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Fraternity and Sorority Involvement, Social Influences, and Alcohol Use Among College Students:

A Prospective Examination

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Abstract

This study used latent growth curve modeling to investigate whether the effects of gender and Greek involvement on alcohol use and problems over the first 2 years of college are best characterized by selection, socialization, or reciprocal influence processes. Three social influences (alcohol offers, social modeling, and perceived norms) were examined as potential mediators of these effects. Undergraduate participants ($N = 388$) completed self-report measures prior to enrollment and in the spring of their freshmen and sophomore years. Male gender and involvement in the Greek system were associated with greater alcohol use and problems prior to college. Both gender and Greek involvement significantly predicted increases in alcohol use and problems over the first 2 years of college. Cross-domain analyses provided strong support for a mediational role of each of the social influence constructs on alcohol use and problems prior to matriculation, and prematriculation social modeling and alcohol offers mediated relations between Greek involvement and changes in alcohol use over time. Findings suggest that students, particularly men, who affiliate with Greek organizations constitute an at-risk group prior to entering college, suggesting the need for selected interventions with this population, which should take place before or during the pledging process.

Keywords

alcohol; fraternity; sorority; selection; longitudinal

Over the past decade, collegiate alcohol use and misuse has garnered a great deal of attention in both the popular media and the scientific community. Much of this attention has focused on heavy episodic drinking, typically defined as consuming five or more drinks (sometimes adjusted to four or more for women) on a single occasion. Roughly 40% of college students, including close to half of men, drink in this manner at least once every 2 weeks, a pattern that historically is slightly higher than same-age noncollege-attending peers and that has remained fairly consistent for more than 2 decades (O'Malley & Johnston, 2002). This pattern of

consumption and, more generally, of alcohol misuse tends to increase with college matriculation (Baer, Kivlahan, & Marlatt, 1995), remain fairly stable during college (Gotham, Sher, & Wood, 1997; although see also Schulenberg, O'Malley, Bachman, Wadsworth, & Johnston, 1996) and, for most, decline thereafter (Fillmore, 1988; Gotham et al., 1997; Jessor, Donovan, & Costa, 1991). Nonetheless, the high rates of heavy drinking, myriad accompanying negative consequences (Hingson, Heeren, Winter, & Wechsler, 2005), and high prevalence estimates of alcohol use disorders (Knight et al., 2002) have spawned recognition of alcohol misuse as the most important health hazard for college students (National Institute on Alcohol Abuse and Alcoholism; NIAAA, 2002).

A number of processes and factors proposed to further understanding and prediction of risky drinking are directly applicable to the study of college student drinking. These include conceptualizations of the manner in which environmental influences unfold, such as selection and socialization, as well as formal social influence taxonomies (e.g., Graham, Marks, & Hansen, 1991). We briefly review these conceptualizations and then consider individual-difference factors that can be examined within the context of these social influence processes.

Selection, Socialization, and Reciprocal Social Influences

Selection proposes that more alcohol-involved students purposively seek out heavier drinking peers. Because many students come to college as experienced drinkers (Baer et al., 1995; Borsari, Bergen-Cico, & Carey, 2003), it is likely that these students seek out peers with similar drinking patterns in order to maintain or increase personal alcohol use. In contrast, *socialization* proposes that students who come to college find themselves in an environment in which alcohol use and misuse are accepted, prevalent, and normative. Consequently, as a result of being immersed in this environment, students may increase their own use in order to fit in with what they perceive as the norm. Indeed, drinking has long been a part of the college culture, encouraged at many social functions, and part of numerous peer interactions (Thombs, 1999).

The concept of reciprocal influence captures the dynamic interplay of selection and socialization processes over time. Specifically, for example, heavy drinking college students may seek out heavy drinking friends (selection). Once in this environment, peers will encourage continued or escalated heavy drinking (socialization). Therefore, the drinking habits of the student entering college may largely determine the degree to which selection and socialization leads to an increase in personal alcohol use. Such a relationship is consistent with the concept of reciprocal determinism (Bandura, 1986), which can be invoked to understand the relationships among the person, the environment, and personal alcohol use.

Active and Passive Social Influences

Graham et al. (1991) posit that social influences may be either active or passive, a taxonomy that has shown utility in predicting alcohol use and problems (e.g., Wood, Read, Palfai, & Stevenson, 2001; Read, Wood, & Capone, 2005). Active social influences are operationalized as direct offers of alcohol. They focus on getting a person to drink and can range from polite gestures (e.g., offering to get a peer a drink, buying a round) to overt commands or encouragement to drink (e.g., forcing others to drink during drinking games; Borsari & Carey, 2001). Such situational factors may be especially relevant for college students, who may frequently be in settings where drinking and overt offers to drink are more socially normative (Baer, 1994; Rabow & Duncan-Schill, 1995).

By contrast, passive social influences are subtler, such as when an individual observes and interprets the drinking patterns of others and then behaves in accordance with these observations (Graham et al., 1991). For example, social modeling is a type of vicarious learning

that has been shown to be an important correlate of alcohol use and problems among college students (Collins, Parks, & Marlatt, 1985; Costa, Jessor, & Turbin, 1999; Read et al., 2005; Wood et al., 2001). After observing a relevant peer group engaging in certain drinking behaviors (e.g., heavy drinking), an individual may then model his or her own drinking behavior according to these observations, resulting in a greater likelihood of adoption and maintenance of heavy drinking. Moreover, social modeling is likely to be heightened in relatively novel settings (e.g., a freshmen at a college party) for which the individual has less certain standing, fewer experiences, and a dearth of behavioral scripts (e.g., Abelson, 1981).

Another type of passive social influence, known as perceived norms, concerns students' perceptions of the drinking environment (Borsari & Carey, 2001; 2003). Perceived norms refer to perceptions or misperceptions about how much and how often other students drink alcohol. A wealth of research has shown that students frequently overestimate the quantity and frequency of other students' drinking regardless of the target, close friends, best friend, typical student, average student, or fellow fraternity or sorority house member (Baer & Carney, 1993; Baer, Stacy, & Larimer, 1991; Perkins, 2002; Perkins, Meilman, Leichter, Cashin, & Presley, 1999). In addition, students are remarkably consistent in reporting that they drink the same or less than others (Borsari & Carey, 2003; Carey, Borsari, Carey, & Maisto, 2006). Although the nature of these misperceptions is not well understood, they may influence personal alcohol use if students adapt their drinking behavior to match the perceived group norm. Indeed, perceived norms can directly influence one's consumption independently of other social background factors, such as age, year in school, and number of close friends (Perkins, 2002).

Curran, Stice, and Chassin (1997) examined relations between peer alcohol use and early adolescent drinking with attention to selection and socialization processes and concluded, consistent with a reciprocal influence explanation, that both selection and socialization were operative in their sample. However, to our knowledge, this work has not been extended to late adolescence and relations between these alternative explanatory mechanisms and active and passive social influences have not been examined. Longitudinal studies of active and passive social influences that incorporate important developmental transitions (e.g., beginning college) are uniquely suited to elucidate selection and socialization patterns. For example, prematriculation differences in active and passive social influences among those who are involved with fraternities or sororities would support selection, changes in active and passive influences over time would be more consistent with socialization mechanisms, and evidence of both processes would be consistent with reciprocal influences.

