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A Person-Centered Approach to Understanding Negative Reinforcement Drinking Among First Year College Students

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Abstract

The current study used a person-centered approach (i.e. latent class analysis) to identify distinct types of college student drinkers based on the predictions of motivational, social learning, and stress and coping theories of maladaptive drinking. A large sample (*N*=844; 53% female) of first-year undergraduates from two institutions, public and private, who reported consuming one or more drinks in the last three months completed measures of depression, anxiety, positive alcohol-outcome expectancies, negative life events, social support, drinking motives, drinking level and drinking-related problems. Latent class analysis revealed a small subgroup of individuals (*n*=81, 9%) who conformed to the anticipated high risk profile; specifically, this group demonstrated high

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levels of negative affect, coping motives, alcohol consumption and drinking-related problems. However, additional groups emerged that showed patterns inconsistent with the proposed vulnerability profile (e.g., high negative affect, positive expectancies, and life stress, but relatively low drinking levels). Findings from our person-centered approach showing the presence of groups both consistent and inconsistent with the predictions of motivational, social learning, and stress and coping theories highlight the need to identify and target certain college students for prevention and intervention of negative affect-related drinking.

Keywords

first-year college students; latent class analysis; alcohol-related problems; negative affect

1. Introduction

It is generally accepted that drinking to cope with negative affect is a maladaptive pattern associated with a multitude of negative outcomes in the population in general (Carpenter & Hasin, 1999; Cooper, Frone, Russell, & Mudar, 1995) and in college students more specifically (Carey & Correia, 1997; Kassel, Jackson, & Unrod, 2000; Park & Levenson, 2002). It is also agreed upon that high levels of negative affect are not sufficient in terms of identifying individuals who display maladaptive levels of alcohol use and drinking-related problems (Cooper, Russell, & George, 1988; Greeley & Oei, 1999). The consensus explanation for the inconsistent associations between negative affect and these drinking outcomes is that they vary in strength, and possibly direction, across a wide array of cognitive, interpersonal, and environmental factors (Cooper et al., 1988; Greeley & Oei, 1999).

In the current study we sought to build on recent research using person-centered approaches for identifying discrete categories of drinkers (e.g., Coffman, Patrick, Palen, Rhoades, Ventura, 2007; Mackie, Conrod, Rijsdijk, & Eley 2011; O'Connor & Colder, 2005). Our goal was to identify college students who displayed profiles consistent with negative affect-related drinking (based on reports of theoretically-relevant vulnerability factors) and compare them to students with different drinking profiles with respect to their alcohol-related problems. A person-centered approach might prove especially informative if (a) there are relatively small groups of individuals for whom negative affect corresponds to maladaptive drinking and related problems, and (b) there are additional groups who possess some or all of the risk factors of interest, but do not display maladaptive drinking levels and/or the associated problems. We focused on college students, since they are a population at elevated risk for binge drinking and alcohol abuse compared to a same-aged, non-college population (Slutske, 2005).

1.1 Theoretical Models of Negative Affect-Related Drinking

Vulnerability models positing a central role of negative affect as a cause of maladaptive drinking have drawn heavily from social learning, motivational, and stress and coping models. Social learning (Maisto, Carey, & Bradizza, 1999) and motivational (Cox & Klinger, 1988) models of alcohol use purport that drinking is heavily influenced by one's

cognitions, or outcome expectancies, that form as a result of both direct and indirect experience with alcohol. Similar to the tenets of tension-reduction theory (Conger, 1956), social learning theory contends that individuals who lack the skills to cope with stress or negative affect may turn to alcohol to manage their affect; in doing so, they are likely to form expectations that drinking is an effective way to reduce tension and stress, thereby making it more likely that they will drink when faced with stress or negative affect in the future (Maisto et al., 1999).

Stress and coping models, on the other hand, acknowledge the critical role of social support in buffering the negative effects of environmental stressors, life crises, and transitions (Cronkite & Moos, 1995; Holahan, Moos, & Bonin, 1999). Specifically, following negative life events, individuals who lack social support may be at greater risk for engaging in maladaptive or avoidant coping behavior, such as drinking. Stressful life events often require people to modify aspects of their thinking, behavior, or lifestyle, and these adjustments may consequently tax coping resources. However, close, supportive relationships with others may help people to view stressors as less overwhelming and threatening. These relationships also may help to offset, or buffer the effects of stress through the provision of instrumental, informational, or emotional support (Cronkite & Moos, 1995), thereby making drinking and/or drinking to cope (an avoidant coping response), less likely.

