

MAJOR ARTICLE

Gender-moderated links between urgency, binge drinking, and excessive exercise

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ABSTRACT

Objective: Exercise correlates with alcohol use, but the nature of this relation and the extent to which it is maladaptive remains unclear. Urgency and motives for engaging in drinking and exercise might indicate when these behaviors are problematic. The current study examined whether urgency moderated the association between exercise motivated by weight loss and drinking. **Participants:** College students ($N = 589$, 45.7% male) completed the study during the spring of 2012. **Methods:** Participants completed self-report assessment measures, including frequency/quantity of alcohol consumption, exercise for weight loss, and urgency, during a single session. **Results:** Negative urgency moderated the relation between exercise and alcohol consumption in men but not women; the link between excessive exercise and alcohol use was stronger for men with higher levels of urgency. **Conclusions:** Further clarification of the mechanisms underlying alcohol use and physical activity—particularly maladaptive approaches to exercise—will inform health interventions among college students.

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Alcohol use; compensatory exercise; urgency

Recent evidence reveals a positive correlation between physical activity and binge drinking.^{1,2} This relation seems paradoxical, as exercise is considered a health-promoting behavior, whereas alcohol consumption is generally considered health demoting.³ Consistent evidence indicates that physically active individuals tend to drink more than their less-active counterparts. In addition, a potential dose-response relationship exists in which, when alcohol consumption rises, activity level also increases.^{4,5} Nevertheless, the exercise reported by those who consume more alcohol might or might not be maladaptive.⁶ The reason *why* drinkers are more physically active than nondrinkers is also unclear.⁴ Therefore, although research has established a relation between exercise and alcohol consumption, more detailed study of the nature of this link is necessary. Several factors that may be important in these considerations are compensatory exercise, urgency, and gender. Each of these will be discussed in turn, highlighting their unique contributions to the maladaptive exercise–alcohol association.

Exercise as compensation for alcohol use

Exercise can relate to either positive consequences, such as healthy weight management,⁶ or negative consequences, such as disordered eating.⁷ Exercise fueled by

concerns about shape and weight may represent one particularly problematic type of physical activity. Before or after consuming alcohol, people who endorse these concerns about shape and weight may be particularly likely to excessively exercise. Although the specific criteria for “excessive exercise” varies within the literature, it commonly refers to the behavior of individuals who report frequent (ie, daily) intense exercise, intended to influence weight or shape.⁸ Excessive exercise is considered a common behavior used by individuals to compensate for consumption of food or binge eating, termed compensatory exercise⁹; individuals can use exercise in a parallel manner to counteract calories consumed through alcohol or binge drinking, by adjusting the time or intensity of their activity. Accordingly, compensatory behaviors, including exercise, have been linked with increased alcohol consumption and alcohol-related problems.¹⁰ Recent work has shown that individuals who drink more tend to work out with more intensity and that increasing physical activity prior to or following alcohol consumption aids in suppressing weight concerns.¹¹

Contributors to both exercise and alcohol use

It remains unclear for whom the alcohol–compensatory exercise link may be more relevant or problematic;

therefore, it is important to examine individual difference variables, relevant to both behaviors, that may contribute to the relation. Within the context of both compensatory exercise and alcohol consumption, urgency and gender represent 2 potentially important variables that may identify why those who are physically active may be more likely to drink.

Urgency

Trait impulsivity is a commonly studied contributor to alcohol consumption.^{12–15} One facet of impulsivity, urgency, the decision to act rashly in response to extreme emotion, is particularly salient both to alcohol use, as well as compensatory behaviors within the context of bulimia.^{16,17} Urgency also seems relevant to exercise in general; in a study of college athletes, trait urgency served as an important predictor of alcohol-related outcomes.¹⁸ It seems that impulsivity, and specifically, urgency, contributes to both exercise and alcohol use and therefore may aid to better understand the link. Urgency is typically categorized as either positive or negative, with action driven by either positive or negative emotion, respectively. Past work has suggested that positive urgency and sensation seeking moderate the relation between exercise and alcohol consumption.¹⁹ The authors suggested that their findings may serve as evidence of the “work hard, play hard” mentality.²⁰ They also recommend that although exercise may commonly be used in alcohol prevention efforts, this may be maladaptive for individuals high in impulsivity.

