

Stress and Binge Drinking: A Daily Process Examination of Stressor Pile-Up and Socioeconomic Status in Affect Regulation

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The goal of this study was to enhance understanding of the interconnections between stress, negative mood, and alcohol use. Daily diary data collected over eight consecutive nights from a nationally representative adult cohort were used to identify if (1) daily stress and cumulative stress pile-up were associated with increased risk of binge drinking, (2) negative affect mediated associations between stressors and binge drinking, and (3) associations among stress, negative affect and binge drinking were moderated by educational attainment as an indicator of socioeconomic status. Results indicated that the odds of binge drinking were higher on days that individuals experienced more severe stressors in contrast to no-stress days. Further, the odds of binge drinking also increased as stressors piled-up over consecutive days. There was no evidence that negative affect mediated associations between stressors and binge drinking. Associations of daily stressors and stressor pile-up with binge drinking were moderated by educational attainment. Study results suggest that affect regulation researchers need to handle “stress” in a multidimensional way and better situate stressors and individuals stress responses within their social context.

Keywords: affect regulation, stress, heavy alcohol use, socioeconomic status, binge drinking

Negative affect holds a special place in the stress and health literature, particularly when considering the putative effect of stress on alcohol use and

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problem drinking behavior. At the most basic level, the affect regulation model contends that stress and alcohol use are linked through a transactional process whereby stressors create distress, and individuals self-medicate with alcohol to lessen the unpleasantness of distress. Despite the intuitive appeal of the model, reviews of the literature report inconsistent support for the model's basic propositions (Greeley & Oei, 1999). The inconsistent or otherwise modest results obtained from affect regulation studies have led several scholars to call for methodologies that allow for more rigorous and systematic discernment of the interconnections between stressors, affective responses to stressors, and alcohol use (Frone, 1999; Greeley & Oei, 1999; Ragland & Ames, 1996).

Daily process designs, such as daily diary studies, are beginning to offer some consistent results about the linkages between stress, affect, and alcohol use (Armeli, Tennen, Affleck, & Kranzler, 2000; Tennen, Affleck, Armeli, & Carney, 2000). First, the stressor-alcohol relationship is sensitive to the source of stressors: nonwork stressors are associated with increased alcohol consumption whereas work stressors are not (Armeli, Tennen, et al., 2000; Carney, Armeli, Tennen, Affleck, & O'Neil, 2000). Second there is little evidence that negative mood explains the stressor-alcohol relationship (Armeli, Tennen, et al., 2000; Carney et al., 2000), although negative affect is typically associated with increased alcohol consumption (Armeli, Tennen, et al., 2000; Swendsen et al., 2000). Finally, daily process studies of the affect regulation model provide strong evidence suggesting that stressors and negative affect contribute to greater alcohol consumption; equally important however is the strong evidence indicating significant and explainable variation in the stress-alcohol and the negative affect-alcohol associations (Armeli, Tennen, et al., 2000; Armeli, Carney, Tennen, Affleck, & O'Neil, 2000; Carney et al., 2000; Swendsen et al., 2000). It is clear, for example, that the associations among stress, negative affect, and alcohol is stronger among men than women and among those with higher positive alcohol expectancies (Cooper, Russell, Skinner, Frone, & Mudar, 1992; Armeli, Carney, et al., 2000).

Daily process studies offer some consistency to the affect regulation literature; nonetheless, more research is needed to understand the role of stress in alcohol use. First, by focusing on the incidence of stressors, previous daily process studies have not adequately addressed the issue of stress chronicity or "pile up" or the idea that independent stressors (particularly daily hassles) may have marginal impact on behavioral outcomes, such as alcohol use, but their cumulative burden may stimulate "release" behaviors such as heavy drinking (Crawford, 1984; Kanner, Coyne, Schaefer, & Lazarus, 1981; McLean, 1976). Evidence suggests, for example, that a negative daily event has a particularly deleterious effect on mood when it is coupled with other ongoing stressors such as living in a poor neighborhood and socioeconomic disadvantage (Caspi,

Bolger, & Eckenrode, 1987; Grzywacz, Almeida, Neupert, & Ettner, 2004). The fact that stressor effects on alcohol consumption are partially or completely attenuated after controlling for day of week (Armeli, Tennen, et al., 2000) also supports the plausibility that the buildup of stressors, presumably greatest on Friday (Zerubaval, 1985), may contribute to increased consumption. Thus, one important step in daily process studies of stress and alcohol requires differentiating between specific incidences of stress and their cumulative burden while remaining sensitive to the entrainment of both stressor exposure and alcohol use within the weekly calendar (Armeli, Tennen, et al., 2000).