Although not exhaustive, social learning and stress and coping models together identify several key vulnerability factors for maladaptive drinking that served as the focus for the current study. Specifically, we focused on expectancies and drinking motives from motivational and social learning models and negative life events and social support from stress and coping models. Below we describe how these variables (and, in some cases, their interactions) have been implicated in negative affect-related drinking.

1.1.1 Positive Outcome Expectancies—Research has shown that positive alcohol-outcome expectancies (PEs), or beliefs about alcohol's favorable effects, moderate the association between life stress and negative affective states and outcomes such as drinking to cope motivation and drinking level (e.g., Cooper, Russell, Skinner, Frone, & Mudar, 1992; Cooper et al., 1995). More specifically, people were at greatest risk for maladaptive drinking if they endorsed higher levels of life stress and/or negative affect along with higher levels of positive expectancies. Thus, accounting for PEs and drinking motives when extracting drinking classes might help to differentiate individuals for whom high levels of negative affect or life stress co-occur with viewing alcohol as a viable coping strategy.

1.1.2 Drinking Motives—Drinking motives are another critical individual difference factor that might help to distinguish between more or less problematic drinking profiles. Although similar to alcohol expectancies, motives are thought to be more proximally related to an individual's alcohol use, in that one might hold a specific expectation for alcohol's effects but might not be motivated to drink for that reason (Cooper, 1994). Cooper (1994) examined four principal motives for drinking, namely drinking to conform, drinking to be social, drinking to cope with negative affect, and drinking to enhance positive mood; only the internally-generated motives (i.e., coping and enhancement) predicted both drinking *and* drinking problems (although enhancement was linked to problems via quantity).

Furthermore, a large-scale review of studies on drinking motives found that of the four motives, coping motives were the strongest predictor of drinking-related problems (Kuntsche, Knibbe, Gmel, & Engels, 2005).

There is also evidence that the association between drinking level and alcohol-related problems depends on the relative levels of negative affect and coping motives. For example, Martens, Neighbors, Lewis, Lee, Oster-Aaland, and Larimer (2008) found that among individuals with high coping motives, those with high levels of negative affect, compared to those with low levels of negative affect, showed a stronger positive association between drinking level and alcohol-related problems. Notably, this interactive effect of negative affect and drinking was not present among individuals with low levels of coping motives. These interactive effects have important implications in terms of identifying groups with varying degrees of alcohol-related problems. Specifically, these findings suggest that there might be subgroups that are elevated on one or two of these dimensions (i.e., negative affect, drinking to cope motives and drinking level), but such groups might not demonstrate the level of alcohol-related problems found among individuals elevated on all three dimensions.

Finally, results from Gmel, Labhart, Fallu, & Kuntsche (2012) indicated that the relative levels of drinking motives (to each other) might be important in terms of identifying individuals at risk for drinking-related problems. Consistent with the broad literature, individuals with relatively higher coping motives reported higher levels of drinking related problems. However, individuals who reported relatively higher levels of social and conformity motives reported fewer alcohol-related problems. These findings raise the possibility that subgroups characterized by high coping motives, relative to other motives, might exhibit the highest levels of alcohol-related problems.

1.1.3 Life Events and Social Support—Negative life events and lack of social support also have been identified as important risk factors in research examining depression vulnerability and alcohol risk (Cronkite & Moos, 1995; Holahan, Moos, & Bonin, 1999). Low levels of social support and exposure to negative life events may be more closely associated with maladaptive drinking patterns among individuals with depressive symptoms, as evidenced in a study of clinically depressed individuals who also reported alcohol use (Holahan, Moos, Holahan, Cronkite, & Randall, 2004). Compared to community controls, depressed individuals reported drinking to cope more often. Moreover, Holahan et al. (2004) found evidence for moderation, such that among depressed participants, coping motives were endorsed most frequently among those who also reported both a high number of negative life events and low levels of social support. Similarly, in a non-clinical sample of college students, Hussong, Hicks, Levy, and Curran (2001) also found support for moderation such that students who perceived lower levels of social support from friends increased their drinking if they also reported high levels of sadness during the preceding weekend.

Two additional studies, however, suggest the relation between social support and maladaptive drinking may be more complex. Cooper et al. (1992) reported that individuals endorsing high levels of social support, coupled with negative life events and positive expectancies, reported a *greater* number of alcohol-related problems. Similarly, Peirce,

Frone, Russell, and Cooper (1996) found that appraisal/belonging support (i.e. the belief that others can offer advice, and are available to socialize and to relax with) exacerbated the association between financial stress and coping motives. On the other hand, tangible social support (i.e., expectations that others would help with specific tasks, such as providing a ride or offering a place to stay) buffered the association. These counterintuitive findings raise the possibility of discrete classes of negative affect-related drinkers that might differ with respect to the role of social support, especially within the context of other vulnerability factors.

