schulenberg & Zarrett, 2006; Settersten & Ray, 2010), educational trajectories are increasingly nonlinear (Goldrick-Rab, 2006; Shanahan, 2000). Students from lower socioeconomic backgrounds are more likely to have interrupted college pathways, including dropping out, stopping out, or transferring (Goldrick-Rab, 2006). However, there is very little educational research that is able to track students across institutions and across cohorts to examine their overall patterns of college attendance and completion (Goldrick-Rab, 2006).

There are also differences in college attendance and graduation by gender and race/ethnicity. Although men have been historically more likely to attend college, the gender gap has reversed so that women now have the advantage (Bailey & Dynarski, 2011; Buchmann & DiPrete, 2006; NCES, 2012d), and this may be partially attributable to differences by gender in high school graduation (Heckman & LaFontaine, 2010). The achievement gap across race/ethnicity is a continuing challenge for educators and policy makers (Greene, Marti, & McClenny, 2008). Among those who entered postsecondary education in 2001-2002, graduation rates across major racial ethnic groups at 4-year colleges in the U.S. were 67% for Asian/Pacific Islander students, 60% for White students, 48% for Hispanic students, 42% for Black students, and 40% for American Indian/Alaska Native students (NCES, 2012b). Differences in *patterns* of attendance across subgroups are less clearly understood.

Family Background

Family background sets the stage for interpreting experiences with college and navigating the transition to post-secondary life. Family background predictors are important in their own right, but also reflect socioeconomic status. First-generation college students may have lower retention rates than students with a parent who attended college, even if the parent did not earn a degree (e.g., Ishitani, 2006). Scarce empirical evidence for the link between socioeconomic status and dropping out suggests that students from low socioeconomic status (SES) backgrounds struggle more during college and have lower incomes and educational attainment after college (Walpole, 2003). Children from lower SES families are both less likely to enter college and, once enrolled, less likely to earn a degree than those from high-income families (Bailey & Dynarski, 2011). Qualitative data suggest that first-generation college attenders and students from working class backgrounds tend to leave school because they feel like they do not fit in, while those with university-educated parents are more likely to leave for academic reasons (Lehmann, 2007). It is important to acknowledge these sociocultural influences underlying college retention for low SES students (Quinn, 2004).

High School Predictors

What happens in high school also sets the stage academically for college experiences. Most notably, high school grades are a strong predictor of college success (Kuh, Curce, Shoup, Kinzie, & Gonyea, 2008), and prior academic performance has been shown to be more important than socioeconomic status and financial aid in predicting retention (Goldrick-Rab, 2006; Herzog, 2005; Kuh et al., 2008). Ultimately, to stay in college and receive a degree, students must earn passing grades and students with a history of academic success are better poised to do so.

A proportion of college attrition may also result from social and health difficulties (Pritchard & Wilson, 2007). In particular, substance use during high school is a risk behavior that correlates with a wide range of achievement and well-being outcomes and is a main component of major adolescent theories, including problem behavior theory (Jessor & Jessor, 1977). High school substance use is correlated with post-high school achievement (Bachman et al., 2008; Fergusson & Boden, 2008; Newcomb & Bentler, 1988; Schulenberg, Bryant, & O'Malley, 2004; Schulenberg, O'Malley, Bachman, & Johnston, 2005). However, less is known regarding how high school substance use is associated with patterns of college attendance, completion and dropout based on prospective data. This is, in part, because research on education seldom includes substance use as a contributor to achievement (Arria et al., 2013). The associations between alcohol, cigarette, marijuana, and other illicit drug use with college attendance, graduation, and dropout are examined.

Purposes of the Study

This study is designed to address key gaps in the relevant literature regarding the historical and developmental patterns of college attendance, as well as the early predictors of the different attendance patterns. We focus specifically on substance use during high school as a potentially important indicator of future college attendance and success. We provide a broad view with national panel data from 28 consecutive cohorts following young people for 7 years starting in the senior year of high school. Our purposes include: (a) mapping the various post-high school patterns of college attendance through the mid-20s among American high school 12th-grade classes from 1976 to 2003; (b) determining how these patterns have changed historically and how they vary by gender, race/ethnicity, and parental education; and (c) testing in multivariate models how attendance patterns are predicted by cohort year, gender, race/ethnicity, parental education, family background, high school grades, and high school substance use.