Gender

In addition to urgency, gender seems pertinent to the exercise—alcohol use link. Previous work has suggested a unique pattern of both alcohol use²¹ and compensatory behaviors²² across genders, indicating patterns of increased alcohol consumption in men but increased compensatory behaviors in women. Recent work has also investigated alcohol use, compensatory exercise, and gender simultaneously. For example, male athletes may be more likely to drink for social reasons. In contrast, female collegiate athletes tend to drink “to cope” or “to feel better.”²³ Undergraduate men appear as likely as women to report exercising both preemptively and after drinking to compensate for the calories consumed in alcohol.²⁴ On the other hand, women binge drinkers seem more likely to have greater weight concern and may show this increased weight concern due to alcohol-related weight gain.^{24,25}

Gender-related differences in urgency may account for gender differences in alcohol use and exercise. Prior work has established that urgency tends to be higher in males.²⁶ Leasure and Neighbors¹⁹ considered

impulsivity, exercise, and alcohol simultaneously and found that positive urgency moderated the exercise-alcohol relation, but their work must be extended in several ways. First, the sample used in the study was composed of predominately women, potentially obscuring effects in males. Second, the authors operationalized exercise using its duration; considering more maladaptive forms of exercise (ie, for weight loss) may provide an illustrative pattern of results.

The current study

The current investigation had 3 main aims—(a) to assess the relation between alcohol consumption and exercise motivated by weight loss; (b) to investigate the role of positive and negative urgency in moderating this relation; and (c) to evaluate whether these variables relate in a consistent manner across genders. In the current study, we hypothesized that weight loss-oriented exercise would increase with alcohol consumption in both males and females. Second, we expected that urgency would moderate the relation between exercise and alcohol use in accordance with previous findings.¹⁹ Finally, although past work has not examined gender effects in regards to exercise, urgency, and alcohol use, we expected that the moderating effect of urgency would vary across gender. As such, we anticipated that the role of urgency in the relation between alcohol use and exercise would be stronger in males, due to past research documenting higher levels of urgency.

Methods

Participants

Participants ($N = 589$, 45.7% male) were undergraduate students at a large university in the Northeast United States, who were recruited using the university’s Psychology 101 subject pool. Participants signed up for a study slot via an online Web site and were given course credit for their participation in the study. The inclusion criterion for the study was participation in the university’s research pool; students were excluded from participation if they were not at least 18 years of age.

Measures

Alcohol consumption

Alcohol consumption was measured using 2 single items that assessed frequency and quantity of alcohol use. In order to assess frequency, participants responded to the question “How many days per week do you drink alcohol (0–7)?” To gauge quantity of drinking, participants

responded to the question “How many drinks do you consume during any drinking episode?” Participants filled in the appropriate number, with no range specified. These 2 items were used as 2 separate outcome measures. Past investigation has supported the use of single-item measures in assessing alcohol consumption and has suggested that single items show comparable validity and reliability to scales with multiple items.^{27,28}

Exercise motivated by weight loss

Exercise patterns motivated by weight loss were measured using 2 items: (a) “I exercise in order to burn calories” and (b) “I exercise vigorously in order to burn calories.” Participants rated these items using a Likert-type scale that ranged from 1 (*average or less than average*) to 5 (*a great deal more than average*). Each participant’s responses to the items were added to compute a composite score (range = 2–10), which was then dichotomized using a median split. Therefore, the sample was separated into 2 groups: (a) those who reported an average, or less than average, amount of exercise for weight-loss purposes, and (b) those who reported a high level of exercise motivated by weight loss. Although previous work has raised concerns about using median splits due to loss of variance,²⁹ the exercise variables were negatively skewed and transforming the variable had little impact on the normality. Dichotomizing had the effect of normalizing the distribution and more accurately characterizing participants in this sample.

