

SELECTION AND SOCIALIZATION EFFECTS OF  
GREEK AFFILIATION ON HEAVY DRINKING  
ACROSS THE TRANSITION TO COLLEGE AND INTO THE COLLEGE YEARS:  
THE EFFECTS OF PERSONALITY TRAITS AND DRINKING NORMS

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A Thesis presented to the Faculty of the Graduate School  
University of Missouri-Columbia

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In Partial Fulfillment  
of the Requirements for the Degree

Masters of Arts

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by  
AESOON PARK

Dr. Kenneth J. Sher, Thesis Supervisor

MAY 2006

The undersigned, appointed by the Dean of the Graduate School, have examined the thesis entitled

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Presented by Aesoon Park

A candidate for the degree of Master of Arts

And hereby certify that in their opinion it is worthy of acceptance.

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Professor Kenneth J. Sher

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Professor Wendy S. Slutske

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Professor Phillip K. Wood

---

Professor Jennifer L. Krull

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Professor Daniel C. Vinson

## ACKNOWLEDGEMENTS

I gratefully acknowledge Dr. Kenneth J. Sher for his generous support and encouragement in completion of my Master's thesis. In addition, I would like to acknowledge my committee members: Wendy S. Slutske, Phillip K. Wood, Jennifer L. Krull, and Daniel C. Vinson. I would also like to thank Patricia C. Rutledge and Jenny M. Larkins for their insightful comments on a previous version of this manuscript and Carol J. Waudby and the staff of the Alcohol, Health, and Behavior and IMPACTS projects for their data collection and management.

## TABLE OF CONTENTS

ACKNOWLEDGEMENTS .....	ii
LIST OF TABLES .....	v
LIST OF FIGURES .....	vi
ABSTRACT .....	vii
Chapter	
1. INTRODUCTION .....	1
Self-Selection Effect of Heavy Drinking on Greek Affiliation .....	2
Socialization Effect of Greek Affiliation on Heavy Drinking .....	3
Both Self-Selection and Socialization Processes in Greek Drinking .....	3
Two Main Limitations of Previous Literature .....	4
Correlates of Self-Selection and Socialization Processes of Greek Drinking .....	6
Research Questions and Hypotheses of the Study .....	8
2. METHOD .....	9
Participants .....	9
Measures .....	11
3. RESULTS .....	14
Overview of Data Analyses .....	14
Preliminary Analyses .....	15
Selection and Socialization Effects of Greek Affiliation on Heavy Drinking .....	19
The Effects of Personality Traits .....	22
The Effects of Perceived Peer Drinking Norms .....	24
4. DISCUSSION .....	27

Selection and Socialization Processes between Greek Affiliation and Heavy Drinking .....	27
Personality Traits: Multiple Paths of Selection .....	29
Perceived Peer Drinking Norms' Limited Role in the Early Stage of Socialization.....	31
Prevention and Intervention Implications .....	33
Limitations, Future Directions, and Conclusions .....	34
5. REFERENCES .....	39

## LIST OF TABLES

Table	Page
1. Summary of Latent Class Analyses of Greek Status over the First Three Years of College .....	47
2. Random Coefficient Models Predicting College Drinking from Gender and Greek Status, with and without Controlling for Precollege Drinking .....	48
3. Product-Moment Correlations, Means, and Standard Deviations of Variables Used in the Current Study .....	49
4. Summary of Mediation Analyses involving Extraversion and Novelty Seeking.....	50
5. Summary of Mediation Analyses involving Perceived Peer Drinking Norms.....	51

## LIST OF FIGURES

Figure	Page
<p>1. Probability of Greek affiliation based on the most likely latent class membership of the four-class latent class analysis on Greek status (in a top panel) and estimated trajectories of heavy drinking as a function of most likely Greek status during the first six semesters of college, based on random coefficient models without (in a middle panel, with observed levels of precollgee drinking) and with (in a bottom panel) controlling precollege drinking. Heavy drinking was measured using the mean score of three items assessing frequencies of getting high, getting drunk, and having five or more drinks in a single sitting during the past 30 days, based on 8-point ordinal scales with response options, such as 0 (“Didn’t get high or light-headed/ didn’t get drunk/ didn’t drink five or more drinks in the past 30 days”), 1 (“Once during the past 30 days”), 2 (“2 to 3 times in the past 30 days”), and 3 (“Once or twice a week”).....</p>	52
<p>2. A latent growth model to examine the selection and socialization effects of Greek affiliation on the trajectory of heavy drinking across the transition to and during the first three years of college. * <math>p &lt; .05</math>. ** <math>p &lt; .01</math>. *** <math>p &lt; .001</math>.....</p>	53
<p>3. A latent growth model to examine effects of extraversion and novelty seeking on the selection effect. Numbers in parentheses indicate estimates from a multi-group analysis that were found to be significantly differ across gender; right and left sides of dash represent estimates of women and men, respectively. All estimates are standardized ones. * <math>p &lt; .05</math>. ** <math>p &lt; .01</math>. *** <math>p &lt; .001</math>.....</p>	54
<p>4. A latent growth model to examine the effect of perceived peer drinking norms on the socialization effect. Numbers in parentheses indicate estimates from a multi-group analysis that were found to be significantly differ across gender; right and left sides of dash represent estimates of women and men, respectively. All estimates are standardized ones. * <math>p &lt; .05</math>. ** <math>p &lt; .01</math>. *** <math>p &lt; .001</math>.....</p>	55

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ABSTRACT

Although heavy drinking among fraternity and sorority members is well documented, it is less clear whether the Greek environment facilitates heavy drinking or whether heavy drinkers select into Greek environments. Moreover, mechanisms underlying the relation between Greek environment and drinking rarely have been studied. Selection and socialization effects of Greek affiliation on drinking and the effects of personality traits and peer drinking norms on those associations were investigated using longitudinal data throughout the transition to college ( $N = 2,376$ ). Latent growth models supported both selection and socialization effects; individuals who involved in heavier drinking at precollege were more likely to join Greek organizations and in turn Greek members increased heavy drinking more than nonmembers, even after the selection effect was controlled. Extraversion was associated with Greek affiliation independent of precollege drinking, whereas the effect of novelty seeking on Greek affiliation was partially mediated by heavier precollege drinking. Peer drinking norms mediated the effect of Greek affiliation on drinking only during the first semester of college. These selection and socialization processes were largely invariant across gender. Theoretical and clinical implications are discussed.

## INTRODUCTION

Fraternity and sorority organizations in college are well known as “the center of the campus alcohol culture” (Wechsler, Dowdall, Maenner, Gledhill-Hoyt, & Lee, 1998). Residence in a Greek house was the strongest correlate of binge drinking (defined as having at least five drinks for men or four drinks for women in a row) in a nationally representative sample of four-year colleges, *College Alcohol Survey* (Wechsler, Dowdall, Davenport, & Castillo, 1995). From 75% to 83% of residents in Greek houses, compared to 44% of college students in general, were involved in binge drinking during the past two weeks across the four surveys of CAS conducted between 1993 and 2001 (Wechsler et al., 2002). Those who belonged to a fraternity or sorority were more likely to be diagnosed with 12-month alcohol abuse or dependence than were nonGreek members (Knight et al., 2002). Other multi-campus studies also consistently found that Greek members were more likely to be drinkers, to drink more heavily, and to have more negative consequences than nonGreek members (Alva, 1998; Engs, Diebold, & Hanson, 1996).

Despite well established findings of heavier drinking among fraternity and sorority members, mechanisms underlying the relation between Greek affiliation and alcohol use rarely have been explored. There are at least three potential ways that Greek affiliation and heavy drinking could relate to each other. First, Greek members may drink heavily because the Greek organizational environment facilitates Greek members’ involvement in heavy drinking (socialization). Second, individuals who were involved in heavy drinking in high school may selectively affiliate with Greek organizations that reinforce their prior drinking pattern (self-selection). Finally, Greek organizations may

attract precollege heavy drinkers and Greek affiliation, in turn, increases the alcohol use of those heavy drinkers even more (both self-selection and socialization). Distinguishing among these potentially different processes underlying the “Greek drinking phenomenon” has significant clinical and theoretical implications. Optimal interventional timing (intervening prior to college versus during the college years) and strategies (focusing on intraindividual factors versus Greek environmental factors) to address Greek drinking problems would differ depending upon the relative extent of selection versus socialization effects. Also, socialization and self-selection processes of Greek drinking represent a broader question about the mechanism by which the environment and the individual affect each other to determine longitudinal courses of drinking behaviors in a developmental context (e.g., Huba & Bentler, 1982; Jessor & Jessor, 1977; Zucker & Noll, 1982).

#### Self-Selection Effect of Heavy Drinking on Greek Affiliation

Several retrospective and longitudinal studies have suggested a self-selection effect of Greek affiliation on drinking. Freshmen with higher levels of alcohol consumption pledged fraternities more than did students who drank less in a retrospective study (O'Connor, Copper, & Thiel, 1996). Similarly, entering freshman who reported they intended to join a fraternity or sorority showed higher levels of several alcohol involvement indicators, including alcohol use quantity and frequency of binge drinking (Cantebury et al., 1992), alcohol use frequency (Werner & Greene, 1992), and negative consequences of drinking (Read, Wood, Davidoff, McLacken, & Campbell, 2002), than did students who did not intend to join a fraternity or sorority. Although behavioral intentions usually are good predictors of behavior (Kelly & Breinlinger, 1995; Pieters &

Verplanken, 1995), intent to join Greek organizations at the time of college entrance is only an approximate measure of Greek membership. Presumably there are individuals who either are not invited to join or decide not to join Greek organizations for any of a number of personal or financial reasons. Additionally, it is possible that some individuals who initially report no intention to join a Greek organization ultimately do affiliate.