1.2 Drinking Motive Profiles

Recent research has attempted to identify distinct drinking profiles, but these studies have focused largely on typologies of individuals' drinking motives. For example, among adolescents Mackie et al. (2011) found four drinking motive classes, with most individuals being categorized as social drinkers (i.e., drink with friends/at parties) or social and enhancement drinkers (i.e., to get high/drunk); only 10% of the sample was classified into a class characterized by high endorsement of coping (i.e., drinking when feel bad/lonely) and social motives. Comparisons of classes indicated that the coping/social class demonstrated the highest levels of depression, anxiety and drinking level. Coffman et al. (2007) found similar drinking classes among high school 12th graders, with about 18% of the students classified as "multi-reason" drinkers, whose motives included anger/frustration, to get away from problems as well as getting high and having a good time. Multi-reason drinkers also reported the highest levels of drunkenness in the past year.

Taken together, results from studies using person-centered analytic approaches, along with Gmel et al. (2012), suggest that identification of relevant negative affect-related drinking classes should take into account a variety of drinking motives (e.g. social motives). Moreover, inclusion of other relevant correlates in the model, such as negative affect and drinking level, might allow for a more nuanced discrimination of the different drinking subtypes.

1.3 The Current Study

The central aim of the current study was to identify individuals who demonstrate maladaptive tension-reduction/self-medication patterns of drinking in the hope of identifying clinically relevant groups of negative affect-related drinkers. We built on previous research using person-centered analytic approaches to identify drinking motive typologies by including additional correlates identified in these studies, such as drinking level, anxiety, and depression (Coffman et al., 2007; Mackie et al., 2011), and individual difference factors identified in social learning and stress and coping models, including positive alcohol expectancies, negative life events, and social support. We posited that inclusion of the relevant vulnerability dimensions could help to produce a more detailed and nuanced understanding of negative affect-related drinker types. Moreover, we elected to focus on the aforementioned variables since they are more amenable to intervention/modification than more distal antecedents such as family history and personality characteristics (e.g., impulsivity). Finally, we validated the identified classes by examining how they differed on alcohol-related problems. Based on motivational, social learning, and stress and coping

theories, we hypothesized that at least one group with high negative affect, low social support, high drinking to cope motivation (relative to other motives), and high positive expectancies would emerge and that this group would report the highest level of alcohol-related problems.

2. Materials and Methods

2.1 Participants and Procedure

Prospective participants were freshmen recruited via email announcements, informational talks, and campus advertisements from two colleges, a small liberal arts college (32% of sample) and a state university (68% of sample), to participate in a larger study of college student substance use and well-being (Brain and Alcohol Research with College Students; BARCS). The study included both drinkers and non-drinkers. Of the 1524 students who completed the initial assessment (which included the assessment of drinking motives), n=318 reported never drinking and n=250 reported that they had not had a drink in the last three months. Given our focus on drinking motives (and need for participants to recall motives from past drinking episodes), we included only individuals who reported consuming alcohol at least once the previous three months. An additional 112 subjects either had missing data on one or more of the core study variables, resulting in a final sample of 844 students (53% female). The mean age was 18.33 years (SD=0.73) and participants reported their race/ethnicity as: 78% Caucasian, 7% African/African American, 5% Hispanic or Latino, 4% Asian American, 5% Multiracial/Other, and 1% did not report. All data were self-reported during the initial interview with a trained research assistant and participants were compensated $30 for their time.

2.2 Measures

2.2.1 Depression and anxiety symptoms—A 13-item short form of the Beck Depression Inventory (BDI) (Beck & Beck, 1972) was used to assess symptoms of depression. Using a 4-point scale (0 to 3), participants responded to each item according to how they had been feeling in the past month. Ratings were summed to form a total score (α = .89). The 20-item Trait form of the State-Trait Anxiety Inventory (STAI) (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) was used to assess the extent to which students generally feel anxious or restless. A 4-point response scale (1=*strongly disagree*, 4=*strongly agree*) was used. Nine items were reverse-scored and all items were summed so that higher scores denoted greater anxiety (α = .93).