Urgency

Positive and negative urgency were measured using the UPPS Impulsivity Scale, urgency subscale.³⁰ The UPPS Impulsivity Scale assesses 4 types of impulsivity—premeditation, urgency, sensation seeking, and perseverance. The urgency subscale has 26 items total, with 14 items measuring positive urgency (Cronbach’s $\alpha = .93$), or the tendency to act impulsively in response to positive emotion, and 12 items assessing negative urgency, or the tendency to act rashly in response to negative affect (Cronbach’s $\alpha = .83$). Participants rate items using a 4-point Likert-type scale that ranges from 1 (*agree strongly*) to 4 (*disagree strongly*). The scale has shown good reliability and validity.³⁰

Demographic information

Participants also completed questions related to demographic information, including body mass index (BMI) and their racial and ethnic backgrounds.

Procedure

All participants were recruited through the Introduction to Psychology Research Pool; information about the study was posted on the university’s research pool Web site. In order to be eligible to participate, individuals were required to be current students at the university and be 18 years of age. If students were interested in participating, they were able to sign up for an in-lab appointment slot online. Each subject’s participation consisted of attending an hour-long in-lab appointment, during which they provided informed consent and completed a series of computer-based questionnaires related to alcohol consumption and eating behaviors. Following completion of the questionnaires, participants were debriefed and received course credit for their participation. The university’s institutional review board approved the study.

Analytic plan

Prior to analyses, all data were screened for univariate and multivariate normality. When necessary, data that showed non-normality were subject to transformations. Analyses included bivariate correlations in order to assess the relation of all variables within the study. In order to conduct regression and moderation analyses, researchers used Hayes’ PROCESS macro.³¹ The macro uses an ordinary least squares–based approach to approximate direct and indirect effects in various mediation and moderation models. As presumably exercise motives (ie, weight loss) and subsequent behaviors may differ systematically across weight classes, moderation analyses were conducted controlling for BMI.

Results

Descriptive statistics

Subjects

Subjects had a mean age of 19.08 ($SD = 2.08$) and a mean body mass index (BMI) in the normal range ($M = 23.11$, $SD = 3.94$). The majority (58.6% of the sample) reported being Caucasian, with other races also represented (14.4% Asian, 12.6% African American, 12% Hispanic/Latino, 0.7% Native American, 8.0% mixed race, and 5.7% chose not to report their race/ethnic background). The racial and ethnic background of our sample reflected that of the general US college population.³²

Study variables

Negative urgency ($M = 2.27$, $SE = 0.46$, skewness = 0.09, SE skewness = 0.10) and positive urgency ($M = 1.86$, $SE = 0.52$, skewness = 0.22, SE skewness = 0.10)

were normal and did not necessitate transformation. Days per week in which alcohol was consumed ($M = 1.62$, $SE = 1.18$, skewness = 0.70) and drinks per drinking day ($M = 5.43$, $SE = 3.66$, skewness = 0.60) were both subject to square-root transformations and demonstrated skews of 0.01 ($SE = 0.10$) and -0.15 ($SE = 0.10$), respectively, following transformation. All bivariate correlations (available in Table 1) between quantitative variables (ie, negative and positive urgency, alcohol consumption per week, and drinks per drinking day) were significant at the $p < .05$ level.

Primary analyses: moderation

Frequency of alcohol consumption

The first set of moderation analyses assessed the degree to which exercise, urgency, and gender related to the frequency of alcohol consumption on a weekly basis.

Negative urgency.. The overall model was significant, $F(8, 568) = 5.95$, $p < .01$, accounting for 7.73% of the variance in days of alcohol consumption per week. Of the individual predictors, the main conditional effect of negative urgency was significant, $b = .21$, $p < .01$. Gender, $b = .24$, $p = .13$, and excessive exercise, $b = .24$, $p = .13$, did not have significant main effects. Of the interactions, the interaction between negative urgency and exercise, $b = -.05$, $p = .80$, between gender and exercise, $b = -.57$, $p = .07$, and between negative urgency and gender, $b = -.07$, $p = .29$, did not account for a significant amount of variance in alcohol use. However, a significant 3-way interaction emerged between gender, exercise, and negative urgency, $b = .27$, $p < .05$. Graphical representations of the interaction in males and females are available in Figures 1 and 2. The nature of the significant interaction was such that among males who reported low levels of exercise, level of alcohol consumption was consistent regardless of their reported negative urgency. On the other hand, among males who reported high levels of exercise motivated by weight loss, high negative urgency was related to more days a week spent drinking, whereas low negative urgency was associated with fewer days of drinking per week. In females,

Table 1. Bivariate correlations between transformed study variables.