#### Socialization Effect of Greek Affiliation on Heavy Drinking

There is supporting evidence for a socialization effect as well. Among high school abstainers, fraternity and sorority members were three times more likely to start drinking during college in a retrospective study (Lo & Globetti, 1993). Although Greek involvement was associated with greater increases in the frequency of heavy episodic drinking during the college years (Park, Sher, & Krull, 2006), it was not related to a higher frequency of heavy episodic drinking three and seven years after college, even after controlling for freshman drinking (Bartholow, Sher, & Krull, 2003; Sher, Bartholow, & Nanda, 2001). Along with the finding of a partial mediating effect of peer drinking norms, Greek environmental pressure to drink was suggested to facilitate heavy drinking. However, these studies failed to control for potential differences in precollege drinking across Greek status; thus, evidence for heavier alcohol use of Greek members in college simply may be a function of their heavier precollege drinking.

#### Both Self-Selection and Socialization Processes in Greek Drinking

Several studies have suggested that both selection and socialization effects of Greek affiliation are operating in drinking among Greek members. Greater increases in drinking quantity and frequency from the senior year of high school to the first year of college as well as greater high school drinking quantity and frequency among Greek

members were found in a quasi-longitudinal retrospective study (Lo & Globetti, 1995). A higher proportion of high-school binge drinkers became Greek members, but also a higher proportion of Greek members started bingeing in college than did nonGreek members in a cross-sectional national study, CAS (Wechsler, Kuh, & Davenport, 1996). A recent study using national longitudinal data from *Monitoring The Future* showed not only that Greek members had higher levels of heavy episodic drinking before college but also that they increased heavy drinking more than did nonGreek members over time in college (McCabe et al., 2005). Even among high school problematic drinkers, residence in a Greek house predicted greater increases in alcohol use and adverse consequences in the first semester of college, even after controlling for drinking and alcohol consequences in the senior year of high school, which were higher in Greek members than in nonGreek members (Baer, Kivlahan, & Marlatt, 1995).

#### Two Main Limitations of Previous Literature

Extant research on the selection and socialization processes of Greek drinking, however, has important limitations. First, most evidence of selection and socialization effects was obtained with cross-sectional (e.g., Canterbury et al., 1992; Kahler, Read, Wood, & Palfai, 2003; Read et al., 2002; Werner & Greene, 1992) or retrospective data (e.g., Lo & Globetti, 1993, 1995; O'Connor et al., 1996). However, cross-sectional or retrospective data do not allow us to rule out concurrent reciprocal relations from putative causal relations, even though a temporal relation does not necessarily indicate a causal relation. Because selection and socialization processes implicate specific sequences of events over time, the use of longitudinal research designs including data on precollege drinking are crucial to distinguish between the self-selection versus socialization effects

and correlates of those effects across the transition to college. The studies of Baer and colleagues (1995) and McCabe and colleagues (2005) were the only two longitudinal studies identified that prospectively examined Greek drinking over the transition to college. However, Baer et al. (1995) used only two assessment points (i.e. senior year in high school and the first semester of college) to examine changes in alcohol use over time. Two time points may be inadequate to model differential trajectories of drinking among individuals appropriately, given the unstable nature of the transitional period. Also, their sample consisted of problematic drinkers in high school who agreed to participate in five years of longitudinal study of alcohol prevention, which may limit the generalizability of their findings. The present study used longitudinal data with a more inclusive sample of incoming students at a Midwestern university assessed in the summer prior to matriculation and six subsequent semesters of college.

Second, the mechanisms underlying the relation between Greek environment and heavy drinking rarely have been studied. For example, although McCabe and colleagues' study (2005) used a nationally representative probability sample of high school seniors followed up biennially, they did not examine the potential effects of individual difference and environmental factors in the selection and socialization processes. Multivariate studies on potential mediators and moderators are needed in order to better understand the mechanisms by which individual difference factors and Greek environment reciprocally affect individuals' drinking behavior over time. In the current study, the effects of both precollege individual difference factors (personality traits), and college environmental factors (perceived drinking norms) on the selection and socialization

processes are examined. Potential differential effects of gender in those processes also are examined.

### Correlates of Self-Selection and Socialization Processes of Greek Drinking

#### *Extraversion and novelty seeking*

The notion of self-selection into Greek systems suggests the potential effects of existing individual differences on selective Greek affiliation. Behavioral disinhibition (as indicated by impulsivity, sensation seeking) and, to some degree, sociability (as indicated by extraversion) have been suggested in the general drinking literature as the most relevant personality dimensions to heavier alcohol use, (although neuroticism/negative emotionality has been associated with drinking *problems*: see Sher, Trull, Bartholow, & Vieth, 1999). Individuals high in extraversion may seek out the Greek environment because of its emphasis on social activities and group life and individuals high in novelty seeking may be attracted to the Greek environment because of its party-centered life style providing higher stimulation. In one study, degree of Greek involvement mediated the effects of impulsive sensation-seeking trait on higher drinking levels in the freshman year (Kahler et al., 2003). In an earlier study from our laboratory, no significant mediating effects of extraversion and novelty seeking on the relation between Greek status and heavy drinking in college were found (Sher et al., 2001). However, that cohort study did not ascertain alcohol involvement until after matriculation and could not statistically model the effect of precollege drinking. In the current study, we extend the previous study by incorporating the effect of drinking both at precollege and college; high levels of novelty seeking and extraversion may predispose individuals to engage in heavier

drinking at precollege and their heavier drinking may make individuals more likely to join Greek systems in college.

### *Perceived drinking norms*

The social and cultural environments of Greek organizations consistently have been suggested as one of the factors which engender and maintain problematic alcohol use among Greek members (Borsari & Carey, 1999). A cultural analysis study of fraternity pledges suggested that alcohol plays a key role in socializing and controlling newcomers during the pledge process (Kuh & Arnold, 1993). The environmental pressure to drink in Greek organizations also has been examined using the construct of social (peer) drinking norms. Most studies examined mean differences of drinking norms across Greek status; lower perception of close friends' disapproval of binge drinking in Greek members than in nonGreeks (Alva, 1998) and higher norms for drinking among Greek-house residents than among residence halls and off-campus residents (Baer, Stacy, & Larimer, 1991) were found. Furthermore, Greek members' perceived approval of weekend drinking remained stable whereas that of nonGreeks decreased over time in a longitudinal study of problematic high school drinkers across the transition to college (Baer, 1994). Peer drinking norms was shown to mediate the relation between Greek affiliation and heavy drinking cross-sectionally and one-year prospectively (Sher et al., 2001). In the current study, we extend that work by accounting for growth in peer drinking norms during college (given the evidence of changes in drinking norms over time; e.g., Baer, 1994) and by incorporating the potential effect of precollege drinking on perceived drinking norms (given extensive literature which identifies peer drinking norm as the strongest and the most consistent correlate of college drinking; e.g., Baer, 2002).

### *Gender differences in Greek drinking*

Although a substantial number of studies on Greek drinking tend to focus on fraternities (e.g., Borsari & Carey, 1999; Faulkner, Alcorn, & Garvin, 1989) or to combine samples across gender (e.g., Goodwin, 1989), significant gender differences have been found in the Greek effect on heavy drinking in terms of fraternity members' heavier drinking levels (Alva, 1998; Baer et al., 1995; Goodwin, 1992; Harrington, Brigham, & Clayton, 1997) and greater increase in heavy drinking over time (Bartholow et al., 2003; McCabe et al., 2005; Park et al., 2006) than those of sorority members. The two studies using nationally representative samples provided evidence of gender differences in terms of selection and socialization. The study by McCabe and colleagues (2005) reported a stronger selection effect in men (indicated by greater differences in heavy episodic drinking at precollege across future Greek status among men than among women) but no gender difference in socialization effect (indicated by non-significant interaction effect between Greek status and gender on the increase in heavy drinking). Wechsler et al. (1996) reported that a substantial number of binge drinkers among fraternity house residents began binge drinking in high school, whereas sorority binge drinkers tended to begin bingeing after college entrance. These findings suggest that binge drinking in fraternity members is more a function of a self-selective process whereas binge drinking in sorority members is more a function of socialization. However, relative gender differences in selection and socialization have never been formally tested.

#### Research Questions and Hypotheses of the Study

In the current study, longitudinal data from a cohort of incoming freshmen at a Midwestern university assessed in the summer prior to college entrance and in six

subsequent semesters of college were used to address the following three research questions. First, self-selection and socialization processes in the relation between Greek affiliation and heavy drinking during the transition to college were examined. Both a selection effect (heavy high-school drinking is positively related to Greek affiliation in college) and a socialization effect (Greek affiliation is related to greater increase in heavy drinking over time) were hypothesized to be significant. Second, the effects of individual difference and environmental factors in those selection and socialization effects were examined. Precollege drinking was hypothesized to mediate the effect of extraversion and novelty seeking on Greek affiliation (selection process) and perceived drinking norms were hypothesized to mediate the effect of Greek affiliation on college drinking (socialization process). Third, potential differences in the selection and socialization processes as a function of gender were examined. Based on the previous literature, we hypothesized that the selection effect would be stronger for men whereas the socialization effect would be stronger for women.

