Published in final edited form as:

J Abnorm Psychol. 2009 May ; 118(2): 241–255. doi:10.1037/a0015126.

Dual Mechanisms Underlying Accentuation of Risky Drinking via Fraternity/Sorority Affiliation: The Role of Personality, Peer Norms, and Alcohol Availability

Aesoon Park¹, Kenneth J. Sher¹, Phillip K. Wood¹, and Jennifer L. Krull^{1,2}

¹ Department of Psychological Sciences, University of Missouri—Columbia and the Midwest Alcoholism Research Center, Columbia, Missouri

² Department of Psychology, University of California, Los Angeles

Abstract

Heavy drinkers prior to college have been shown to increase their drinking in college via their self-selection into the Greek societies and subsequent Greek influence on their drinking. This study characterized the dual mechanisms underlying these processes: (a) the Greek selection on the basis of personality and precollege drinking and (b) the Greek influence through alcohol-conducive environmental factors. Prospective data obtained in the summer prior to college and over the first 6 semesters of college ($N = 3,099$) indicated strong precollege drinking-based selection, strong initial influence immediately after college entrance, and sustained influence afterward. Impulsivity/novelty seeking was associated with Greek affiliation both directly and indirectly via precollege drinking, whereas extraversion and neuroticism were associated with Greek affiliation largely independent of precollege drinking. Greek affiliation was related to higher levels of drinking norms immediately after college entrance and alcohol availability by the sophomore year, but not afterward, after controlling for prior drinking. Findings highlight the diverse mechanisms underlying accentuation of risky drinking over the transition to college and during the college years, through dynamic interplay between individuals and high-risk environments.

Keywords

risky drinking; fraternity and sorority affiliation; personality; peer drinking norms; alcohol availability

Population-based studies have shown that problematic drinking is largely a phenomenon of young adulthood. For example, the highest prevalence rates of both alcohol abuse and dependence were found among individuals ages 18–29 (Grant et al., 2004), with 18 as the peak age of onset (Li, Hewitt, & Grant, 2004). Among young adults, college students show higher rates of heavy drinking (Johnston, O'Malley, & Bachman, 2003; Slutske et al., 2004) and an alcohol use disorder (Dawson, Grant, Stinson, & Chou, 2004; Slutske, 2005; Substance Abuse and Mental Health Services Administration, 2003) than do their noncollegiate age peers, although the effect of college enrollment differs across measures of alcohol use and misuse (White & Jackson, 2004–2005). Nearly 80% of college students drink, 40% engage in heavy drinking (O'Malley & Johnson, 2002), and approximately 20% meet diagnostic criteria for an alcohol use disorder (Dawson et al., 2004; Knight et al., 2002; Slutske, 2005). Problematic

drinking among college students is associated with an array of direct and indirect consequences (Perkins, 2002a), including an estimated 696,000 physical assaults, 97,000 sexual assaults, and 1,717 unintentional deaths in 2001 (Hingson, Heeren, Winter, & Wechsler, 2005). Thus, although drunken excess is normative among college students, college drinking involves serious harms and symptomatology.

Among college students, fraternity and sorority members have long been shown to be at high risk for alcohol problems. Greek members are more likely to drink, to drink heavily, to experience negative consequences due to drinking, and to meet criteria for an alcohol use disorder than are nonmembers (e.g., Alva, 1998; Engs, Diebold, & Hanson, 1996; Knight et al., 2002; Wechsler et al., 2002). Greek residence was the strongest predictor of binge drinker status among 33 demographic, precollege and college variables (Wechsler, Dowdall, Davenport, & Castillo, 1995). A large national study of fraternity members (Caudill et al., 2006) found that 86% had five or more drinks once or more and 64% three times or more during the previous 2 weeks, reaching an average estimated blood alcohol concentration level of .10 when they drank. Wechsler, Dowdall, Maenner, Gledhill-Hoyt, and Lee (1998) maintained that Greek organizations are “at the center of the campus alcohol culture,” with enormous influence on campus-wide drinking, and thus successful intervention to decrease this alarming degree of drinking in the Greek system would be a prerequisite for addressing college drinking problems.

Selection and Influence Processes in Greek Drinking: Accentuation of Risking Drinking

Risky drinking in the Greek system appears a function of both intraindividual characteristics of Greek members and alcohol-conducive Greek environmental influence. Previous studies indicate that Greek members show not only a higher level of risky drinking prior to college entrance but also a greater increase in risky drinking in college, even after controlling for precollege drinking, than do nonmembers (Baer, Kivlahan, & Marlatt, 1995; Capone, Wood, Borsari, & Laird, 2007; Lo & Globetti, 1993; McCabe et al., 2005). Thus, the Greek influence effect compounds the self-selection effect such that Greek members’ already high level of risky drinking at precollege further increases due to their involvement with the Greek system—that is, accentuation of risky drinking through Greek affiliation.

However, limitations of the previous literature preclude the systematic differentiation of the roles of Greek environmental factors and individual-difference factors in Greek drinking. Most extant evidence was obtained from retrospective data (e.g., Lo & Globetti, 1993, 1995; O’Connor, Copper, & Thiel, 1996; Wechsler, Kuh, & Davenport, 1996), and therefore spurious third-variable effects cannot be controlled. The three otherwise well-designed prospective studies (i.e., Baer et al., 1995; Capone et al., 2007; McCabe et al., 2005) confounded the influence effect with the selection effect because none of them controlled for precollege drinking in examination of changes in college drinking. In addition, Baer and colleagues’ (1995) study was based on a sample of high school problem drinkers who were followed up only in the first semester of college, and thus is limited in its generalizability and characterization of a sustained Greek influence effect. Despite its virtue of generalizability, McCabe and colleagues’ (2005) national study confounded differences in timing of Greek affiliation across campuses, making it difficult to apportion variance accurately due to selection versus influence. Therefore, replication of existing studies using prospective data, including a precollege baseline and follow-ups in multiple college years, is needed.

Furthermore, the prospective single-campus study design would allow researchers to probe an unresolved question of the time when the Greek influence is puissant over the course of college. The detrimental influence of Greek affiliation may be stronger when members are initially

exposed to and highly motivated to conform to the Greek culture; alternatively, the Greek influence may be stronger when members acculturate to their organization's social climate. This has significant implications for optimal timing of prevention/intervention efforts to curb risky drinking in Greek systems.

Dual Mechanisms Underlying Accentuation of Risky Drinking

What mechanisms make this continuity, indeed accentuation, of risky drinking among Greek members possible over the transition to college, despite radical changes in many aspects of life involved in college entrance? Borrowing from the broad perspective of person–environment interplay, we propose that this continuity of problematic drinking takes place through dual processes: (a) self-selection into the Greek system on the basis of individual characteristics and (b) influence of the Greek system via its multifaceted alcohol-conducive environments.

Self-Selection Into the Greek System on the Basis of Precollege Drinking and Personality Traits

Personality research has demonstrated that individuals actively opt for environments compatible with their own dispositions. This niche-seeking process has been described as selection (Buss, 1987), proactive person–environment interaction (Caspi & Bem, 1990), and active genotype–environment correlation (Plomin, DeFries, & Loehlin, 1977; Scarr & McCartney, 1983). Evidence for this personality-based environment selection is extensive in many facets of human behaviors, from peer relationships to occupational decision to assortative marriage (Caspi, Roberts, & Shiner, 2005). This kind of personality influence may be prominent during transitional periods when there is a greater range of alternative choices and thus individuals tend to act on the basis of their preexisting characteristics (Caspi & Bem, 1990).

Similarly, individuals' dispositions are likely to influence the decision to affiliate the Greek system over the transition to college. Three broad-based personality traits may be of relevance to understanding Greek affiliation: impulsivity/novelty seeking (tendency to act rashly with little self-regulation and heightened levels of sensation- and novelty seeking), extraversion (interest and energy toward outside the self), and neuroticism (liability to experience negative emotions). Individuals with different attributes may be attracted to different aspects of the Greek system. Some of the personality effects on Greek affiliation may be related to the Greek system's emphases on academic achievement, community service, leadership, group life, and social functions, qualities rather independent of drinking. However, some of the personality effects may operate through its association with drinking behaviors, given the prominent role of personality in the etiology of alcohol use and misuse (Sher, Trull, Bartholow, & Vieth, 1999) and the Greek system's reputation for heavy drinking (Larimer, Irvine, Kilmer, & Marlatt, 1997).

Specifically, impulsivity/novelty seeking may be related to Greek affiliation, through its association with precollege drinking. A trait broadly defined by the qualities of impulsivity, disinhibition, and sensation- and novelty seeking is one of the strongest personality correlates of alcohol use and misuse as well as other externalizing disorders across clinical, general, and college populations (Sher et al., 1999). Those high in impulsivity/novelty seeking are more likely to engage in heavy drinking at precollege, which may lead them to select into the Greek system because of its ample opportunities for maintaining their drinking habits; thus, the effect of impulsivity/novelty seeking on Greek affiliation is expected to be mediated by precollege drinking. Yet, it is less clear how impulsivity/novelty seeking would differentially bias incoming students toward Greek affiliation, over and above precollege drinking. Extraversion is another personality correlate of heavy drinking (but not of alcohol problems) among college students, although evidence for its role in noncollege populations is mixed (Baer, 2002). Thus,

those high in extraversion may select into the Greek system for the same reason of continuing their drinking patterns as those high in impulsivity/novelty seeking. Simultaneously, extraverts may seek out the Greek environment because of its diverse opportunities of extracurricular activities, social events, leadership, and group life. Accordingly, extraverts are expected to opt for the Greek system for two different reasons, with one possibly related to precollege drinking and another one independent of it. Consistent with these notions, positive relations of Greek involvement with impulsivity/novelty seeking (Kahler, Read, Wood, & Palfai, 2003; Sher, Bartholow, & Nanda, 2001) and extraversion (Sher et al., 2001) were found. Despite a well-documented association of neuroticism with clinical alcoholism, its role in heavy drinking among college students has received mixed supports (Baer, 2002). Given the high rate of problematic drinking among Greek members, an association between neuroticism and Greek drinking would be worthy of exploration. It is less clear whether neuroticism would be associated with Greek affiliation after precollege drinking is accounted for.

Greek Influence via Perceived Peer Drinking Norms and Alcohol Availability

Two alcohol-conducive aspects of the Greek environment may serve as potentiating mechanisms by which Greek members' risky drinking is maintained and further augmented: perceived peer drinking norms and alcohol availability. *Perceived peer drinking norms* refer to a perception about peers' typical drinking behaviors (descriptive or behavioral norms) and/or dominant attitudes toward drinking (injunctive or attitudinal norms; Borsari & Carey, 2003; Perkins, 2002b). People's behaviors are influenced by their perception of the norm in their social group (Festinger, 1954; Jessor & Jessor, 1977). Given that peers are the most salient in their influence in adolescence (Jacob & Leonard, 1994; Kandel, 1980, 1985), it is not surprising that college students' perceived drinking norms are strongly associated with their own drinking (Borsari & Carey, 2001, 2003), even after controlling for personal attitudes toward drinking as well as other robust risk factors for drinking (Perkins & Wechsler, 1996).