Study variable	1	2	3	4
1. Days of alcohol consumption per week	—			
2. Drinks per drinking day	.65	—		
3. Negative urgency	.22	.15	—	
4. Positive urgency	.14	.17	.56	—

Note. All correlations were statistically significant, $p < .05$.

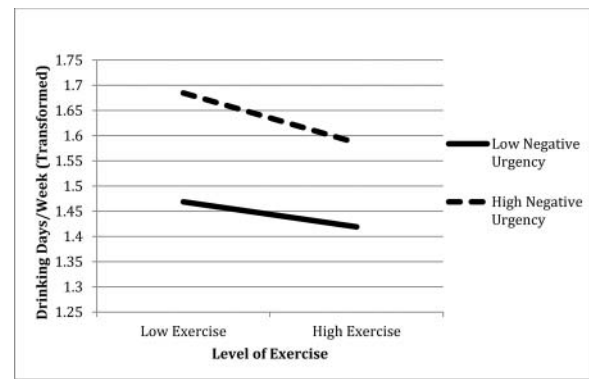


Figure 1. Impact of urgency on the relation between exercise and drinking days per week in women.

higher levels of negative urgency predicted greater drinking days per week; however, this pattern was consistent across both levels of weight-related exercise.

Positive urgency.. In an effort to replicate the findings of Leasure and Neighbors,¹⁹ the second set of moderation analyses examined positive urgency as a moderator of the exercise—alcohol consumption relation. Interestingly, although the overall model was significant, $F(8, 560) = 2.74$, $p < .01$, the only single predictor that accounted for a significant amount of variance was positive urgency, $b = .13$, $p < .01$. Notably, the main effect of gender evidenced a nonsignificant trend, $b = .22$, $p = .07$. The main effect of exercise, $b = -.05$, $p = .76$, along with interaction effects between positive urgency and exercise, $b = -.02$, $p = .78$, gender and exercise, $b = .10$, $p = .69$, positive urgency and gender, $b = -.08$, $p = .20$, and positive urgency, gender, and exercise, $b = -.003$, $p = .38$, were not significant.

Quantity of alcohol consumption

A second set of moderation analyses were undertaken in order to test whether urgency, exercise motivated by

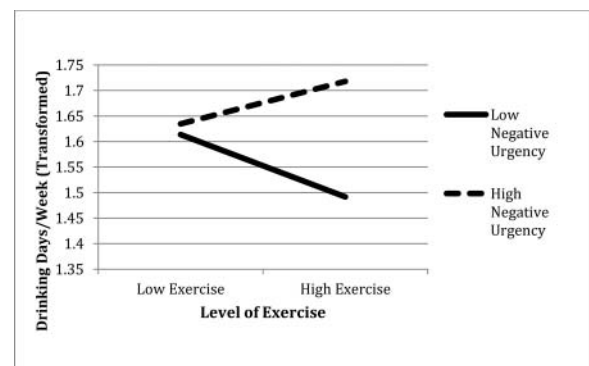


Figure 2. Impact of urgency on the relation between exercise and drinking days per week in men.

weight loss, and gender had similar effects when the quantity of alcohol consumption was considered (ie, drinks per drinking day).

Negative urgency. Effect sizes for this set of analyses are available in Table 2. Similar findings emerged in the model for negative urgency; the overall model was significant and accounted for 13.86% of the variance in drinks per drinking day. In this model, the main effect of negative urgency, the interaction between gender and exercise, and a 3-way interaction between gender, exercise, and negative urgency were significant. The significant 3-way interaction is depicted in Figures 3 and 4. This interaction, again, highlighted that negative urgency moderated the relationship between exercise and drinks per drinking day in males. Among males who did not report high levels of exercise for weight loss, drinks per drinking day were consistent, regardless of reports of negative urgency. High levels of exercise were associated with decreased alcohol consumption among those low in negative urgency; however, males who reported high levels of exercise for weight loss and high negative urgency drank more drinks per drinking day. For females, higher negative urgency was predictive of increased drinks per drinking day, but again, this relation did not vary across levels of reported exercise.