## METHOD

### Participants

Data collected as part of a prospective study of the trajectories of alcohol involvement during the summer prior to college entrance and the four years of college were used. For the precollege assessment (Wave 0), 3,720 (88%) of 4,226 incoming first-time college students at the University of Missouri-Columbia completed a paper-and-pencil questionnaire assessing substance use and health behaviors. The questionnaire was administered during a formally scheduled time slot in the summer orientation preceding college matriculation. Participants at precollege consisted of slightly more women (54%)

and predominantly Caucasians (90%), with a mean age of 18.0 years ( $SD = 0.4$ ). This precollege sample, excluding those who died ( $n = 2$ ) and actively refused continuing participation ( $n = 207$ ), has been followed up and administered a web-based survey every semester during the following three years (Waves 1 to 6). A total of the 88% of precollege sample ( $n = 3,273$ ) have participated in at least one or more college assessment, and 43% of the precollege sample ( $n = 1,581$ ) participated in all six college assessments. Written parental consent was obtained for all participants under age 18 at precollege assessment and assent/consent was obtained from each participant. All measures and procedures were reviewed and approved by the human subjects institutional review board.

For the present study, data from the participants ( $n = 2,376$ ) who were continuously enrolled as full-time students throughout the first three years of college and participated in at least one or more college assessment (in addition to the precollege assessment) were selected.<sup>1</sup> Only full-time students were included because the effect of Greek affiliation presumably differs among part-time students or non-college students versus full-time students. Thirty percent of the precollege sample ( $n = 1,124$ ) was excluded because they were not continuously enrolled as full-time students based on registrar's records and 6% of the precollege sample ( $n = 220$ ) was excluded because they did not participate in any assessment after the precollege assessment. The mean age of this sample at the precollege baseline was 17.9 years ( $SD = 0.4$ ), and the sample was predominantly Caucasian (90%) and included more women (58%) than men. This sample was approximately representative of the population of the study university demographically.

A series of attrition analyses showed that noncompleters ( $n = 220$ ) were more likely to be male (63%) than were completers (43%:  $h = .42$ , Cohen, 1988). The effect sizes on attrition of being older ( $d = .16$ ), drinking more heavily (as assessed by a composite score of monthly frequencies of feeling high, getting drunk, and having five or more drinks in a sitting:  $d = .13$ ), and being Caucasian ( $h = .00$ ) were small. A multivariate logistic regression analysis including all these variables also showed that attrition was significantly predicted by being male (odds ratio = 2.23 [1.66, 2.99]). These attrition results suggested that our findings may underestimate potential gender differences. The overall effect of those variables on attrition, however, was minimal; power of the multivariate logistic regression to discriminate attrition status (as measured by the c statistic which potentially ranges from 0.5 to 1.0) was low as 0.62, and the proportion of the variance of attrition accounted for by those variables (as measured by Nagelkerke  $R^2$ : Nagelkerke, 1991) was only 3%.

## Measures

### *Demographics*

Demographic data including age, gender, and ethnicity were obtained from the registrar's office of the university.

### *Fraternity/sorority affiliation*

A dichotomous Greek status variable (1 = Greek member; 0 = NonGreek member) was determined from participants' responses at each college assessment (Waves 1 to 6) regarding their degree of affiliation with a fraternity or sorority among four options of "*I am not a member and I never attend fraternity or sorority events,*" "*I am not a member but I occasionally attend fraternity or sorority events,*" "*I am not a*

*member but I regularly attend fraternity or sorority events,” and “I am a member.”*

Participants who indicated that they were not members were classified as nonGreek members regardless of how frequently they attended fraternity or sorority activities.

Across the six semesters of this study, 31% to 36% of women ( $n = 361 - 421$ ) and 26% to 32% of men ( $n = 181 - 246$ ) were classified as Greek members.

### *Heavy drinking*

The mean score of three items measuring frequencies of getting high, getting drunk, and having five or more drinks in a single sitting during the past 30 days (Jessor & Jessor, 1973) was calculated at precollege and the first six semesters of college (Waves 0 to 6). Participants responded to each item based on 8-point scales ranging from “*Didn’t get high or light-headed/ didn’t get drunk/ didn’t drink five or more drinks in the past 30 days*” (0), “*Once in the past 30 days*” (1), “*2 to 3 times in the past 30 days*” (2), “*Once or twice a week*” (3), “*3 to 4 times a week*” (4), “*5 to 6 times a week*” (5), “*Nearly every day*” (6), to “*Every day*” (7). If two or more items were missing at a given measurement point, the mean score was coded as missing. Although quantity-based measures of alcohol use have been used widely for assessing high-risk drinking, they do not take into account the potential variability in the effect of drinking due to individual difference factors such as body weight, metabolism of alcohol, and drinking history, and due to situational factors such as duration of drinking episode. Thus, measures of a subjective effect of alcohol use (that is, getting high and drunk) were also used as well as a more traditional objective measure of alcohol use (that is, having five or more drinks at a sitting) to assess the construct of “heavy drinking” (Jackson, Sher, Gotham, & Wood,

2001). Internal consistency, as measured by Cronbach's coefficient alpha ( $\alpha$ ) of this measure ranged from .92 to .93 over the seven assessment points.

### *Personality traits*

Two measures of personality traits were administered in the first semester of college assessment (Wave 1); the extraversion scale of the NEO Five Factor Inventory (Costa & McCrae, 1989) and a shortened Novelty Seeking scale (Sher, Wood, Crews, & Vandiver, 1995) of the short form of the Tridimensional Personality Questionnaire (Cloninger, 1987). The extraversion scale ( $\alpha = .85$ ) is assessed by 12 items to which participants responded on 5-point Likert scales, ranging from “*Strongly disagree*” (0) to “*Strongly agree*” (4). A scale score, which potentially ranged from 0 to 48, was used for analyses. If three or more items were missing, the score was coded as missing. The novelty seeking scale consists of 13 items ( $\alpha = .70$ ) which assess the higher-order personality dimension of novelty seeking based on Cloninger's unified biosocial theory of personality. Novelty seeking is hypothesized to reflect exploratory excitability, impulsiveness, and extravagance. The response options were “*False*” (0) and “*True*” (1), and the scale score potentially ranged from 0 to 13. If four or more items were missing, the total score was coded as missing.

### *Perceived peer drinking norms*

At every semester of college (Waves 1 to 6), six items were administered to measure peer drinking norms based on 0 – 4 scales, with higher scores indicating higher drinking 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?”* (Jessor & Jessor, 1977).

The mean score of the six items was used for the analyses. If two or more items were missing at a measurement point, the score was coded as missing. Cronbach’s coefficient alphas for this measure ranged from .91 to .93 over the six assessment points.

## RESULTS

### Overview of Data Analyses

Two preliminary analyses on the Greek status variable were conducted: latent class analysis (LCA) and random coefficient analysis. First, LCA was used to identify discrete patterns of Greek status over the first three years of college. LCA is a technique used to distinguish a mixture of subgroups in a population measured by multiple categorical indicators, assuming that there are distinct latent classes among individuals underlying the observed multivariate categorical variables (Lazarsfeld & Henry, 1968). Second, random coefficient models were used to examine potential differences in the trajectories of heavy drinking in college as a function of the latent Greek status variable as identified by LCA. A random coefficient model accommodates randomly missing data by giving more weight to cases with complete data, compared to general linear models which exclude individuals with any missing data (Raudenbush & Bryk, 2002).

As main analyses, three sets of latent growth models were estimated. The first model was to examine selection and socialization effects of Greek status on heavy drinking during the transition to college and the first three years of college; the second model was to examine the effect of personality traits on the selection effect; and the third model was to examine the effect of drinking norms on the socialization effect. At each step, multi-group analyses were conducted to examine potential differences across gender

in these selection and socialization processes. Mplus version 3.01 (Muthen & Muthen, 1998-2004) was used to estimate latent growth models due to its ability to deal with categorical variables and missing data. Because of the missing data in the present study and the categorical nature of the Greek status variable, theta parameterization and weighted least squares estimation using a diagonal weight matrix with robust standard errors and mean-and variance-adjusted chi-square test statistic (WLSMV) using a full weight matrix were used.

### Preliminary Analyses

#### *Latent class analysis of Greek status*

The use of observed variables of Greek status in subsequent latent growth models were precluded for the following reasons. First, only 52% ( $n = 1,237$ ) of our sample had complete data on Greek status across all six college assessments and the proportion of participants with missing data on Greek status ranged from 18% to 26% over the six assessments of college. Second, although 88% of individuals with complete data on Greek status stayed constantly as either Greek members ( $n = 282$ ) or nonmembers ( $n = 809$ ), a remaining 22% ( $n = 146$ ) did change their Greek status over time, and a total of 25 discrete patterns of Greek status over the six semesters of college were observed.

Thus, latent class analyses (LCA) were estimated to disaggregate participants into discrete latent groups of Greek status over the first three years of college. LCA models were fit for two to five latent classes using maximum likelihood estimation with standard errors and a chi-square test that are robust to non-normality (MLR). An attempt to estimate six latent classes failed due to a negative residual variance. The goodness-of-fit coefficients and solutions of these latent class models are shown in Table 1.