Recent narrative reviews of Greek drinking have uniformly suggested that perceived peer drinking norms play a pivotal role in sustaining risky drinking within the Greek system (Barry, 2007; Borsari & Carey, 1999; Danielson, Taylor, & Hartford, 2001). Greek members report higher perceived peer descriptive (Baer, 1994; Baer, Stacy, & Larimer, 1991) and injunctive (Alva, 1998) norms than do nonmembers. These differences further increase in the first semester (Baer, 1994) and over 4 years of college (Bartholow, Sher, & Krull, 2003). Thus, Greek members who already have heavy drinking habits and permissive attitudes toward drinking may act on their propensity in the Greek system, where they perceive that their peers also engage in and approve risky drinking. Given the presumably substantial role of peer influence, it is surprising that the prospective effect of peer norms in Greek drinking has rarely been tested. In a notable exception (Sher et al., 2001), perceived peer norms in the junior year partially mediated the effect of Greek affiliation on heavy drinking in the senior year in a study of oversampled children of alcoholics; however, no prospective mediation was found in other college years.

Obviously, individuals cannot act on their intention to drink without alcohol. Increased alcohol availability is associated with increased alcohol consumption (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2002). For example, greater alcohol availability near college campuses (measured by observation ratings of alcohol specials, advertisements, age verification policy, etc.) was associated with students' higher drinking and binge drinking rates (Kuo, Wechsler, Greenberg, & Lee, 2003). Similarly, the Greek system's enabling environment with presumably easy access to alcohol may contribute to increases in risky drinking among Greek members (Borsari & Carey, 1999). This facilitating effect of alcohol availability may be crucial for those who are underage and thus otherwise have relatively limited access to alcohol (Wechsler, Kuo, Lee, & Dowdall, 2000). There are few adults to monitor compliance

with this designation regularly, although an increasing number of Greek houses have become alcohol free (Crosse, Ginexi, & Caudill, 2006). Many social functions involving alcohol are held in Greek houses, and members easily identify places to hide alcohol at their houses (Kuh & Arnold, 1993). About 60% of Greek members, compared with less than 20% of nonmembers, owned a fake identification (ID) card by the end of sophomore year (Martinez, Rutledge, & Sher, 2007). Senior members may play a facilitating role in providing underage members alcohol and handing over information about where to get alcohol without IDs or how to get fake IDs.

It is noteworthy that individuals' drinking affects their alcohol-related environments as much as those environments affect individuals' drinking (e.g., Bullers, Cooper, & Russell, 2001; Parra, Sher, Krull, & Jackson, 2007). That is, heavy drinkers are likely to opt for heavy drinking peers and situations in which alcohol is accessible, which, in turn, increase their perceived peer drinking norms and alcohol availability. Thus, this reciprocal relation between risky environments and drinking in college (as well as the effects of precollege drinking on these college factors) needs to be accounted for to characterize an accentuating role of these environmental factors in Greek drinking.

Study Hypotheses

Using longitudinal data from a cohort of incoming freshmen at a large public midwestern university assessed in the summer prior to college and six subsequent semesters of college, we tested the following hypotheses: First, both selection (with heavy precollege drinking being positively related to Greek affiliation) and influence (with Greek affiliation being associated with greater increases in college drinking) would account for the relation between Greek affiliation and risky drinking. However, it is less clear whether the influence effect would be stronger early versus late in Greek life. Second, the personality traits of impulsivity/novelty seeking, extraversion, and neuroticism would be associated with Greek affiliation. Specifically, the association of impulsivity/novelty seeking and neuroticism would be largely mediated by precollege drinking, whereas extraversion would be related to Greek affiliation both directly and indirectly through precollege drinking. Finally, Greek affiliation would be associated with higher levels of alcohol-conducive environmental factors (i.e., peer norms and alcohol availability) and greater increases of them over the course of college. In turn, those environmental factors would be related to college drinking concurrently and prospectively.

Method

Participants

Data used for the present analyses were collected as part of a prospective study of substance use and health behaviors. For the precollege assessment, 3,720 (88%) of 4,226 incoming first-time college students at the University of Missouri—Columbia completed a paper-and-pencil questionnaire in the summer orientation preceding college matriculation. This precollege sample was followed up and was administered a Web-based survey every fall (October/November) and spring (March/April) of the subsequent 4 years. Written parental permission/consent was obtained for all participants under age 18, and assent/consent was obtained from each participant. All measures and procedures were reviewed and approved by the university's institutional review board.

The following four criteria were used to select a sample for the present analyses: (a) nonmissing data for the risky drinking variables at the precollege assessment; (b) nonmissing data for the risky drinking and Greek membership variables at one or more follow-up assessments¹; (c) enrollment as a college student throughout the first six semesters of college²; and (d) being classified as either constant Greek members or constant nonmembers in a latent class analysis

(LCA; Lazarsfeld & Henry, 1968) of Greek status over the first six semesters.³ Of the precollege baseline sample ($N = 3,720$), a total of 621 (17%) participants were excluded: 14 (0.4%) due to their missing data on the risky drinking variables at the precollege assessment, 440 (12%) due to their missing data on the risky drinking and Greek membership variables at all college assessments, 2 (0.1%) due to their noncollege student status, and 165 (4%) due to their being classified by the LCA as those who either joined the Greek system later than the first semester ($n = 71$) or left the Greek system prematurely ($n = 94$). The resulting final sample ($N = 3,099$) had a mean age of 17.95 years ($SD = 0.38$; range = 16–20) at the precollege baseline and included slightly more women ($n = 1,724$; 56%) than men. This sample was predominantly Caucasian ($n = 2,800$; 90%), but it also included participants who identified themselves as African American (147; 5%), Asian (89; 3%), Hispanic (48; 2%), and Native Indian (14; 0.5%). These demographics were approximately representative of the population of the student body at the study university.

A series of attrition analyses were conducted to compare the final sample ($N = 3,099$) with those who were not included in the present analyses ($n = 621$). The effect size of each precollege variable on attrition (as measured by h and d ; Cohen, 1988) was trivial to small; a greater frequency of having 12 or more drinks in a single sitting ($d = .27$), being male ($h = .26$), a greater frequency of having five or more drinks in a single sitting ($d = .18$), being older ($d = .16$), and being non-Caucasian ($h = .02$) were associated with a higher probability of attrition. The combined effect of those variables on attrition also was minimal, as indicated by 3% of Nagelkerke R^2 in multiple logistic regression (Nagelkerke, 1991). These results suggest, however, that our findings may slightly underestimate the effects of precollege risky drinking.

Measures

Demographics—Data on participants' age, sex, ethnicity, and college enrollment status were obtained from the registrar's office of the university.

Fraternity/sorority affiliation—Greek affiliation was determined from participants' responses at each college assessment regarding their degree of affiliation with a fraternity or sorority. Note that the Greek pledge process occurs prior to the first semester at the study university. Among those who reported their Greek status, 29%–31% of women and 24%–28% of men described themselves as Greek members across the six college assessments.⁴ For the present analyses, a time-invariant dichotomous Greek status variable (1 = Greek member; 0 = nonmember) resulting from the aforementioned LCA of Greek status over the first six semesters was used. Seventy percent ($n = 2,179$) of the final sample was classified as nonmembers and 30% ($n = 920$) as Greek members.

Risky drinking—Two items were administered to measure risky drinking at the precollege and six college assessments: (a) an item measuring a frequency of having five or more drinks in a single sitting during the past 30 days and (b) an item measuring a frequency of having 12

¹Results of analyses with complete data ($n = 1,292$ – $1,320$; 42%–43% of the final sample) were very similar to those of analyses with missing data reported here.

²Analyses with only full-time students ($n = 2,241$) yielded very similar results to those reported here.

³The use of observed variables of Greek status was precluded by a high proportion of missing data on the Greek status variable (22%–32% across assessments) and a considerable proportion of participants (12%) who changed their reports of Greek status over time, with 25 different temporal patterns. Thus, LCA was used to disaggregate participants into discrete latent subgroups of Greek status, accounting for its time-varying nature and the missing data. A four-class solution was retained due to its better fit to the data, parsimony, and interpretability than other solutions. However, 95% of participants ($N = 3,099$) were classified as being either constant Greek members or constant nonmembers, according to the four-class solution. In addition, the number of individuals who were classified as those who either joined late (2%; $n = 71$) or left Greek organizations prior to the senior year (3%; $n = 94$) was too small to be meaningfully analyzed in the present analytic framework. See Park et al. (2008b) for further LCA results and hierarchical linear models demonstrating differential trajectories of substance use behaviors among four time-varying Greek status groups (although that study focused on full-time students only).

or more drinks in a single sitting during the past 30 days. The definition of a drink was given to participants as a 12-oz. can or bottle of beer or wine cooler, a 4-oz. glass of wine, or a shot of liquor straight or in a mixed drink. Participants responded to each item based on an 8-point scale ranging from 0 (*didn't drink 5/12 or more drinks in the past 30 days*), 1 (*once in the past 30 days*), 2 (*2 to 3 times in the past 30 days*), 3 (*once or twice a week*), 4 (*3 to 4 times a week*), 5 (*5 to 6 times a week*), 6 (*nearly every day*), to 7 (*every day*). Means of having five or more drinks steadily increased over seven assessments among both Greek members (from 1.68 [$SD = 1.64$] at precollege to 2.06 [$SD = 1.47$] in the spring semester of the junior year) and non-members (from 0.82 [$SD = 1.33$] to 1.09 [$SD = 1.34$]). The same pattern was found in having 12 or more drinks among Greek members (from 0.47 [$SD = 0.98$] to 0.82 [$SD = 1.26$]) and nonmembers (from 0.24 [$SD = 0.74$] to 0.34 [$SD = 0.84$]).

An item measuring having five or more drinks in a single sitting is among the most frequently used items for drinking assessment, such as the Monitoring the Future Survey (Presley, Harrold, Scouten, Lyerla, & Meilman, 1994) and the CORE Alcohol and Drug Survey (Johnston, O'Malley, Bachman, & Schulenberg, 2008a, 2008b). Heavy drinking, measured by such items, has been associated with increased levels of an array of negative physical and social consequences (Carey, 2001). However, given the highly normative nature of heavy drinking among college students (O'Malley & Johnston, 2002), assessment of nonnormative hazardous drinking using an item measuring having 12 or more drinks in a single sitting is needed to characterize a broader range of the severity of risky drinking in the Greek system and to avoid a potential ceiling effect of the typical heavy drinking measures.