A second gap in the daily process literature examining stress and alcohol is the relative inattention to variation in both the appraisal (i.e., stressor-affect) and coping (affect-alcohol) linkages within the affect regulation model. Armeli, Tennen, and colleagues (2000) reported significant explainable variation in the stressor-affect and the affect-alcohol associations, but examined between-person differences in only the affect-alcohol linkage. Likewise, Swendsen and colleagues (2000) examined the affect-alcohol linkage and found that the within-person association between nervous mood and alcohol consumption was stronger for men than women. Other studies find significant variation in the stressor-consumption relationship (Armeli, Carney, et al., 2000; Carney et al., 2000); however, without disaggregating the two components of the model, it is difficult to determine if the variation is attributable to differences in stressor appraisal (i.e., the extent to which stressors elicit distress) or differences in coping (i.e., the extent to which distress elicits drinking behavior).

Finally, the samples used in previous daily process studies are limited. All of the previous daily process studies of alcohol have used convenience samples; consequently, the generalizability of the study to the broader population of adults is tenuous. The samples in previous studies were also small and relatively homogeneous with regard to age, education, marital status, and employment. Small and homogeneous samples limit the possible number of between-person characteristics that can be used to explain variation in either the appraisal or coping linkages of the affect regulation model. Socioeconomic status (SES) is a compelling potential source of between-person variation in the affect regulation model because it is inversely associated with elevated rates of heavy drinking (Naimi et al., 2003), it conditions exposure to life stressors (Turner & Lloyd, 1999), it influences the relative availability of resources for coping with stressors (Turner & Marino, 1994; Turner, Wheaton, & Lloyd, 1995), and evidence indicates that stressors have a greater psychological impact on lower status individuals (Grzywacz et al., 2004). Moreover, compelling ethnographic research suggests that SES is strongly linked to the culture of control and release (Crawford, 1984). This evidence suggests that SES, which is difficult to capture in small samples,

may contribute to variation in the average levels of alcohol use as well as variation in the associations of stress and affect with alcohol use.

The goal of this paper was to address the limitations of previous daily process studies examining the affect regulation model of alcohol consumption. In this paper we seek to enhance our understanding of the interconnections between stress, negative mood, and alcohol use by exploiting the first nationally representative daily diary study to accomplish three aims: 1) identify if both daily stress and stress pile-up were associated with increased risk of binge drinking, 2) determine the extent to which negative affect mediates associations between stressor variables and binge drinking, and 3) delineate whether associations among stress, negative affect, and binge drinking are moderated by educational attainment as a proxy indicator of socioeconomic status.

METHOD

Sample

Data for the analyses are from the National Study of Daily Experiences (NSDE). NSDE respondents included 1,031 adults (562 women, 469 men) who had previously participated in the National Survey of Midlife Development in the United States (MIDUS), a nationally representative telephone-mail survey of 3,032 people, aged 25–74 years, carried out in 1995–1996 under the auspices of the John D. and Catherine T. MacArthur Foundation Network on Successful Midlife. NSDE respondents were randomly selected from the MIDUS sample and received \$20 for their participation in the project. Over the course of eight consecutive evenings, respondents completed short telephone interviews about their daily experiences. Data collection spanned an entire year (March 1996 to April 1997) and consisted of 40 separate “flights” of interviews, with each flight representing the 8-day sequence of interviews from approximately 38 respondents. The initiation of interview flights was staggered across the day of the week to control for the possible confounding between day of study and day of week. Of the 1,242 MIDUS respondents contacted, 1,031 agreed to participate, yielding a response rate of 83%. Respondents completed an average of 7 of the 8 interviews, resulting in a total of 7,221 daily interviews.