Individual-Difference Factors

A number of important individual-difference variables have been identified in the college student drinking literature (e.g., see Baer, 2002). Here we focus on three domains with particular relevance for longitudinal examination of social influence processes during the college years: gender, peer influences, and fraternity or sorority involvement.

Gender

In the college literature, women consistently report lower levels of drinking than men (e.g., Wechsler et al., 2002). Apart from gender differences in alcohol metabolism (Marshall, Kingstone, Boss, & Morgan, 1983), alcohol does not appear to play as central a role in facilitating interpersonal relationships for women as it does for men. Among men, drinking together is often a shared activity used to cultivate friendships, foster intimacy, and engender closeness and support. By contrast, because women's everyday interactions with friends tend to be more supportive and intimate than men's, women may rely less on alcohol consumption for these purposes (Borsari & Carey, 2006; Rabow & Duncan-Schill, 1995).

Peer Influences

Peers are consistently found to be the most robust influences on alcohol use in college (Borsari & Carey, 2001; Hussong, Hicks, Levy, & Curran, 2001; Wood, Read, Palfai, & Stevenson, 2001). During the transition from adolescence to young adulthood, time spent with heavy drinking peers is consistently associated with personal heavy alcohol consumption (Schulenberg et al., 1996). This trend continues during the college years when personal use is consistently correlated with that of close friends (Martin & Hoffman, 1993; Werner, Walker, & Greene, 1996).

Fraternity and Sorority Involvement

Arguably, the Greek, or fraternity-sorority, system is the best environment on campus in which to examine the role of social influence processes on alcohol use and problems. Members of Greek organizations consistently demonstrate higher levels of alcohol use and problems than nonmembers (Lo & Globetti, 1995; Sher, Bartholow, & Nanda, 2001). Specifically, fraternity and sorority members and leaders exhibit high levels of use and approval of use (Cashin, Presley, & Meilman, 1998). In fact, particular houses often have reputations based on their members' alcohol consumption (Larimer, Irvine, Kilmer, & Marlatt, 1997). In a review of 2 decades of research on fraternity drinking, Borsari and Carey (1999) identified five factors contributing to the heavy drinking consistently observed in fraternities: (a) a continuity of heavy alcohol use from high school to college; (b) self-selection into heavy drinking environments; (c) the central role that alcohol plays in fraternity socialization; (d) misperceptions of drinking norms; and (e) the enabling environment of the fraternity house. Thus, an individual's decision to join the Greek system and the subsequent socialization that may occur in this environment provide an ideal context in which to study the influences of selection, socialization, and active and passive social influences on college student drinking.

Recent longitudinal studies (e.g., Bartholow, Sher, & Krull, 2003) have provided support for socialization effects among those involved in the Greek community and have begun to explicate potentially important social influences that may mediate relations between Greek involvement and collegiate alcohol use and problems. However, as noted by Sher et al. (2001), longitudinal studies that include prematriculation assessment are required to provide stronger tests of selection (and reciprocal influence) effects. Moreover, investigation of the potential mediational role of a more comprehensive set of social influences than has been done to date would further our understanding of the etiology of college student drinking and provide guidance for preventive intervention efforts.

The Current Study

The present study investigated selection, socialization, and reciprocal influence patterns on drinking behaviors among college students during their first 2 years of college. We used a latent growth curve modeling (LGCM) framework ideally suited for modeling developmental transitions to advance the literature on college student drinking in several substantive ways. First, we included a broad set of social influences relevant to alcohol use and problems during the transition into college. Second, we examined prematriculation differences and change over time in social influences and alcohol use and problems as a function of gender and Greek involvement. We hypothesized that relations between Greek involvement and alcohol use and problems would be best characterized by a reciprocal influence pattern incorporating both selection and socialization effects. Additionally, we tested several hypotheses related to gender differences. Consistent with a large body of literature, we hypothesized that male gender would be associated with higher prematriculation levels of alcohol use and problems. Given the centrality of social networks with respect to men's drinking (e.g., Borsari & Carey, 2006), we also hypothesized that male gender would be associated with higher levels of prematriculation

social influences. We also investigated potential gender differences in changes in alcohol involvement and social influences over the early college years. Finally, using cross-domain LGCM, we systematically tested the hypothesis that social influences would mediate relations between Greek involvement and alcohol use and problems.

Method

Participants

Participants were incoming college students at a public university in the northeastern United States. From an eligible sample of 578 Wave 1 (prematriculation) respondents, 416 students (all 191 men and 225 randomly selected women) were targeted for a longitudinal study of college student health behaviors and attitudes.¹ Of these, 388 students (93% of those targeted) participated at Wave 2 in the spring of their freshmen year, and 355 (85.3% of those targeted) participated at Wave 3 in the spring of their sophomore year.

At Wave 1, participants had an average age of 18.1 ($SD = 0.22$) years; 56% were women. The majority of participants (87.4%, $n = 339$) were White, followed by Asian (4.4%, $n = 17$), Hispanic (2.3%, $n = 9$), Black (2.1%, $n = 8$), Native American (0.2%, $n = 1$), and other ethnicity or multiracial (3.3%). Race and ethnicity data were missing for one participant (0.2%). Comparison of race and ethnicity data for the sample with the university's population of incoming freshmen for the same academic year indicates that Whites were somewhat overrepresented in the sample (87% vs. 77.5%), whereas Hispanics (2.3% vs. 3.6%) and Blacks (2.1% vs. 3.6%) were slightly underrepresented. University data indicate that 10.4% of incoming freshmen did not provide race or ethnicity data; this may largely account for the apparent overrepresentation of Whites in our sample. Women composed 56% of both the sample and the population of incoming freshmen.

To make further comparisons between our sample and a larger university sample of incoming freshmen ($n = 2,117$, 96% of that year's incoming class), we conducted t tests. No significant difference was observed for drinking status, $t(2011) = -0.63$. Significant differences were observed for typical weekly quantity-frequency of alcohol use, $t(696) = 3.54$, $p < .001$, and past-2-week heavy drinking, $t(568) = 2.85$, $p < .005$. However, effect sizes for these differences were small, with an average d of 0.13.

Procedure

Participants were recruited from a sample of 2,117 incoming freshmen (96% of the incoming class) attending summer orientation. During this orientation, students viewed an on-line announcement inviting first time freshmen to participate in a study of "college student health behaviors and attitudes." From this announcement, we received 970 e-mail inquiries about the project. Prospective participants were mailed a cover letter, consent form, and a baseline questionnaire packet. Follow-up recruitment efforts included two rounds of telephone calls, postcard reminders, and resending of mail surveys, which resulted in completed questionnaires from 589 respondents. Of these, 11 were eliminated because they were outside the study's 18-19 years old age requirement. From this pool of 578 respondents, all 191 men and 225 randomly selected women were targeted for the longitudinal arm of the study in order to ensure roughly equal representation of men and women. All participants provided informed consent and completed a battery of questionnaires at each wave, by mail at Wave 1 and typically on

¹These numbers differ slightly from some previous reports due to ongoing data checking and correction. Read et al. (2003,2005) reported a target sample of 425 for the longitudinal arm of the study, which did not exclude 11 men who were ineligible for the longitudinal study due to extensive missing data at baseline or age restrictions, and incorrectly reported a target subsample of 223, rather than 225 women.

site at follow-up waves, but in some cases by mail (21 at Wave 2, 48 at Wave 3). Participants received cash remuneration for their participation.