Personality traits—Three measures of personality traits were administered in the first college assessment: a shortened Novelty Seeking scale (Sher, Wood, Crews, & Vandiver, 1995) of the short form of the Tridimensional Personality Questionnaire (Cloninger, 1987) and the Extraversion and Neuroticism scales of the NEO Five Factor Inventory (Costa & McCrae, 1989; for further psychometric studies, see Egan, Deary, & Austin, 2000; McCrae & Costa, 2004). The Novelty Seeking scale consists of 13 items ($\alpha = .72$), which assess the higher order personality dimension of novelty seeking, defined by the traits of exploratory excitability, impulsivity, and extravagance.⁵ Items were measured using a 0 (*false*) to 1 (*true*) scale. A sum score, ranging from 0 to 13, was used for the analyses. Extraversion ($\alpha = .81$) and Neuroticism ($\alpha = .86$) scales were each assessed by 12 items based on a 0 (*strongly disagree*) to 4 (*strongly agree*) Likert scale. Scale scores, each ranging from 0 to 48, were used for the analyses. If 25% (3) or more of the items of each scale were missing, the scale score was coded as missing; if less than 25% of items were missing, the score was prorated. Means of the Novelty Seeking, Extraversion, and Neuroticism scales were 5.15 ($SD = 2.86$), 32.72 ($SD = 5.47$), and 20.25 ($SD = 7.43$) among Greek members and 5.16 ($SD = 2.95$), 29.49 ($SD = 6.31$), and 21.52 ($SD = 8.31$) among non-members, respectively.

⁴Most fraternity members lived in fraternity houses throughout the first 3 years of college, whereas most sorority members lived in residence halls in the freshman year then moved to sorority houses in the sophomore year at the study university. To examine potential sex differences in the selection and socialization effects due to different living arrangements in the freshman year, we conducted multigroup analyses across sex for the basic selection and influence models. For 5 + drinks, no differences across sex in selection and socialization were found, $\Delta\chi^2(2, N = 3,099) = 4.32, p = .12$. For 12 + drinks, however, there were significant sex differences in socialization, $\Delta\chi^2(2, N = 3,099) = 75.59, p < .000$, but not in selection, $\Delta\chi^2(1, N = 3,099) = 2.56, p = .11$. Specifically, stronger socialization in the first semester ($b = 0.17 [SE = 0.03], p < .000$) and in the first 3 years of college ($b = 0.08 [SE = 0.02], p < .000$) was found among men than among women ($b = 0.04 [SE = 0.01], p < .000; b = 0.02 [SE = 0.01], p < .000$). Thus, this sex difference in Greek socialization seems to be a function of different risky drinking patterns across sex throughout the first 3 years of college (i.e., 12 + drinks is relatively uncommon in women), rather than of different living arrangements for male and female Greek members in the freshman year. We also note that similar processes of selection and socialization between on-campus living types (Greek houses vs. residence halls) and risky drinking across sex were found in another study using this sample (Park et al., 2008a).

⁵We note that models with the Conscientiousness scale of the NEO Five Factor Inventory, instead of the Novelty Seeking scale of the TPQ, yielded the essentially same results in terms of its significant direct and indirect effects on Greek affiliation (but with reversed direction of solutions).

Perceived peer drinking norms—At each college assessment, six items were administered to measure peer norms on the basis of 0–4 scales, with higher scores indicating higher norms: “How do most of your friends feel about drinking?” “How do most of your friends feel about getting drunk?” “How many of your close friends drink alcohol?” “How many of your close friends get drunk on a regular basis (at least once a month)?” “How many of your close friends drink primarily to get drunk?” and “When your close friends drink, how much (on average) does each person drink?” (Jessor & Jessor, 1977).⁶ A mean score of the six items ($\alpha = .91-.93$) was used for the analyses, which increased over time among Greek members (from 2.85 [$SD = 0.85$] in the first semester to 3.01 [$SD = 0.83$] in the sixth semester) and nonmembers (from 2.23 [$SD = 1.08$] to 2.44 [$SD = 1.00$]). If 25% (2) or more of the items were missing, the mean score was coded as missing; if less than 25% of items were missing, the score was prorated.

Alcohol availability—Seven items were administered to measure alcohol availability at each college assessment. First, perceived ease of obtaining alcohol was assessed on the basis of a 4-point scale ranging from 0 (*very easy*) to 3 (*very difficult*). Second, having a fake ID to obtain alcohol was assessed on the basis of a 4-point scale ranging from 0 (*No, and I have no intention of getting one*) to 3 (*Yes, and I have used it*). Third, five items, each measuring keeping alcohol in living quarters, obtaining alcohol from someone 21 or older, obtaining alcohol from someone underage, having bought alcohol themselves without being carded, and getting alcohol from home (parents, relatives), were measured on 2-point scales ranging from 0 (*no*) to 1 (*yes*). A sum score of these seven items, ranging from 0 to 11, was used for the analyses, which increased over time among Greek members (from 5.70 [$SD = 2.35$] in the first semester to 7.39 [$SD = 1.61$] in the sixth semester) and nonmembers (from 3.92 [$SD = 2.39$] to 6.81 [$SD = 1.93$]).

Items measuring alcohol availability are causal indicators rather than effect indicators (Bollen & Lennox, 1991), and thus internal consistency ($\alpha = .59-.66$) is not an appropriate psychometric index for this scale. Instead, its associations with other constructs in theoretically predicted ways provided evidence for construct validity (Cronbach & Meehl, 1955). First, the means of the alcohol availability variables dramatically increased as participants got older, as described above. Second, there were strong positive associations between alcohol availability and a frequency of having five or more drinks ($r = .61-.64$) and a frequency of having 12 or more drinks ($r = .36-.42$) during the first four semesters when 99%–100% of participants who provided data on their age were legally underage to drink alcohol. Finally, those of legal age showed much higher means (7.33 [$SD = 1.23$] and 7.40 [$SD = 1.11$]) than did those who were underage (5.68 [$SD = 2.72$] and 5.81 [$SD = 2.79$]) in the fifth and sixth semesters, respectively, when 35% and 74% of participants who provided data on their age were of legal age.

Results

Product–Moment Correlations Among Study Variables

There were large associations between the two drinking measures ($r = .61-.68$ across assessment occasions). Greek affiliation’s associations with the drinking measures were small, with a slightly larger association with having five or more drinks (5 + drinks; $r = .25-.32$) than with having 12 or more drinks (12 + drinks; $r = .13-.22$). Greek affiliation’s association with extraversion was small ($r = .23$), and its associations with impulsivity/novelty seeking ($r = -.002$) and neuroticism ($r = -.07$) were trivial. Greek affiliation’s associations with peer drinking norms ($r = .26-.29$) and alcohol availability ($r = .14-.34$) were small to moderate. Associations

⁶These six items can be divided into two items reflecting injunctive norms ($\alpha = .90-.93$) and four items reflecting descriptive norms ($\alpha = .88-.90$). The product–moment correlation coefficients between these two subsets of items were high ($r = .75-.79$) and between each subset of items, and the total six items were extremely high ($r = .87-.98$). Thus, a sum of the six items was used for the present analyses. As expected, results of each subset of items were very similar to those reported here.

of extraversion ($r =$ from $-.01$ to $-.12$) and neuroticism ($r =$ from $-.07$ to $-.03$) with the drinking variables were trivial. Small to moderate associations of novelty seeking with the drinking variables were found, with a slightly larger association with 5 + drinks ($r = .20-.32$) than with 12 + drinks ($r = .15-.22$). Peer norms' association with 5 + drinks was large ($r = .61-.66$), compared with its moderate association with 12 + drinks ($r = .35-.39$). Alcohol availability's association with 5 + drinks was moderate to large ($r = .33-.64$), compared with its small to moderate association with 12 + drinks ($r = .17-.41$). The association between peer norms and alcohol availability was moderate to large ($r = .38-.67$).

Overview of Latent Growth Models

As preliminary analyses, we estimated four unconditional latent growth models to characterize trajectories of the two drinking variables and the two alcohol-conducive environmental variables (i.e., peer norms and alcohol availability) over the first six semesters of college. As main analyses, we estimated four sets of conditional latent growth models. The first set characterized selection and influence processes between Greek affiliation and risky drinking; the second set characterized personality-based selection into the Greek system mediated by precollege drinking; and the third and fourth sets characterized the Greek influence on risky drinking, which covaried with peer norms and alcohol availability, respectively. We estimated each set of models using the two drinking measures separately.

We used Mplus Version 4 (L. K. Muthén & B. O. Muthén, 1998–2006) due to its ability to deal with categorical outcome variables and missing data. We used full information maximum-likelihood (FIML) estimation with conventional standard errors and chi-square test statistics in the unconditional models. Due to the presence of the categorical Greek status outcome variable, we used weighted least squares estimation with robust standard errors and mean- and variance-adjusted chi-square test statistic (WLSMV) in the conditional models. FIML and WLSMV estimate a likelihood function for each individual on the basis of all available variables to take full use of the present data, without interposing missing data values. FIML estimation assumes missing at random (Little & Rubin, 2002), where missingness is allowed to be a function of the observed covariates and outcomes. WLSMV allows missingness to be a function of the observed covariates but not the observed outcomes. Note that the test statistic and the degrees of freedom of WLSMV are calculated on the basis of a chi-square distribution of p values, and thus models with the same number of free parameters may have different degrees of freedom (B. O. Muthén, 1998–2004, pp. 19–20).

Unconditional Latent Growth Models

Risky drinking—We estimated two growth factors (i.e., intercept and slope) in separate unconditional models for each of the two drinking variables. The intercept factor represented the mean level in the first semester of college, and the slope factor represented the linear change over the first six semesters of college. The intercept was specified by setting factor loadings for the manifest indicators to 1. The slope factor's loadings were scaled to be proportional to months following the first semester assessment (0, 0.5, 1.2, 1.7, 2.4, and 2.9). The covariance between the two factors was estimated; covariances among errors of repeated measures were constrained to zero. Models showed excellent fits to the data, both for 5 + drinks, $\chi^2(16, N = 3,099) = 76.71, p < .001$; comparative fit index (CFI) = .993; Tucker-Lewis Index (TLI) = .994; root-mean-square error of approximation (RMSEA) = .035 (95% confidence interval [CI] = .027, .043), and for 12 + drinks, $\chi^2(16, n = 3,089) = 94.32, p < .001$; CFI = .989; TLI = .989; RMSEA = .040 (95% CI = .032, .048), even though the chi-squares were significant due to a large sample size. We found significantly positive means of the growth factors, for 5 + drinks (b [unstandardized estimate] = 1.34 [$SE = 0.03$] for intercept, and $b = 0.04$ [$SE = 0.01$] for slope) and for 12 + drinks ($b = 0.40$ [$SE = 0.02$] for intercept, and $b = 0.06$ [$SE = 0.02$] for slope; all $ps < .001$). These findings indicated that participants, on average, consumed five or

more drinks in a sitting once to twice per month and consumed 12 or more drinks less than once per month in the first semester; the frequency of those drinking behaviors increased over the first six semesters. We found significant variances of intercept and slope, for 5 + drinks (1.58 and 0.08) and for 12 + drinks (0.56 and 0.04, respectively; all $ps < .001$). We found significantly negative covariance between intercept and slope for 5 + drinks, β (standardized estimate) = $-.30$, $p < .001$, indicating that participants with a higher level of 5 + drinks in the first semester tended to increase their drinking to a smaller degree over time than did those with a lower initial level. This result may represent a phenomenon “regression toward the mean” or the “law of initial values,” frequently observed in longitudinal data (Rogosa, 1988; Shrout & Bolger, 2002). Covariance between intercept and slope was not significant for 12 + drinks ($\beta = -.05$, $p = .21$), reflecting no relation between its initial level in the first semester and its increase over time.