2.2.2 Stressful life events—Twenty-five of the 36 items on the Life Events Scale for Students (Clements & Turpin, 1996; Linden, 1984) identified by Covault, Tennen, Armeli, Conner, Herman, Cillessen, et al. (2007) as unambiguously negative events (e.g. major personal injury/illness, break-up of parents' marriage or divorce), were used to assess negative life stress in the last year. We created an overall composite which reflected the count of the events experienced by each student.

2.2.3 Social support—Perceived Social Support from Family and Friends scales was assessed with 14 items (7 items for each family and friends) derived from Procidano and

Heller's (1983) scale. Responses were made on a 7-point scale (1=*strongly disagree*, 7=*strongly agree*). A composite family/friends support score was calculated by summing all 14 items (α = .89), with a higher score denoting greater perceived support.

2.2.4 Positive alcohol-outcome expectancies—The six positive expectancy subscales from the Alcohol Effects Questionnaire (AEQ; Rohsenow, 1983) were used to assess participants' expectations about the positive effects of alcohol based on a 7-point response scale (1=*strongly disagree*, 7=*strongly agree*). Per the recommendation of George, Frone, Cooper, and Russell (1995), we created an overall composite positive expectancy score (α = .96).

2.2.5 Drinking motives—A revised version of the Motivations for Alcohol Use among Adolescents scale (Cooper, 1994) was used in the current study to assess the four drinking motives: drinking to cope, drinking to enhance, drinking to conform, and drinking to socialize. Specifically, the coping item asking about drinking when "depressed or nervous" was split into two separate items as was the single coping item asking about drinking "to feel more self-confident and sure of yourself" (these changes were the focus of a separate research question not examined in the present study). A 5-point response scale was used (1=*almost never/never*, 5=*almost always/always*). Reliabilities for all subscales were high (coping α = .88; enhancement α = .91; conformity α =.89; social α =.91).

2.2.6 Alcohol consumption—Participants responded to seven questions regarding the number of drinks, on average, that they consumed each day of the week in the past month [e.g., "How much alcohol, on average (measured in number of drinks), do you drink on a typical SUNDAY?"] (Collins, Parks, & Marlatt, 1985). A standard drink was defined as one 12 oz. can/bottle of beer, one 5 oz. glass of wine, or one shot (1.5 oz.) of liquor either alone or in a mixed drink; standard drinks typically contain 14 grams of pure alcohol (NIAAA, n.d.). The values participants reported for each of the seven days of the week were summed, yielding an average number of drinks per week.

2.2.7 Alcohol problems—The 24-item Brief Young Adult Alcohol Consequences Questionnaire (Kahler, Strong, & Read, 2005) was used to assess negative consequences that occurred in the last year as the result of drinking (e.g., passing out, doing impulsive things one regretted later, work or school work suffered because of drinking). A 4-point response scale was used (1=*never*, 4=*more than 5 times*) and responses were summed to form a total score (α = .95).

3. Results

3.1 Descriptive Statistics and Correlations

Our sample reported drinking approximately 13 standard drinks per week (*SD*=10.02) over the previous 30 days. There was considerable range in the number of alcohol-related problems reported by participants. Approximately 9% of the sample reported that they had not experienced any alcohol-related problems in the last year. However, the median score of 35 for this measure (Range 24–96) suggests that a sizable percentage of the sample experienced several alcohol-related problems at least once or more in the last year.

As displayed in Table 1, depressive and anxiety symptoms showed positive associations with negative life events, positive expectancies (PEs), all four drinking motives, and alcohol-related problems, and an inverse association with perceived social support. PEs showed a similar pattern of associations and also were related to drinks per week. Negative life events were positively associated with all study variables, with the exception of social support, for which there was an inverse relation. Finally, the four drinking motives were positively correlated with one another and were significantly associated with drinks per week and alcohol-related problems.

3.2 Identification of Drinker Profiles

We used latent class analysis (LCA; Magnusson, 1998; Muthén & Muthén, 2004) to identify distinct classes based on the following variables: drinks per week, drinking motives, anxiety and depression symptoms, social support, negative life events, and positive alcohol expectancies. We estimated models with increasing numbers of classes and evaluated whether extraction of subsequent classes improved model fit. We decided on the final number of classes based on statistical (i.e., whether the extraction of an addition class resulted in improved model fit) and practical (i.e., whether the solution produced classes large enough for meaningful comparisons) grounds. The models were estimated in Mplus software (Muthén & Muthén, 2011). Based on Nylund, Asparouhov, and Muthén's (2007) findings, we evaluated model fit using the Bayesian Information Criterion (BIC; Schwarz, 1978), with better fitting models indicated by decreases in the BIC, and the bootstrapped parametric likelihood ratio test (BLRT) (Muthén & Shedden, 1999). We also examined entropy values – a summary measure of classification; values close to 1 indicate clear classification (Celeux & Soromenho, 1996).

