Published in final edited form as:
Addict Behav. 2011 March ; 36(3): 274–277. doi:10.1016/j.addbeh.2010.11.008.

Exercise and Coping-Oriented Alcohol Use among a Trauma-Exposed Sample

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Abstract

The present investigation examined the relation between exercise intensity and alcohol use coping motives among trauma-exposed adults. Participants were 114 adults (58 women; M_{age} = 22.31 years, *SD* = 8.89) who reported exposure to at least one traumatic event (APA, 2000) and alcohol use in the past 30 days. Partially consistent with expectation, engagement in vigorous-intensity activities (>6 resting metabolic rate [MET] score) demonstrated a significant, incremental (negative) association with alcohol use coping motives. This incremental association was observed after accounting for current alcohol consumption, non-criterion alcohol use motives, anxiety sensitivity, posttraumatic stress symptom severity, as well as engagement in light- and moderate-intensity activities (≤6 resting MET score). Results are discussed in terms of better understanding the association between vigorous-intensity aerobic exercise and coping-oriented alcohol use among trauma-exposed individuals.

Keywords

Trauma; Exercise; Alcohol; Coping; Anxiety

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The co-occurrence of trauma exposure with alcohol use and its disorders has been well documented (e.g., Langeland & Hartgers, 1998; McFarlane, 1998; McFarlane et al., 2009; Stewart, 1996). Extant work indicates that trauma-exposed individuals report greater motivation to drink alcohol to cope with negative affect states, as compared with those who have not experienced trauma (Dixon, Leen-Feldner, Ham, Feldner, & Lewis, 2009; Kilpatrick et al., 2000; Stewart, Conrod, Samoluk, Pihl, & Dongier, 2000; Stewart, Mitchell, Wright, & Loba, 2004; Ullman, Filipas, Townsend, & Starzynski, 2006). Additionally, among trauma-exposed individuals, drinking to cope with negative affect has been significantly associated with posttraumatic stress symptom severity (Ullman, Filipas, Townsend, & Starzynski, 2005).

Interestingly, aerobic exercise programs have begun to show initial positive effects with regard to both posttraumatic stress (Diaz & Motta, 2008; Newman & Motta, 2007) and alcohol use (Brown et al., 2009; 2010; Read & Brown 2003; Stathopoulou, Powers, Berry, Smits, & Otto, 2006). For example, among trauma-exposed individuals, moderate-intensity aerobic exercise has been shown to significantly reduce posttraumatic stress symptoms (Diaz & Motta, 2008; Newman & Motta, 2007). These findings provide some convergent evidence that aerobic exercise may be helpful in reducing emotional distress and problematic alcohol use among trauma-exposed populations. It is possible that exercise may serve as an emotion regulatory tactic for trauma-exposed, alcohol-using persons (Steptoe, Edwards, Moses, & Mathews, 1989). Yet, it is presently unclear whether aerobic exercise relates to alcohol coping motives among trauma-exposed, alcohol-using persons. Additionally, as past work has not taken into account the shared variance among alcohol use motives, it is unclear whether aerobic exercise is uniquely related to alcohol coping motives after accounting for shared variance among other alcohol use motives.

Together, the purpose of the present investigation was to provide an initial evaluation of the associations between aerobic exercise and coping-oriented alcohol use among a trauma-exposed population. As prior work suggests moderate-intensity aerobic exercise may be beneficial for individuals with both trauma exposure histories (Diaz & Motta, 2008; Newman & Motta, 2007) and problematic alcohol use behaviors (Brown, et al., 2010; Murphy, Pagano, & Marlatt, 1986), it was hypothesized that greater engagement in activities of at least moderate-intensity (i.e., both moderate- and vigorous-intensity), as compared with light-intensity activities, would be inversely (negatively) associated with coping-oriented alcohol use. This association was expected to be evident above and beyond the effects of alcohol consumption, co-occurring motives for alcohol use (e.g., social), as well as posttraumatic stress symptom severity and anxiety sensitivity; these variables have been shown to be significantly associated with coping-oriented alcohol use in past work (Dixon et al., 2009; Stewart et al., 2000; Stewart et al., 2004; Ullman et al., 2005; Stewart & Zeitlin, 1995).