Perceived peer drinking norms—The unconditional model of peer norms was estimated in the same manner as the aforementioned models of risky drinking. The model showed an adequate fit to the data, $\chi^2(16, N = 3,091) = 289.75$, $p < .001$; CFI = .979; TLI = .980; RMSEA = .074 (95% CI = .067, .082). We found significantly positive means of the growth factors, $b = 2.48$ ($SE = 0.02$) for intercept, and $b = 0.06$ ($SE = 0.01$) for slope ($ps < .001$), indicating that participants’ perceived peer drinking norms increased over time. We found significant variances of intercept and slope, 0.98 and 0.05, respectively ($ps < .001$). We found significantly negative covariance between intercept and slope ($\beta = -.40$, $p < .001$), indicating that participants with a higher level of peer norms in the first semester tended to show a smaller increase over time than did those with a lower initial level.

Alcohol availability—The unconditional model of alcohol availability with an intercept factor and a linear slope factor did not fit the data well, $\chi^2(16, N = 3,099) = 1277.39$, $p < .001$; CFI = .831; TLI = .841; RMSEA = .159 (95% CI = .152, .167). Observed mean levels of alcohol availability indicated that a rate of increases of alcohol availability in the first four semesters (4.43–5.27) was much smaller than a rate of increases afterward (5.27–6.98). This dramatic increase of alcohol availability in the junior year was understandable, given that increasing numbers of participants had attained legal age by the fall (35%) and spring (74%) semesters of the junior year. Thus, we modeled these differential rates of changes in alcohol availability using two slope factors: the first slope factor representing the linear change in the first four semesters (with factor’s loadings of 0, 0.5, 1.2, 1.7, 1.7, and 1.7 for six college measurements) and the second slope factor representing the linear change in the following two semesters (with factor’s loadings of 0, 0, 0, 0, 0.7, and 1.2). This piecewise unconditional latent growth model showed an excellent fit to the data, $\chi^2(12, N = 3,099) = 61.65$, $p < .001$; CFI = .993; TLI = .992; RMSEA = .037 (95% CI = .028, .046).⁷ We found significantly positive means of the intercept and the first and second slope factors (4.46 [$SE = 0.05$], 0.58 [$SE = 0.03$], and 1.31 [$SE = 0.05$], respectively, $ps < .001$). This result indicated that alcohol availability, on average, increased in the first 2 years and then drastically increased in the junior year. We found significant variances of the intercept and the two slopes (5.12, 0.95, and 3.53, respectively, $ps < .001$). Significantly negative covariances of intercept with the first slope factor ($\beta = -.13$) and with the second slope factor ($\beta = -.62$, $ps < .001$) indicated that participants with a higher level of alcohol availability in the first semester showed smaller increases over the 3 years than did those with a lower initial level. A significantly negative covariance between the first and second slope factors ($\beta = -.42$, $p < .001$) indicated that participants with a greater increase in

⁷An unconditional model with intercept, linear slope, and quadratic slope also showed an adequate fit to the data, $\chi^2(12, N = 3,099) = 151.13$, $p < .001$; CFI = .981; TLI = .977; RMSEA = .061 (95% CI = .053, .070). However, this quadratic growth model was not used for the final analyses because of its high covariance between the linear and quadratic slope factors ($\beta = -.93$, $p < .001$), limiting interpretation of the estimates.

the first 2 years showed a smaller increase in the junior year than did those with a smaller increase in the first 2 years.

Selection and Influence Processes

We included precollege drinking as an exogenous manifest variable and dichotomous Greek status as an endogenous categorical variable; we included the two growth factors of college drinking (i.e., intercept and slope from the unconditional models) as covarying endogenous latent variables. Paths from precollege drinking to the two college drinking factors were estimated to control for the effect of precollege drinking on college drinking. The effects of sex on all variables in the models were also controlled for (paths are not shown in figures). Standardized estimates (unstandardized estimates in parentheses) for each model of the two drinking variables are shown in Figure 1.

The models showed an excellent fit to the data, both for 5 + drinks, $\chi^2(8, N = 3,099) = 20.38$, $p = .01$; CFI = .994; TLI = .995; RMSEA = .022, and for 12 + drinks, $\chi^2(10, N = 3,099) = 100.45$, $p < .001$; CFI = .981; TLI = .988; RMSEA = .054. Results supported both selection and influence processes between Greek affiliation and the two drinking variables. Specifically, a significant positive path from precollege drinking to Greek status, both for 5 + drinks ($\beta = .34$, $b = 0.24$ [$SE = 0.02$]) and for 12 + drinks ($\beta = .18$, $b = 0.22$ [$SE = 0.03$]), $ps < .001$ indicated a strong selection effect such that individuals with heavier precollege drinking were more likely to join the Greek system. Significant positive paths from Greek status to the intercept factor, both for 5 + drinks ($\beta = .16$, $b = 0.19$ [$SE = 0.03$]) and for 12 + drinks ($\beta = .12$, $b = 0.09$ [$SE = 0.01$]), $ps < .001$, reflected an initial Greek influence effect such that Greek members drank more heavily than did nonmembers in the first semester, even after controlling for their heavier precollege drinking. Significant positive paths from Greek status to the slope factor, both for 5 + drinks ($\beta = .19$, $b = 0.05$ [$SE = 0.01$]) and for 12 + drinks ($\beta = .21$, $b = 0.05$ [$SE = 0.01$]), $ps < .001$, indicated a sustained Greek influence effect such that Greek members increased their risky drinking over time more than did nonmembers, even after controlling for prior risky drinking.

Notably, the two drinking variables showed the different degrees of the initial and sustained Greek influence effects over the first 3 years of college in terms of absolute magnitudes based on those measures (as indicated by unstandardized estimates). For 5 + drinks, the initial influence effect ($b = .19$) in the first semester was slightly larger than the accumulating sustained influence effect for the subsequent 3 years of college (i.e., $b = .05 \times 2.9 = .15$). For 12 + drinks, however, the initial influence effect ($b = .09$) was slightly smaller than the accumulating sustained influence effect (i.e., $b = .05 \times 2.9 = .15$).

Personality-Based Self-Selection Into the Greek System

Building on the aforementioned basic selection and influence model, we added three personality traits as covarying exogenous pseudolent variables, correcting attenuation due to unreliability of those measures (Schmidt & Hunter, 1996). Paths from personality to Greek affiliation represented direct effects of personality traits on Greek affiliation; paths from personality to precollege drinking and, in turn, to Greek affiliation represented indirect (mediated) effects.⁸ The effects of personality traits on college drinking were modeled by estimating paths from personality traits to the college drinking growth factors (paths are not shown in figures). The effects of sex on all variables in the models were also controlled for (paths are not shown in figures). Standardized estimates for each model of the two drinking variables are shown in Figure 2. The unstandardized estimates (and 95% CI based on 500 bootstrap draws) of indirect effects, direct effects, and total effects, and the proportions of the total effects mediated (as a measure of effect size of a mediator; MacKinnon & Dwyer, 1993) are shown in Table 1. Due to the opposite directions between indirect and direct effects

of impulsivity/novelty seeking and neuroticism, we calculated those personality traits' total effects by summing absolute values of direct and indirect effects (MacKinnon, 2003).

The models showed an excellent fit to the data, both for 5 + drinks, $\chi^2(12, N = 3,099) = 25.98$, $p = .01$; CFI = .995; TLI = .995; RMSEA = .019, and for 12 + drinks, $\chi^2(18, N = 3,099) = 124.16$, $p < .001$; CFI = .984; TLI = .987; RMSEA = .044. For 5 + drinks, the effects of all three personality traits on Greek affiliation were partially mediated by precollege drinking, as indicated by their significant direct and indirect effects. Specifically, individuals high in impulsivity/novelty seeking ($\beta = .34$), high in extraversion ($\beta = .09$), and low in neuroticism ($\beta = -.10$, all $ps < .001$) engaged in heavier drinking at precollege. Then, in turn, individuals with higher rates of 5 + drinks at precollege were more likely to join the Greek system ($\beta = .34$, $p < .001$). As shown in Table 1, those indirect effects were significant. Even after controlling for precollege drinking, we found significant direct effects on Greek affiliation such that individuals low in impulsivity/novelty seeking ($\beta = -.15$), high in extraversion ($\beta = .39$), and high in neuroticism ($\beta = .13$, all $ps < .001$) were more likely to become Greek members. Notably, models only with neuroticism indicated that individuals low (instead of high) in neuroticism were more likely to join the Greek system, as indicated by a significant negative direct path from neuroticism to Greek affiliation, both for 5 + drinks ($\beta = -.09$) and for 12 + drinks ($\beta = -.11$, $ps \leq .001$); thus, the positive direct effect of neuroticism on Greek affiliation in models with all three personality traits appeared to be a suppression effect attributable to having impulsivity/novelty seeking and extraversion in the models.

For 12 + drinks, we found very similar patterns of results with one exception. That is, indirect effects of extraversion and neuroticism were not significant, due to nonsignificant paths from extra-version ($\beta = .02$, $p = .51$) and from neuroticism ($\beta = -.05$, $p = .08$) to precollege 12 + drinks. This result suggested that extra-version and neuroticism were not associated with precollege 12 + drinks and that individuals high in extraversion ($\beta = .42$) and high in neuroticism ($\beta = .11$, $ps < .001$) tended to join the Greek system largely independent of this extremely risky precollege drinking.⁹

Greek Influence Processes via Alcohol-Conducive Environmental Factors

Perceived peer drinking norms—Building on the basic selection and influence model described earlier, we included two growth factors of peer norms (i.e., intercept and linear slope from the unconditional model) as covarying endogenous latent variables. To model concurrent reciprocal influences between college drinking and peer norms, we correlated their intercepts

⁸Note that personality traits were measured in the first semester of college, although they conceptually precede precollege drinking and Greek affiliation. Two sets of ancillary analyses were conducted to examine the robustness of our findings. First, a set of models, in which covarying personality traits and precollege risky drinking jointly affected Greek affiliation, were estimated (which have identical model fit indices as those reported here). The relations between personality traits and precollege drinking and those variables' effects on Greek affiliation remained remarkably similar to those reported here. Second, a set of models with risky drinking in the second semester (which was temporally later than the personality measurement) mediating the relation between personality traits and Greek affiliation also yielded remarkably similar results, with excellent model fit indices. These results supported the robustness of our findings in terms of the role of risky drinking in personality-based selection into the Greek system.