The analytic sample used in this study was restricted to NSDE participants who reported not abstaining from drinking alcohol. An estimated 22.2% of NSDE respondents reported abstaining from alcohol, a proportion that is lower than the estimated 35.4% of adults who reported abstaining from alcohol in the 1995 National Alcohol Survey (Greenfield, Midanik, & Rogers, 2000). The final analytic sample included $n = 802$ individuals. Sampling weights correcting for selection probabilities and nonresponse to the original sample, and

modified for the current analysis allow this sample to match the composition of the U.S. population on age, sex, race, and education based upon the October 1995 Current Population Survey.

Study participants were, on average, 44.6 ($SD = 13.4$) years old, 57% female, and 13% nonwhite (see Table 1). Seventy percent of this population was currently married, and the modal level of education (40%) in this sample was a "high school degree or General Equivalence Degree (GED)." Approximately 8% of the population had less than a high school degree, 27% of the population reported having a vocational/technical degree or some college, and approximately 25% reported graduating from college. Approximately 15% of the population reported one or more episodes of binge drinking during the interview period, and the average level of negative affect across interview days and individuals was 1.20. Stressors were reported on about 30% of the days in the broader sample (Almeida, Wethington, & Kessler, 2002), contributing to a low overall daily stressor level in the sample, and an average stressor pile-up of 1.03 ($SD = .67$).

Measures

Dependent variable. *Binge drinking* was constructed from a single question from the daily interview that asked: "Counting a drink as a bottle of beer, a glass of wine, or shot of liquor, how many drinks did you have since we spoke yesterday?" If an individual reported consuming five or more drinks for men and four or more for women (Wechsler, Dowdall, Davenport, & Rimm, 1995) within the previous 24-hr recall period, they were coded (1) for having binge drank on that day. Preliminary analyses suggest that the binge drinking variable is reliable and valid. The intraclass correlation of

Table 1. Descriptive Statistics for All Analytic Variables

	<i>M</i> or %	<i>SD</i>
Age	44.61	13.42
Gender (female = 1)	56.9%	
Race/ethnicity (nonwhite = 1)	12.6%	
Marital status (married = 1)	69.9%	
Education		
Less than high school	7.3%	
High school or GED	40.2%	
Voc./tech deg or some col	27.2%	
College graduate	25.4%	
Binge drinking	15.3%	
Negative affect	1.20	0.28
Daily stress	0.69	0.56
Stressor pile-up	1.03	0.67

Note. Weighted estimates from the National Study of Daily Experiences (NSDE).

respondents' alcohol consumption across the interview period was .85 suggesting considerable stability in individuals' alcohol use patterns. The estimated prevalence of binge drinking among NSDE respondents was 15.3%, a figure comparable to those obtained from the Behavioral Risk Factor Surveillance System from 1995 and 1997 (Naimi et al., 2003). Finally, using prospective data from the MIDUS survey 1 year earlier in which respondents were asked about alcohol-related experiences, preliminary analyses indicated that the odds of having reported one or more episodes of binge drinking during the interview period were 2.3 (confidence interval $[CI] = 1.60 - 3.40$) and 6.9 ($CI = 4.35 - 11.12$) times higher for those who reported one or more symptoms of alcohol dependence and one or more episodes of having drank more than intended in the previous year.

Independent variables. *Daily stress* and *stress pile-up* were assessed with the Daily Inventory of Stressful Experiences (DISE, Almeida et al., 2002). The DISE is a semistructured instrument containing seven "stem" questions for identifying whether stressful events occurred in various life domains such as at work or family, as well as a series of questions for probing affirmative responses. For each daily interview, individuals who responded affirmatively to any of the stem questions received a value of (1) on an indicator variable of "any stress" and were coded (0) otherwise. Respondents' narrative responses to investigator probes to affirmative responses to any of the stem questions provided additional information on the content of the stressful experiences as well as the meaning of the stressor for the respondent. Objective severity, similar to Brown and Harris' (1978) ratings of short-term contextual threat, was assigned by trained coders based upon the degree of disruptiveness and unpleasantness associated with the stressor. Coders' scores ranged from a minor or trivial annoyance (1) to a severely disruptive event (4). Interrater reliability (Kappa) on the objective severity measure was .75. Any stress was then combined with coders' ratings of how disruptive or unpleasant the stressor to yield an ordered four-category *daily stressor* variable: 0 = no stressor, 1 = stressor/low severity, 2 = stressor/medium severity, and 3 = stressor/high severity.