Measures

Greek involvement—As noted by Bartholow et al. (2003), students who are not members of Greek organizations per se but who frequently associate with members may experience social influences similar to Greek members. As such, conceptualizing Greek involvement as a dichotomy (member-nonmember) may ignore vital information regarding these processes. Accordingly, we classified participants according to their Greek affiliation at Wave 2 (spring of freshmen year) in three categories: (a) members (21.3%), (b) nonmembers who regularly or occasionally attend Greek social events (32.6%), and (c) nonmembers who do not attend Greek events (46.1%). Note, at the study university, students are eligible to pledge during their first semester; but, because pledging occurs after housing arrangements are made, only a few (11%) Greek members actually resided in fraternity or sorority housing in their freshmen year. By the sophomore year, 43% of Greeks in our sample resided in fraternity or sorority housing.

Alcohol use—Typical alcohol use was assessed for the past 3 months using a weighted quantity-frequency composite derived by multiplying two items assessing typical quantity per drinking occasion and frequency of alcohol consumption per week (Read et al., 2005).

Alcohol problems—Alcohol-related consequences were assessed with an abbreviated (24-item) version of the Young Adult Alcohol Problems Screening Test (Hurlbut & Sher, 1992). This test assesses past-year frequency of several common negative consequences of alcohol use, including drinking and driving, feeling physically sick, neglecting responsibilities, and unwanted sexual behaviors. Items are rated on a continuous scale ranging from either 0 (*never*) to 9 (*40 or more times*) or, for consequences with lower base rates, from 0 (*never*) to 4 (*3 or more times*). Participants were asked about negative consequences during the past year at Wave 1 and during the past 6 months at Waves 2 and 3 to ensure nonoverlapping response intervals at the shorter (Wave 2) interval. Alpha coefficients for the test in this sample were .92 at Wave 1, .93 at Wave 2, and .93 at Wave 3.

Alcohol offers—A four-item measure assessed how frequently in the past 3 months the participant had been offered, bought, or given a drink without asking for one or had been provided with unsolicited refills (Read et al., 2005). Response options were rated on a 5-point scale ranging from 0 (*never*) to 4 (*10 or more times*). Alpha coefficients for this measure were .86 at Wave 1, .88 at Wave 2, and .89 at Wave 3.

Social modeling—Social modeling was assessed with five items adapted from measures used by Jessor et al. (1991) and Wood et al. (2001). Participants were queried about close friends' attitudes about drinking and getting drunk and the average quantity per occasion consumed by close friends. Attitude items were rated on a 5-point continuous response scale ranging from 0 (*strongly disapprove*) to 4 (*strongly approve*). Response options for typical quantity consumed ranged from 0 (*close friends don't drink*) to 4 (*more than 6 drinks*). Alpha coefficients for this measure were .77, .82, and .81 at Waves 1, 2, and 3, respectively.

Perceived norms—Perceived peer norms were measured by two items developed by Baer and colleagues (Baer & Carney, 1993; Baer et al., 1991) and adapted by Wood et al. (2001). These items required that participants estimate typical frequency and quantity of alcohol use by "the typical college student of your gender during the school year." Responses to the perceived frequency item ranged from 0 (*typical student of my gender doesn't drink*) to 9 (*twice a day or more*), while the quantity item was open ended. For the present analyses, these items were multiplied to yield perceived norms for Quantity \times Frequency of Alcohol Use.

Results

Overview of Latent Growth Curve Analyses

LGCM was used to examine changes in alcohol use and problems over the first 2 years of college. In addition, two hypothesized predictors of change over time—gender, Greek involvement, and their interaction—were examined. Finally, three types of social influences—alcohol offers, social modeling, and perceived norms—were included in the models as putative mediators. Thus, we investigated three potential mediational sequences with particular implications for explanations of Greek involvement in relation to alcohol use and problems: First, consistent with selection effects, Greek involvement would predict baseline (prematriculation) differences in the social influence mediators, which, in turn, would predict baseline differences in alcohol use and problems. In other words, students who choose to affiliate with the Greek system enter school as heavier drinkers and have a historically more supportive social environment for drinking than students who do not affiliate with the Greek system. Second, and consistent with a reciprocal influence explanation; Greek involvement would predict baseline differences in the social influence mediators, which, in turn, would predict changes in alcohol use and problems over time. For example, students from social environments supportive of alcohol use will choose to become involved with the Greek system, which will influence subsequent alcohol use and problems. Third and consistent with socialization effects, Greek involvement would predict changes in social influence mediators over time, which, in turn, would be associated with changes in alcohol use and problems over time. Therefore, students who enter the Greek system will be exposed to a social environment that encourages heavy drinking, which then results in increased consumption and problems.

Examination of distributions—Examination of univariate distributions revealed elevated levels of skewness and kurtosis (e.g., > than 2 and 4, respectively) in both outcome variables, alcohol use and problems, and one of the social influence variables, perceived norms. Consistent with procedures outlined by Tabachnick and Fidell (2001), we performed square root transformations on these variables, which resulted in acceptable skewness and kurtosis values (e.g., < 2 and 4, respectively).

Preliminary data analyses—Following an analytic framework described by Chassin, Curran, Hussong, and Colder (1996), preliminary analyses were conducted to determine if there was significant variability in the intercepts and slopes of both outcome variables and the four mediators. When significant variability was not present, the associated parameters were modeled as fixed effects (Singer & Willett, 2003). For those variables that demonstrated significant variability, growth curve models were then estimated with hypothesized predictors (gender and Greek involvement) included. In order to investigate the three mediational sequences, a series of cross-domain latent growth curve models was examined. Each mediator was modeled separately with alcohol use and problems, yielding a total of six potential models. All LGCM analyses were conducted using Amos 4.0 (Arbuckle & Wothke, 1999).

Unconditional Means Models

For each variable (two outcome variables and three mediators), an initial model was estimated consisting of a single latent variable (intercept) represented by three indicators corresponding to measures of the variable at all three waves of data collection. All factor loadings were fixed to 1.0 in order to represent the absence of growth over time. This no-growth model did not fit the data well for any of the variables, (i.e., all chi-square values were significant, all $ps < .001$), indicating the presence of change over time. For each of these variables, a two-factor (intercept and slope) model was then estimated.

Unconditional Models

The next step in the analyses was the estimation of unconditional models for those variables showing growth over time. These models consisted of two latent factors, one representing the intercept of the growth curve and one representing the slope of the growth curve, each with three indicators. Consistent with the initial models, the factor loadings for the intercept factor were fixed at 1.0. The factor loadings for the slope factor were fixed at 0 for Wave 1 and at 1.5 for Wave 3 in order to accurately represent the time interval between them (i.e., Wave 3 was 1.5 years after Wave 1). Inspection of the means across the three time points did not reveal a pattern consistent with linear change over the 18 months. Therefore, we chose to estimate the Wave 2 coefficients in order to provide a more accurate model of the growth curve (McArdle & Bell, 2000).

For the alcohol use variable, negative error variance was observed for the Wave 3 indicator, likely reflecting the presence of floor effects. In order to address this issue, the three error variances for alcohol use were constrained to be equal across time (L. Muthén, personal communication, May 19, 2005). In addition, nonsignificant variance of the slope factor was observed for the social modeling variable. This suggests that increases in social modeling over time were similar across individuals. Thus, due to the lack of variability in growth, this variable was modeled as a fixed effect in subsequent models. The remaining variables (alcohol use, alcohol problems, alcohol offers, and perceived norms) showed significant variance of both the intercept and slope factors, suggesting individual variability in the starting point and rate of change over time and were therefore modeled as random effect variables.