We decided on a 5-class solution; this solution had a lower BIC compared to the 4-class solution (38635.86 vs. 38905.54), and according to the BLRT (354.61, $p < .001$), fit significantly better than the 4-class solution. We attempted to estimate a 6-class solution, but it failed to converge and the preliminary estimates indicated multiple classes with exceedingly small sample sizes ($n \leq 18$). Entropy values for the 4- and 5-class models were similar (~.85); these values reflect good classification (Celeux & Soromenho, 1996). Figure 1 shows the profiles for the 5-class solution; the descriptive statistics and mean comparisons for variables used in the analysis and alcohol-related problems are shown in Table 2. We used a conservative Bonferonni adjustment for all mean comparisons. Since drinking class was related to sex and school type, these variables were used as controls in the analysis of alcohol-related problems.

As depicted in Figure 1, individuals in Class 1 (34% of the sample - the largest group) were characterized by overall low levels of drinking, negative affect and life stress, PEs and drinking motives, and slightly above average levels of social support. We labeled this group *infrequent, non-problem drinkers*; it was the largest group and most adaptive in terms of having the lowest level of alcohol-related problems. Individuals in Class 2 (13% of the sample) were characterized by low to moderate levels of drinking and motives, high negative affect and life stress, low social support and average PEs; we labeled this group *negative affect-prone moderate drinkers.* Interestingly, although the second highest level of negative

affect and life stress characterized this group, these factors did not correspond to very high drinking levels or related problems. Public university students were overrepresented in this class; 68% of the sample was comprised of public school students yet they comprised 87% of this class. Individuals in Class 3 (31% of the sample - the second largest group) were characterized by moderate to high drinking levels, high levels of enhancement and social motives relative to coping and conformity motives, low negative affect and life stress, high support and moderate PEs. We termed these individuals *adaptive social/enhancement drinkers*; although their drinking was equivalent to Classes 4 and 5, who reported similar social and enhancement motives, Class 3 experienced fewer alcohol-related problems. Private school students were somewhat overrepresented in this class; only 32% of the sample was comprised of private school students yet they comprised 55% of this class.

Individuals in Class 4 (13% of the sample) were characterized by above average drinking levels (similar to Classes 3 and 5), high motives (with relatively higher conformity and coping levels), average negative affect, life stress and social support, and high PEs. We labeled these individuals *high affect reinforcement problem drinkers* given their extreme endorsement of all the drinking motives (both positive and negative reinforcement) and PEs, high levels of drinking level and problems. Of note is that this group reported significantly more alcohol-related problems than Class 2, even though Class 2 showed higher levels of negative affect and life stress and lower levels of social support. Finally, individuals in Class 5 (9% - the smallest group) were characterized by above average drinking levels, and motives, extremely high negative affect and life stress, low social support and high PEs. We labeled this group the *classic negative affect-prone maladaptive heavy drinkers* because they possessed the predicted profile in terms of the vulnerability dimensions and they reported the greatest number of problems.

4. Discussion

Using a person-centered approach, we examined whether first-year college students could be meaningfully classified by various cognitive, interpersonal, and environmental vulnerabilities outlined in motivational, social learning, and stress and coping models of alcohol use. Our findings suggest that there is substantial heterogeneity among students with respect to these dimensions and that the classes of interest differed on alcohol-related problems. Consistent with the tenets of social learning-based vulnerability models (Cooper et al., 1988) and stress and coping models (Cronkite & Moos, 1995; Holahan, Moos, & Bonin, 1999), the most maladaptive group in terms of alcohol-related problems – i.e., classic negative affect-prone maladaptive heavy drinker group (class 5) – showed the anticipated risk profile (e.g., high levels of life stress, negative affect alcohol use, coping motives, etc.). More informative, in our opinion, was that the person-centered approach also revealed groups whose profiles were somewhat inconsistent with these models. For example, we found one class with the traditional risk factors (i.e., high levels of life stress and negative affect along with low social support), but its members displayed relatively low levels of coping motives, drinking, and drinking-related problems. Below we consider how the different constellations of vulnerability factors characterizing each group might help to explain some of the theoretically inconsistent findings we observed.