Methods

Monitoring the Future (MTF) is an ongoing national study of adolescents and young adults (Johnston, O'Malley, Bachman, & Schulenberg, 2012a, 2012b). The study has used questionnaires administered in schools to survey nationally representative samples of about 16,000 American high school seniors every year since 1975. Approximately 2,400 individuals are randomly selected from each senior-year cohort for biennial follow-up via mailed questionnaires; drug users are oversampled for follow-up and weighting is used to

adjust for attrition. The national MTF panel data used here consisted of 28 consecutive cohorts (high school classes of 1976–2003) of respondents who were surveyed as high school seniors (modal age 18) and who participated in up to four biennial follow-up surveys (through 2010). The biennial follow-up surveys began one year after high school for one random half of each cohort and two years after high school for the other half. Only the first random half of each follow-up cohort (surveyed at modal ages 19, 21, 23, and 25) was included in these analyses due to our interest in college attendance immediately following high school (i.e., starting with age 19), yielding a total $N = 12{,}033$ (weighted N=10,020; 37.8% of those eligible).

Attrition analyses indicated that participants who remain in the panel study through early adulthood are more likely to be White; women; higher on high school grade point average, college plans, and parental education level; and lower on high school truancy and senior-year substance use in comparison to attriters. In addition, in the present analyses, individuals from earlier cohorts were more likely to remain in the study than those from more recent cohorts. Further detail regarding the MTF design and procedures can be found in Bachman, Johnston, O'Malley, and Schulenberg (2011), in Johnston et al. (2012a, 2012b), and on the MTF website (www.monitoringthefuture.org).

Measures

Of particular importance in examining historical and developmental trends, all measures used in this analysis were consistent across cohorts and ages. College attendance was coded for each participant at each follow-up based on responses of *I'm doing this now* and *I have done this* to the following four separate questions: How likely are you to … (a) Attend a two-year college; (b) Graduate from a two-year college program; (c) Attend a four-year college; (d) Graduate from a four-year college program. Respondents were also asked, (e) "During March of this year, were you taking courses at any school or college?" with response options of *No; Yes, less than half-time; Yes, about half-time or more; Yes, as a full-time student*. Participants were defined as 4-year college graduates at a given wave if they reported that they had already graduated, based on question (d), in the current wave or in a previous wave of data collection. That is, once a participant reported graduating, that status was carried forward to future waves. Participants were coded as 2-year college graduates if they said they had already graduated, based on question (b), in the current wave or in a previous wave of data collection. Participants were defined as current 4-year college attendees if they reported they were currently attending, based on question (c), *and* reported full-time attendance in question (e). Respondents were classified as 2-year college attendees if they said they were currently attending, based on question (a), *and* reported full-time attendance in question (e). All respondents who did not fit into any of the other categories and had valid data on all indicators used to define college status were coded as non-attenders. We ran additional analyses using any attendance rather than full-time attendance criteria. When any attendance was used, only 407 participants (4.1% of our sample) were recoded from non-attenders to attenders. Given this low rate and that less than full-time attendance is ambiguous, we chose to use the more straightforward measure of full-time attendance throughout. Using these five coded statuses at each wave, observed patterns were grouped into five major attendance patterns (as shown in Table 1): 4-Year Graduates, 2-Year

Graduates, Still Enrolled, Dropouts, and Never-Attenders. Sub-categories of the major patterns reflect differences in timing of enrollment (i.e., Late Start, or beginning more than a year after the senior year of high school), whether 2-year and 4-year schools were attended (i.e., Combined), and whether enrollment was continuous or not (i.e., Stopout if attendance was interrupted).