⁹Personality measures used in the present study are designed to assess only major personality domains, and thus they do not include sufficient items to assess each facet of the major domains. Nonetheless, exploratory ancillary analyses were conducted to examine whether specific subordinate facets account for our findings in major domains. Overall, results of subordinate facets were remarkably similar to those of the major personality domains, especially in magnitude of estimates. For the Novelty Seeking domain, indirect effects of the two facets examined, Impulsivity (five items; $\alpha = .62$) and Extravagance (seven items; $\alpha = .62$), were significant and remarkably similar to those of the Novelty Seeking domain, both for five or more drinks ($.08 \leq bs \leq .10$) and for 12 or more drinks ($bs = .03$). For the Extraversion domain, indirect effects of the facets of Activity (three items; $\alpha = .64$) and Positive Emotion (four items; $\alpha = .65$) were trivial and nonsignificant for both drinking measures ($.000 \leq bs \leq .03$); however, indirect effects of the Gregariousness facet (two items; $\alpha = .48$) were significantly positive both for five or more drinks ($b = .12$, $p < .001$) and for 12 or more drinks ($b = .03$, $p = .04$). For the Neuroticism domain, indirect effects of four facets examined, Anxiety (measured by three items; $\alpha = .62$), Depression (four items; $\alpha = .76$), Self-Consciousness (two items; $\alpha = .54$), and Vulnerability (two items; $\alpha = .44$), were similar to those of the Neuroticism domain, both for five or more drinks ($-.09 \leq bs \leq -.01$) and for 12 or more drinks ($-.03 \leq bs \leq .01$), despite their inconsistent significance patterns. However, future replication of these preliminary results, using full scales of each personality facets, is warranted.

as well as their slopes. To model their prospective reciprocal influences, we also estimated a path from the intercept of peer norms to the slope of college drinking and a path from the intercept of college drinking to the slope of peer norms. We estimated paths from Greek affiliation to the growth factors of college drinking and peer norms to represent the Greek influence effects. The effects of precollege drinking on Greek affiliation and the growth factors of college drinking and peer norms and the effects of sex on all variables in the models were controlled for (paths are not shown in figures). Standardized estimates for each model of the two drinking variables are shown in Figure 3, left panel.

The models showed an excellent fit to the data, both for 5 + drinks, $\chi^2(13, N = 3,099) = 39.49$, $p < .001$; CFI = .990; TLI = .994; RMSEA = .026, and for 12 + drinks, $\chi^2(28, N = 3,099) = 156.19$, $p < .001$; CFI = .975; TLI = .990; RMSEA = .038. Findings were very similar across the two drinking measures. Greek affiliation was associated with a higher level of peer norms in the first semester, for 5 + drinks ($\beta = .25$) and for 12 + drinks ($\beta = .36$, $ps < .001$). In turn, this level of peer norms in the first semester was positively related to the level of drinking in the first semester, for 5 + drinks ($r = .30$) and for 12 + drinks ($r = .18$, $ps < .001$). Individuals high in peer norms in the first semester also tended to increase risky drinking to a smaller degree for 5 + drinks ($\beta = -.18$, $p < .001$) but not for 12 + drinks ($\beta = .003$, $p = .93$). However, despite this smaller increase rate of 5 + drinks, those high in peer norms in the first semester still engaged in heavy drinking in the sixth semester much more frequently than did those low in peer norms in the first semester. That is, when participants were divided into three mutually exclusive groups in terms of their peer norms in the first semester (as indicated by a factor score of the intercept), a mean frequency of 5 + drinks in the sixth semester for individuals high in peer norms (one standard deviation above the mean) was much higher (2.66, $SD = 1.30$) than for individuals low in peer norms (one standard deviation below the mean; 0.27, $SD = 0.78$), as well as for individuals in the middle (between -1 and 1 standard deviation; 1.38, $SD = 1.35$). More important, changes in peer norms were positively associated with changes in drinking, for 5 + drinks ($r = .38$) and for 12 + drinks ($r = .14$, $ps < .001$), which implied the larger increase in peer norms may be associated with the larger increase in risky drinking after accounting for the effects of Greek affiliation and the peer norms in the first semester.

Alcohol availability—We estimated models in the same manner as the models of peer norms described above, except that alcohol availability was represented by three growth factors (i.e., intercept, linear slope of the freshman and sophomore years, and linear slope of the junior year from the unconditional model). Standardized estimates for each model of the two drinking variables are shown in Figure 3, right panel.

The models showed an excellent fit to the data, both for 5 + drinks, $\chi^2(15, N = 3,099) = 39.84$, $p < .001$; CFI = .992; TLI = .995; RMSEA = .023, and for 12 + drinks, $\chi^2(27, N = 3,099) = 163.99$, $p < .001$; CFI = .978; TLI = .989; RMSEA = .040. We found very similar results across the two drinking measures. Greek affiliation was associated with a higher level of alcohol availability in the first semester, for 5 + drinks ($\beta = .31$) and for 12 + drinks ($\beta = .42$, $ps < .001$). Greek affiliation was also associated with a greater increase in alcohol availability in the freshman and sophomore years, for 5 + drinks ($\beta = .14$, $p = .003$) and for 12 + drinks ($\beta = .15$, $p < .001$). In turn, alcohol availability in the first semester was positively related to drinking in the first semester, for 5 + drinks ($r = .30$) and for 12 + drinks ($r = .23$, $ps < .001$). Individuals with high alcohol availability in the first semester also tended to increase risky drinking to a smaller degree, for 5 + drinks ($\beta = -.32$, $p < .001$) and for 12 + drinks ($\beta = -.08$, $p = .02$). Despite this smaller increase in college drinking, however, those high in alcohol availability in the first semester still engaged in risky drinking in the sixth semester much more frequently than did those low in alcohol availability in the first semester. Mean frequencies of 5 + drinks and 12 + drinks in the sixth semester for individuals high in alcohol availability (one standard deviation above the mean of the factor score of the intercept) were much higher (2.66, $SD = 1.32$; and

1.34, $SD = 1.50$) than individuals low in alcohol availability (one standard deviation below the mean; 0.28, $SD = 0.71$; and 0.08, $SD = 0.41$), and than individuals in the middle (between -1 and 1 standard deviation; 1.40, $SD = 1.38$; and 0.41, $SD = 0.87$, respectively). More important, an increase of alcohol availability in the first four semesters was positively related to an increase of drinking in the first six semesters, for 5 + drinks ($r = .32$) and for 12 + drinks ($r = .17$, $ps < .001$) after accounting for the effects of Greek affiliation and the alcohol availability in the first semester.

We found a different pattern of results for alcohol availability in the junior year. Greek affiliation was associated with a smaller increase in alcohol availability in the junior year, for 5 + drinks ($\beta = -.18$) and for 12 + drinks ($\beta = -.30$, $ps < .001$). Interestingly, a greater increase in alcohol availability in the junior year was associated with a smaller increase in risky drinking over the first six semesters, for 5 + drinks ($r = -.11$) and for 12 + drinks ($r = -.09$, $ps \leq .001$). This result indicated that nonmembers quickly caught up with Greek members in alcohol availability as they approached or attained legal age and that this normative increase in alcohol availability was not accompanied by a greater increase in risky drinking.

Discussion

The present study extends previous research on risky drinking among Greek members in several important ways. First, the self-selection and influence processes were replicated using prospective data of an inclusive sample assessed at precollege and over the first 3 years of college. Most of the Greek influence effects occurred in the first semester, although clear evidence was found for continuing influence effects over 3 years. Second, three major personality traits were associated with selection into the Greek system, but in markedly distinct ways. Specifically, impulsivity/novelty seeking was associated with Greek affiliation both directly and indirectly via precollege drinking, whereas extraversion and neuroticism were associated with Greek affiliation largely independent of precollege drinking. Third, Greek affiliation was associated with higher levels of perceived peer drinking norms and alcohol availability in the first semester and a greater increase in alcohol availability until the sophomore year. However, Greek affiliation was not associated with further increases in these high-risk environmental factors in the junior year, after controlling for prior drinking. Together, these selection and influence processes in the relation between Greek affiliation and risky drinking represent a facet of the broader issue of the mechanisms by which risky behaviors are shaped and manifested through a dynamic interplay between individuals and their environments within a specific developmental context (e.g., Huba & Bentler, 1982; Jessor & Jessor, 1977; Zucker & Noll, 1982).

Selection and Influence Processes of Greek Drinking

The presence of both selection and influence processes confirms earlier research (e.g., Baer et al., 1995; Capone et al., 2007; McCabe et al., 2005); however, several methodological strengths of the present study (i.e., nonselective nature of the sample, extended follow-ups in college, controlling precollege drinking effects on college drinking, and incorporating missing data) permit more convincing inferences than prior research allowed. Findings indicate that involvement in the Greek system enables precollege heavy drinkers to maintain and indeed further increase their drinking over the transition to college. The concept of an “accentuation effect” of individual–environment interactions (Feldman & Newcomb, 1969) describes the nature of this relation precisely in that “initial differences ... which motivate an individual to enter and interact in an environment may tend to be reinforced and accentuated by the experiences in the environment” (Walsh, 1973, p. 60), and consequently, the initial characteristics are extended by the environment over time.

Notably, the Greek influence effect in the first semester was much greater than the sustained influence effect afterward, especially in relatively normative heavy drinking (i.e., having five or more drinks in a single sitting). However, the accumulated Greek influence effects were substantial such that a difference in the rates of risky drinking as a function of Greek status in the first semester was almost doubled for having five or more drinks and tripled for having 12 or more drinks by the end of junior year. This finding indicates that the threshold for examining risky drinking among Greek members may be too low to delineate properly hazardous aspects of Greek drinking in much of the extant research. Measures of more extreme drinking behaviors need to be incorporated in future studies.

Personality Traits and Precollege Drinking: Multiple Paths of Selection

Our finding of selection into the Greek system on the basis of the major personality traits is consistent with the notion of the “dispositionally guided selection” (Caspi & Herbener, 1990), in which individuals actively select into certain environments compatible to their personal characteristics. This demonstration of personality-based selection into the high-risk environment for drinking is significant, given that extant alcohol literature has characterized selection solely on the basis of drinking behaviors (i.e., heavier drinkers select into environments that are conducive to a heavy drinking lifestyle). Notably, the mechanisms by which those personality traits affect the selection process differed in fundamental ways, with some associated with risky drinking and some associated with nondrinking aspects of Greek life. Thus, this represents a type of equifinality in which different processes lead individuals to the same outcome (Greek affiliation), which further leads to another outcome (heavier drinking), emphasizing the importance of studying multiple pathways in environment selection most likely due to the multifaceted composition of many environments.