The "any stress" indicator variable was also used to construct a variable assessing *stressor pile-up*. Stressor pile-up is a lagged variable representing the number of days over the past 3 days in which a stressor was recorded. The first day in each person's diary was coded as missing because the previous 3 days were completely unknown. The sum total of "any stress" days for the previous 3 days were computed for diary days 2 through 8 even if previous 3 days were not recorded. The 3-day period for defining stressor pile-up operationally was based on both conceptual and practical grounds. Conceptually, in the context of diary study, stressor pile-up connotes exposure to stressors across multiple days, thereby requiring a 2-day period at a minimum. Practically, our measurement options were constrained by the 8-day

duration of the diary study. We selected the 3-day period to maximize the number of days a variable could be created and used in the analysis, while remaining attentive to the idea of temporal accumulation over several days.

Daily negative affect was operationalized using an inventory of 10 emotions expanded from the psychological distress scale designed for the MIDUS survey (Mroczek & Kolarz, 1998) and queried during each telephone interviews. This scale was developed from the following well-known and valid instruments: The Affect Balance Scale (Bradburn, 1969), the University of Michigan's Composite International Diagnostic Interview (Kessler et al., 1994), the Manifest Anxiety Scale (Taylor, 1953), and the Center for Epidemiological Studies Depression Scale (Radloff, 1977). Respondents were asked how much of the time today did they feel: worthless; hopeless; nervous; restless or fidgety; that everything was an effort; and so sad that nothing could cheer you up. Response categories for the index items were 1 = none of the time, 2 = a little of the time, 3 = some of the time, 4 = most of the time, and 5 = all of the time. Scores across the 10 items were summed ($\alpha = .89$).

Socioeconomic status was operationalized as a series of dichotomous indicators of educational attainment representing less than high school education; high school or GED, a technical degree or some college education, and college graduate (reference category). This strategy was chosen because education captures the well-established health gradient (Adler et al., 1994; Marmot, Ryff, Bumpass, Shipley, & Marks, 1997; Marmot et al., 1998,) and it is less prone than household income to exhibit missing data values. Additionally, education is relatively stable across the life course after early adulthood, it is more comparable across men and women than occupation, and it is more comparable across single and married persons than income. Most important is that education is less prone to endogeneity bias from reverse causality (e.g., binge drinking affecting the socioeconomic status measure) than measures such as income and occupation.

Analyses

The method used to examine the associations posited by the affect regulation model and sources of variation in affect regulation linkages by SES was based on a multilevel model, also commonly referred to as a hierarchical linear model with a logit-link function for dichotomous outcomes (HLM, Bryk & Raudenbush, 1992). The simple form of an HLM can be conceived of as two separate models, one a within-person model (Level 1) and the other a between-person model (Level 2). A distinctive feature of HLM is that the intercepts and slopes are allowed to vary across persons (Lee

& Bryk, 1989), allowing estimates of between-person models of within-person variability. Using a simple example in which binge drinking depends on a single explanatory variable—stressors—the model can be expressed as:

$$\text{Level 1: BINGE}_{it} = a_{0i} + a_{1i}\text{STRESS} + e_{it}, \quad (1)$$

where BINGE_{it} is an indicator representing whether or not Person i binge drank on Day t ; STRESS_t represents whether Person i experienced a stressor and its objective severity on Day t ; a_{0i} is the intercept indicating Person i 's average level of binge drinking when no stressor was reported; a_{1i} is the slope indicating the association between daily stress and binge drinking for Person i ; and e_{it} is the random component or error associated with binge drinking of Person i on Day t . To estimate average effects for the entire sample, the intercepts and slopes of the Level 1 within-person model become the outcomes for the Level 2 between-person equations as follows:

$$\text{Level 2: } a_{0i} = B_0 + d_i, \quad (2)$$

$$a_{1i} = B_1 + g_i \quad (3)$$

Equation 2 shows that Person i 's average logit for binge drinking across the diary days (a_{0i}) is a function of the intercept for the entire sample (B_0)—the grand mean of the sample—and a random component or error (d_i). Likewise, equation 3 shows that Person i 's slope between daily stress and binge drinking (a_{1i}) is a function of the grand mean of the entire sample (B_1), and a random component or error (g_i).