Positive urgency. The overall model was significant, $F(8, 556) = 9.84, p < .01$. As was the case for the previous model examining positive urgency, the only significant main effect in the model was positive urgency, $b = .19, p < .05$. The main effect of exercise, $b = .04, p = .89$, and several interaction effects, including positive urgency and exercise, $b = -.09, p = .55$, positive urgency and gender, $b = -.02, p = .84$, and positive urgency, exercise, and gender, $b = .38, p = .12$, did not reach the traditional thresholds for statistical significance. Both gender, $b = .46, p = .05$, and the interaction between gender and

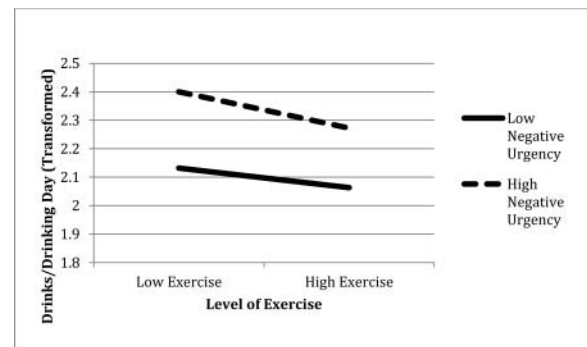


Figure 3. Impact of urgency on the relation between exercise and drinks per drinking day in women.

exercise, $b = -.82, p = .08$, showed nonsignificant trends.

Post hoc analyses

Across all regression analyses, BMI was not a significant covariate; at first glance, this finding seems counterintuitive, as BMI relates in previous work to the variables of interest in the current study.²² In order to explore this relation further, we conducted post hoc analyses testing the association between BMI and compensatory exercise. Two independent-samples t tests (ie, one for females and one for males) indicated that for both males, $t(263) = 2.03, p = .043$, and females, $t(312) = 2.83, p = .005$, those individuals who reported engaging in exercise driven by weight loss had a lower BMI than those who did not, which was in line with previous work.²²

Comment

The current study investigated the role of urgency and gender in delineating the relation between exercise and alcohol use. More specifically, past findings had

Table 2. Moderation analyses: effects of gender and negative urgency on the exercise–quantity of alcohol use relation.

Effect	$F(df_2, df_1)$	p	Coefficient	SE	p
Full model	$F(8, 564) = 11.35$	.00			
1. Constant			1.44	0.25	.00
2. Gender			0.37	0.32	.25
3. Urgency			0.26	0.08	.00
4. Exercise			0.05	0.38	.90
5. Urgency $\times$ Exercise			−0.06	0.16	.69
6. Gender $\times$ Exercise			−1.43	0.64	.03
7. Urgency $\times$ Gender			0.03	0.14	.84
8. Urgency $\times$ Exercise $\times$ Gender			0.56	0.28	.04
9. BMI			0.01	0.01	.32

Note. Effects significant at the $p < .05$ level are bolded.

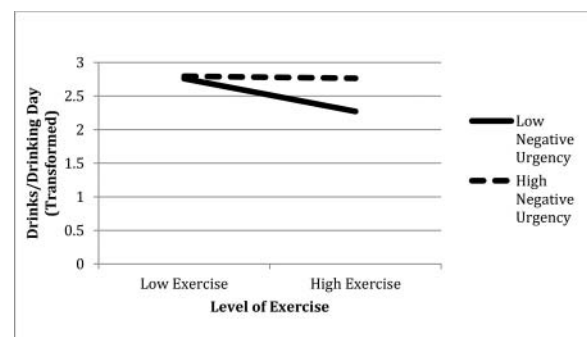


Figure 4. Impact of urgency on the relation between exercise and drinks per drinking day in men.

established links between increased exercise use, alcohol consumption, and urgency; we examined whether exercise specifically motivated by weight loss would relate differentially to alcohol use and urgency.