Method

Participants

Participants were comprised of a sample of 114 adults (58 women; M_{age} = 22.31 years, *SD* = 8.89, *range* = 18 – 61) recruited from the Burlington, Vermont, community. Approximately 89.5% of participants identified as white/non-Hispanic.

The current study data were collected as part of a larger laboratory investigation. Inclusion criteria for this investigation were comprised of (1) being at least 18 years of age, (2) reporting exposure to at least one PTSD Criterion A traumatic event (American Psychiatric Association [APA], 2000), and (3) endorsing alcohol consumption in the 30 days prior to participation. Exclusion criteria for the larger investigation were comprised of (1) current

Axis I psychopathology (except substance abuse and dependence, which were not formally assessed), (2) current (past month) suicidal ideation, (3) current or past chronic cardiopulmonary illness, (4) current serious medical illness (e.g., bronchitis, emphysema), (5) pregnancy, and/or (6) inability to provide written, informed consent.

Measures

The *Structured Clinical Interview for DSM-IV Axis I Disorders/Non-patient Version* (SCID-I/N-P; First, Spitzer, Gibbon, & Williams, 1995) was used to rule-out individuals with current (past month) Axis I disorders (with the exception of substance abuse and dependence, which were not assessed) and current (past month) suicidal ideation.

The *Posttraumatic Diagnostic Scale* (PDS; Foa, 1995) was used to index traumatic event exposure and to measure posttraumatic stress symptom severity (α = .91). The PDS is a 49-item self-report instrument. Respondents rate the frequency (0 = *not at all* or *only one time* to 3 = *five or more times a week/almost always*) of 17 posttraumatic stress symptoms experienced in the past month in relation to the most disturbing event endorsed. The PDS has excellent psychometric properties (Foa, Cashman, Jaycox, & Perry, 1997).

The *Alcohol Use Disorders Identification Test* (AUDIT; Babor, de la Fuente, Saunders, & Grant, 1992) is a 10-item measure used to index alcohol consumption and alcohol use problems (α = .82). There is a large body of literature attesting to the psychometric properties of the AUDIT (e.g., Saunders, Aasland, Babor, & de la Fuente, 1993).

The *Anxiety Sensitivity Index* (ASI; Reiss, Peterson, Gursky, & McNally, 1986) is a 16-item measure (α = .82) on which respondents indicate, on a 5-point Likert-style scale (0 = *very little* to 4 = *very much*), the degree to which they are concerned about the possible negative consequences of anxiety symptoms. The ASI has demonstrated good psychometric properties (Peterson & Reiss, 1992).

The Exercise Habits Questionnaire-Revised (EHQ-R; Zvolensky, 2008) is a self-report descriptive measure of physical activity. The EHQ-R prompts respondents to indicate, for 29 different physical activities (e.g., running, stair stepping, golf, rock climbing, yoga), the number of sessions they have completed in the past two weeks as well as the time spent per session (e.g., less than 20 minutes; 20–29 minutes…50 minutes or more). This information was used in combination with the compendium of physical activities (Ainsworth et al., 2000) to calculate total minutes of bi-weekly aerobic exercise (see also Tart et al., 2010). For minutes spent per session, we used the midpoint of the range (e.g. 2 = 20–29 minutes equaled 24.5 minutes) and for “50 minutes or more,” we used 50 minutes. We classified activities associated with metabolic equivalent (METS) values < 3 as light intensity, 3 – 6 as moderate intensity and > 6 as vigorous intensity (Ainsworth et al., 2000).