HLM provides the flexibility to allow the intercepts and slopes to vary across persons by stable individual characteristics (e.g., SES). For example, to examine SES differences in the daily covariation of binge drinking and daily stress, one can formulate the following model:

$$\text{Level 1: BINGE}_{it} = a_{0i} + a_{1i}\text{STRESS} + e_{it} \quad (4)$$

$$\text{Level 2: } a_{0i} = B_0 + B_1(\text{SES}) + d_i, \quad (5)$$

$$a_{1i} = B_2 + B_3(\text{SES}) + g_i \quad (6)$$

Equations 5 and 6 model SES differences in Level 1 intercepts and slopes. Of particular note is equation 6 because it tests whether the stressor-binge drinking slopes (a_{1i}) vary according to socioeconomic status.

In these analyses, as in previous daily process studies (e.g., Armeli, Tennen, et al., 2000), day of week differences in drinking were controlled

using six orthogonal dummy variables, with “Monday” serving as the omitted reference variable. Age, gender, race and ethnicity, and marital status are also controlled by including these between-person predictors in the level 2 intercepts model (i.e., equation 5).

RESULTS

Table 2 reports the results of the level 1 within-person associations posited by the affect regulation model. The first column provides weighted unstandardized logistic regression coefficients estimating the association of daily stressors and stressor pile-up with binge drinking. This model provides a basic test of whether variation in stressor exposure is associated with binge drinking. These estimates indicate that as the severity of experienced stressors increases, the odds of reporting binge drinking also increases.¹ Independent of the effect of daily stressors, however, results reported in the first column also indicate that a greater accumulation of stressors across the past 3 days is also associated with increased odds of binge drinking. The odds of binge drinking are 16% greater, i.e., $EXP(0.15)$, on days when an individual's stressor pile-up is one unit greater than her/his average.

The remaining columns of Table 2 reflect tests of the specific linkages in the affect regulation model. Results reported in the second column of Table 2 speak to the association between stressor exposure and negative affect, or the appraisal linkage of the affect regulation model. Results from the “appraisal” model (column 2) indicate that negative affect is greater on days when individuals confront more severe stressors, suggesting that negative affect is a viable mediator of the association between stressor exposure and binge drinking. However, stressor pile-up is not associated with greater daily negative affect. The last column of Table 2 simultaneously addresses two elements of the affect regulation model. First, it considers the “coping linkage” of the affect regulation model, or the extent to which negative affect is associated with binge drinking. Second, it informs the extent to which associations between stress exposure and binge drinking are attenuated after modeling the effects of negative affect, suggesting mediation. Results reported in the last column of Table 2 indicate that daily stressors, stressor pile-up, and negative affect are each associated with binge drinking in the expected direction. Although there is some apparent attenuation of the daily stressor parameter estimate in the last column as compared with the first column, the attenuated estimate lies within the 95% confidence interval of

¹ Additional analyses using dummy indicators of low, medium, and high stressor severity in contrast to no stressors were also undertaken. The results indicated that medium and high severity stressors differed from no stressor, but there was no difference between low severity stressors and no stressor.

Table 2. Pooled Within-Person Associations of Daily Stress and Stress Pile-Up With Binge Drinking and Negative Affect

Outcome	Binge drinking ^a	Negative affect ^b	Binge drinking ^a
	b (SE)	b (SE)	b (SE)
Intercept	−2.32 (0.09)***	1.11 (0.02)***	−2.10 (0.08)***
Daily stressor	0.16 (0.04)***	.03 (0.01)***	0.11 (0.03)**
Stress pile-up	0.15 (0.06)**	−.01 (0.01)	0.21 (0.05)***
Negative affect			0.51 (0.23)*

Note. Weighted estimates from the National Study of Daily Experiences (NSDE). b = unstandardized regression coefficients for Level 1; SE = standard error. Models adjust for day-of-week.