Conditional Models

The primary aim of the next phase in the analyses was to predict the observed variability in the intercept and slope factors. For each construct, the latent factors were regressed on two hypothesized predictors, gender and Greek involvement at Wave 2 (during the spring of the participants' freshmen year).² All models demonstrated excellent fit to the data (e.g., all chi-square values were nonsignificant, comparative fit index > .98, root-mean-square error of approximation < .05). Both gender and Greek involvement were associated with significantly higher levels of prematriculation alcohol use ($p < .05$). In addition, both gender and Greek involvement were predictors ($p < .01$) of the significant increase in drinking such that male gender and greater involvement in the Greek system were associated with increased consumption over the first 2 years of college. Regarding alcohol-related consequences, Greek involvement was associated with significantly higher levels of prematriculation alcohol problems ($p < .001$), as well as increases in problems over time ($p < .01$). Additionally, male gender was significantly related to increases in alcohol-related problems over time ($p < .05$).

Direct effects of Greek involvement were also observed for all three potential mediators, perceived norms, social modeling, and alcohol offers ($p < .05$), such that Greek involvement significantly predicted higher levels of prematriculation endorsement of these social influences. Greater involvement in the Greek system also significantly predicted increases in alcohol offers over 18 months ($p < .01$). In contrast to our expectations, significant gender effects ($p < .05$) were observed for only one social influence variable, perceived norms, with men reporting greater perceptions at baseline regarding the drinking behavior of their peers than women.

²We observed significant positive associations between race (dichotomized as White-non-White) and alcohol use such that White race was associated with higher levels of consumption. However, due to the racial homogeneity (88% White) and the imprecision of simple dichotomization of race as White-non-White, we elected not to include race as a predictor in our latent growth models.

In order to further examine the influence of gender and Greek involvement on the outcome factors, the Gender \times Greek Involvement interaction was included as a third predictor. Significant interaction effects were observed for the intercept ($p < .05$) and slope ($p < .05$) of alcohol problems but not for alcohol use. These findings indicate that men, particularly those who later join or informally affiliate with fraternities, reported more alcohol-related consequences before they matriculated and experienced greater increases in problems over time than other students.

In sum, results of the single domain latent growth curve models indicate that men and individuals involved in the Greek system had greater levels of alcohol use and problems prior to matriculation and experienced greater increases in both over time. In fact, a very similar pattern of effects emerged for use and problems (see Figure 1 for depiction of alcohol use growth curves). Specifically, men who would later become members of fraternities demonstrated the greatest use and problems at baseline and the greatest increases over time. Women who would become sorority members and men who reported attending Greek events showed the next highest levels of baseline use and problems as well as similar levels of increases on these variables over time. Women who attended Greek activities and men who reported no Greek involvement exhibited lower levels of use and problems at baseline and similar (modest) growth over time. Finally, women who reported no Greek involvement reported the lowest levels of use and problems and little growth over time.

In addition, Greek involvement was significantly related to three social influence variables, predicting the initial status for two (social modeling and perceived norms) and both the initial status and rate of change of the third (alcohol offers). These findings indicate that individuals who become members or attend Greek activities in college experienced greater alcohol-related social influences before college and also exhibited greater increases, at least for active social influences, during the early college years relative to those with no Greek involvement.

Cross-Domain Models

In the final phase of the analyses, cross-domain models were estimated in order to examine the pattern of associations between the alcohol use and problems and social influence intercept and slope terms and to investigate the hypothesized mediational role of three social influences. Each social influence variable (i.e., alcohol offers, social modeling, and perceived norms) was modeled with alcohol use and problems separately, resulting in a total of six cross-domain models overall. As noted previously, due to results obtained in preliminary model estimation, social modeling was modeled as a fixed effect.

Results of the cross-domain analyses are depicted in Figures 2-5, with results from the passive social influence models (i.e., social modeling and perceived norms) shown together. As in the single domain (i.e., conditional) models, indices of model fit were excellent across all models (comparative fit index $> .98$, root-mean-square error of approximation $< .07$). For alcohol use (see Figures 2 and 3), significant direct effects of Greek involvement were observed for prematriculation (intercept) alcohol use and increases in drinking over time (slope). Also consistent with the single domain models, we observed effects of Greek affiliation on all three social influence variables. Specifically, Greek involvement was significantly associated with initial status on alcohol offers ($\beta = .35, p < .001$), perceived norms ($\beta = .19, p < .01$), and social modeling ($\beta = .44, p < .001$) and with changes in alcohol offers ($\beta = .85, p < .001$) over time. Next, we looked at the associations between the intercepts of the mediator and outcome variables. Significant associations were observed between Wave 1 (prematriculation) alcohol use and social influences ($r = .72$ for alcohol offers, $r = .62$ for social modeling, $r = .48$ for perceived norms); students with high levels of alcohol use prior to beginning college were likely to report concurrently high levels of both active and passive social influences. Finally, we observed significant relations between initial status on two of the mediator variables and

changes in drinking over time. Prematriculation levels of both alcohol offers ($r = .17$) and social modeling ($r = .27$) were significantly associated with changes in alcohol use over 18 months.

A similar pattern of results emerged for alcohol-related problems (see Figures 4 and 5). Significant direct effects of Greek involvement on initial status and changes in alcohol-related problems were observed. In addition, significant associations were observed between Wave 1 alcohol-related problems and Wave 1 social influences, such that higher levels of problems prior to college were concurrently associated with higher levels of alcohol offers ($r = .77$), social modeling ($r = .70$), and perceived norms ($r = .42$). In these three models, initial status on the social influence variables was not associated with changes in alcohol-related consequences over time.

Next, results of the cross-domain analyses were used to further examine the three potential mediating sequences of interest. Following procedures described by MacKinnon and colleagues (Cheong, MacKinnon, & Khoo, 2001; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002), we computed z scores for the indirect (mediated) effect for each of the potential mediating sequences: (a) that Greek involvement would be related to prematriculation social influence mediators that, in turn, would be associated with prematriculation alcohol use and problems; (b) that Greek involvement would predict prematriculation social influences that, in turn, would predict changes in alcohol use and problems over time; and (c) that Greek involvement would predict changes in social influences over time that, in turn, would be related to changes in alcohol use and problems.

As can be seen in Table 1, consistent, strong evidence was observed for the initial mediational sequence posited; namely, relations between Greek involvement and prematriculation (intercept). Alcohol use and alcohol problems were mediated by prematriculation measures (intercepts) of all three social influence variables. Support for the second mediational sequence was observed in two of the cross-domain models. Specifically, prematriculation alcohol offers and social modeling (intercepts) mediated relations between Greek involvement and changes in alcohol use but not alcohol problems over time (slope). We did not observe support for the third mediational sequence; the direct effects of Greek involvement on changes in alcohol use or alcohol problems over time were not mediated by changes in social influences over time.