The identification of the classic negative affect-prone maladaptive heavy drinker group (class 5) was our core finding. This group corresponded most closely to the predictions of social learning and stress and coping models of alcohol use, in that its members expected alcohol use to result in positive outcomes, had minimal social support on which to draw in the face of high levels of negative life events and negative affect, and endorsed high levels of coping motives and alcohol use in general. Consistent with Gmel et al. (2012), this group also showed relatively high levels of coping motives compared to other motives. As expected, this group showed the greatest number of drinking-related problems. The fact that this group was comprised of a relatively small number of individuals (9% of the sample) was consistent with the findings of Coffman et al. (2007), who found that only 18% of their sample drank to cope with negative affect (e.g., to get away from problems, to deal with anger/frustration) and that this group demonstrated the most problematic drinking patterns. Similarly, in Mackie et al. (2011), the number of individuals comprising the “coping/social” group was relatively small (10%), yet this group showed the highest levels of alcohol use, depression, and delinquency. Collectively, it appears that the number of late adolescents and young adults who match the classic negative affect-prone maladaptive heavy drinker profile may be relatively small, but their risk for adverse outcomes is high.

Our study highlights the fact that person-centered analyses with a large sample may be critical to differentiating between the different types of negative reinforcement drinkers. More specifically, we found a class of drinkers [i.e., negative affect-prone moderate drinkers (class 2)] that appeared to be similar to the classic negative affect-prone maladaptive heavy drinkers with respect to depression, anxiety, negative life events, and social support, but differed in terms of having lower positive outcome expectancies, drinking motives, drinking level and alcohol-related problems. That these groups differed in terms of positive outcome expectancies is consistent with Cooper et al.’s (1995) findings showing expectancies moderated the association between negative affect and coping motives. Thus, strong beliefs in the positive effects of alcohol might be a critical determinant of the development of strong affect-regulation motives, and in turn, increased drinking level and related problems.

Another vulnerability factor that helped to distinguish the classes, albeit in a complicated fashion, was perceived social support. For example, high affect reinforcement problem drinkers (class 4) showed high levels of anxiety, positive expectancies and alcohol problems, but moderate levels of social support. The negative affect-prone moderate drinkers (class 2) also showed higher levels of anxiety and depression, but lower levels of social support, coping motives, drinking, and drinking-related problems compared to class 4. This picture was further complicated by the presence of the classic negative affect-prone maladaptive heavy drinkers (class 5), who demonstrated the lowest level of social support and the highest level of alcohol-related problems. Thus, in some cases social support was relatively high among problematic drinkers who also displayed other risk factors (e.g., class 4 with high expectancies and anxiety), but in other cases it was low (e.g., class 5).

The seemingly contradictory interplay between social support and the other vulnerability factors is not without precedent. Cooper et al. (1992) reported that individuals endorsing high levels of social support, coupled with negative life events and positive expectancies, reported a greater number of alcohol-related problems. Similarly, Peirce, Frone, Russell, and

Cooper (1996) found that appraisal/belonging support (i.e. the belief that others can offer advice, and are available to socialize and to relax with) exacerbated the association between financial stress and coping motives, whereas tangible social support (i.e., expectations that others would help with specific tasks, such as providing a ride or offering a place to stay) buffered the association. Additionally, Hussong et al. (2001) observed significant associations between levels of hostility and sadness and subsequent drinking levels among college students with high levels of friendship quality, but this increased drinking did not manifest into increased negative emotions as it did among individuals with low levels of social support. Hussong et al. posited that for some college students, drinking might be an adaptive way to cope, especially among those who have supportive, intimate friendships.

In the present study, these different types and effects of social support might have manifested in the various classes identified. For example, the moderate to high levels of social support among the high affect reinforcement problem drinkers (class 4) and the adaptive social/enhancement drinkers (class 3) might have reflected high levels of belongingness support and elaborate social networks. Consistent with this notion, both groups also were characterized by relatively high levels of social drinking motives, and class 4 was the highest in terms of conformity drinking motives. In contrast, the low levels of support among our most maladaptive group (i.e., classic negative affect-prone maladaptive heavy drinkers [class 5]) might have reflected low tangible support in the context of their numerous vulnerabilities. Future studies are needed to disentangle the effects various types of support across different drinker profiles.