^a Estimates obtained from a multilevel logistic regression model. ^b Estimates obtained from a multilevel linear regression model.

* $p < .05$. ** $p < .01$. *** $p < .001$ (two-tailed).

the first estimate suggesting no change. Further, the p value from a simple Sobel test did not reach traditional significance levels ($p = .075$). Thus, there is no evidence indicating that negative affect mediates the daily stress-binge drinking association.

Table 3 reports the results of the cross-level associations where the intercepts and slopes of the level 1 models, reported in Table 2, were regressed on gender and educational attainment as an indicator of socioeconomic status. Column 1 indicates that average levels of binge drinking are lower among women than men, and higher among those with a high school or GED, and among those with a technical degree or some college in contrast to those with a college degree. Column 1 also indicates that daily stress and stress pile-up slopes are modified by level of educational attainment. The daily stress-binge drinking slope is weaker for individuals with less than a high school degree than for those who graduated from college. However, the association between stress pile-up and binge drinking is stronger for those with less than a high school degree in contrast to those with a college degree. Results reported in the second column indicate that average levels of negative affect are higher for individuals with less than a high school degree in contrast to those who graduated from college. The effect of daily stress on negative affect is stronger for individuals with a high school degree or GED or less in contrast to those with a college education suggesting that lower status individuals are more psychologically vulnerable to daily stress.

Results reported in the third column of Table 3 mirror those reported for the first column. The parameter estimate indicated an interesting difference in the effect of daily stress on binge drinking among those with less than a high school degree relative to those with a college degree dropped from -0.63 to -0.42 after controlling for negative affect. As before, average levels of binge drinking were lower for women than men, and higher among lower socioeconomic groups. The effect of daily stress on binge drinking continued

Table 3. Cross-Level Interactions Predicting Binge Drinking and Negative Affect: Intercepts and Slopes as Discrete Outcomes in the Affect Regulation Model as a Function of Gender and Socioeconomic Status

	Binge drinking ^a	Negative affect ^b	Binge drinking ^a
	b (SE)	b (SE)	b (SE)
Intercept			
Gender (female = 1)	−0.54 (0.07)***	−0.01 (0.01)	−0.44 (0.06)***
<High school	−0.19 (0.12)	0.08 (0.03)*	−0.06 (0.10)
High school or GED	0.21 (0.09)*	0.03 (0.02)	0.19 (0.07)**
Voc. deg/some col.	0.21 (0.08)**	0.03 (0.02)	0.17 (0.07)**
Daily stressor			
Gender (female = 1)	−0.05 (0.05)	0.02 (0.01)	−0.05 (0.04)
<High school	−0.63 (0.09)***	0.15 (0.07)*	−0.42 (0.05)***
High school or GED	−.05 (0.06)	0.03 (0.01)*	−0.07 (0.05)
Voc. deg/some col.	−.06 (0.05)	−0.01 (0.01)	−0.03 (0.04)
Stress pile-up			
Gender (female = 1)	0.15 (0.08)*	0.01 (0.02)	0.20 (0.07)**
<High school	0.67 (0.19)***	−0.11 (0.09)	0.43 (0.11)***
High school or GED	−0.14 (0.10)	−0.02 (0.02)	−0.11 (0.08)
Voc. deg/some col.	0.06 (0.07)	−0.04 (0.02)	0.02 (0.06)
Negative affect			
Gender (female = 1)			0.34 (0.20)
<High school			0.01 (0.24)
High school or GED			−0.08 (0.25)
Voc. deg/some col.			−0.42 (0.27)

Note. Weighted estimates from the National Study of Daily Experiences (NSDE). b = unstandardized regression coefficients for Level 2; SE = standard error. Intercept model adjusts for age, marital status (married = 1), and race and ethnicity (nonwhite = 1). College graduates are the omitted reference category for educational attainment.

^a Estimates obtained from a multilevel logistic regression model. ^b Estimates obtained from a multilevel linear regression model.

* $p < .05$. ** $p < .01$. *** $p < .001$ (two-tailed).

to be lower for those with less than a high degree than those with the college degree; however, the effect of stress pile-up on binge drinking was greater for those with a high school degree or GED or less in contrast to those with a college degree.