Specifically, individuals high in impulsivity/novelty seeking appear to select into the Greek system because of its drinking-centered atmosphere. Although an association between impulsivity/novelty seeking and drinking has been well described (e.g., Sher et al., 1999), it has not been previously demonstrated that individuals high in impulsivity/novelty seeking increase their drinking through selection into a high-risk environment, which then exerts further influence on drinking. This precollege drinking-mediated effect of impulsivity/novelty seeking on Greek affiliation demonstrates one mechanism by which high-risk individuals maintain their prior drinking habits during a developmental transition. Interestingly, after accounting for precollege drinking, an unexpected association was found such that individuals low in impulsivity/novelty seeking were likely to join the Greek system. These findings might represent differences among Greek organizations in their emphasis on drinking versus education/service. Indeed, considerable differences in the reputation for (Larimer et al., 1997) and the rate of (Harrington, Brigham, & Clayton, 1997; Park, Sher, & Krull, 2008a) heavy drinking among fraternity chapters have been found. Moreover, these findings suggest that specific environments have diverse facets, each of which may have different associations with individuals’ preexisting dispositions and behaviors. Thus, future studies on environmental selection may need to consider systematically a range of covariates that are theoretically linked to various aspects of the environment being selected.

The effects of extraversion and neuroticism on Greek affiliation were largely independent of extremely risky drinking at precollege, whereas the mediating effects of relatively normative heavy drinking were small but significant (and positive for extraversion and negative for neuroticism when considered univariately). This finding suggests potentially differentiating effects of extraversion and neuroticism on various forms of heavy drinking behaviors. Extraverted students appear to choose the Greek system for the most part to nourish their higher social, activity needs and to enhance positive emotions, but not necessarily to practice extremely risky drinking. Students who tend to experience negative emotions may be less likely

to opt for the Greek system, given the high demands of the Greek life. Our findings are consistent with the previous studies, suggesting that heavy drinking (but not more problematic drinking) among college students is associated with extraversion (Baer, 2002) and facilitating social functions and enhancing positive emotions rather than with coping of negative emotions (Kuntsche, Knibbe, Gmel, & Engels, 2005). These largely alcohol-irrelevant selection paths are still important because Greek members are exposed to risky environmental factors for problematic drinking even if their primary motivation for affiliation is unrelated to drinking. Future studies on the reasons for Greek affiliation may clarify these selection processes on the basis of different personality traits.

Time-Limited Role of Perceived Peer Drinking Norms and Alcohol Availability in the Greek Influence Effects

Our finding highlights the importance of peer norms in the early stage of Greek affiliation. Through rush and pledgship, typically occurring in the first semester, newcomers may observe and adopt the culture of their Greek organizations (Arnold & Kuh, 1992), by which the culture of the organization, including risky drinking, is perpetuated. The very first semester may make newcomers especially vulnerable to peer influence because they may not have behavioral scripts of the new setting (Abelson, 1981). High-perceived norms among Greek members (who are likely to be heavy drinkers) may be due to their prolonged exposure to heavy drinkers (Maisto, Carey, & Bradizza, 1999) or a “false consensus” to perceive their own behaviors as more prevalent among peers (Wolfson, 2000). Future research would do well to provide a more fine-grained assessment of these potential mechanisms underlying peer drinking norms in the Greek system.

Surprisingly, Greek affiliation was not related to a subsequent increase in peer norms. This finding is unexpected given that peer drinking norms consistently have been suggested as one of the major correlates of the Greek influence effect on heavy drinking (e.g., Bartholow et al., 2003; Borsari & Carey, 1999; Sher et al., 2001). This result may be due, in part, to a ceiling effect of our peer norm measure; that is, Greek members’ peer norms had already achieved relatively high levels by the first semester such that further increases were difficult to achieve. However, we do not believe such a ceiling effect could explain the lack of findings for the most part. The measure’s good internal consistency and moderate to high correlation with other related constructs (i.e., risky drinking, impulsivity/novelty seeking, and alcohol availability) that are comparable across Greek status indicate its considerable variability to resolve any true differences as a function of Greek status. A previous longitudinal study (Capone et al., 2007) also found that Greek involvement was not associated with increases in perceived peer norms by the sophomore year, after accounting for an initial level of peer norms. Thus, despite a strong cross-sectional association between Greek affiliation and peer norms (Borsari & Carey, 1999), the Greek effect on increases in drinking over the college years may not be based on increases in drinking norms. An overestimated role of peer norms in Greek drinking in the extant literature might be due to paucity of prospective studies to differentiate concurrent versus prospective effects of peer norms. However, future prospective studies in which peer norm measures are used without a concern of potential ceiling effects are needed to better characterize the association between Greek affiliation and changes in peer norms.

The Greek environment increased members’ risky drinking through its easy access to alcohol until the sophomore year when a majority of members were underage; this finding highlights the need for contextualizing the role of alcohol availability within a developmental context. The importance of alcohol accessibility (such as alcohol-free campus, price, marketing, outlet density, and age validation enforcement) in drinking among late adolescents and young adults has been increasingly recognized (e.g., NIAAA, 2002; Toomey, Lenk, & Wagenaar, 2007). Previous studies also found that active alcohol offers and exposure to peers’ heavy drinking

practice, but not perceived peer norms, predicted further increases in alcohol use and alcohol problems among college students (Capone et al., 2007; Read, Wood, & Capone, 2005). Together, it appears that proximal physical environmental factors are more important than are sociocognitive environmental factors in determining the sustained Greek influence effects on risky drinking at least before students attain legal age. The use of items to measure alcohol availability specific to the Greek environment is needed to better characterize distinct aspects of the Greek system that facilitate members' drinking behavior in future studies.

Prevention and Intervention Implications

Distinguishing among the selection and influence processes underlying the Greek drinking phenomenon has significant clinical implications. Optimal interventional timing (intervening prior to college vs. in the specific college years) and strategies (focusing on intraindividual factors vs. Greek environmental factors) to address Greek drinking problems would differ depending on the extent of selection versus influence effects. First, the strong selection based on prior drinking suggests that interventions designed to reduce and delay high school drinking may have salutary effects on college drinking by reducing the drinking momentum that appears to build over the college transition. Intervention after arrival on campus may be too late to be effective. Second, Kuh and Arnold (1993) suggested that rush and pledging should occur in the second semester or the sophomore year to account for freshmen's high vulnerability for peer influence during those recruitment processes, which is supported by our findings. Intervening prior to matriculation and delaying immersion into Greek culture may dampen the strong influence effect immediately after college entrance, especially among Greek members who are light drinkers (Park et al., 2008a). However, steady increases in risky drinking among Greek members throughout the first 3 years of college also indicate the need for continual intervention efforts targeting students of all levels. Third, our findings underscore the values of programs that include both "supply reduction" and "demand reduction" strategies (Wechsler, Seibring, Liu, & Ahl, 2004). Social norm marketing campaigns and intervention programs, to address college drinking problems by providing accurate information about peer students' typical drinking behaviors, have flourished in the last decade (Dejong, 2002; Perkins, 2002b), yielding mixed evidence for their efficacy (Clapp, Lange, Russell, Shillington, & Voas, 2003; Wechsler et al., 2003; Werch et al., 2000 but see Perkins & Craig, 2002). Our findings regarding the sustaining role of alcohol availability as compared with peer norms in the Greek influence suggest that effective intervention programs should target multifaceted environments, restricting alcohol accessibility in college campuses and communities (Crosse et al., 2006; Wechsler et al., 2004) as well as addressing individuals' exaggerated peer drinking norms.

Limitations

Several limitations of the present study should be mentioned. First, our sample is based on a single midwestern public school with a large Greek system, which precludes population-wide generalization of our findings. Thus, this type of study involving an in-depth analysis of a single campus needs to be interpreted with respect to national but possibly less comprehensively assessed studies. Second, precollege drinking was assessed at only one measurement point, just after high school graduation. It would be informative to examine the longitudinal trajectories of alcohol use from early adolescence, although such a strategy is not feasible in a single-campus study. Third, only a dichotomous variable of Greek status was used. Although a dichotomous Greek status variable measured at one assessment has been used widely, use of alternative measures of Greek status may be useful to characterize differential selection and influence processes, such as Greek residence (Park et al., 2008a), Greek activity involvement (Bartholow et al., 2003), and time-varying Greek status (Park, Sher, & Krull, 2008b). Fourth, personality traits were measured in the first semester of college at the same time as initial Greek affiliation assessment, although they were modeled as exogenous to

precollege drinking and Greek affiliation. However, there is only a 5-month lag between the precollege and the first college assessments. Personality traits generally are regarded as stable over short time intervals, especially in differential stability (rank order) as opposed to absolute stability (quantity) of major personality dimensions (Robins, Fraley, Roberts, Trzesniewski, 2001). Given the emerging literature regarding differential effects of subordinate facets of major personality dimensions on alcohol use and misuse (e.g., Whiteside & Lynam, 2001), our study is also limited in its ability to resolve the roles of more specific aspects of personality traits. Finally, there was a concern of potential ceiling effects of perceived peer drinking norms, and thus the finding of a limited association of Greek affiliation with their increases over time should be interpreted with caution.

Despite the limitations enumerated above, however, our study represents significant application of a personality–environment interplay perspective to a major public health concern, characterizing dynamic and multiple mechanisms by which risky drinking is accentuated over the transition to college and during the college years.

Acknowledgments

Preparation of this article was supported by National Institute on Alcohol Abuse and Alcoholism Grants R37 AA7231 and AA13987 awarded to Kenneth J. Sher and Grant P50 AA11998 awarded to Andrew Heath. We gratefully acknowledge Kristina M. Jackson, Wendy S. Slutske, Patricia C. Rutledge, Daniel C. Vinson, and Jenny M. Larkins for their insightful comments on a previous version of this article. Also, we thank Carol J. Waudby and the staff of the Alcohol, Health, and Behavior and IMPACTS projects for their data collection and management.