Although both four-class and five-class solutions showed good fit to the data, the four-class solution was retained due to its parsimony and interpretability. The improvement in fit (indicated by decreases in the Akaike and sample-size adjusted Bayesian information criteria) of the five-class model over the four-class model was considerably less than of the four-class model over the three-class model. Also, the deterioration of classification accuracy (indicated by a decrease in entropy measuring average probability of assignment to the most likely class) was noticeably larger for the five-class model than the four-class model. Interpretability of solutions also supported the four-class model. Classes 4 and 5 of the five-class model divided individuals who left Greek organizations into two small classes (consisting of 2% and 3 % of participants, respectively); Estimated latent class probabilities indicated that individuals in Class 4 left Greek organizations in the first to second year of college and individuals in Class 5 left in the second to third year of college. The probability of Greek affiliation in the first six semesters of college based on the most likely latent class membership of the four-class model is presented in Figure 1, top panel. Classes were: constant nonGreek members (64%;  $n = 1,511$ ), constant Greek members (30%;  $n = 710$ ), nonGreek to Greek members (joiners: 2%;  $n = 58$ ), and Greek to nonGreek members (quitters: 4%;  $n = 97$ ). The average latent class probabilities for the most likely latent class membership ranged from 93% to 99% across four classes.

#### *Random coefficient models*

Potential differences in the trajectories of college drinking across Greek status based on the four-class solution of latent class analysis were examined using two random coefficient models, with or without controlling for precollege drinking. The six college

measurements were coded as 0, 0.5, 1.2, 1.7, 2.4, and 2.9, based on differences in months between measurements to represent linear growth in heavy drinking over time and these coefficients were squared to represent quadratic growth. Linear and quadratic growth were included as random effects. Gender and three dummy variables comparing constant Greek members to constant nonGreek members, quitters, and joiners were added as time-invariant predictors. Finally, two-way interactions of both linear and quadratic growth with the three Greek status dummy variables and gender were included. Three-way interactions of linear and quadratic growth with the three Greek status dummy variables and gender and two-way interactions between Greek status dummy variables and gender, though tested, were dropped sequentially from the model for reasons of parsimony because none of them were significant (all  $p > .05$ ) and excluding those interactions yielded a non-significant decrement in model fit,  $\Delta\chi^2(9) = 16.40, ns$ . Results of the two random coefficient models, with or without controlling for precollege drinking, are presented in Table 2. Plots of estimated trajectories of heavy drinking during the first six semesters of college as a function of the four Greek statuses are presented in Figure 1, two bottom panels. The effect of gender was controlled for the purpose of the figure because the numbers of joiners and quitters were too small to be divided by gender (28 men among 58 joiners and 22 men among 97 quitters).

Results of a model in which precollege drinking was not controlled for showed significant main effects of the comparison between constant nonGreeks versus Greeks and the comparison between joiners versus Greeks but a non-significant effect of the comparison between quitters versus Greeks. These findings indicated that those who were nonGreek members in the first semester of college (that is, constant nonGreeks and

joiners) showed significantly lower levels of heavy drinking than did those who were Greek members (that is, constant Greeks and quitters). Interestingly, quitters showed a significantly lower level of heavy drinking than did constant Greeks in the sixth semester of college,  $\gamma = -.41, p < .01$ , in a follow-up analysis. In terms of interactions, the linear increase in heavy drinking over time (linear trend) was greater,  $\gamma = -.18, p < .01$ , and the deceleration in the rate of linear increase over time (quadratic trend) was smaller in Greeks than nonGreeks,  $\gamma = -.05, p < .01$ . Also, joiners' deceleration in the rate of linear increase over time was smaller than that of Greeks,  $\gamma = -.11, p < .05$ . Even after controlling for a main effect of precollege drinking, these key findings remained virtually the same (see Table 2), except differences in heavy drinking between constant Greeks and joiners in both the first semester,  $\gamma = -.09, p = .50$  and sixth semester,  $\gamma = .01, p = .95$  became non-significant. These findings provided preliminary evidence of a socialization effect of Greek affiliation on heavy drinking in college, which we next analyzed in greater detail.

#### *Use of time-invarying dichotomous Greek status variable*

Although a four-class solution of latent class analysis on Greek status over the first three years of college seemed to be the best solution as described earlier, most participants (94% of total sample;  $n = 2,221$ ) were classified as being either constant nonGreek members or constant Greek members, and the number of individuals who were classified as those who either joined or left Greek organizations over the first three years of college was too small (7% of total sample;  $n = 155$ ) to be meaningfully analyzed in subsequent latent growth models. This finding of largely stable nature of Greek status over time in LCA replicated the fact that 88% of individuals with complete data on Greek

status remained either Greek members or nonGreek members constantly throughout the first three years of college. Therefore, we decided to use 2,221 full-time college students classified as either constant Greek or nonGreek members in the four-class model of LCA in the subsequent analyses and to use a time-invarying dichotomous variable of Greek status over the first three years of college based on the LCA.<sup>2</sup>

### *Descriptive statistics*

Means, standard deviations, and product-moment correlations of variables used in the current study among the final sample ( $n = 2,221$ ) are presented in Table 3. Effect sizes, as product-moment correlations, for gender on peer drinking norms and personality traits were small. Effect sizes for Greek affiliation on heavy drinking and peer drinking norms were moderate. Novelty seeking was moderately associated with heavy drinking and peer drinking norms, whereas extraversion was weakly associated with them. Heavy drinking was strongly associated with perceived peer drinking norms cross-sectionally and longitudinally.

### Selection and Socialization Effects of Greek Affiliation on Heavy Drinking

A latent growth model was estimated to examine the selection and socialization effects of Greek affiliation on the trajectory of heavy drinking across the transition to college and during the first three years of college (see Figure 2). Two latent college drinking variables, intercept and slope, were included to estimate the trajectory of heavy drinking in college. The intercept factor represented the mean level of heavy drinking in the first semester of college and the slope factor represented the linear change in heavy drinking over time. The intercept was specified by setting factor loadings for the indicators of college heavy drinking to 1. The slope factor's loadings were determined to

represent the differences in months between measurements (0, 0.5, 1.2, 1.7, 2.4, and 2.9 for Waves 1 to 6). The error variances of the two factors were correlated with each other, but the error variances of manifest indicators of heavy drinking in college were not correlated with each other. A manifest variable of heavy drinking at precollege was included as an exogenous variable and a dichotomous Greek status was included as an endogenous categorical variable. Paths from precollege drinking to the two college drinking factors were estimated to control for the effect of precollege drinking on college drinking; therefore, estimates of selection (a path from precollege drinking to Greek status) and socialization (paths from Greek status to the two college drinking factors) effects of Greek status were conservative.

The model showed an excellent fit to the data,  $\chi^2(7, n = 2,221) = 19.12, p < .01$ ; Comparative Fit Index (CFI) = .99; Tucker-Lewis Index (TLI) = .99; Root Mean Square Error of Approximation (RMSEA) = .03. Significantly positive means of intercept,  $b = .57, z = 13.31$ , and slope  $b = .11, z = 7.08$ , factors of college drinking were found, indicating that overall college students tended to increase heavy drinking over time during the first three years of college. Results supported both selection and socialization effects of Greek affiliation on heavy drinking. A significant positive path from precollege drinking to Greek status ( $\beta = .35, p < .001$ ) indicated a strong selection effect that individuals with heavier precollege drinking were more likely to become Greeks in college. Significant positive paths from Greek status to the intercept ( $\beta = .18, p < .001$ ) and slope ( $\beta = .11, p < .01$ ) factors of college drinking indicated socialization effects that Greek members tended to have heavier drinking in the first semester of college and also to increase their heavy drinking over time more than did nonGreek members, even after

controlling for the significant effects of precollege drinking on both the intercept and slope factors of college drinking. The positive effect of precollege drinking on the college drinking intercept but its negative effect on the college drinking slope (along with a negative error correlation between the college drinking intercept and slope) represents a phenomenon of “regression toward the mean” or the “law of initial values.” This is frequently observed in longitudinal data, that individuals with a lower initial level tended to have a higher rate of increase than did those with a higher initial level (Rogosa, 1988; Shrout & Bolger, 2002). It should be noted that although nonGreek members had a higher rate of increase in heavy drinking than that of Greek members, it does not mean that nonGreek members had a higher level of heavy drinking; despite Greek members’ lower rate of increase, Greek members consistently had a higher level of heavy drinking in college than did nonGreek members because of their higher level of heavy drinking in the first semester of college.

#### *Invariance of Selection and Socialization Effects across Gender*

To determine whether the relation between Greek affiliation and heavy drinking differed across gender, multi-group analyses were performed. Invariance across subgroups was estimated by constraining specific structural paths to be the same across subgroups. Then, the decrement of model fit due to those constraints was determined by chi-square difference tests between the less constrained and more constrained models. No differences across gender in selection and socialization effects of Greek affiliation on heavy drinking were found. Specifically, constraining the “selection” path from precollege to Greek affiliation to be invariant across gender,  $\Delta\chi^2(1) = .11, p = .74$ , yielded non-significant decrements in model fit. Similarly, constraining the

“socialization” paths from Greek affiliation to the two college drinking factors to be invariant across gender,  $\Delta\chi^2(2) = .03, p = .99$ , yielded non-significant decrements in model fit.

### The Effects of Personality Traits

Potential mediation of personality effects by precollege drinking on Greek affiliation was examined using a latent growth model. Manifest variables of extraversion and novelty seeking were included as covarying exogenous variables.<sup>3</sup> Direct paths from the two personality traits to Greek status represent direct effects and paths from the two personality traits to Greek status through precollege drinking represent indirect effects. Paths from personality traits to the college drinking intercept and slope factors were estimated to control for the effect of personality traits on college drinking (see Figure 3). Standardized estimates of direct effects, and indirect effects are presented in Table 4. Bootstrap 95% confidence intervals for the standardized indirect effects resulted from 500 bootstrap draws are presented in parentheses. Total effects (as a sum of a direct effect and all indirect effects) and proportion of the total effect due to a mediating effect (as a measure of effect size of a mediator: MacKinnon & Dwyer, 1993) also are presented. Note that a total effect of novelty seeking to Greek affiliation was calculated as a sum of absolute values of direct and indirect effects due to their opposite signs (MacKinnon, 2003).