All predictors of college attendance were measured during the senior year of high school (modal age 18). Demographic predictors included cohort, gender, and race/ethnicity. Cohort was determined by the year of 12th-grade attendance. We created a trichotomy to facilitate interpretation, based on observed trends in college attendance and non-attendance. Dummy codes were for (1) high school seniors from 1977 through 1985, (2) high school seniors from 1986 through 1994 (the reference group), and (3) high school seniors from 1995 through 2003. In alternate models where cohort was treated as a continuous variable, substantive findings were very similar. Gender was coded so that men=1 and women=0. Race/ethnicity was coded by dummy variables with White as the reference group, compared to Black, Hispanic, Asian, and Other Race/Ethnicity categories.

Two family background measures were used. Two-parent family was coded as 1; all other family structures were coded as 0. Parental education was coded as the highest education level of either parent, with 1=*some college or more* and 0=*no college*.

High school predictors included high school grades, an average of *B- or above*=1 and *C+ or below*=0. Twelfth grade measures of substance use were also used, and dichotomized to 1=*Use* and 0=*No Use* in the last 30 days for cigarettes, marijuana, and any illicit drug other than marijuana. Binge drinking (consuming 5 or more drinks in a row) on at least one occasion in the last two weeks was also coded as 1= *Yes* and 0=*No*. Dichotomous predictors were used to facilitate interpretation given the complexity of the college patterns outcomes.

Plan of Analysis

To address the first research question regarding dominant patterns of college attendance, observed patterns and prevalence statistics were computed. In addition, differences in the prevalence of types of attendance (late start, combined, and stopout) by 2-year and 4-year graduation status were examined. To address the second research question regarding historical changes and variations by subgroup, prevalence rates for attendance patterns by each cohort, gender, race/ethnicity, and parental education subgroup were documented with chi-square tests of equality. To address the third research question, concerned with predictors of attendance, a series of three multivariate logistic regression analyses was conducted to compare a) any college attendance vs. no college attendance; b) 2-year graduation vs. 4-year graduation; and c) dropping out vs. 4-year graduation. Covariates and predictors were cohort, gender, race/ethnicity, parental education, family structure, high school grades, and high school substance use (cigarette use, binge drinking, marijuana use, and use of illicit drugs other than marijuana). For models predicting type of graduation and dropout, pattern of attendance (i.e., late start, combined, and stopout) were also included. Finally, the extent to which cohort moderated the effects of the other demographic variables was also tested. Gender by cohort interactions are shown in the tabled results. Race/ethnicity by cohort

interactions and parent education by cohort interactions were not significant, so they were not included in the final models and are not shown.

Results

Descriptive statistics regarding the variables of interest are shown in Table 2. For example, 26% of the sample used cigarettes, 18% used marijuana, and 9% used illicit drugs other than marijuana in the last 30 days, and 29% reported binge drinking in the past two weeks as seniors in high school.

College Attendance Patterns

To address the first research question, Table 1 shows the dominant patterns of college attendance from modal ages 19 to 25 among American high school graduates from 1977 to 2003. Overall, 27.5% of high school graduates did not attend post-secondary education at any time. Over half of all high school seniors graduated with a degree: 46.6% graduated from a 4-year school and 11.8% graduated from a 2-year school. This leaves 14.1% who spent some time in a 2- or 4-year college, but had not graduated as of 2010.

However, as shown in Table 1, the patterns of attendance varied considerably. For example, about two-thirds of those who graduated from a 4-year college, and about two-fifths of those who graduated from a 2-year college, followed a continuous enrollment pattern. Over 10% of the sample (14.9% of those who ever attended college) dropped out of college, and nearly twice that many followed a pattern of starting late, stopping out, and/or remaining in college at model age 25. In addition, many young adults (13.7% of all attenders) reported combined patterns of attending both 2-year and 4-year colleges. Differences in the prevalence of late start, combined attendance, and stopping out for 2-year graduates and 4-year graduates were examined. College attendance patterns of late start and stopout were more often (p<.001) used by 2-year graduates (35.1% late start; 18.9% combined) than by 4-year graduates (11.4% late start, 10.5% stopout). The difference in combined attendance by 2-year graduates (14.3%) versus 4-year graduates (15.6%) was not significant.