Our results yielded several notable findings. First, contrary to our hypothesis, there was not a significant overall link between exercise and alcohol use. This result contradicts previous reports that suggest elevated exercise in drinkers may be compensatory in nature.²² One explanation for this discrepancy is that different types of exercise relate differentially to alcohol use. Specifically, exercise related to weight loss may not relate to the “work hard, play hard” mentality found in athletes.³³ It is also possible that a positive link between exercise and alcohol use may only be true of subgroups of individuals (eg, those with personality traits such as urgency).

Second, positive urgency served as a significant predictor of frequency and quantity alcohol use, such that greater positive urgency was associated with greater drinks per drinking day and more drinking days per week. This finding converges with previous work highlighting the significance of positive urgency in alcohol use.¹⁹ However, in contrast to both the findings of Leasure and colleagues¹⁹ and our hypothesis, positive urgency did not moderate the relation between alcohol use and increased levels of exercise for weight loss. Instead, in our results, negative urgency was a significant moderator of the exercise–alcohol relation, and the interaction between these variables was only significant in males. High levels of weight loss–motivated exercise were linked to increased alcohol use and more drinking days per week only among males who reported high levels of urgency. Males who reported low negative urgency and high exercise were more likely to drink less and report fewer drinking days. Although our sample did indicate that males consumed more alcohol overall, quantity and frequency of consumption was not suggestive of a restricted range in females.

Our results indicate several risk profiles for problematic drinking and exercise, specifically within males. Among men who are low in negative urgency, increased physical activity may be protective and lead to less alcohol consumption—both in frequency (days per week) and quantity (drinks per drinking day). For men who report higher negative urgency, our findings may be interpreted in several ways. Men who express high levels of negative urgency may be more likely to drink and exercise in order to regulate negative affect. On the other hand, increased weight loss–related exercise among men with high negative urgency may serve to regulate concerns about alcohol-related weight gain more so than “drinking to cope.” Therefore, it could be that the drinking and exercise reported by men with high negative

urgency in our sample is related to weight and shape concerns; however, this comment is speculative, as we did not directly include a consideration of these variables in the current study. Overall, our results suggest that the impact of exercise on alcohol consumption may depend on the personality profile of the individual in question.

Problematic drinking and its relation to increased exercise is a well-established target for clinical concern. Our findings indicated that positive urgency is a potential risk factor for alcohol use across all exercise profiles and genders. Additionally, results related to negative urgency indicate 2 clinically distinct risk profiles for males—one related to more general difficulties with emotion regulation and one more indicative of risk for an eating disorder. One, if an individual uses both alcohol and exercise to regulate high levels of negative affect, emotion regulation in response to negative mood may be an important focus in treatment. In this case, it may be best to reinforce the individual’s use of exercise as an emotion regulation strategy and develop alternative other strategies to replace alcohol use. On the other hand, if an individual exercises as compensation for calories consumed in alcohol, this risk profile is more indicative of potential for eating disorder. Although each of these risk profiles would indicate treatment targeted for emotion regulation, underlying motivation for exercise that specifically relates to shape and weight may dictate how or if a clinician would include exercise within the treatment strategy. Effective interventions targeting eating disorder risk should aim to better understand the specific moderating effect that urgency may have in driving a specific motive for exercise (eg, for weight loss).

Within regression analyses, BMI was not a significant covariate, indicating that alcohol consumption did not vary systematically with BMI. Although past investigation has found associations between BMI and alcohol consumption, the magnitude of this relation has been small.²² Post hoc analyses indicated that across both genders, those individuals who endorsed compensatory exercise had a lower BMI than those who did not. The significant, negative link between compensatory exercise and BMI among a general college population coincides with previous work.²²

In addition to clinical implications, our results provide information that might be incorporated on a more widespread scale across college campuses. Campaigns that seek to improve the health habits of college populations should consider that the nature and impact of behaviors such as alcohol use and exercise vary across individuals. Incorporating more nuanced messages educating students about adaptive and maladaptive *functions* of certain behaviors may lead to better outcomes. Additionally, better identification of characteristics (eg,

negative urgency) or group membership (eg, gender) that place college students at higher risk for engaging in problematic alcohol use and compulsive exercise could lead to more targeted and effective prevention and intervention.