Discussion

The current study utilized LGCM to investigate whether the effects of gender and Greek involvement on alcohol use and problems over the first 2 years of college are best characterized with regard to selection, socialization, or reciprocal influence processes. In addition, we investigated a range of social influence variables prior to matriculation and changes in these factors over time as potential mediators of these effects. Through the use of LGCM, we were able to systematically conduct these mediational analyses to further our understanding of the role of social influence processes in the development of college student alcohol use and problems.

Overall, consistent with our major hypothesis, our findings are most supportive of a reciprocal influence process explanation of Greek involvement on alcohol use and problems during the transition into college. Specifically, greater involvement in the Greek system (compared with lesser or no involvement) was associated with greater alcohol use and problems prior to college and with significant increases in drinking over the first 2 years of college. For alcohol problems, a significant Gender \times Greek interaction effect suggests that the observed reciprocal influence pattern for Greek-involved men is particularly robust; incoming male students who became Greeks showed significantly higher levels of alcohol problems prior to college and significantly greater increases over the freshmen and sophomore years. As would be expected based on

previous studies (Baer et al., 1995; O'Malley & Johnston, 2002), the observed Greek and gender effects occurred in the context of significant overall growth over time in alcohol use and related problems in our university matriculating sample.

Cross-domain LGCM analyses provided evidence for both active and passive social influences as mediators of Greek involvement and alcohol use and problems relations. The observed mediational role of prematriculation social influences on prematriculation alcohol use and problems was invariant, supported in each of the six models in which it was tested. We also observed evidence, albeit less consistently, that social influences assessed prior to college mediated relations between Greek involvement and changes in alcohol use over time. The more robust and consistent prematriculation mediational pattern suggests that the link between Greek involvement and collegiate alcohol involvement may be more heavily influenced by selection into heavier drinking milieus prior to matriculation. Nonetheless, continued involvement in the Greek system leads to further significant increases in alcohol use and problems over time, at least during the early college years.

We offer two potential explanations for the lack of significant associations between changes in social influences and changes in alcohol use and problems over time. The first is that social influences prior to college are a more important mechanism of changes in drinking than are early college social influences. However, we consider this a tentative conclusion, given that there are plausible methodological reasons for not observing mediating effects between the slopes of social influences and alcohol use and problems. Namely, we were limited by only two follow-up points, which were conducted over a relatively short (18-month) time interval. Second, the relatively small number of Greek members (11% at Wave 2) residing in Greek houses may have hindered our ability to detect socialization effects. Actually residing in Greek housing would likely increase socialization processes and this should be examined in future research.

In a similar vein, our finding that social modeling increased at a similar rate across individuals whereas alcohol offers and perceived norms varied is interesting and warrants brief consideration. Perhaps the lack of variability observed in our sample reflects the relative stability of selection effects compared to the other social influences we assessed. Specifically, although peer groups may change as students enter college, the characteristics of those peer groups (e.g., more or less alcohol involved) may be relatively stable. An intriguing, albeit speculative, possibility is that peer group stability may in fact facilitate individual variability in the other two social influence domains we assessed. Affiliating with more (or less) alcohol-involved peers would likely lead to different experiences observing other students' drinking and in being in environments where alcohol offers are more (or less) common. A potential result could be a sort of polarization of perceived norms and alcohol offers that might lead to increased individual variability in both perceived norms and alcohol offers over time. In addition to Greek involvement, it is also quite likely that a number of other factors, such as place of residence, degree of involvement in other school organizations and activities, and location and degree of student employment, also influence active and passive social influences. It is also important to note that in our study social modeling referenced the perceived drinking behavior and attitudes of close friends and did not include actual assessment of close friends' drinking. Although the misperception of peer drinking norms is robust regardless of the target (e.g., students in general, close friends, fellow Greeks), numerous studies have demonstrated that perceived norms are elevated among Greeks, which is likely indicative of recognition of the heavier drinking of this group (Baer et al., 1991; Borsari & Carey, 2001).

Our findings replicate and extend a great deal of previous cross-sectional research indicating higher levels of alcohol use, alcohol-related negative consequences, and dependence symptomatology (e.g., Alva, 1998; Berkowitz & Perkins, 1986; Cashin et al., 1998; Engs,

Diebold, & Hanson, 1996; Lo & Globetti, 1995; Read, Wood, Davidoff, McClacken, & Campbell, 2002; Wechsler, Dowdall, Davenport, & Castillo, 1995) among those involved in the Greek system. Likewise, our findings add to a much smaller body of prospective research demonstrating higher levels of alcohol use and problems (Baer et al., 1995; Sher et al., 2001), other drug use (McCabe et al., 2005), and membership in more problematic alcohol growth trajectory groups (Schulenberg et al., 1996) for Greeks throughout the college years.

The current study extends previous research in multiple ways. First, the prospective design, with prematriculation assessment along with two postmatriculation follow-ups, allows for an examination of alternative social influence patterns during a developmental period typified by increases in alcohol use and problems. Second, we extend earlier findings by Sher et al. (2001) both conceptually and methodologically through systematic examination of a taxonomy of social influences within the context of LGCM and mediation analyses. Third, consistent with suggestions by Bartholow et al. (2003), we observed for both men and women that those who were not members of fraternities or sororities but did report involvement in Greek activities demonstrated selection and socialization effects similar to, although less pronounced than, those of Greek members.

Limitations

Findings from the current study should be considered in light of several limitations. First, the sample was recruited from a single, ethnically homogenous public university. Therefore, the results may not generalize to the U.S. college population and, particularly, to more diverse universities. Given observed ethnic and racial differences in collegiate alcohol use (e.g., O'Malley & Johnston, 2002; Windle, 2003), replication of our findings in a sample better suited to examine ethnic and racial variability would constitute an important advancement. Second, although comparisons between the current sample and the population from which it was drawn indicate comparability on demographic variables and extremely modest differences with regard to alcohol use, the current sample comprises students who responded to an online announcement during orientation about a study on "college student health behaviors and attitudes." Although our assessment prior to the students entering college represents an important advance, our study included only three occasions of measurement across the first 2 years of college. This limited our ability to model growth across later college years and may have hindered detection of socialization effects of Greek involvement for social modeling and perceived norms. Observation of socialization effects may have been further hampered by the residence status of our sample; only 11% of Greek members resided in Greek housing in their freshmen year, although this percentage had increased to 43% by the sophomore year. Finally, although we used a taxonomy of social influences that has demonstrated utility in both early and late adolescent samples (Graham et al., 1991; Wood et al., 2001), college student drinking is influenced by a wide array of social and environmental factors and by no means do our constructs capture the full spectrum of these influences.

Implications and Conclusions

The delineation of particular social influence patterns linking gender, Greek involvement, and alcohol use and problems, as well as the identification of mediators of these influences, have clear implications for the etiology of alcohol use and misuse. The support for a reciprocal social influence pattern is consistent with a central tenet of social learning theory, reciprocal determinism (Bandura, 1986; Maisto, Carey, & Bradizza, 1999), and previous research with earlier adolescents (Curran et al., 1997). The observation of direct and indirect relations between active and passive social influences provides further evidence of a unique role for these constructs in the development of college student drinking and related problems.