The model showed an excellent fit to the data,  $\chi^2(20, n = 2,221) = 39.03, p < .01$ ; CFI = .99; TLI = .99; RMSEA = .02. Results indicated that the relation between personality traits and Greek affiliation was partially mediated by precollege drinking, as indicated by its significant both direct and indirect effects (see Figure 3 and Table 4).

Specifically, individuals with higher levels of extraversion,  $\beta = .08, p < .001$ , and novelty seeking,  $\beta = .31, p < .001$ , tended to engage in heavier drinking at precollege. Then, in turn, individuals with heavier precollege drinking were more likely to become Greeks in college,  $\beta = .35, p < .001$ . Even after controlling for these indirect effects, significant direct effects on Greek affiliation were found in that individuals with a *higher* level of extraversion,  $\beta = .29, p < .001$ , but a *lower* level of novelty seeking,  $\beta = -.10, p < .01$ , were more likely to become Greeks. About 9% of the extraversion effect and 53% of the novelty seeking effect on Greek affiliation were mediated by precollege drinking.

In terms of effects of personality traits on college drinking (see Table 4), the effect of extraversion on heavy drinking in the first semester of college was completely mediated by precollege drinking and Greek affiliation, indicated by its significant indirect effects but non-significant direct effect. The effect of novelty seeking on the heavy drinking in the first semester of college was partially mediated by precollege drinking and Greek affiliation, indicated by its significant indirect and direct effects. About 86% of the extraversion effect and 62% of the novelty seeking effect on heavy drinking in the first semester were mediated by precollege drinking and Greek affiliation. The effects of extraversion and novelty seeking on the increase in college drinking were completely mediated by precollege drinking but not by Greek affiliation. About 45% of the extraversion effect and 97% of the novelty seeking effect on the increase of heavy drinking over time were mediated by precollege drinking and Greek affiliation.

#### *Invariance of the Effects of Personality Traits across Gender*

To determine whether the effects of personality traits in the relation between heavy drinking and Greek affiliation differed across gender, multi-group analyses were

performed. Gender differences in two paths were found. First, constraining a path from novelty seeking to Greek affiliation to be invariant across gender yielded a significant decrement in model fit,  $\Delta\chi^2(1) = 6.31, p < .05$ . In a follow-up analysis, a significantly negative effect of novelty seeking on Greek affiliation was found in women, unstandardized estimate  $b = -.06$ , standardized estimate  $\beta = -.16, p < .001$ , but no significant effect was found in men,  $b = .002, \beta = .01, p = .91$ . This result suggested that women with a *lower* novelty seeking trait were more likely to become Greeks, after controlling for the indirect effect (that individuals with a *higher* novelty seeking tended to drinking heavily at precollege and then their heavy drinking led to Greek affiliation in college). But, among men, the effect of novelty seeking on Greek affiliation was completely mediated by precollege drinking and there was no direct effect remaining after controlling for the indirect effect. Percentage of total variance mediated was 40% in women but 95% in men. Second, constraining a path from precollege drinking to the college drinking slope to be invariant across gender yielded a significant decrement in model fit,  $\Delta\chi^2(1) = 5.68, p < .05$ . Follow-up analysis showed that the negative effect of precollege drinking on the increase of heavy drinking in college was stronger in women,  $b = -.07, \beta = -.37, p < .001$ , than in men,  $b = -.04, \beta = -.19, p < .01$ .

#### The Effects of Perceived Peer Drinking Norms

A latent growth model was estimated to examine a potential mediating effect of drinking norms on the relation between Greek affiliation and heavy drinking. Two latent drinking norm variables were included to estimate the trajectory of drinking norms in college: intercept to represent a mean level of drinking norms in the first semester of college and slope to represent linear change in drinking norms over time. The factor

loadings of the intercept and slope factors were determined in the same manner as the previously-described intercept and slope factors for college drinking. The error variances of the two latent drinking norm factors were correlated with each other but the error variances of the drinking-norm manifest indicators were left uncorrelated with each other. Paths from Greek status to the two college drinking factors represent direct effects and paths from Greek status to the two college drinking factors through two drinking-norm factors represent indirect effects. The paths from precollege drinking to the two drinking-norm factors were estimated to control for the effect of precollege drinking on drinking norms in college (see Figure 5).<sup>4</sup>

The model showed an excellent fit to the data, CFI = .98; TLI = .99; RMSEA = .03, even though the chi-square is significant due to a large sample size,  $\chi^2(12, n = 2,221) = 35.17, p < .001$ . Standardized estimates of direct effects, indirect effects (bootstrap 95% confidence intervals for the standardized indirect effects in parentheses), total effects, and proportion of the total effect due to a mediating effect are presented in Table 5.

Significantly positive means of intercept,  $b = 1.89, z = 64.34$ , and slope  $b = .12, z = 11.93$ , of drinking norms were found, indicating that overall college students' drinking norms tended to increase during the first three years of college. A significantly negative error correlation between the drinking-norm intercept and slope factors indicates that individuals with a lower drinking norm in the first semester tended to have a higher rate of increase over time than did those with a higher initial level.

In terms of the relation between Greek status and college drinking (see Table 5), the socialization effect of Greek affiliation on heavy drinking in the first semester of college was partially mediated by drinking norms in the first semester of college.

However, the effect of Greek affiliation on the increase in heavy drinking over time in college was not mediated by drinking norms in the first semester or by the change in drinking norms over time in college. Even after controlling for these indirect effects through drinking norms, significant direct effects of Greek affiliation on the two college drinking factors were found, in that Greek members had a higher level of heavy drinking in the first semester of college,  $\beta = .05, p < .05$ , and higher rate of increase of heavy drinking over time,  $\beta = .09, p < .05$ , than did non-Greek members. About 72% of the Greek effect on the drinking in the first semester and 17% on the increase of drinking over time were mediated by the two drinking-norm factors.

The effect of precollege drinking on heavy drinking in the first semester of college was partially mediated largely by drinking norms in the first semester and to a lesser extent by Greek affiliation. Precollege drinking's negative effect on the increase in heavy drinking in college was partially mediated by its negative effect on the increase in drinking norms in college but *not by Greek affiliation*. Even after controlling for these indirect effects, significantly strong direct effects of precollege drinking on the two college drinking factors were found,  $\beta = .41, p < .001$ ;  $\beta = -.15, p < .001$ . About 47% of precollege drinking on the drinking in the first semester and 30% on the increase of drinking over time were mediated by the two drinking-norm factors and Greek affiliation.

#### *Invariance of the Effects of Peer Drinking Norms across Gender*

To determine whether the effects of drinking norms on the relation between heavy drinking and Greek affiliation differ across gender, multi-group analyses were performed. Among women, the error variance of drinking norms at Wave 6 was negative; because the magnitude of negative error variance was negligible ( $b = -.002, z = .029, p = .94$ ), the

error variance of drinking norms at Wave 6 in women was set to zero. Only one gender difference was found; constraining a path from precollege drinking to the drinking norm intercept to be invariant across gender yielded a significant decrement in model fit,  $\Delta\chi^2(1) = 8.87, p < .01$ . Follow-up analysis showed that a positive effect of precollege drinking on the initial levels of drinking norm in the first semester in college were stronger in women,  $b = .44, \beta = .57, p < .001$ , than in men,  $b = .34, \beta = .51, p < .001$ .

## DISCUSSION

This comprehensive, longitudinal study of self-selection and socialization processes in the relation between Greek affiliation and heavy drinking extends previous research on Greek drinking in several important ways. First, evidence of both self-selection and socialization processes were found from prospective data including precollege drinking data; that is, heavy drinkers tended to selectively affiliate with Greek systems and Greek affiliation, in turn, increased heavy drinking in college. Second, mediational analyses helped to clarify the mechanisms underlying both the self-selection and socialization processes. Specifically, both extraversion and novelty seeking traits were associated with selection into the Greek system, but, in clearly distinct ways (see Page 38). Third, the socialization effect was mediated via perceived peer drinking norms only during the first semester of college, but not afterward. Fourth, multi-group analyses showed that these selection and socialization processes and effects of personality traits and drinking norms were largely invariant across gender.

### Selection and Socialization Processes between Greek Affiliation and Heavy Drinking

The finding of both selection and socialization processes replicate research that individuals already engaged in heavier drinking at precollege were more likely to join

Greek organizations and Greek members increased heavy drinking more than did nonmembers in college (McCabe et al., 2005), even after controlling for the precollege drinking (Baer et al., 1995). Thus, the socialization effect compounds the initial selection effect in that future Greek members' already higher levels of heavy drinking at precollege further increase due to their involvement in the Greek environment. The concept of an "accentuation effect" of individual-environment interactions in college (Feldman & Newcomb, 1969) seems to describe 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" and consequently the initial characteristics are extended by the environment over time (p.60; Walsh, 1973).