Variations in Attendance by Cohort, Gender, and Race/Ethnicity

To address the second research question, Table 3 shows how these attendance patterns have varied by cohort, gender, race/ethnicity, and parental education. Chi-square tests indicated significant differences ($p < .001$) by cohort, $\chi^2(8)=481.0$; race/ethnicity, $\chi^2(16)=185.7$; and parental education $\chi^2(4)=1232.6$. Gender differences were significant at $p < .05$, $\chi^2(4)=10.5$. These findings indicate that the pattern of never attending college has decreased considerably with historical time, from 37.3% of those who were seniors in high school in 1977-1985 to 16.1% of those who were seniors in high school in 1995-2003. Graduating from a 4-year college has become more prevalent, increasing from 36.6% of those who were seniors in high school in 1977-1985 to 59.3% of those who were seniors in high school in 1995-2003. Rates of 2-year graduation have remained steady at about 12% across the years. Dropout has also been relatively steady at 11%, 12%, and 9%, respectively, across the three cohort groups.

Attendance patterns differed markedly based on race/ethnicity, with Asian respondents having the highest education attainment, followed by White respondents, and participants who reported Black, Hispanic, and Other Race/Ethnicity having lower education attainment. Dropout rates ranged from 15.6% for Black and 15.5% for Hispanic to 9.1% for Asian students. As noted above, the race/ethnicity by cohort interactions were not significant, indicating that these rates of college patterns by race/ethnicity have not shifted significantly over the past several decades. Attendance patterns also differed by parent education. Respondents whose parents attended some college were much more likely to report graduating from a 4-year school and much less likely to never attend college. The parent education by cohort interactions were not significant, indicating that these patterns of differential attendance and graduation by parental education have not changed over time. Overall, men and women had similar prevalence rates of the five primary patterns across time. (Gender by cohort interaction effects are presented in the next section).

Predictors of College Attendance and Graduation Patterns

The third research question concerned the demographic, family, and individual high school predictors of attendance patterns. Multivariate logistic regression analyses were conducted.

Predicting any college attendance—Table 4 shows logistic regression findings in which we predicted any college attendance (compared to the reference group of no college attendance). Main effects were found for historical cohort such that the 1977-1985 cohorts were less likely than the 1986-1994 cohorts to attend college; the 1995-2003 groups were more likely than the 1986-1994 cohorts to attend. Adjusted odds ratios from multivariate analyses, controlling for all other variables, are presented in the table. For example, the odds ratio for the 1977-1985 cohorts (compared to the reference group of 1986-1994 cohorts) predicting any college attendance was 0.64, meaning that the odds for students to attend college were 36% lower in the earlier cohorts than for those in the middle cohorts. The odds ratio for students in the 1995-2003 cohorts (compared to the 1986-1994 cohorts) predicting any college attendance was 1.56, meaning that the odds for students to attend college in the most recent cohorts were 56% higher than for those in the middle cohorts. There were no significant main effects for gender. For race/ethnicity, there were two differences: Compared to White youth, Asian youth were more likely to attend college and those of Other race/ethnicity were less likely to attend college. Interactions of cohort by gender were not significant for college attendance.

With regard to family background predictors, controlling for all other variables, youth from two-parent families compared to other family structures and youth whose parents had at least some college education had greater odds of attending college. Not surprisingly, high school grades were a significant predictor, with high school seniors with a GPA of B- or above, compared to those with a lower GPA, having about four times greater odds of attending college, controlling for all other variables in the model. In terms of substance use, high school seniors who smoked cigarettes or who used illegal drugs other than marijuana in the past 30 days had significantly lower odds of college attendance. There were no significant differences by binge drinking or marijuana use. The remaining two analyses focus only on those who attend college.

Predicting type of graduation—Table 4 shows the multivariate logistic regression model predicting graduating from a 2-year school compared to the reference group of graduating from a 4-year school. There were no significant main effects for cohort, gender, or race/ethnicity. There was one significant gender by cohort interaction. In the earliest cohorts only, men were less likely than women to graduate from 2-year schools compared to graduating from 4-year schools.