References

- Abelson BB. Psychological status of the script concept. *American Psychologist* 1981;36:715–729.
- Alva SA. Self-reported alcohol use of college fraternity and sorority members. *Journal of College Student Development* 1998;39:3–10.
- Arnold, JC.; Kuh, GD. *Brotherhood and the bottle: A cultural analysis of the role of alcohol in fraternities*. Bloomington: Center for the Study of the College Fraternity; 1992.
- Baer JS. Effects of college residence on perceived norms for alcohol consumption: An examination of the first year in college. *Psychology of Addictive Behaviors* 1994;8:43–50.
- Baer JS. Student factors: Understanding individual variation in college drinking. *Journal of Studies on Alcohol* 2002;14(Suppl):40–53.
- Baer JS, Kivlahan DR, Marlatt GA. High-risk drinking across the transition from high school to college. *Alcoholism: Clinical & Experimental Research* 1995;19:54–61.
- Baer JS, Stacy A, Larimer M. Biases in the perception of drinking norms among college students. *Journal of Studies on Alcohol* 1991;52:580–586. [PubMed: 1758185]
- Barry AE. Using theory-based constructs to explore the impact of Greek membership on alcohol-related beliefs and behaviors: A systematic literature review. *Journal of American College Health* 2007;56:307–315. [PubMed: 18089514]
- Bartholow BD, Sher KJ, Krull JL. Changes in heavy drinking over the third decade of life as a function of collegiate fraternity and sorority involvement: A prospective, multilevel analysis. *Health Psychology* 2003;22:616–626. [PubMed: 14640859]
- Bollen K, Lennox R. Conventional wisdom on measurement: A structural equation perspective. *Psychological Bulletin* 1991;110:305–314.
- Borsari BE, Carey KB. Understanding fraternity drinking: Five recurring themes in the literature, 1980–1998. *Journal of American College Health* 1999;48:30–40. [PubMed: 10485163]
- Borsari B, Carey KB. Peer influences on college drinking: A review of the research. *Journal of Substance Abuse* 2001;13/14:391–424. [PubMed: 11775073]
- Borsari B, Carey KB. Descriptive and injunctive norms in college drinking: A meta-analytic integration. *Journal of Studies on Alcohol* 2003;64:331–341. [PubMed: 12817821]

- Bullers S, Cooper ML, Russell M. Social network drinking and adult alcohol involvement: A longitudinal exploration of the direction of influence. *Addictive Behaviors* 2001;26:181–199. [PubMed: 11316376]
- Buss DM. Selection, evocation and manipulation. *Journal of Personality and Social Psychology* 1987;53:1214–1221. [PubMed: 3320336]
- Capone C, Wood MD, Borsari B, Laird RD. A prospective examination of relations between fraternity/sorority involvement, social influences and alcohol use among college students: Evidence for reciprocal influences. *Psychology of Addictive Behaviors* 2007;21:316–327. [PubMed: 17874882]
- Carey KB. Understanding binge drinking: Introduction to the special issue. *Psychology of Addictive Behaviors* 2001;15:283–286. [PubMed: 11767257]
- Caspi, A.; Bem, DJ. Personality continuity and change across the life course. In: Pervin, L., editor. *Handbook of personality: Theory and research*. New York: Guilford Press; 1990. p. 549-575.
- Caspi A, Herbener ES. Continuity and change: Assortative marriage and the consistency of personality in adulthood. *Journal of Personality and Social Psychology* 1990;58:250–258. [PubMed: 2319443]
- Caspi A, Roberts BW, Shiner R. Personality development. *Annual Review of Psychology* 2005;56:453–484.
- Caudill BD, Crosse SB, Campbell B, Howard J, Luckey B, Blane HT. High-risk drinking among college fraternity members: A national perspective. *Journal of American College Health* 2006;55:141–155. [PubMed: 17175900]
- Clapp JD, Lange JE, Russell C, Shillington A, Voas RB. A failed norms social marketing campaign. *Journal of Studies on Alcohol* 2003;64:409–414. [PubMed: 12817831]
- Cloninger CR. Tridimensional Personality Questionnaire, version 4. 1987Unpublished manuscript
- Cohen, J. *Statistical power analysis for the behavioral sciences*. Vol. 2. New York: Academic Press; 1988.
- Costa, PT., Jr; McCrae, RR. *The NEO-PI/NEO-FFI Manual Supplement*. Odessa, FL: Psychological Assessment Resources; 1989.
- Cronbach L, Meehl P. Construct validity in psychological tests. *Psychological Bulletin* 1955;52:281–302. [PubMed: 13245896]
- Crosse S, Ginexi E, Caudill B. Examining the effects of a national alcohol-free fraternity housing policy. *Journal of Primary Prevention* 2006;27:477–495. [PubMed: 16906465]
- Danielson C, Taylor SH, Hartford M. Examining the complex relationship between Greek life and alcohol: A literature review. *NASPA Journal* 2001;38:451–465.
- Dawson DA, Grant BF, Stinson FS, Chou PS. Another look at heavy episodic drinking and alcohol use disorders among college and noncollege youth. *Journal of Studies on Alcohol* 2004;65:477–488. [PubMed: 15378804]
- Dejong W. The role of mass media campaigns in reducing high-risk drinking among college students. *Journal of Studies on Alcohol* 2002;14(Suppl):182–192.
- Egan V, Deary I, Austin E. The NEO-FFI: Emerging British norms and an item-level analysis suggest N, A and C are more reliable than O and E. *Personality and Individual Differences* 2000;29:907–920.
- Engs RC, Diebold BA, Hanson DJ. The drinking patterns and problems of a national sample of college students, 1994. *Journal of Alcohol & Drug Education* 1996;41:13–33.
- Feldman, K.; Newcomb, T. *The impact of college on students*. San Francisco: Jossey-Bass; 1969.
- Festinger L. A theory of social comparison processes. *Human Relations* 1954;7:117–140.
- Grant BF, Dawson DA, Stinson FS, Chou S, Dufour MC, Pickering RP. The 12-month prevalence and trends in DSM-IV alcohol abuse and dependence: United States, 1991–1992 and 2001–2002. *Drug & Alcohol Dependence* 2004;74:223–234. [PubMed: 15194200]
- Harrington NG, Brigham NL, Clayton RR. Differences in alcohol use and alcohol-related problems among fraternity and sorority members. *Drug & Alcohol Dependence* 1997;47:237–246. [PubMed: 9306049]
- Hingson R, Heeren T, Winter M, Wechsler H. Magnitude of alcohol-related mortality and morbidity among U.S. college students ages 18–24: Changes from 1998 to 2001. *Annual Review of Public Health* 2005;26:259–279.

- Huba, G.; Bentler, PM. A developmental theory of drug use: Derivation and assessment of a causal modeling approach. In: Baltes, PB.; Brim, OG., editors. *Life-span development and behavior*. Vol. 4. New York: Academic Press; 1982. p. 147-203.
- Jacob, T.; Leonard, K. Family and peer influences in the development of adolescent alcohol abuse. In: Zucker, R.; Boyd, G.; Howard, J., editors. *The development of alcohol problems: Exploring the biopsychosocial matrix of risk*. Rockville, MD: Department of Health and Human Services; 1994. p. 123-155.
- Jessor, R.; Jessor, SL. *Problem behavior and psychosocial development: A longitudinal study of youth*. New York: Academic Press; 1977.
- Johnston, LD.; O'Malley, PM.; Bachman, JG. *College Students and Adults Ages 19–40*. Vol. 2. Bethesda, MD: National Institute on Drug Abuse; 2003. *Monitoring the future: National survey results on drug use, 1975–2002*.
- Johnston, LD.; O'Malley, PM.; Bachman, JG.; Schulenberg, JE. *Monitoring the Future national survey results on drug use, 1975–2007. Volume I: Secondary school students*. Bethesda, MD: National Institute on Drug Abuse; 2008a. p. 707NIH Publication No. 08–6418A
- Johnston, LD.; O'Malley, PM.; Bachman, JG.; Schulenberg, JE. *Monitoring the Future national survey results on drug use, 1975–2007. Volume II: College students and adults ages 19–45*. Bethesda, MD: National Institute on Drug Abuse; 2008b. p. 319NIH Publication No. 08–6418B
- Kahler CW, Read JP, Wood MD, Palfai TP. Social environmental selection as a mediator of gender, ethnic, and personality effects on college student drinking. *Psychology of Addictive Behaviors* 2003;17:226–234. [PubMed: 14498817]
- Kandel DB. Drugs and drinking behavior among youth. *Annual Review on Sociology* 1980;6:235–285.
- Kandel DB. On process of peer influences in adolescent drug use. *Advances in Alcohol and Substance Abuse* 1985;4:139–163. [PubMed: 3874527]
- Knight JR, Wechsler H, Kuo M, Seibring M, Weitzman ER, Schuckit MA. Alcohol abuse and dependence among U.S. college students. *Journal of Studies on Alcohol* 2002;63:263–270. [PubMed: 12086126]
- Kuh GD, Arnold JC. Liquid bonding: A cultural analysis of the role of alcohol in fraternity pledgship. *Journal of College Student Development* 1993;34:327–334.
- Kuntsche E, Knibbe R, Gmel G, Engels R. Why do young people drink? A review of drinking motives. *Clinical Psychology Review* 2005;25:841–861. [PubMed: 16095785]
- Kuo M, Wechsler H, Greenberg P, Lee H. The marketing of alcohol to college students: The role of low prices and special promotions. *American Journal of Preventive Medicine* 2003;25:204–211. [PubMed: 14507526]
- Larimer ME, Irvine DL, Kilmer JR, Marlatt GA. College drinking and the Greek system: Examining the role of perceived norms for high-risk behavior. *Journal of College Student Development* 1997;38:587–598.
- Lazarsfeld, PR.; Henry, NW. *Latent structural analysis*. Boston: Houghton Mifflin; 1968.
- Li TK, Hewitt B, Grant BF. Alcohol use disorders and mood disorders: A National Institute on Alcohol Abuse and Alcoholism perspective. *Biological Psychiatry* 2004;56:718–720. [PubMed: 15556112]
- Little, RJA.; Rubin, DB. *Statistical analysis with missing data*. Vol. 2. New York: Wiley; 2002.
- Lo CC, Globetti G. A partial analysis of the campus influence on drinking behavior: Students who enter college as nondrinkers. *Journal of Drug Issues* 1993;23:715–725.
- Lo CC, Globetti G. The facilitating and enhancing roles Greek associations play in college drinking. *International Journal of the Addictions* 1995;30:1311–1322. [PubMed: 7591346]
- MacKinnon, DP. *Mediation FAQ: An answer to Julie's question from Dr. David Mackinnon*. 2003. Retrieved January 7, 2006, from <http://www.public.asu.edu/~davidpm/ripl/maloy.htm>
- MacKinnon DP, Dwyer JH. Estimating mediated effects in prevention studies. *Evaluation Review* 1993;17:144–158.
- Maisto, SA.; Carey, KB.; Bradizza, CM. Social learning theory. In: Blane, H.; Leonard, K., editors. *Psychological theories of drinking and alcoholism*. Vol. 2. New York: Guilford Press; 1999. p. 106-163.
- Martinez JA, Rutledge PC, Sher KJ. Fake ID ownership and heavy drinking in underage college students: Prospective findings. *Psychology of Addictive Behaviors* 2007;21:226–232. [PubMed: 17563142]