Unexpectedly, few significant differences across gender were found in the selection and socialization processes between Greek affiliation and heavy drinking with some notable exceptions (regarding gender differences in the selection based on extraversion, see Pages 23, 24, 29 and 30). Although several studies have reported greater increases in heavy drinking over time among fraternity members than among sorority members (e.g., Lo & Globetti, 1995; McCabe et al., 2005; Park et al., 2006), they did not control for the effect of differential precollege drinking levels across gender, with an exception of Baer et al. (1995). Thus, more stringent methodology of the current study (using prospective data in modeling a selection effect and controlling for precollege drinking in modeling a socialization effect) may provide a more accurate assessment of gender differences in these processes. An alternative explanation is that gender differences in the Greek effect may occur only in a subset of drinking behaviors. At least

two studies using multiple measures of alcohol use found inconsistent findings across measures. Read et al. (2002) reported a greater selection effect of intent to join a Greek organization in men among incoming college students on drinking quantity-frequency and negative consequences but not on yearly frequencies of heavy episodic drinking. Baer et al. (1995) found a greater socialization effect of Greek residence in men on severity of alcohol dependence symptoms, but not on drinking quantity, maximum drinking quantity, drinking frequency, negative consequences, and the number of alcohol dependence criteria met during the transition to college. Thus, the Greek effect may be stronger among men on alcohol problems and consequences but not on more normative forms of drinking practice in college students. However, more studies using various drinking measures are needed to better understand potential gender differences in Greek drinking.

#### Personality Traits: Multiple Paths of Selection

Our findings indicate that both extraversion and novelty seeking represent distinct predispositions to Greek affiliation, supporting the notion of the “dispositionally guided selection” (Caspi & Herbener, 1990) where individuals actively select into certain environments based on their personal characteristics. Notably, however, the mechanisms by which those two personality traits affect the self-selection process appear to differ in fundamental ways. Individuals high in extraversion, regardless of gender, are more likely to join Greek systems but this relation is largely unrelated to precollege drinking. Extraverted students may choose Greek environment because of its emphasis on social activities which nourish their higher social needs, but not necessarily because of its emphasis on heavy drinking. Prior research has not found a consistent relation of

extraversion with college drinking (see Baer, 2002; Sher et al., 1999) and with Greek drinking (Sher et al., 2001), and the need to examine potential mediating and moderating processes were suggested (e.g., Sher et al., 1999). The finding of selection into Greek systems via extraversion is important in terms of a mediating effect of Greek affiliation on the relation between extraversion and college drinking.

Novelty seeking also was related to selection into Greek systems, but an unexpected gender difference was found. Men high in novelty seeking were more likely to join Greek systems and this selection was strongly associated with their heavy precollege drinking. The role of novelty seeking in women was more complex. Similar to men, women *high* in novelty seeking tended to join Greek systems and this pattern was associated with heavy precollege drinking. But women *low* in novelty seeking also were likely to join Greek systems, unrelated to precollege drinking. Individuals high in novelty seeking across gender may select into Greek systems because of its drinking and parties which meet their stimulation needs. Whereas, women low in novelty seeking may choose the Greek environment, perhaps due to its commitment to social service and sound learning that reinforce their ethical and dutiful traits. Because novelty seeking has been shown to be a robust correlate of heavy drinking (see Sher et al., 1999), it is not surprising that heavier precollege drinking among individuals high in novelty seeking leads to Greek affiliation which reinforces their heavy drinking patterns. Notably, even after controlling for precollege drinking and Greek affiliation, novelty seeking remains related to heavier college drinking, suggesting that there may be other mechanisms by which novelty seeking affects college drinking, besides Greek affiliation.

Overall, these findings indicate that there are multiple, personality-based influences on selection into the Greek environment; some associated with heavy drinking, some associated with nondrinking aspects of Greek life. However, once an individual affiliates into the system, it is likely that the same socialization pressures exist regardless of the underlying motivation for affiliation. Future study on the reasons for Greek affiliation may clarify this selection process according to different personality traits and motivations.

#### Perceived Peer Drinking Norms' Limited Role in the Early Stage of Socialization

Results show that the mediating effect of drinking norms on the relation between Greek affiliation and college drinking occurs only in the first semester of college and the Greek effect on the additional increase of heavy drinking over time is not mediated by drinking norms. This finding highlights the importance of drinking norms in the early stage of socialization in Greek systems. Actually, rush and pledgeship were suggested to play a major role to acculturate newcomers (Arnold & Kuh, 1992), which typically occur in the first semester of college. The very first semester of college may make pledges and initiates especially vulnerable to peer influence on alcohol use for several reasons. Alcohol is often used by upperclass students as a key element in acculturating and controlling newcomers (see Arnold & Kuh, 1992; Kuh & Arnold, 1993) and newcomers would be more than willing to conform because they “are anxious to be accepted into the group” (p. 466; Creeden, 1990). Also, newcomers may not have developed a good sense of how they want to drink and how other students drink yet, and being exposed to excessive drinking of upperclass students may lead them to perceive heavy drinking practice as normative. Thus, through rush and pledgeship which “places an unusual

emphasis on drinking,” (p.466; Creeden, 1990) newcomers may learn and adopt the culture of their Greek organizations, by which the culture of the organization, including heavy drinking, is perpetuated.

Surprisingly, the Greek effect on drinking norms seems to be limited to the very beginning of the socialization process and the additional increase in heavy drinking among Greek members afterward seems to be not associated with the increase of drinking norms. This finding was unexpected given that peer drinking norms consistently have been suggested as one of the major correlates of the Greek socialization effect on alcohol use (e.g., Borsari & Carey, 1999; Sher et al., 2001). Remaining significant associations between Greek affiliation and college drinking even after controlling for peer drinking norms suggest that the mechanism by which Greek affiliation facilitates alcohol use in later stages of Greek membership may differ from those in earlier stages. For example, Greek environment may sustain members’ heavy drinking through its availability of alcohol and exposure to partying/drinking settings. For example, attendance at fraternity parties, but not Greek membership, was associated with higher levels of intoxication (measured as BAC), suggesting that environmental context is a critical determinant of excessive drinking rather than Greek membership per se. Also, higher levels of positive drinking expectancies (Cashin, Presley, & Meilman, 1998; Larimer, Anderson, Baer, & Marlatt, 2000) among Greek members may contribute to their continuation of heavy drinking. Thus, arguably freshmen begin to involve in heavy drinking due to peer pressure but they may continue drinking heavily because they expect to get positive experiences out of drinking or because alcohol is easily available. Future studies to

examine those potential mediators in the later stage of the socialization process are needed.<sup>5</sup>

### Prevention and Intervention Implications

These findings have significant implications regarding optimal timing of intervention for college drinking problems. Overall, findings highlight prevention and intervention efforts prior to or immediately after college entrance to curb heavy drinking on college campuses. Significant roles of precollge drinking and personality traits on Greek affiliation and, in turn, on college drinking, indicate the importance of prevention prior to college entrance. Despite national efforts to address drinking problems in college especially since the 1990s, Wechsler et al. (2002) concluded that “these efforts were not sufficient.” It may be because intervention in college is too late to be efficient. Turrisi’s parent-student communication interventions (e.g., Turrisi, Jaccard, Taki, Dunnam, & Grimes, 2001) are very promising in that it encourages parents’ prevention efforts to deal with potential risky drinking behaviors among incoming college students prior to college entrance. Wood, Read, Mitchell, and Brand (2004) supported this approach in that parental discipline influenced college students’ drinking to attenuate detrimental peer influence. Regarding intervention strategies in college, the prominent role of peer drinking norms on heavy drinking in the first semester suggested that social norming approaches (e.g., Zimmerman, 1997) may be helpful in the very early stages of Greek socialization process. Also, Kuh and Arnold (1993) suggested that rush and pledgeship should occur in the second semester or year of college in order to account for high vulnerability of freshman to be influenced by peer pressure in the processes of rush and pledgeship.

## Limitations, Future Directions, and Conclusions

Several limitations of the current study should be mentioned. First, only a dichotomous variable of Greek status, based on the latent class analysis of Greek status over the three years of college due to large missing data, was used. Although a dichotomous Greek status variable measured at one assessment has been used widely in research, various alternative ways to represent Greek affiliation may be useful to characterize differential selection and socialization processes in Greek drinking, including Greek residence, Greek activity involvement, and time-varying Greek status. Individuals' selection into Greek residence may be influenced by different factors than selection into Greek activities attendance. As such, the degree and nature of socialization due to Greek residence versus activity attendance may differ each other. Also, it is noteworthy that, although Greek status was found to be largely stable at least during the first three years of college, the attempt modeling Greek status as time-varying using random coefficient models gave us unique evidence of socialization effect that heavy drinking changed as a function of changes in Greek status.

Second, precollege drinking was assessed at only one measurement point, right after high school graduation. Although the inclusion of precollege drinking to control its effect on college drinking and peer drinking norms significantly expanded previous research, alcohol use during the time between high school graduation and college entrance might be less representative due to the highly transitional nature of this period. Future studies may examine the longitudinal trajectories of alcohol use from early adolescence and its relation to selection and socialization processes of Greek drinking in college.

Third, even though personality traits were modeled as exogenous to precollege drinking and Greek affiliation, they were measured in the first semester of college, which was four months after the precollege drinking assessment and at the same time as initial Greek affiliation assessment. However, personality traits generally are regarded as stable over time, especially in terms of the rank order as opposed to the mean level (Sher et al., 1999). Moreover, there is only a five-month lag between precollege and the first semester of college assessments; thus, it is less likely that this measurement issue yields different results regarding the role of personality traits in the selection effect of Greek affiliation.

Fourth, the sample of a single campus is used, consisting of higher proportions of Caucasians and Greek members than national averages, which are characteristic of Midwestern four-year universities. Being Caucasian or a Greek member consistently has been associated with heavier drinking than other ethnic groups and nonGreek members, respectively (see Jackson & Sher, 2003; O'Malley & Johnston, 2002). Thus, the findings should be interpreted with a caution that they might be less applicable to students at certain colleges (e.g., Western coast universities in which the rates of Greek members and Caucasians are much lower). In order to confirm our findings, a study using a random sample from multiple campuses is needed.