Family background predictors were significant, with participants from a two-parent family and those whose parents had some college education being less likely to graduate from a 2-year school compared to a 4-year school. In terms of high school variables, higher GPA predicted a lower likelihood of graduating from a 2-year school versus a 4-year school. High school students who used cigarettes were more likely to graduate from a 2-year college compared to graduating from a 4-year college. There were no significant effects of binge drinking, marijuana use, or other illicit drug use. In addition, students who started college late or who stopped out of college were more likely to get a 2-year (compared to a 4-year) degree. There were no significant differences in type of graduation based on combining attendance at 2-year and 4-year schools.

Predicting college dropout—Table 4 also shows the multivariate logistic regression model predicting dropping out of college compared to the reference group of graduating from a 4-year school. Historical cohort was a significant predictor, such that the most recent high school cohorts (1995-2003) were least likely to drop out compared to graduating from a 4-year college. Men were more likely than women to drop out of college. However, a gender by cohort interaction emerged, such that in the earliest cohorts only, men were less likely than women to drop out. Black and Hispanic participants were more likely to drop out than White participants. There were no differences between White Americans and Asian Americans or those from Other races/ethnicities.

Considering family background, young adults from two-parent families and those whose parents had some college education were less likely to drop out than to graduate. High school predictors were also important. Students with higher high school grades were less likely to drop out. Those who used cigarettes, marijuana, and other illicit drugs in high school were more likely to drop out. Conversely, those who engaged in binge drinking in high school were less likely to drop out of 4-year college. However, in additional models (not shown), each substance was entered separately. In a multivariate model with all covariates except cigarette use, marijuana use, and other illicit drug use, high school binge drinking was not significantly associated with college dropout. With each substance entered separately, all other substance use findings were substantively the same as shown in Table 4 (i.e., use of cigarettes, marijuana, and other illicit drugs in high school predict dropping out of college, compared to graduating with a 4-year degree). Participants who started school late or who combined 2-year and 4-year attendance were less likely to drop out of college.

Discussion

For most young people, the college experience is central, representing the first visible step along the transition to adulthood. Yet little is known about the different patterns of college

attendance followed by individuals and the prevalence and predictors of such patterns, despite the centrality of college to the transition to adulthood. The relevant literature has suffered from numerous gaps due at least in part to limited sampling and inconsistent measurement across historical and developmental time. National multi-cohort, multi-wave panel data on the patterns of college attendance and graduation provide a look at the varied educational pathways of American young adults following high school, and the role of high school predictors including substance use as an important indicator of future college attendance and success. Thus, we bring needed data to the issues, to corroborate, integrate, and extend previous findings.

College Patterns and Historical Change

Only 27.5% of participants reported not attending college at all, which is similar to other reported rates (NCES, 2012a). Nearly half (46.6%) of the participants graduated from a 4-year school and an additional 11.8% graduated from a 2-year school during the seven years following high school graduation. Even among graduates there was considerable variation in patterns. For example, 16.0% of the sample (34.3% of 4-year graduates) graduated from a 4-year school after starting late, spending part of their time at a 2-year school, and/or stopping out. Similarly, 7.2% of the sample (61.2% of 2-year graduates) graduated from a 2-year school after starting late, spending part of their time at a 4-year school, and/or stopping out. A total of 5.9% of all participants dropped out of a 4-year school and 4.5% dropped out of a 2-year school, with an additional 0.4% dropping out after attending both types of schools. At age 25, 3.3% of participants were currently in school but had not yet earned either a 2-year or 4-year degree. Overall, the two dominant patterns are graduating from a 4 year college right out of high school and not attending college at all, but neither pattern is experienced by a majority of the population, with our findings showing the wide diversity of post-high school pathways.

Historical change in college patterns has been strong and consistent, showing a clear trend toward greater 4-year college entry and completion. Results indicate that most recent cohorts are more likely to attend and graduate from 4-year and 2-year schools than previous cohorts. As noted, in the most recent cohorts women have closed the gender gap (Bailey & Dynarski, 2011; Buchmann & DiPrete, 2006; NCES, 2012d). In agreement with previous research (NCES, 2012b), Asian Americans tended to reach higher education levels than all other students, while Hispanic Americans and Black Americans were more likely to drop out of college than White Americans. Family background variables were important predictors of greater educational achievement (Ishitani, 2006). Similar to previous reports, the strongest predictor of higher achievement was high school grades (Goldrick-Rab, 2006; Herzog, 2005; Kuh et al., 2008).