The *Drinking Motives Questionnaire-Revised* (*DMQ-R*; Cooper, 1994) is a 20-item self-report measure designed to index alcohol use motivation. Participants rate, on a 5-point Likert-style scale (1 = *almost never/never* to 5 = *almost always/always*), how frequently each of the listed reasons motivates them to drink alcohol. The measure reflects four different motives for drinking alcohol: Social (i.e., “Because it improves parties and celebrations”;α = .93), Coping (i.e., “To forget your worries”; α = .82), Enhancement (i.e., “Because you like the feeling”; α = .87), and Conformity (i.e., “Because your friends pressure you to drink”; α = .81). The DMQ-R has demonstrated good psychometric properties (Cooper, 1994; MacLean & Lecci, 2000).

Procedure

Interested persons, responding to flyers and advertisements, were scheduled for an appointment. Upon arrival, each participant provided written consent to participate in the research study. Next, participants were administered the SCID-I/N-P (First et al., 1995). If deemed eligible, participants completed self-report measures and received $25 compensation. This study was approved by the Institutional Review Board of the University of Vermont.

Results

Participant Characteristics

Participants reported experiencing an average of 2.05 (*SD* = 1.41) PTSD Criterion A traumatic events, and 53.5% of the total sample reported drinking at least 2-3 times per week, with 52.6% reporting drinking at least 5-6 drinks, on average, per occasion. Participants scored a mean of 11.13 (*SD* = 5.30) on the AUDIT, with approximately 73.7% of the sample reporting at least moderate alcohol use problems, as indexed by a score of 8 or greater on the AUDIT.

Zero-Order Correlations and Hierarchical Regression Analysis

Table 1 presents zero-order correlations among continuous variables and Table 2 summarizes the results of the hierarchical regression analysis. A hierarchical linear regression was conducted to examine the association between aerobic exercise intensity and alcohol use Coping motives. Covariates were entered at steps one and two of the model (see Table 2). At step one, Conformity motives for alcohol use were positively associated with alcohol use Coping motives. At step two, both posttraumatic stress symptom severity and anxiety sensitivity were positively associated with alcohol use Coping motives. Finally, step three revealed that only vigorous-intensity aerobic exercise was significantly associated (negatively) with drinking alcohol to cope, above and beyond the variance accounted for by the covariates at steps one and two of the model, as well as both light- and moderate-intensity aerobic exercise at step three of the model.

Discussion

Individuals' engagement in vigorous-intensity activities, but not moderate- or light-intensity activities, was inversely related to alcohol use coping motives. Thus, trauma-exposed, alcohol using individuals who reported greater level of engagement in vigorous-intensity exercise were less likely to use alcohol for coping reasons. Conversely, trauma-exposed alcohol using individuals who reported lower levels of vigorous-intensity aerobic exercise were more likely to endorse coping-oriented alcohol use. Though prior work suggests moderate-intensity aerobic exercise may be useful in the reduction of problematic drinking behavior among a variety of populations (Brown, et al., 2010; Murphy et al., 1986; Stathopoulou et al., 2006; Read & Brown 2003), the present findings provide cross-sectional support for associations between higher exercise intensity (i.e., vigorous-intensity aerobic exercise) and lower levels of coping-oriented alcohol use for trauma-exposed individuals. Theoretically, vigorous-intensity aerobic exercise may serve as a type of (intensive) interoceptive exposure to perceived aversive trauma-related symptoms (e.g., hyperarousal; Smits, Powers, Berry, & Otto, 2007), thereby reducing the noxious symptoms that might otherwise perpetuate coping-oriented alcohol use among this population (e.g., Vujanovic, Marshall-Berenz, & Zvolensky, in press; Vujanovic, Zvolensky, & Bernstein, 2008).