Despite the limitations enumerated above, this study provides unique findings regarding the selection and socialization processes in the relation between Greek affiliation and heavy drinking from the transition to college to the third year of college. The study design has many methodological strengths including the use of prospective data of an inclusive large sample of college students, inclusion of precollege drinking data as well as college drinking, and addressing missing data better with latent class

analysis and latent growth models to get more generalizable estimates. Also, findings provide a better understanding of the dynamic relation between individual characteristics and the collegiate environment on longitudinal trajectories of heavy drinking. This knowledge may lead to the development of effective interventions and prevention strategies aimed at reducing alcohol use in Greek systems, highlighting the importance of prevention efforts prior to college entrance and the very first semester of college.

## Footnotes

<sup>1</sup>Analyses without missing data did not change the key findings of the present study in terms of selection and socialization processes and the roles of personality traits and peer drinking norms in those processes.

<sup>2</sup>Analyses using Greek status based on the two-class model and an observed variable of Greek status at Wave 1 showed very similar results to those reported here.

<sup>3</sup>Note that personality traits were measured at Wave 1, although conceptually they precede precollege drinking measured at Wave 0 and Greek affiliation measured at Waves 1 to 6.

<sup>4</sup>An alternative model with controlling for a path from a college drinking intercept to a drinking-norm slope showed very similar results regarding mediating effects of drinking norms to those reported here.

<sup>5</sup>Exploratory ancillary analyses were conducted to examine potential mediating effects of alcohol availability and positive alcohol expectancy on the socialization effect of Greek affiliation on college drinking, although measures of those two constructs may not have been optimal because this study was not designed to resolve alcohol availability in a sensitive way. Alcohol availability was measured by the sum score of two dichotomously coded items assessing “easiness” of obtaining alcohol and having a “fake ID”, resulting in a score from 0 to 2, at each college assessment ( $\alpha = .29 - .45$  across measurements). Two latent variables, intercept and slope, were included to estimate the trajectory of alcohol availability in college. Preliminary results showed that alcohol availability in the first semester was significantly related to Greek status,  $\beta = .25, p < .001$ , and heavy drinking in the first semester,  $\beta = .10, p < .001$ , even after controlling for

percollege drinking. However the increase in alcohol availability over time was not associated with Greek affiliation,  $\beta = .02$ , *ns*, and it had minimal influence on the increase in college drinking over time,  $\beta = .08$ , *ns*, after controlling for peer drinking norms. The same analytic scheme was used to examine the potential mediating effects of positive alcohol expectancies, measured by a mean score of eight items, ranging from 0 to 4 ( $\alpha = .82 - .84$  across measurements; Fromme, Stroot, & Kaplan, 1993). Neither the initial level,  $\beta = .04$ , *ns*, nor increase over time,  $\beta = .01$ , *ns*, of positive alcohol expectancy was associated with Greek affiliation after controlling for precollege drinking, even though both were positively associated with the initial level of college drinking,  $\beta = .13$ ,  $p < .01$ , and increase in college drinking over time,  $\beta = .14$ ,  $p < .01$ . The failure of alcohol availability and alcohol expectancies to explain mediation of the residual Greek socialization effect on the increase in college drinking, that is not accounted for by peer norms, may be due to measurement imprecision or more complex relations between these two constructs and peer drinking norms.

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Table 1  
*Summary of Latent Class Analyses of Greek Status over the First Three Years of College*

	Model fit indices				Solutions				
	$\chi^2(df)$	AIC <sup>a</sup>	BIC <sup>b</sup>	Entropy	Class 1 (NonGreek members)	Class 2 (Greek members)	Class 3 (NonGreek to Greeks)	Class 4 (Greek to nonGreeks)	Class 5 (Greek to nonGreeks)
2-class	515.27(47)***	5,991.33	6,025.07	0.97	1,546 (65%)	830 (35%)			
3-Class	269.70(40)***	5,770.45	5,822.37	0.95	1,523 (64%)	774 (33%)	79 (3%)		
4-Class	94.85(35)***	5,573.49	5,643.58	0.95	1,511 (64%)	710 (30%)	58 (2%)	97 (4%)	
5-Class	26.52(28)	5,529.96	5,618.22	0.92	1,472 (62%)	712 (30%)	57 (2%)	58 (2%) <sup>c</sup>	77 (3%) <sup>c</sup>

*Note.*  $N = 2,376$ .

<sup>a</sup>Akaike information criteria. <sup>b</sup>Sample-size adjusted Bayesian information criteria. <sup>c</sup>Estimated latent class probabilities suggested that individual in Class 4 left Greek organizations from the first to second years of college and those in Class 5 left from the second to third years of college. \*\*\*  $p < .001$ .

Table 2  
*Random Coefficient Models Predicting College Drinking from Gender and Greek Status, with and without Controlling for Precollege Drinking*

Fixed effects	Without controlling precollege drinking			With controlling precollege drinking		
	Estimate	SE	t/F	Estimate	SE	t/F
Intercept	1.79	0.05	34.11***	0.96	0.04	21.99***
Precollege drinking	-	-	-	0.56	0.01	46.32***
Linear trend <sup>a</sup>	0.11	0.05	2.19*	0.10	0.05	1.94
Quadratic trend <sup>a</sup>	-0.02	0.02	-1.11	-0.01	0.02	-0.88
Gender <sup>b</sup>	0.35	0.05	6.59***	0.15	0.04	3.68***
Overall Greek status <sup>c</sup>	-	-	72.03***	-	-	24.36***
nonGreeks <sup>c</sup>	-0.84	0.06	-14.36***	-0.38	0.05	-8.29***
Joiners <sup>c</sup>	-0.50	0.17	-2.97**	-0.09	0.13	-0.67
Quitters <sup>c</sup>	-0.16	0.14	-1.16	-0.08	0.10	-0.90
Linear X Gender	0.10	0.05	1.89	0.09	0.05	1.80
Linear X Overall Greek status	-	-	4.08***	-	-	3.57*
Linear X nonGreeks	-0.18	0.06	-3.29**	-0.16	0.05	-3.00**
Linear X Joiners	-0.28	0.16	-1.79	-0.27	0.15	-1.76
Linear X Quitters	-0.05	0.13	-0.41	-0.03	0.12	-0.22
Quadratic X Gender	-0.01	0.02	-0.67	-0.01	0.02	-0.62
Quadratic X Overall Greek status	-	-	4.17**	-	-	3.89***
Quadratic X nonGreeks	0.05	0.02	2.96**	0.05	0.02	2.74**
Quadratic X Joiners	0.11	0.05	2.09*	0.11	0.05	2.08*
Quadratic X Quitters	-0.02	0.04	-0.31	-0.02	0.04	-0.48
Random effects	Estimate	SE	Z	Estimate	SE	Z
Variance in the intercept	1.19	0.05	25.49***	0.53	0.03	19.63***
Variance in the linear trend	0.36	0.04	8.48***	0.36	0.04	8.50***
Variance in the quadratic trend	0.03	0.01	7.49***	0.03	0.01	7.49***
Residual variance across individuals	0.33	0.01	49.73***	0.33	0.01	49.76***

Note. These effects are based on data from 11,222 observations from 2,376 participants.

<sup>a</sup>Time was coded as 0, 0.5, 1, 2, 1, 7, 2, 4, and 2,9 according to the differences in months between measurements; <sup>b</sup>0 = female; 1 = male. <sup>c</sup>The comparison group of a overall Greek status variable and three dummy variables was constant Greek members.

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

Table 3  
Product-Moment Correlations, Means, and Standard Deviations of Variables Used in the Current Study

	Demographics		Personality						Heavy drinking						Peer drinking rooms					
	Gender	Greek status <sup>a</sup>	E	NS	W0	W1	W2	W3	W4	W5	W6	W1	W2	W3	W4	W5	W6			
Demographics																				
Gender																				
Greek status	-.03	-																		
Personality																				
E	-.18	.23	-																	
NS	.04	.01	.02	-																
W0	.12	.29	.08	.30	-															
W1	.13	.29	.11	.33	.70	-														
W2	.10	.33	.14	.28	.67	.79	-													
W3	.16	.34	.15	.30	.65	.72	.79	-												
W4	.18	.35	.13	.30	.65	.70	.76	.81	-											
W5	.22	.30	.16	.28	.58	.65	.71	.76	.78	-										
W6	.20	.32	.11	.25	.58	.64	.68	.71	.74	.79	-									
Peer drinking norms																				
W1	.05	.28	.14	.28	.59	.70	.65	.62	.60	.58	.56	-								
W2	.05	.29	.16	.25	.55	.66	.70	.67	.62	.63	.60	.83	-							
W3	.07	.31	.17	.25	.53	.63	.68	.71	.63	.65	.60	.76	.84	-						
W4	.09	.26	.13	.23	.52	.61	.64	.68	.67	.64	.63	.73	.82	.88	-					
W5	.11	.27	.16	.24	.48	.57	.61	.64	.63	.70	.64	.69	.77	.82	.83	-				
W6	.05	.27	.15	.24	.48	.57	.61	.62	.63	.66	.67	.67	.74	.78	.82	.85	-			
M	.43	.32	30.70	4.87	1.11	1.30	1.32	1.36	1.36	1.45	1.51	2.36	2.42	2.53	2.55	2.56	2.61			
SD	.50	.47	6.04	2.82	1.40	1.27	1.28	1.29	1.31	1.25	1.29	1.07	1.06	1.06	1.04	1.00	0.98			

Note.  $n = 1,390 - 2,221$ . Greek status was based on dichotomous class membership of latent class analysis on Greek status over the first six semesters of college. W0 was summer prior to college matriculation. W1 to W6 corresponded to the first six semesters of college. E = extraversion. NS = novelty seeking.  
<sup>a</sup>0 = female. 1 = male. <sup>b</sup>0 = nonGreek member. 1 = Greek member.  
 Correlation coefficients equal to or larger than .05 are significant at the level of  $p < .05$ .