The findings regarding lower college attendance rates among those with parents who did not attend college, combined with the higher college dropout rates among Hispanic and Black youth, correspond with known structural inequalities in current American society. However, interactions of cohort by race/ethnicity and cohort by parental education were not significant, suggesting that these inequalities have not changed significantly over time. That is, all race/ethnicity groups and parent education groups have experienced increases in

college attendance and graduation, and subgroup differences have remained proportionally constant over the past three decades. Much of the problem may relate to feelings of belonging, highlighting the importance of social integration as it relates to educational success (Crosnoe, 2009, 2011; Lehmann, 2007; Quinn, 2004). Given recent evidence suggesting that college education especially benefits subgroups less likely to attend (Brand & Xie, 2010), individuals and society may benefit from efforts aimed at showing how those from lower socioeconomic statuses and some racial/ethnic minority groups can be better socially integrated into the college experience and, more generally, into educational experiences across the life course.

Substance Use and College Success

The findings regarding substance use illustrate that cigarette and illicit drug use in high school are risk factors for lower educational attainment and college dropout, although it is clear that substance use and educational difficulties are reciprocally related (e.g., Bachman et al., 2008). For alcohol use, we find paradoxical effects, such that high school seniors who engaged in binge drinking were more likely to graduate from a 4-year college than to drop out. However, this was true only in models controlling for use of cigarettes, marijuana, and illegal drugs other than marijuana. In other analyses using MTF data to construct latent growth curves, having a higher level of 12^{th}-grade binge drinking was associated with college dropout among men, and a faster increase in binge drinking was associated with staying in college, although those analyses did not control for any other 12^{th}-grade predictors (Schulenberg & Patrick, 2012). Although excessive drinking and use of illicit substances and cigarettes among high school seniors may reflect current and future educational difficulties, moderate alcohol use may reflect the opposite (Crosnoe, 2011). We note that MTF data are collected during the latter half of the senior year, and it must be recognized that, while certainly not recommended, alcohol use was normative at this time of life for most of the cohorts included here (Johnston et al., 2012a). This interesting and unique relationship between alcohol use and educational success likely results from several processes including anticipatory socialization (Schulenberg & Maggs, 2002) and the social integration function of alcohol use during this time of life (Crosnoe & Riegle-Crumb, 2007).

Dropping Out of College

The fact that dropout rates were relatively low, especially in comparison to what a given institution might report, underscores the likelihood that dropping out of one university is often followed by entering another university. Fewer than two-thirds of 4-year college attenders complete a degree at the first institution they attend within 6 years (NCES, 2012b), although we show that a larger majority of those who attend college (81%) and a majority of all high school seniors (58%) do earn a 2-year or 4-year degree at some institution. In addition, by following young people for a full seven years, we were able to include stopouts who eventually returned to complete their degrees, who might appear to be dropouts in shorter-term studies. Dropout rates have not varied greatly historically, although in the most recent cohorts they are a couple of percentage points lower and down to about 9% of all high school seniors. However, it is important to note that this is likely an underestimate of the overall college dropout rate, because college dropouts are more likely to be study dropouts as well.

Strengths and Limitations

An important strength of this study is the use of national panel data from multiple cohorts across the past three decades, following representative samples of young people from the senior year of high school through age 25. In addition, measures of college attendance and predictors were consistent across cohorts and development. Together, these strengths help to bring some needed clarity and consistency to the relevant literature.

Limitations include attrition and the 2-year gap between data collection (except for the one year between senior year and the first follow-up survey). As is true for longitudinal studies of drug use, attrition is higher among drug users and it may be higher among those who drop out of college, which biases our sample towards those who are functioning better in young adulthood. This suggests that our findings are likely an underestimate of college dropping-out and of the relationship between substance use and college dropout. A biennial data collection design is not optimal for estimating dropping out, stopping out, and enrolling. Future research with representative samples is required, including studies with more detailed measures of time to degree, institutional characteristics, receipt of financial aid, and the effects of concurrent experiences during college on retention and achievement. This study provides a needed broad overview of patterns of college attendance among American young adults, and certainly sets the stage for future research regarding the nuances of these patterns and their associations with other time-varying covariates and role transitions and outcomes among young adults.