DISCUSSION

The goal of this paper was to extend the affect regulation literature by addressing conceptual and methodological limitations of previous daily process studies of stress and alcohol using data from the first nationally representative daily diary study. The results of this study corroborate several findings from previous studies that used less generalizable samples. First, like previous studies that found greater alcohol consumption on days when stressful events occurred (Armeli, Tennen, et al., 2000; Carney et al., 2000),

we found that the odds of binge drinking was greater on days when stressors—particularly severe stressors—were confronted. Second, we found that binge drinking is also more likely to occur on days of elevated negative affect (Swendsen et al., 2000) suggesting that binge drinking may be used to cope with elevated distress. However, in contrast to the central tenant of the affect regulation model, we found little evidence suggesting that negative affect mediates the relationship between stressful events and alcohol use. These results parallel other daily process studies of alcohol use as well as reviews of the literature (Armeli, Tennen, et al., 2000; Carney et al., 2000; Greeley & Oei, 1999).

The results of this study also make new contributions to the affect regulation literature. First, our results indicating that both daily stressors and the accumulation of stressors over time are associated with greater odds of binge drinking among adults is a new and important contribution to the literature. These results are consistent with arguments that stressors take a variety of forms (Pearlin, 1989; Wheaton, 1994), and that exposure to different forms of stressors can have independent and incremental health effects (Burks & Martin, 1985; Caspi et al., 1987; Lepore, Evans, & Palsane, 1991; Wheaton, 1994). We acknowledge that it is difficult to interpret the meaning of the *stress pile-up* variable because it could be reflective of a single underlying chronic stressor such chronic underemployment or mismatch between work and family, which have been linked to problem drinking (Frone, Russell, & Cooper, 1997; Grzywacz & Dooley, 2003; Grzywacz & Marks, 2000), but it could also reflect the accumulation of a series of unrelated events. Nonetheless, our results clearly suggest that future daily process studies of stress and alcohol need to be attentive to the broader stress universe (Wheaton, 1994) because acute events, chronic stressors, and daily hassles are distinct yet interrelated experiences. Perhaps a broader conceptualization of “stress” that includes a relative mix of stressors will yield a better and more consistent understanding of the linkages between stress and alcohol use.

Our evidence indicating that stress-binge drinking association is conditioned by level of educational attainment, as a proxy of socioeconomic status, is also an important contribution to the affect regulation literature. Apart from gender (e.g., Cooper et al., 1992), the affect regulation literature has given little attention to how macrolevel forces such as social structure and culture influence stressor exposure and shape individual responses to stressors. Our results suggest that the stress-binge drinking association differs by SES such that binge drinking in response to daily stress is less common among those with little formal education relative to college graduates, but that binge drinking in response to stress accumulation is more common among those with little formal education relative to college graduates.

Theory and previous research suggest two possible explanations for

differences in the stress-alcohol association by SES. The first possibility is that lower-status individuals have less access to social resources for coping with stressors (Pearlin, 1989; Turner & Marino, 1994; Turner & Lloyd, 1999) and consequently turn to less adaptive forms of coping, such as heavy drinking, to handle the accumulation of daily stress. Although this explanation is theoretically plausible and consistent with previous research and results of this study indicating that lower status individuals are more psychologically vulnerable to the stressors of daily life (Aneshensel, 1992; Grzywacz et al., 2004), it cannot explain our results suggesting that lower status individuals are *less likely* than high status individuals to binge drink on days where a single more severe stressor was confronted. We believe that the culture of "control and release" (Crawford, 1984) provides a more convincing explanation for the current findings. We interpret the weaker daily stressor-binge drinking slope for individuals with low education in contrast to college graduates to reflect adherence to idea of personal control: in the face of difficulty lower status individuals believe it is important to demonstrate high levels of personal control. By contrast, we interpret the stressor pileup-binge drinking association, which is stronger for individuals with low educational attainment than for college graduates, to reflect the culture of release: sometimes it is in the best interest of personal health to just "let it go" and not worry (Crawford, 1984). Unfortunately, whether the different association of binge drinking with stressors and negative affect by SES are due to differences in socially structured resources for coping (Pearlin, 1989; Turner & Marino, 1994; Turner & Lloyd, 1999; Wheaton, 1983) or cultural differences in appropriate responses to stressors cannot be discerned in our data. Future research should examine these alternative explanations.