Table 4  
*Summary of Meditational Analyses Involving Extraversion and Novelty Seeking*

	Direct effect	Indirect effect (95% confidence intervals) through				Sum of indirect	Total effect	% mediated
		Precollege drinking	Greek status	Precollege drinking & Greek status	Indirect			
Extraversion to Greek status	.29***	.03** (.01/.05)	-	-	.03	.31	9%	
Novelty seeking to Greek status	-.10**	.11*** (.09/.13)	-	-	.11	.21 <sup>a</sup>	53% <sup>a</sup>	
Extraversion to CD intercept	.02	.05** (.02/.09)	.06*** (.04/.08)	.01** (.00/.01)	.11	.13	86%	
Novelty seeking to CD intercept	.13***	.21*** (.18/.24)	-.02** (-.03/-01)	.02*** (.02/.03)	.21	.34	62%	
Extraversion to CD slope	.02	-.02** (-.04/-01)	.03 (.00/.06)	.00 (.00/.01)	.01	.03	45%	
Novelty seeking to CD slope	.00	-.08*** (-.11/-05)	-.01 (-.03/.00)	.01 (.00/.02)	-.08	-.08	97%	

*Note.*  $n = 2,221$ . CD = college drinking. Standardized estimates. Bootstrap 95% confidence intervals for the standardized indirect effects are in parentheses.

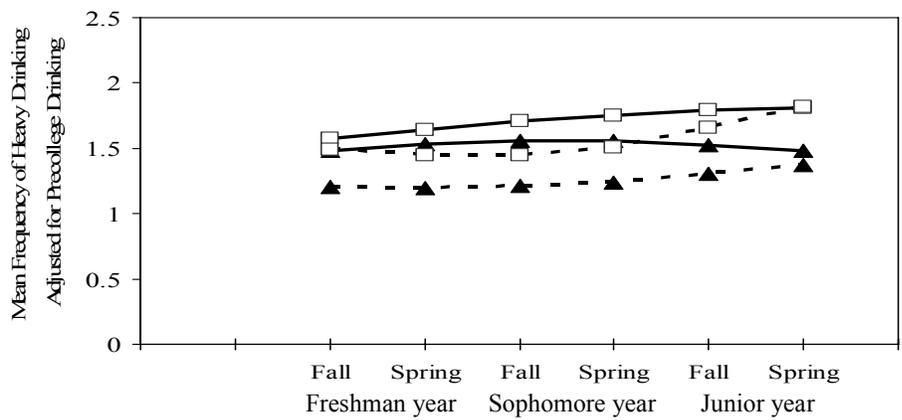
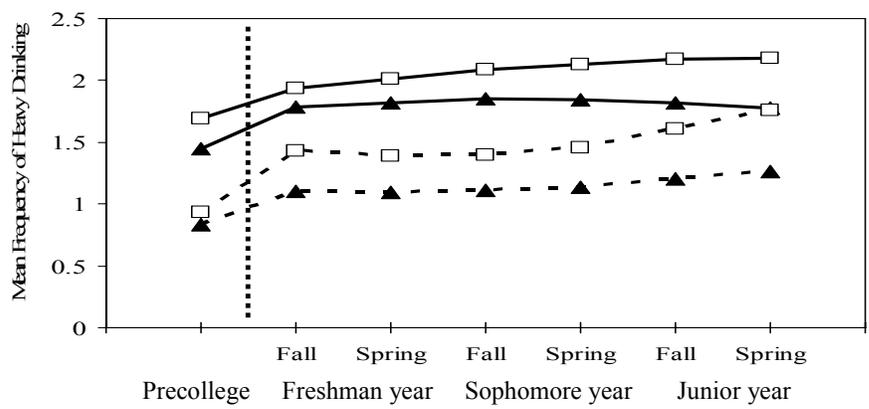
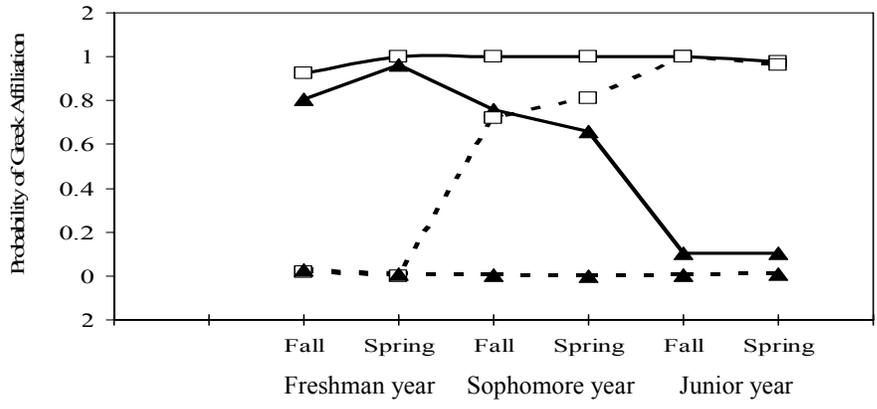
<sup>a</sup>Due to the opposite directions between indirect and direct effects, a total effect was calculated by summing absolute values of direct and indirect effects (MacKinnon, 2003).

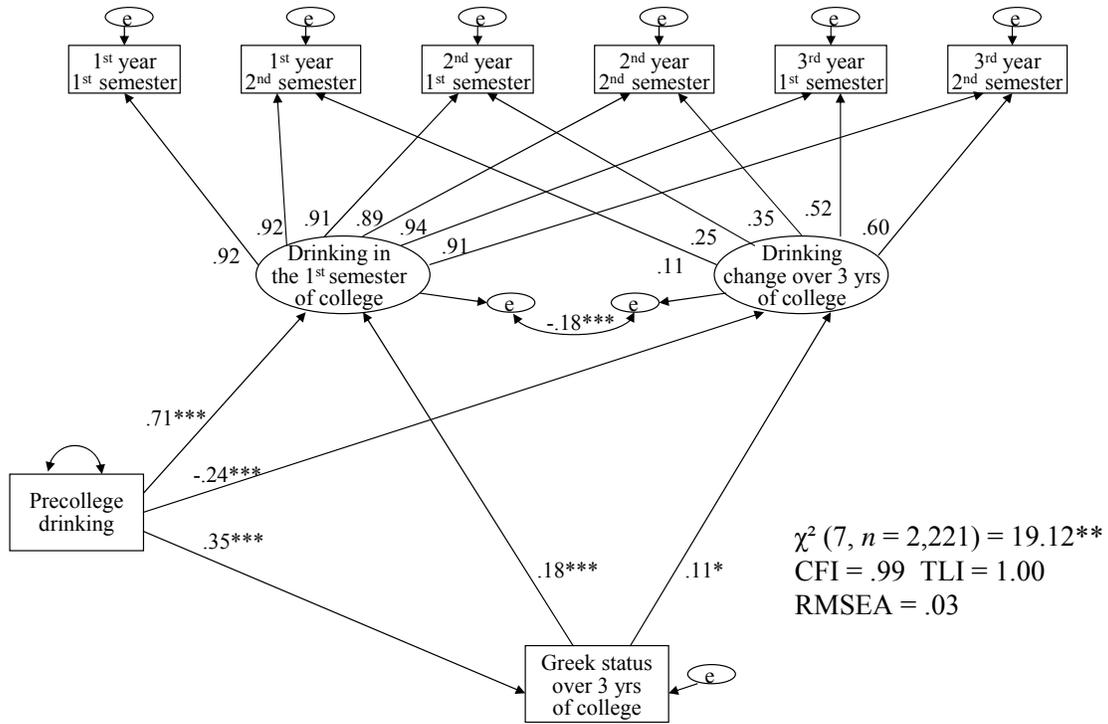
\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 5  
*Summary of Meditational Analyses Involving Perceived Peer Drinking Norms*

	Direct effect	Indirect effect (95% confidence intervals) through						Sum of indirect	Total effect	% mediated
		PN intercept	PN slope	Greek status	Greek status & PN intercept	Greek status & PN slope	Greek status & PN slope			
Greek status to CD intercept	.05*	.13*** (.10/.17)	-	-	-	-	.13	.18	72%	
Greek status to CD slope	.09*	.02 (.00/.04)	.00 (-.07/.06)	-	-	-	.02	.11	17%	
Precollege drinking to CD intercept	.41***	.30*** (.27/.33)	-	.02* (.01/.03)	.05*** (.03/.06)	-	.36	.77	47%	
Precollege drinking to CD slope	-.15***	.05 (-.01/.09)	-.15*** (-.20/-.10)	.03 (.00/.06)	.01 (-.00/.02)	.00 (-.02/.02)	-.06	-.21	30%	

Note.  $n = 2,221$ . PN = perceived peer drinking norm. CD = college drinking. Standardized estimates. Bootstrap 95% confidence intervals for the standardized indirect effects are in parentheses.  
 \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .





$\chi^2 (9, n = 2,221) = 22.38^*$   
 CFI = .99 TLI = .99 RMSEA = .03