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Table 1
Distribution of College Attendance Patterns

Attendance Patterns	Percent	Weighted *N*
4-Year Graduates	**46.6**	**4668**
Stay-in[a] 4-Year Graduate	30.6	3066
Stay-in Combined[b] 4-Year Graduate	5.8	580
Late start[c] 4-Year Graduate	4.4	443
Late start Combined 4-Year Graduate	0.9	89
Stopout[d] 4-Year Graduate	4.3	433
Stopout Combined 4-Year Graduate	0.6	57
2-Year Graduates	**11.8**	**1184**
Stay-in 2-Year Graduate	4.6	459
Stay-in Combined 2-Year Graduate	0.9	86
Late start 2-Year Graduate	3.9	395
Late start Combined 2-Year Graduate	0.2	20
Stopout 2-Year Graduate	1.6	161
Stopout Combined 2-Year Graduate	0.6	63
Still Enrolled at Age 25 (Non-Graduates)	**3.3**	**329**
Stay-in 4-Year Non-Graduate	0.2	21
Stay-in Combined Non-Graduate	0.1	12
Late start 4-Year Non-Graduate	0.9	91
Late start 2-Year Non-Graduate	0.7	71
Late start Combined Non-Graduate	0.2	17
Stopout 4-Year Non-Graduate	0.7	75
Stopout 2-Year Non-Graduate	0.1	13
Stopout Combined Non-Graduate	0.3	26
Dropouts	**10.8**	**1084**
Immediate-start[e] 4-Year Dropout[f]	5.2	522
Late-start 4-Year Dropout	0.7	74
2-Year Dropout	3.6	357
Late-start 2-Year Dropout	0.9	87
Combined Dropout	0.4	44
Never Attenders	**27.5**	**2755**

Note. Total *N*=10,020.

[a]Stay-in refers to continuous enrollment until graduation.

[b]Combined refers to students who attended both 2-year and 4-year schools across the follow-up waves.

[c]Late-start refers to those who did not attend until after age 19.

[d]Stop-out refers to those who reported dropping out before returning to graduate.

[e]Immediate start refers to students who enrolled the year following high school.

[f] Dropout refers to those who left school and did not graduate.

Table 2

Descriptive Information on Predictors

	Mean	SD
Gender		
Male	0.40	0.45
Race/Ethnicity		
White	0.84	0.33
Black	0.06	0.22
Hispanic	0.04	0.19
Asian	0.03	0.14
Other race	0.03	0.15
Family Background		
Two-parent family	0.82	0.35
Parent some college education	0.65	0.43
High School Predictors		
High school grades (>B-)	0.84	0.33
Cigarette use	0.26	0.40
Binge drinking	0.29	0.41
Marijuana use	0.18	0.35
Other illicit drug use	0.09	0.26
Type of College Attendance		
Late start	0.17	0.35
Combined	0.14	0.32
Stopout	0.11	0.29

Note. All predictors are dichotomous, with minimum value=0 and maximum value=1.

Table 3

Percentage of Respondents Reporting Each College Attendance Pattern by Cohort Year, Gender, Race/Ethnicity, and Parental Education

	Weighted *N*	4-Year Graduates	2-Year Graduates	Still Enrolled	Dropouts	Never Attended
Cohort (12th Grade)						
1977-1985	*3882*	36.6	12.4	2.7	11.0	37.3
1986-1994	*3468*	47.7	11.5	3.7	11.9	25.2
1995-2003	*2685*	59.3	11.9	3.4	9.3	16.1
Gender						
Female	*5970*	46.8	12.5	2.7	10.6	27.4
Male	*4065*	46.1	11.2	4.0	11.2	27.5
Race/Ethnicity						
White	*8369*	47.8	11.8	3.1	10.3	26.9
Black	*600*	34.6	13.1	3.8	15.6	32.9
Hispanic	*440*	34.1	12.2	1.4	15.5	34.1
Asian	*276*	68.8	11.2	2.8	9.1	8.1
Other	*267*	34.0	12.6	4.9	9.6	38.9
Parental Education						
Some College	*6608*	58.5	10.8	3.5	11.0	16.2
No College	*3499*	28.1	13.4	2.8	10.0	45.7