Limitations

Moving forward, future research must replicate and address the limitations of the current findings. First, the study was cross-sectional in nature; longitudinal investigation of the variables in question may provide a more definitive answer as to the causal directionality of the relations studied. Second, although our study was novel in its consideration of exercise motivated by weight loss, the questions used to assess this variable were not taken from an existing measurement. Therefore, our results should be replicated with an existing, validated measurement of compensatory exercise. Third, notwithstanding the fact that most articles within alcohol use and exercise use self-report measurement, it remains possible that participants under- or overreported drinking or exercise behaviors due to social desirability concerns. Fourth, it is important to note that the observed effects were small to medium in size and therefore do not constitute the only variables that play a part in the link between exercise and alcohol use. Future work should explore other variables that influence and interact with the variables measured in the current study. Additionally, the current sample has limits to its definitive external validity; future research should establish whether the current findings generalize to other populations, such as clinical samples or college students of varying geographical origin. Relatedly, the current findings should be replicated in a sample that permits adequately powered comparisons between racial and ethnic groups.

Conclusions

Results from the current investigation highlight that alcohol use and exercise may be related to positive outcomes within particular contexts and when driven by certain motives, but serve as maladaptive in others. Our findings also suggest that a consideration of personality traits, such as negative urgency, may help to identify individuals for whom the exercise—alcohol relation is most problematic. The results from the current investigation provide a call for future research on the association between alcohol, exercise, and urgency; additionally, we hope that the current findings spark a more general conversation about the need to better consider the intricacies present in constructs that may serve simultaneous adaptive and maladaptive functions.

Conflict of interest disclosure

The authors have no conflicts of interest to report. The authors confirm that the research presented in this article met the ethical guidelines, including adherence to the legal requirements, of the United States and received approval from the Institutional Review Board of the University of Albany, SUNY.

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References

1. Dunn MS, Wang M. Effects of physical activity on substance use among college students. *Am J Health Stud.* 2003;18:126–132.
2. French MT, Popovici I, Maclean JC. Do alcohol consumers exercise more? Findings from a national survey. *Am J Health Promot.* 2009;24:2–10.
3. Ettner SL, French MT, Popovici I. Heavy drinking and health promotion activities. *Soc Sci Med.* 2010;71:134–142.
4. Barry AE, Piazza AK. Should exercise be promoted as an effective intervention strategy to off-set excessive college student drinking? *J Am Coll Health.* 2010;59:139–140.
5. Musselman JR, Rutledge PC. The incongruous alcohol-activity association: physical activity and alcohol consumption in college students. *Psychol Sport Exerc.* 2010;11:609–618.
6. Anderson DA, Simmons AM, Martens MP, Ferrier AG, Sheehy MJ. The relationship between disordered eating behavior and drinking motives in college-age women. *Eat Behav.* 2006;7:419–422.
7. Liechty JM, Lee MJ. Longitudinal predictors of dieting and disordered eating among young adults in the US. *Int J Eat Disord.* 2013;46:790–800.
8. Mond JM, Calogero RM. Excessive exercise in eating disorder patients and in healthy women. *Australas Psychiatry.* 2009;43:227–234.
9. Davis HA, Holland LA, Keel PK. A preliminary examination of a nonpurging compensatory eating disorder. *Int J Eat Disord.* 2014;47:239–243.
10. Barry AE, Piazza-Gardner AK. Drunkorexia: understanding the co-occurrence of alcohol consumption and eating/exercise weight management behaviors. *J Am Coll Health.* 2012;60:236–243.
11. Piazza-Gardner AK, Barry AE. A qualitative investigation of the relationship between consumption, physical activity, eating disorders, and weight consciousness. *Am J Health Educ.* 2012;45:174–182.
12. Adams ZW, Kaiser AJ, Lynam DR, Charnigo RJ, Milich R. Drinking motives as mediators of the impulsivity-substance use relation: pathways for negative urgency, lack of premeditation, and sensation seeking. *Addict Behav.* 2012;37:848–855.
13. Curcio AL, George AM. Selected impulsivity facets with alcohol use/problems: the mediating role of drinking motives. *Addict Behav.* 2011;36:959–964.
14. Labrie JW, Kenney SR, Napper LE, Miller K. Impulsivity and alcohol-related risk among college students: examining