Consistent with Gmel et al.'s (2012) findings, we also found some evidence of the seemingly protective effects of social and conformity motives. For example, we found that individuals in our class 3, which was relatively higher on social motives, showed similar levels of drinking-related problems to class 2, despite endorsing greater alcohol consumption. In addition, these two classes had similar levels of coping motives; thus, the relatively higher social motives for class 3 seemed to lessen the effects of coping motives and drinking level on drinking-related problems. Also, class 4 showed a similar motive profile to class 5 except for relatively higher levels of conformity motives. Again, despite similar drinking levels, class 5 showed higher levels of drinking-related problems. We do understand that these differences were observed in the context of differences in other risk factors; nonetheless, they are consistent with the notion that the order and strength with which drinking motives are endorsed (along with information on other relevant factors) for an individual or group may be a useful and accurate way to predict risk for drinking-related problems.

4.1 Limitations and Future Directions

Several limitations of our study are of note. Although we included students from public and private school settings, the extent to which the number and nature of the latent classes from the current study would generalize to students at dissimilar institutions (e.g., community college or for-profit institutions), to students further along in their college career, or to non-college attending individuals is unknown. It is possible that different drinker profiles might emerge if these different populations were studied. Alternatively, one might simply find that

the membership frequencies would differ across classes similar to the ones uncovered in the present study like we observed across public and private institutions. Future studies with large subsamples from each of these populations are needed to investigate this possibility.

In addition, the cross-sectional nature of our data limits our conclusions about the causal direction of the relations of interest. Future research using a longitudinal design could help shed light on several important questions raised by the current findings. For example, are negative affect-prone moderate drinkers (class 2) more likely to develop into classic negative affect-prone maladaptive heavy drinkers (class 5) than others? Understanding how individuals might migrate from one class to another would allow us to better formulate early interventions strategies.

A final limitation of our study was that the measures of anxiety and social support may have been limited in scope, making it difficult to discern why these constructs served as vulnerabilities for problem drinking for some groups and not others. For example, the high anxiety levels among the negative affect-prone moderate drinkers (class 2) might reflect social anxiety, which in turn might have limited their socializing and ultimately their drinking levels (Ham & Hope, 2005). Future research should attempt to tease apart the potential contribution of different forms of anxiety. Future research also should consider additional intrapersonal factors not included in our model. For example, characteristics such as impulsivity, aggression, and low life satisfaction were shown to differentiate college students who met the criteria for alcohol dependence versus those who did not, despite similar rates of drinking (Beseler, Taylor, Kraemer, & Leeman, 2012).

4.2 Implications

In spite of these limitations, our findings may have important implications for the identification of students at risk for alcohol problems early in their college career. Given that anxiety and depression are the most common presenting problems at college counseling centers (Barr, Rando, Krylowicz, & Reetz, 2010), it may be advisable to screen students with these symptoms with respect to their motives and expectancies for drinking, in addition to life events that might be exacerbating their negative mood or drinking, so as to reduce the likelihood that they will turn to alcohol to manage negative moods and life stress. In cases where a student's presentation matches the profile of the classic negative affect-prone maladaptive heavy drinker, s/he might be counseled on how to be more mindful of his/her drinking; that is, as suggested by Park and Levenson (2002), these students might benefit from becoming more attuned to the links between their moods, expectancies, and drinking behavior. In conclusion, our study builds on previous person-centered studies of drinking behavior by demonstrating that there are different types of negative reinforcement drinkers with differential risk for alcohol-related problems.

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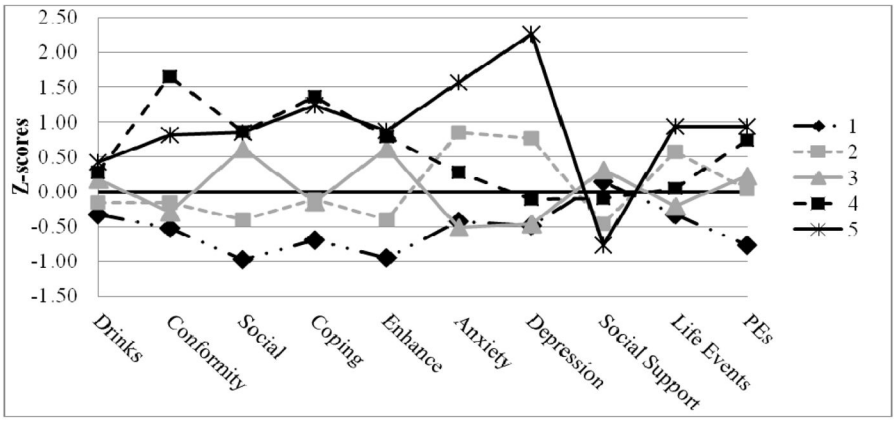

Figure 1.
Endorsement rates of drinking and the vulnerability factors by each latent class (*N*=844).