Note. Chi-square tests indicated significant differences ($p < .001$) by cohort, $\chi^2(8)=481.0$; race/ethnicity, $\chi^2(16)=185.7$; and parental education $\chi^2(4)=1232.6$. Gender differences were significant at $p < .05$, $\chi^2(4)=10.5$.

Table 4

Odds Ratios (OR) and 95% Confidence Intervals (95% CI) for Logistic Regressions Predicting Any College Attendance, 2-Year College Graduation, and College Dropout

	Any College Attendance vs. No College Attendance	2-year Graduation vs. 4-year Graduation	College Dropout vs. 4-year Graduation
Demographics	OR (95% CI)	OR (95% CI)	OR (95% CI)
Cohorts 1977-1985[1]	0.64 (0.52-0.77) ***	1.28 (0.93-1.77)	1.12 (0.80-1.53)
Cohorts 1995-2003[1]	1.56 (1.21-2.00) ***	1.07 (0.75-1.53)	0.48 (0.32-0.72) ***
Male gender	0.99 (0.83-1.19)	1.22 (0.95-1.56)	1.32 (1.04-1.68) *
Black[2]	1.12 (0.89-1.41)	0.89 (0.63-1.26)	1.72 (1.27-2.31) ***
Hispanic[2]	0.81 (0.63-1.04)	1.26 (0.86-1.83)	2.26 (1.61-3.17) ***
Asian[2]	3.76 (2.22-6.35) ***	0.64 (0.40-1.01)	0.68 (0.43-1.10)
Other race[2]	0.63 (0.46-0.86) **	1.30 (0.80-2.10)	1.09 (0.64-1.84)
Family Background			
Two-parent family	1.39 (1.21-1.58) ***	0.82 (0.67-0.99) *	0.78 (0.64-0.94) *
Parent some college education	3.91 (3.27-4.69) ***	0.42 (0.32-0.55) ***	0.45 (0.34-0.58) ***
High School Predictors			
High school grades (≥B-)	4.03 (3.53-4.61) ***	0.32 (0.26-0.41) ***	0.26 (0.21-0.33) ***
Cigarette use	0.56 (0.49-0.63) ***	1.55 (1.28-1.88) ***	1.32 (1.08-1.61) **
Binge drinking	0.97 (0.85-1.08)	0.86 (0.71-1.04)	0.81 (0.67-0.98) *
Marijuana use	0.97 (0.83-1.13)	0.99 (0.78-1.24)	1.38 (1.10-1.73) **
Other illicit drug use	0.73 (0.61-0.88) ***	1.19 (0.89-1.59)	1.66 (1.26-2.19) ***
Type of College Attendance			
Late start	N/A	4.41 (3.71-5.24) ***	0.53 (0.40-0.69) ***
Combined	N/A	1.09 (0.89-1.33)	0.23 (0.16-0.32) ***
Stopout	N/A	3.24 (2.66-3.94) ***	N/A
Interactions			
1977-1985 × Male gender	1.00 (0.79-1.27)	0.50 (0.36-0.72) ***	0.56 (0.40-0.78) ***

	Any College Attendance vs. No College Attendance	2-year Graduation vs. 4-year Graduation	College Dropout vs. 4-year Graduation
1995-2003 × Male gender	0.98 (0.72-1.32)	0.70 (0.48-1.02)	0.98 (0.67-1.43)

*** *Note.* $p<.001$,

** $p<.01$,

* $p<.05$.

[1] Reference group was 1986-1994.

[2] Reference group was White. Any College Attendance (n=6912) vs. No college attendance (n=2365). 2-year graduation (n=1060) and Dropout (n=996) vs. 4-year graduation (n=4540).