This study also has a number of significant implications for preventive interventions with college students. Our findings suggest that college administrators and prevention specialists should become more aware that students, particularly men, who affiliate with fraternities and sororities, represent an at-risk group prior to matriculation and underscore the need for selected interventions with this at-risk population prior to, or as part of, the pledge process. Further, interventions should recognize the dynamic interplay of selection and socialization effects and incorporate both individual and environmental elements. Motivational interviewing, one of the two interventions that was judged to have demonstrated efficacy in college student populations by the NIAAA Task Force on College Drinking (NIAAA, 2006), has been modified to provide individual- and house-level feedback to Greek students with reductions in alcohol use observed at follow-up (Larimer et al., 2001). This type of approach could easily incorporate discussions of selection and socialization effects. Moreover, given our findings, other, more policy-focused interventions, such as delaying rush until the spring semester of the freshmen year, implementing alcohol-free rushes, or prohibiting alcohol use at fraternities and sororities, merit investigation. Although research on the effects of policy changes on Greek drinking is scant, one recent study of universities in two states noted that only 25% prohibited alcohol use at fraternities and sororities (Mitchell, Toomey, & Erickson, 2005). For any of these largely untested policy-oriented interventions, it is important to assess for potential iatrogenic effects (Kilmer, Larimer, Parks, Dimeff, & Marlatt, 1999) or for movement of alcohol problems from the campus to the community (Hingson & Howland, 2002). Finally, from a methodological standpoint, our examination of putative mediators using LGCM (from guidelines promulgated by Cheong et al., 2001) also has implications for future preventive intervention research with college students.

In conclusion, consistent with our hypotheses and observations made by Borsari and Carey (1999, p. 32), it appears that formal (and perhaps informal) affiliation with heavier drinkers in the Greek community leads to a mutually reinforcing system in which initially higher levels of alcohol use and problems are exacerbated by the increased affiliation with heavier drinking peers. Our findings also suggest that active and passive social influences are mechanisms through which Greek membership influences alcohol use and problems. Future research would benefit from examination of the direct and indirect effects observed here over the entire course of college, with larger and more ethnically representative samples featuring a larger proportion of Greeks residing in fraternity and sorority housing to allow for stronger tests of socialization effects.

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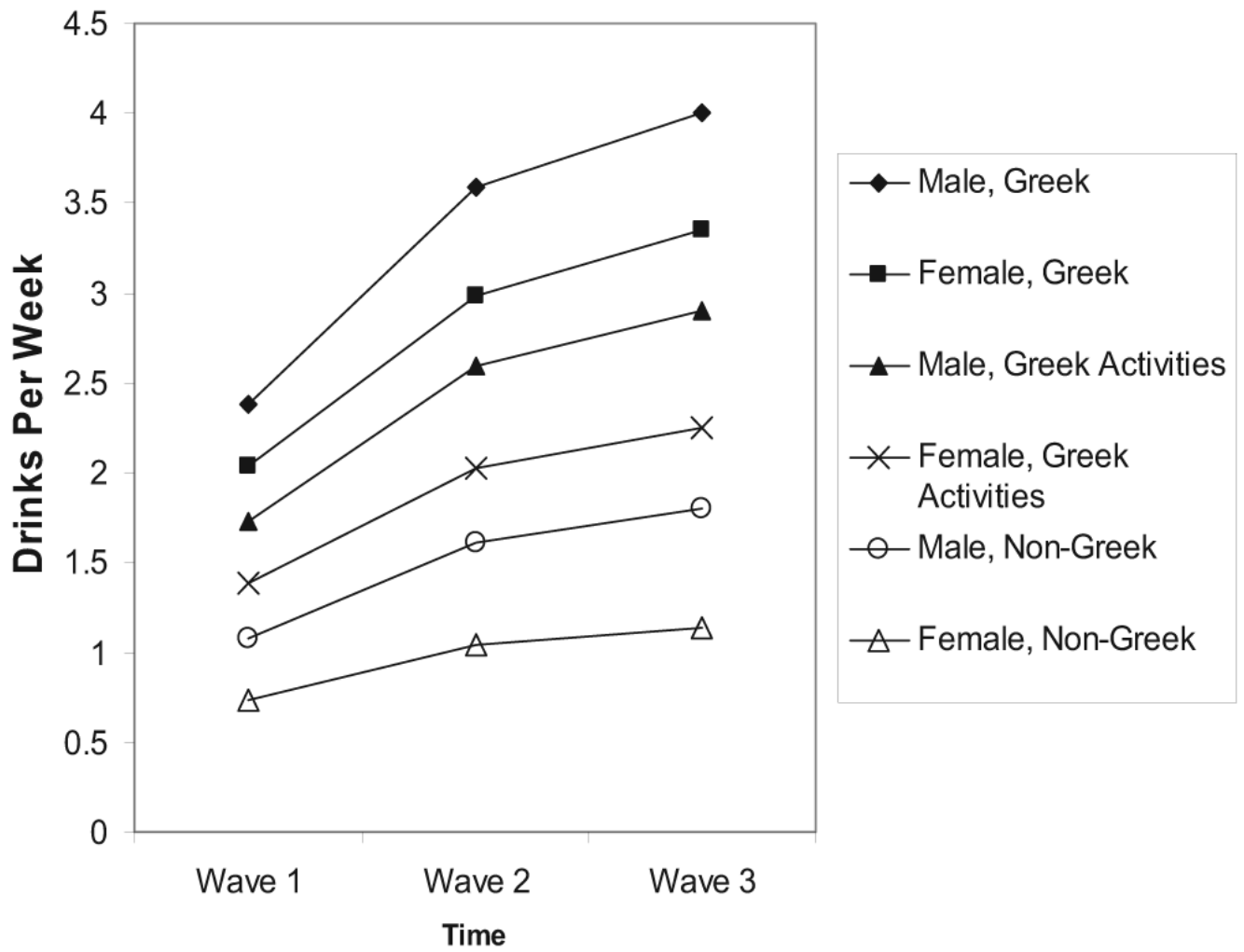


Figure 1. Alcohol use growth curves by gender and Greek involvement. Although not depicted, the time interval between Wave 2 and Wave 3 is 12 months, in contrast to the 6-month interval between Waves 1 and 2.