- urgency, sensation seeking and the moderating influence of beliefs about alcohol's role in the college experience. *Addict Behav.* 2014;39:159–164.
15. Littlefield AK, Stevens AK, Sher KJ. Impulsivity and alcohol involvement: multiple, distinct constructs and processes. *Curr Addict Rep.* 2014;1:33–40.
 16. Buchholz LJ, Crowther JH. Women who use exercise as a compensatory behavior: how do they differ from those who do not?. *Psychol Sport Exerc.* 2014;15:668–674.
 17. Fischer S, Smith GT, Anderson KG. Clarifying the role of impulsivity in bulimia nervosa. *Int J Eat Disord.* 2003;33:406–411.
 18. Martens MP, Pedersen ER, Smith AE, Stewart SH, O'Brien K. Predictors of alcohol-related outcomes in college athletes: the roles of trait urgency and drinking motives. *Addict Behav.* 2011;36:456–464.
 19. Leasure JL, Neighbors C. Impulsivity moderates the association between physical activity and alcohol consumption. *Alcohol.* 2014;48:361–366.
 20. Martens MP, Watson II JC, Royland EM, Beck NC. Development of the athlete drinking scale. *Psychol Addict Behav.* 2005;19:158–164.
 21. Wilsnack RW, Wilsnack SC. Gender and alcohol: consumption and consequences. In: Boyle P, Boffetta P, Lowenfels AB, et al, eds. *Alcohol: Science, Policy and Public Health.* Oxford, UK: Oxford University Press; 2013:153–160.
 22. Barry AE, Whiteman S, Piazza-Gardner AK, Jensen AC. Gender differences in the associations among body mass index, weight loss, exercise, and drinking among college students. *J Am Coll Health.* 2013;61:407–413.
 23. Wilson GS, Pritchard ME, Schaffer J. Athletic status and drinking behavior in college students: the influence of gender and coping styles. *J Am Coll Health.* 2004;52:269–275.
 24. Bryant JB, Darkes J, Rahal C. College students' compensatory eating and behaviors in response to alcohol consumption. *J Am Coll Health.* 2014;60:350–356.
 25. Vickers KS, Patten CA, Bronars C, et al. Binge drinking in female college students: the association of physical activity, weight concern, and depressive symptoms. *J Am Coll Health.* 2004;53:133–140.
 26. Nolen-Hoeksema S, Hilt L. Possible contributors to the gender differences in alcohol use and problems. *J Gen Psychol.* 2006;133:357–374.
 27. Dollinger SJ, Malmquist D. Reliability and validity of single-item self-reports: with special relevance to college students' alcohol use, religiosity, study, and social life. *J Gen Psychol.* 2009;136:231–242.
 28. Zimmerman M, Ruggero CJ, Chelminski I, et al. Developing brief scales for use in clinical practice: the reliability and validity of single-item self-report measures of depression symptom severity, psychosocial impairment due to depression, and quality of life. *J Clin Psychiatry.* 2006;67:1536–1541.
 29. Cohen J. The cost of dichotomization. *Appl Psychol Meas.* 1983;7:249–253.
 30. Whiteside SP, Lynam DR, Miller JD, Reynolds SK. Validation of the UPPS impulsive behaviour scale: a four-factor model of impulsivity. *Eur J Pers.* 2005;19:559–574.
 31. Hayes AF. *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach.* New York, NY: Guilford Press; 2013.
 32. United States Department of Education. Status and trends in the education of racial and ethnic groups. Available at: <http://nces.ed.gov/pubs2010/2010015.pdf>. Published 2013. Accessed September 9, 2014.
 33. Green K, Nelson TF, Hartmann D. Binge drinking and sports participation in college: patterns among athletes and former athletes. *Int Rev Sociol Sport.* 2014;49:417–434.

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