- McCabe SE, Schulenberg JE, Johnston LD, O'Malley PM, Bachman JG, Kloska DD. Selection and socialization effects of fraternities and sororities on US college student substance use: A multi-cohort national longitudinal study. *Addiction* 2005;100:512–524. [PubMed: 15784066]
- McCrae RR, Costa PT Jr. A contemplated revision of the NEO Five-Factor Inventory. *Personality and Individual Differences* 2004;36:587–596.
- Muthén, BO. Mplus technical appendices. Los Angeles: Muthén & Muthén; 1998–2004.
- Muthén, LK.; Muthén, BO. Mplus user's guide. Vol. 4. Los Angeles: Author; 1998–2006.
- Nagelkerke NJD. A note on a general definition of the coefficient of determination. *Biometrika* 1991;78:691–692.
- National Institute on Alcohol Abuse and Alcoholism. A call to action: Changing the culture of drinking at U.S. colleges. Final report of the task force on college drinking. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism; 2002.
- O'Connor RMJ, Copper SE, Thiel WS. Alcohol use as a predictor of potential fraternity membership. *Journal of College Student Development* 1996;37:669–675.
- O'Malley PM, Johnston LD. Epidemiology of alcohol and other drug use among American college students. *Journal of Studies on Alcohol* 2002;14(Suppl):23–39.
- Park A, Sher KJ, Krull JL. College living unit/type and alcohol misuse during the transition to college: Multilevel selection and socialization effects. 2008aManuscript submitted for publication
- Park A, Sher KJ, Krull JL. Risky drinking in college changes as fraternity/sorority affiliation changes: A person–environment perspective. *Psychology of Addictive Behaviors* 2008b;22:219–229. [PubMed: 18540719]
- Parra G, Sher KJ, Krull J, Jackson KM. Frequency of heavy drinking and perceived peer alcohol involvement: Comparison of influence and selection mechanisms from a developmental perspective. *Addictive Behaviors* 2007;32:2211–2225. [PubMed: 17428616]
- Perkins HW. Social norms and the prevention of alcohol misuse in collegiate contexts. *Journal of Studies on Alcohol* 2002a;14(Suppl):164–172.
- Perkins HW. Surveying the damage: A review of research on consequences of alcohol misuse in college populations. *Journal of Studies on Alcohol* 2002b;14(Suppl):91–100.
- Perkins, HW.; Craig, DW. A multifaceted social norms approach to reduce high-risk drinking. Newton, MA: Higher Education Center for Alcohol and Other Drug Prevention; 2002.
- Perkins HW, Wechsler H. Variation in perceived college drinking norms and its impact on alcohol abuse: A nationwide study. *Journal of Drug Issues* 1996;26:961–974.
- Plomin R, DeFries JC, Loehlin JC. Genotype–environment interaction and correlation in the analysis of human behavior. *Psychological Bulletin* 1977;84:309–322. [PubMed: 557211]
- Presley, CA.; Harrold, R.; Scouten, E.; Lyerla, R.; Meilman, PW. Core Alcohol and Drug Survey: User's manual. Vol. 5. Carbondale, IL: Core Institute; 1994.
- Read JP, Wood MD, Capone C. A prospective investigation of relations between social influences and alcohol involvement during the transition into college. *Journal of Studies on Alcohol* 2005;66:23–34. [PubMed: 15830900]
- Robins RW, Fraley RC, Roberts BW, Trzesniewski KH. A longitudinal study of personality change in young adulthood. *Journal of Personality* 2001;69:617–640. [PubMed: 11497032]
- Rogosa, DR. Myths about longitudinal research. In: Schaie, KW.; Campbell, RT.; Meredith, WM.; Rawlings, SC., editors. *Methodological issues in aging research*. New York: Springer; 1988. p. 171–209.
- Scarr S, McCartney K. How people make their own environments: A theory of genotype (leading to) environment effects. *Child Development* 1983;54:424–435. [PubMed: 6683622]
- Schmidt FL, Hunter JE. Measurement error in psychological research: Lessons from 26 research scenarios. *Psychological Methods* 1996;1:199–223.
- Sher KJ, Bartholow BD, Nanda S. Short- and long-term effects of fraternity and sorority membership on heavy drinking: A social norms perspective. *Psychology of Addictive Behaviors* 2001;15:42–51. [PubMed: 11255938]

- Sher, KJ.; Trull, TJ.; Bartholow, BD.; Vieth, A. Personality and alcoholism: Issues, methods, and etiological processes. In: Leonard, KE.; Blane, HT., editors. *Psychological theories of drinking and alcoholism*. Vol. 2. New York: Guilford Press; 1999. p. 54-105.
- Sher KJ, Wood MD, Crews TM, Vandiver PA. The Tridimensional Personality Questionnaire: Reliability and validity studies and derivation of a short form. *Psychological Assessment* 1995;7:195–208.
- Shrout PE, Bolger N. Mediation in experimental and non-experimental studies: New procedures and recommendations. *Psychological Methods* 2002;7:422–445. [PubMed: 12530702]
- Slutske WS. Alcohol use disorders among US college students and their non-college-attending peers. *Archives of General Psychiatry* 2005;62:321–327. [PubMed: 15753245]
- Slutske WS, Hunt-Carter EE, Nabors-Oberg RE, Sher KJ, Bucholz KK, Madden PA, et al. Do college students drink more than their non-college-attending peers? Evidence from a population-based longitudinal female twin study. *Journal of Abnormal Psychology* 2004;113:530–540. [PubMed: 15535786]
- Substance Abuse and Mental Health Services Administration. Alcohol use and risks among young adults by college environment status. Rockville, MD: Substance Abuse and Mental Health Services Administration, Office of Applied Studies; 2003.
- Toomey TL, Lenk KM, Wagenaar AC. Environmental policies to reduce college drinking: An update of research findings. *Journal of Studies on Alcohol and Drugs* 2007;68:208–219. [PubMed: 17286339]
- Walsh, WB. Theories of person-environment interaction: Implications for the college student. Iowa City, IA: American College Testing Program; 1973.
- Wechsler H, Dowdall GW, Davenport A, Castillo S. Correlates of college student binge drinking. *American Journal of Public Health* 1995;85:921–926. [PubMed: 7604914]
- Wechsler H, Dowdall GW, Maenner G, Gledhill-Hoyt J, Lee H. Changes in binge drinking and related problems among American college students between 1993 and 1997: Results of the Harvard School of Public Health College Alcohol Study. *Journal of American College Health* 1998;47:57–68. [PubMed: 9782661]
- Wechsler H, Kuh G, Davenport A. Fraternities, sororities and binge drinking: Results from a national study of American colleges. *NASPA Journal* 1996;33:260–279.
- Wechsler H, Kuo M, Lee H, Dowdall GW. Environmental correlates of underage alcohol use and related problems of college students. *American Journal of Preventive Medicine* 2000;19:24–29. [PubMed: 10865160]
- Wechsler H, Lee JE, Kuo M, Seibring M, Nelson TF, Lee H. Trends in college binge drinking during a period of increased prevention efforts. Findings from 4 Harvard School of Public Health College Alcohol Study surveys: 1993–2001. *Journal of American College Health* 2002;50:203–217. [PubMed: 11990979]
- Wechsler H, Nelson TF, Lee JE, Seibring M, Lewis C, Keeling RP. Perceptions and reality: A national evaluation of social norms marketing interventions to reduce college students' heavy alcohol use. *Journal of Studies on Alcohol* 2003;64:484–494. [PubMed: 12921190]
- Wechsler H, Seibring M, Liu IC, Ahl M. Colleges respond to student binge drinking: Reducing student demand or limiting access. *Journal of American College Health* 2004;52:159–168. [PubMed: 15018427]
- Werch CE, Pappas DM, Carlson JM, DiClemente CC, Chally PS, Sinder JA. Results of a social norm intervention to prevent binge drinking among first-year residential college students. *Journal of American College Health* 2000;49:85–92. [PubMed: 11016132]
- White HR, Jackson KM. Social and psychological influences on emerging adult drinking behavior. *Alcohol, Research, and Health* 2004–2005;28:182–190.
- Whiteside SP, Lynam DR. The Five Factor Model and impulsivity: Using a structural model of personality to understand impulsivity. *Personality and Individual Differences* 2001;30:669–689.
- Wolfson S. Students' estimates of the prevalence of drug use: Evidence for a false consensus effect. *Psychology of Addictive Behaviors* 2000;14:295–298. [PubMed: 10998955]
- Zucker, RA.; Noll, RB. Alcohol consumption and related problems. Washington, DC: U.S. Government Printing Office; 1982. Precursors and development influences on drinking and alcoholism: Etiology from a longitudinal perspective; p. 289-330.DHHS No. ADM 82–1190

Figure 1.

Latent growth models characterizing selection and influence processes between Greek affiliation and risky drinking. A separate model was estimated for each of the two drinking measures, having five or more drinks and having 12 or more drinks in a single sitting in the past 30 days. Standardized estimates (and unstandardized estimates in parentheses) are shown; numbers on the left side of the slash are estimates for a model of five or more drinks, and numbers on the right side of the slash are estimates for a model of 12 or more drinks. The effects of sex on all variables in the models were controlled for (paths are not shown). The circled letter *e* indicates an error term (i.e., residual variance). *** $p < .001$.

Figure 2.

Latent growth models characterizing personality-based self-selection into Greek systems, mediated by precollege risky drinking. A separate model was estimated for each of the two drinking measures, having five or more drinks and having 12 or more drinks in a single sitting in the past 30 days. Standardized estimates are shown; numbers on the left side of the slash are estimates for a model of five or more drinks, and numbers on the right side of the slash are estimates for a model of 12 or more drinks. The effects of three personality traits on college drinking growth factors and the effects of sex on all variables in the models were controlled for (paths are not shown). The circled letter *e* indicates an error term (i.e., residual variance). * $p < .05$. ** $p < .01$. *** $p < .001$.

Figure 3.

Latent growth models characterizing the influence of Greek affiliation on college risky drinking, covarying with perceived peer drinking norms (left panel) and alcohol availability (right panel). A separate model was estimated for each of the two drinking measures, having five or more drinks and having 12 or more drinks in a single sitting in the past 30 days. Standardized estimates are shown; numbers on the left side of the slash are estimates for a model of five or more drinks, and numbers on the right side of the slash are estimates for a model of 12 or more drinks. The effects of precollege risky drinking and sex on all variables in the models were controlled for (paths are not shown). The circled letter *e* indicates an error term (i.e., residual variance). * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 1
Mediation of Precollege Drinking in the Effects of Personality on Greek Affiliation

Predictor	Mediator at precollege	Indirect effect	95% CI of indirect effect	Direct effect	Total effect	Proportion mediated
Impulsivity/novelty seeking	5 + drinks	.10***	.08, .13	-.14***	.24 ^a	42%
	12 + drinks	.04***	.02, .05	-.07*	.12 ^a	33%
Extraversion	5 + drinks	.05**	.01, .04	.40***	.43	7%
	12 + drinks	.003	-.01, .01	.41***	.42	1%
Neuroticism	5 + drinks	-.03**	-.04, -.01	.10**	.13 ^a	23%
	12 + drinks	-.01	-.01, .001	.08**	.09 ^a	11%

Note. $N = 3,099$. All estimates are unstandardized. Confidence intervals (CIs) resulted from 500 bootstrap draws.

^aDue to a suppression effect, a total effect was calculated by summing absolute values of direct and indirect effects.

* $p < .05$.

** $p < .01$.

*** $p < .001$.