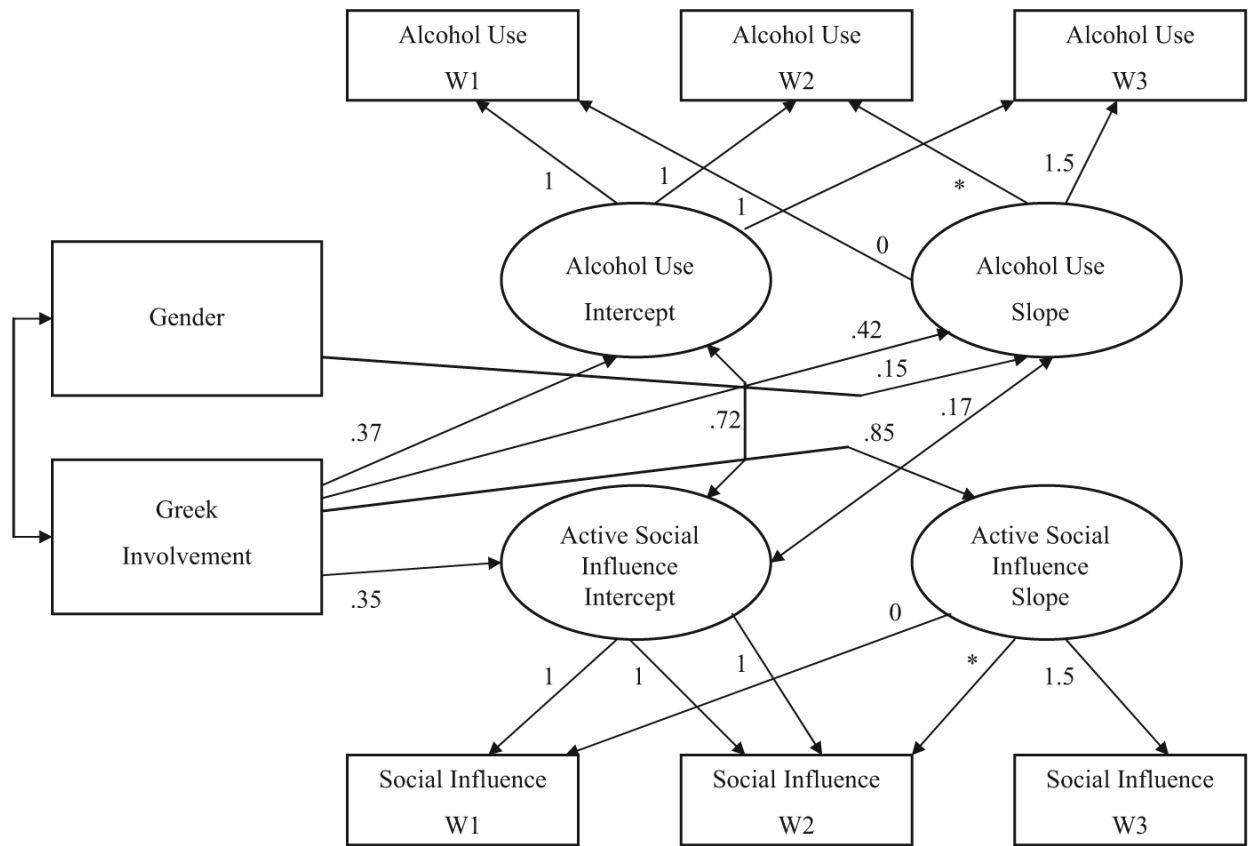


Figure 2. Cross-domain latent growth curve model of alcohol use and active social influences. Parameter estimates shown are for alcohol offers models. Only significant paths are depicted, and all parameters shown are $p < .05$. *Denotes a freely estimated factor indicator. W1 = Wave 1; W2 = Wave 2; W3 = Wave 3.

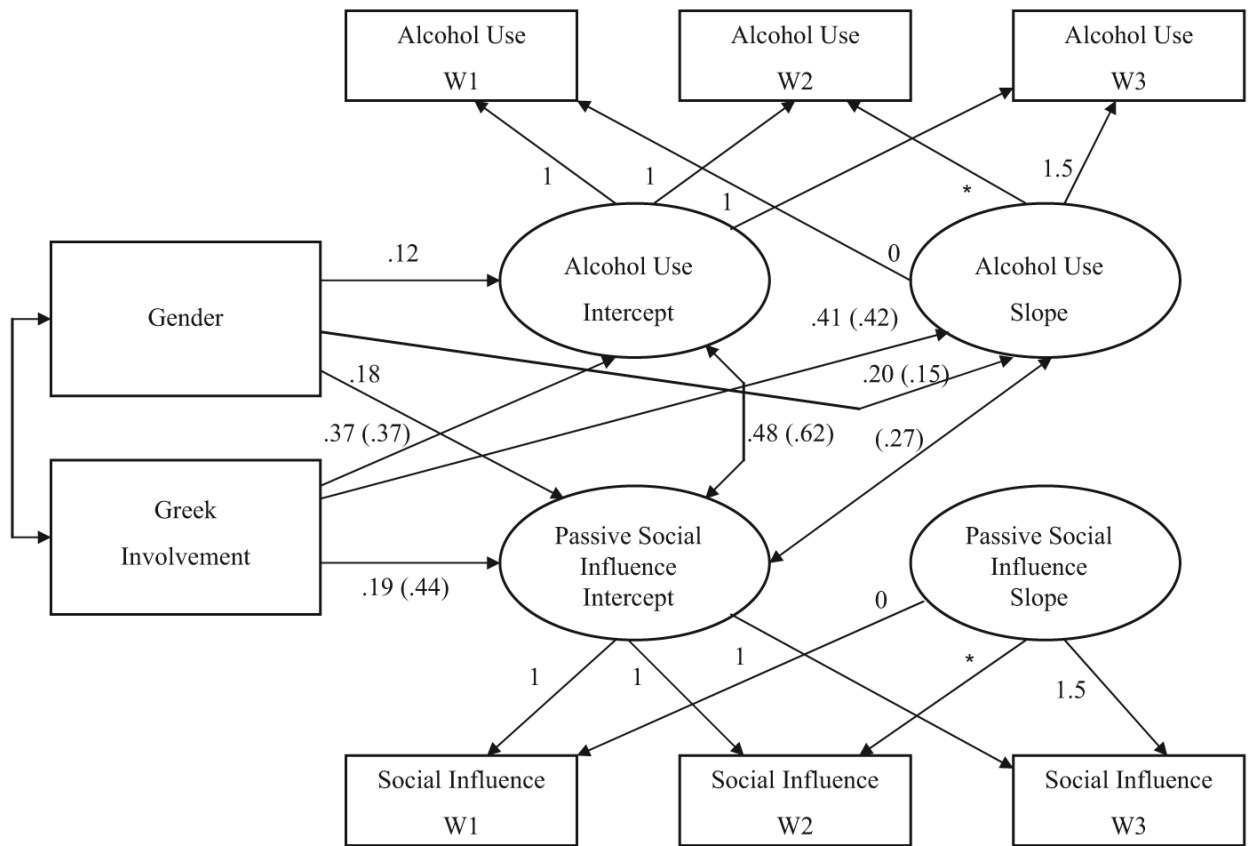


Figure 3. Cross-domain latent growth curve model of alcohol use and passive social influences. Parameter estimates shown are for perceived norms and social modeling (in parentheses) models. Only significant paths are depicted, and all parameters shown are $p < .05$. *Denotes a freely estimated factor indicator. W1 = Wave 1; W2 = Wave 2; W3 = Wave 3.