Table 1

Descriptive Statistics and Intercorrelations among the Study Variables

Variable	*M* (*SD*)	1	2	3	4	5	6	7	8	9	10	11
1 Sex (0=Male, 1=Female)	---											
2 Depressive symptoms	3.79 (4.88)	.12										
3 Anxiety symptoms	40.46 (10.19)	.05	.69									
4 Negative life events	4.28 (3.13)	.10	.42	.34								
5 Perceived social support	73.72 (14.91)	.22	−.30	−.41	−.14							
6 Positive expectancies	3.61 (1.19)	−.04	.28	.31	.19	−.10						
7 Coping motives	1.90 (0.91)	−.01	.36	.40	.26	−.16	.55					
8 Enhancement motives	2.78 (1.15)	.01	.20	.15	.16	−.02	.52	.52				
9 Social motives	3.00 (1.09)	−.02	.21	.15	.12	.01	.57	.54	.79			
10 Conformity motives	1.63 (0.83)	−.09	.25	.30	.12	−.16	.36	.63	.34	.43		
11 Drinks per week	13.14 (10.02)	−.30	.04	.07	.13	−.14	.36	.28	.29	.23	.13	
12 Drinking-related problems	38.69 (13.64)	−.08	.31	.30	.27	−.09	.58	.49	.40	.39	.34	.50

Note. *N*=844. Correlations ≥ .07 significant at .05 alpha level (two-tailed).

Table 2

Characteristics of the Latent Classes

	Latent class					
	1	**2**	**3**	**4**	**5**	***p***
n (% of total *N*)	285 (34%)	112 (13%)	260 (31%)	106 (13%)	81 (9%)	
Age	18.32 (0.74)	18.47 (1.15)	18.27 (0.51)	18.30 (0.59)	18.36 (0.74)	.194
Female (%)	51%	63%	53%	40%	58%	.013
Caucasian (%)	75%	74%	80%	82%	75%	.803
School type						<.001
Public (%)	70%	87%	55%	75%	75%	
Private (%)	30%	13%	45%	25%	25%	
Depressive symptoms	1.41_{a} (1.80)	7.54_{b} (3.41)	1.57_{a} (1.77)	3.27_{c} (3.01)	14.83_{d} (4.60)	<.001
Anxiety symptoms	36.14_{a} (8.07)	49.16_{b} (4.75)	35.32_{a} (7.40)	43.28_{c} (7.80)	56.41_{d} (6.99)	<.001
PE	2.70_{a} (1.07)	3.66_{b} (0.95)	3.89_{b} (0.83)	4.49_{c} (0.94)	4.72_{c} (0.87)	<.001
Negative life events	3.26_{a} (2.39)	6.08_{b} (3.05)	$3.65_{a,c}$ (2.70)	4.45_{c} (3.02)	7.21_{b} (4.01)	<.001
PSS	$75.88_{a,c}$ (14.15)	66.81_{b} (15.52)	78.46_{a} (12.91)	72.30_{c} (13.96)	62.31_{b} (14.58)	<.001
Coping motives	1.27_{a} (0.35)	1.80_{b} (0.58)	1.77_{b} (0.62)	3.14_{c} (0.87)	3.03_{c} (0.92)	<.001
Enhancement motives	1.68_{a} (0.60)	2.32_{b} (0.69)	3.49_{c} (0.79)	$3.69_{c,d}$ (0.83)	3.79_{d} (0.83)	<.001
Social motives	1.95_{a} (0.64)	2.56_{b} (0.64)	3.67_{c} (0.65)	3.94_{d} (0.74)	3.93_{d} (0.77)	<.001
Conformity motives	1.20_{a} (0.35)	1.50_{b} (0.53)	$1._{39b}$ (0.47)	3.01_{c} (0.84)	2.31_{d} (1.00)	<.001
Drinks per week	9.88_{a} (8.40)	11.60_{a} (9.72)	14.93_{b} (10.20)	15.92_{b} (9.99)	17.40_{b} (11.34)	<.001
Alcohol-related problems	31.46_{a} (8.92)	39.64_{b} (12.75)	38.75_{b} (10.63)	46.21_{c} (15.61)	52.81_{d} (17.39)	<.001

Note. Means with different subscripts are significantly different at the .05 alpha level (with Bonferroni adjustment). Standard deviations appear below the means in parentheses. PE = Positive Alcohol Outcome Expectancies; PSS = Perceived Social Support.