The contributions of this study must be considered within the context of its limitations. The diary period only spanned an 8-day period, raising questions as to whether individuals' typical drinking patterns were captured, particularly when diary studies are known to promote behavioral self-monitoring and possibly less alcohol use. However, even though *individuals'* typical drinking patterns may not have been captured, the overall design and execution of the NSDE should have effectively captured the experiences of different socioeconomic *groups* in terms of their stressors, negative affect, and alcohol use. A second limitation is the relative rarity of binge drinking in the data (i.e., 4% of interview days), and the possibility that estimated associations between stressors, negative affect, and binge drinking may be unreliable (King & Zeng, 2000). Several of the estimated standard errors were greater than 30% of their respective parameter estimates, suggesting that some observed associations should be viewed as preliminary and interpreted with caution. Next, although previous research suggests that the association between stress exposure and alcohol use may depend on the source of stress (Armeli, Tennen, et al., 2000; Carney et al., 2000), we were not able to consider this

issue because of insufficient power due to the relative infrequency of work- and family-specific stressors (7% and 5% of study days for work and family stressors respectively). The relative absence of minorities in the analysis sample limits the ability to generalize study results to racial and ethnic minority groups. Our operational definition of stressor pile-up, while conceptually driven, was constrained by the number of total days of observation. Future research should empirically evaluate alternative operational definitions of this concept. A final limitation is our reliance on educational attainment as an indicator of SES. Although education is a commonly used, it does not adequately capture the complexities shaping an individual's location in the social hierarchy (Magnuson & Duncan, 2002). Limitations notwithstanding, the results of this study make important contributions to the affect regulation literature.

The results of this study suggest two distinct expansions of the affect regulation model. First, the results of our study suggest that the affect regulation needs to be refined to incorporate an expanded conceptualization of stress. Whereas affect regulation researchers have examined a variety of individual characteristics that moderate the linkage between stress and alcohol use such as dominant coping style or beliefs about alcohol (Armeli, Carney, et al., 2000; Cooper et al., 1992), stressors have been handled monolithically. More attention needs to be given to the complexities of the "stress universe" (Wheaton, 1994) in terms of the temporal nature of stressors (e.g., acute vs. chronic), stressor origins (e.g., work vs. family; Armeli, Tennen, et al., 2000), and the inherent threats embodied in stressors (Almeida et al., 2002). Second, affect regulation researchers need to give greater attention to individuals' social contexts. Variables such as socioeconomic status, location in the life span, race and ethnicity, as well as marital status, parental status, and employment arrangement have been largely overlooked in the affect regulation literature, despite evidence indicating that they each condition exposure to different types of stressors, they shape individuals' responses to stressors and overall levels of affect, and they shape individuals' alcohol use patterns (e.g., Finch, Catalano, Novaco, & Vega, 2003; Grzywacz et al., 2004; House et al., 1994; Turner et al., 1995; Lachman & Weaver, 1998; Naimi et al., 2003). We argue that a better understanding of the affect regulation model requires placing individuals and their responses to stressors within their broader social context.

In conclusion, this study complements and extends the affect regulation literature in several important ways. Using data from the first nationally representative daily diary study, we found that the odds of binge drinking were greater on days in which more severe stressors were experienced and on days when stressors accumulated. Like previous studies using less generalizable samples we also found no evidence suggesting that negative affect mediated the stressor-drinking association. Newer to the literature is our evidence indicating

that several of the pathways in the stressor-drinking association were stronger for lower status individuals, as indicated by educational attainment, in contrast to those in a higher status location. Collectively, the results of our study and those of others suggest that “stress” plays an important role in understanding individuals’ use of alcohol; however, our results highlighted the complexities of the “stress” concept and the importance of individuals’ social contexts in shaping the stress-alcohol association. These results suggest that future attempts to refine the affect regulation model require more sophisticated and multifaceted handling of the “stress” concept, as well as the theoretical and methodological ability to situate individuals’ experience and responses to stressors within a broader social context.

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