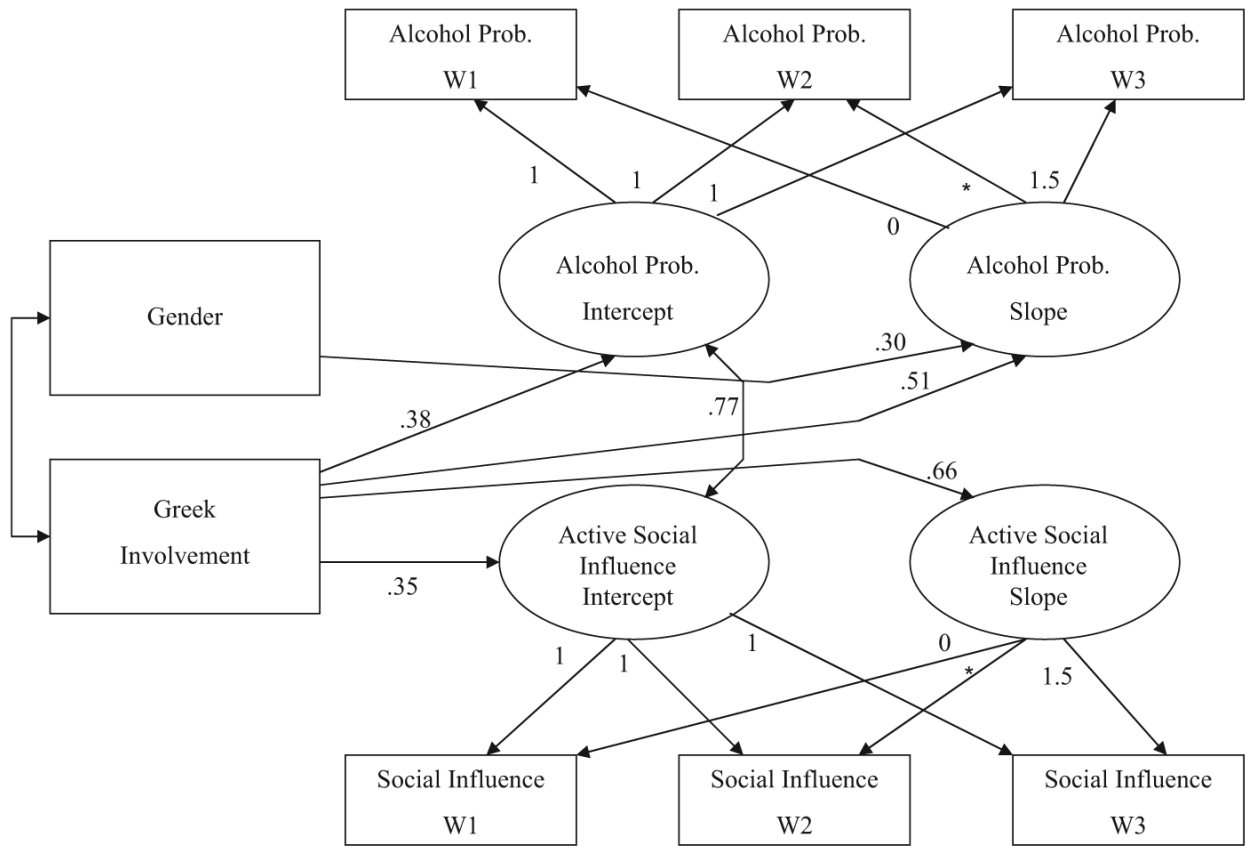


Figure 4. Cross-domain latent growth curve model of alcohol-related problems and active social influences. Parameter estimates shown are for alcohol offers models. Only significant paths are depicted, and all parameters shown are $p < .05$. *Denotes a freely estimated factor indicator. Prob. = problems; W1 = Wave 1; W2 = Wave 2; W3 = Wave 3.

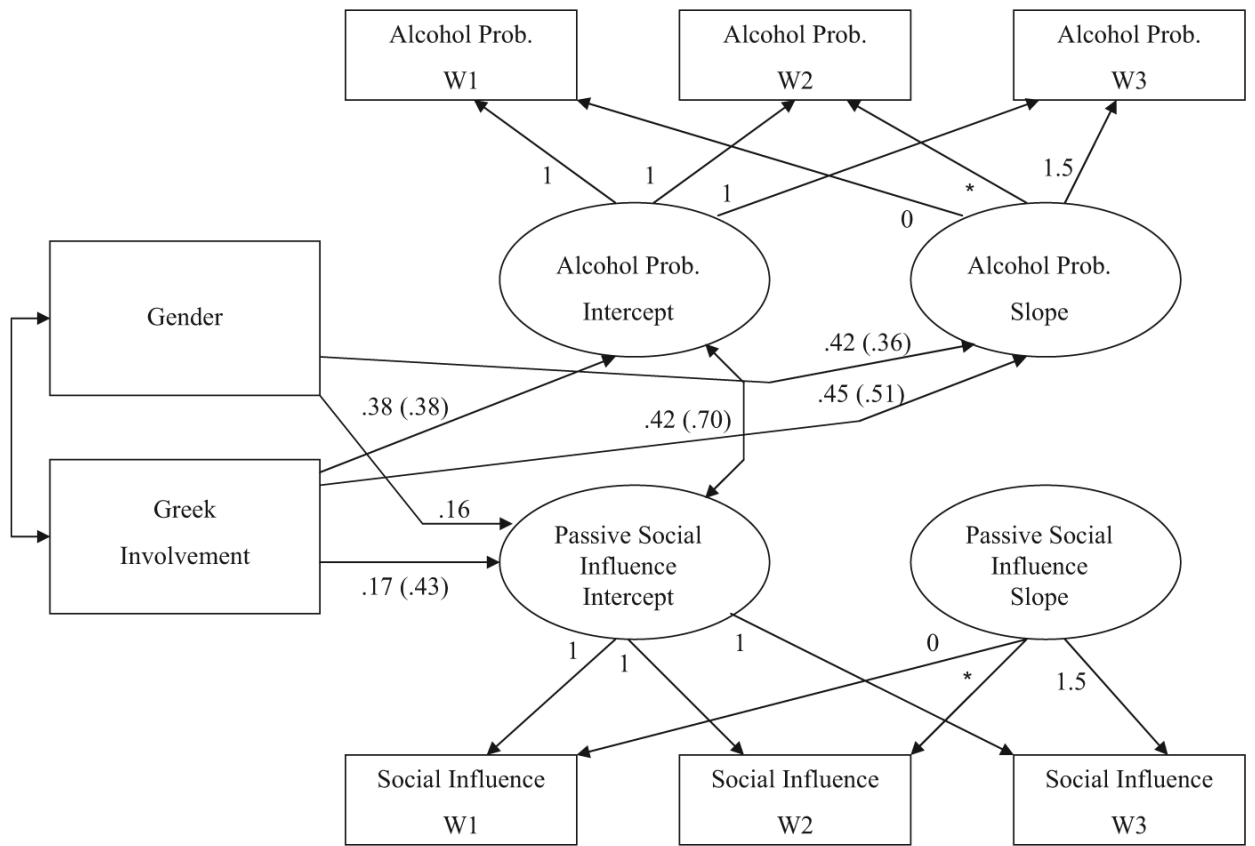


Figure 5. Cross-domain latent growth curve model of alcohol-related problems and passive social influences. Parameter estimates shown are for perceived norms and social modeling (in parentheses) models, respectively. Only significant paths are depicted, and all parameters shown are $p < .05$. *Denotes a freely estimated factor indicator. Prob. = problems; W1 = Wave 1; W2 = Wave 2; W3 = Wave 3.

Table 1

Summary of Mediation Analyses

Dependent variable	Mediational sequence	Mediator	z score for indirect effect
Alcohol use	Greek involvement \Rightarrow mediator intercept \Rightarrow outcome intercept	Social modeling	5.99 ^{***}
		Alcohol offers	4.80 ^{***}
		Perceived norms	2.55 [*]
Alcohol problems	Greek involvement \Rightarrow mediator intercept \Rightarrow outcome slope	Social modeling	2.59 ^{**}
		Alcohol offers	1.75 [*]
		Social modeling	6.07 ^{***}
Alcohol problems	Greek involvement \Rightarrow mediator intercept \Rightarrow outcome intercept	Alcohol offers	4.95 ^{***}
		Perceived norms	2.47 [*]

* $p < .05$.** $p < .01$.*** $p < .001$.