Importantly, the relation between vigorous-intensity aerobic exercise and alcohol use coping motives was found to be significant above and beyond the effects of current alcohol

consumption, co-occurring alcohol use motives (i.e., Social, Enhancement, Conformity), posttraumatic stress symptom severity, and anxiety sensitivity; each of these variables have been established predictors of coping-oriented alcohol use (Stewart et al., 2004; Stewart & Zeitlin, 1995). Interestingly, the present investigation found no significant relation between posttraumatic stress symptom severity and exercise intensity (i.e., light-, moderate-, or vigorous intensity). This finding is noteworthy, as it is inconsistent with previous literature showing a negative relation between posttraumatic stress symptoms and exercise intensity (de Assis et al., 2008; Diaz & Motta, 2008; Newman & Motta, 2007). One possible explanation for the disparate findings is that the present, nonclinical sample, did not meet diagnostic criteria for any current Axis I psychopathology, including PTSD. It is possible that exercise level is only directly related to reductions in posttraumatic stress symptoms among clinical populations with PTSD. Indeed, vigorous-intensity aerobic exercise may serve as a competing behavior for problematic drinking, such that behavioral resources allocated to exercise functionally reduce resources available to engage in alcohol use (Brown et al., 2008; Madden, 2000; Murphy et al., 1986; Read & Brown 2003).

The current investigation has a number of limitations. First, the present investigation was based on a sample of mainly Caucasian young adults, and therefore, future work would benefit from replication and extension with more diverse populations. Second, the current study relied exclusively on self-report measures of all studied variables, which could have led to an over/under-estimation of time spent exercising, for example. The inclusion of multi-method assessments (e.g., ecological momentary assessment with physiological measures) would bolster future investigations. Third, the current investigation is cross-sectional in design, and therefore, directionality cannot be inferred from the findings. Future work would benefit from the prospective examination of the studied variables to determine whether increasing vigorous-intensity aerobic exercise indeed leads to decreases in coping-oriented or otherwise problematic drinking behaviors. Finally, the current study examined a community-recruited sample of trauma-exposed individuals and not a clinical sample with PTSD. Future work would therefore benefit from extending these findings to clinical populations with PTSD.

- Trauma-exposed, alcohol using individuals who reported greater level of engagement in vigorous-intensity exercise, were less likely to use alcohol for coping reasons.
- This incremental association was observed after accounting for current alcohol consumption, non-criterion alcohol use motives, anxiety sensitivity, posttraumatic stress symptom severity, as well as engagement in light- and moderate-intensity activities.
- No relation was found between either moderate- or light- intensity exercise and coping-oriented alcohol use

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Table 1

Descriptive Data and Zero-order Relations among Predictor and Criterion Variables

Variable Name	1	2	3	4	5	6	7	8	9	10	M(SD)
1. Vigorous-Intensity Exercise	-	.46**	.08	−.21*	.11	.08	−.03	.12	−.10	−.06	255.79 (322.74)
2. Moderate-Intensity Exercise	-	-	−.04	−.16	−.01	.05	−.04	−.01	−.13	−.01	313.03 (372.76)
3. Light-Intensity Exercise	-	-	-	−.04	−.09	−.06	−.05	−.04	−.04	.00	13.51 (50.14)
4. DMQ – Coping	-	-	-	-	.35**	.26**	.32**	.20*	.31**	.23*	9.80 (4.05)
5. DMQ - Social	-	-	-	-	-	.66**	.37**	.60**	.11	.02	16.96 (5.55)
6. DMQ - Enhancement	-	-	-	-	-	-	.19*	.67**	.01	−.24*	15.49 (5.19)
7. DMQ - Conformity	-	-	-	-	-	-	-	.14	.15	.07	6.99 (2.69)
8. Alcohol Consumption	-	-	-	-	-	-	-	-	−.07	−.15	7.27 (4.43)
9. Anxiety Sensitivity	-	-	-	-	-	-	-	-	-	.23*	15.89 (7.46)
10. Posttraumatic Stress Symptom Severity	-	-	-	-	-	-	-	-	-	-	5.54 (7.24)

Note.

* $p < .05$;

** $p < .01$

Table 2

Regression Analysis Testing the Predictive Role of Vigorous-Intensity Exercise in terms of Alcohol Use Coping Motives

Independent Variable(s)		β	t	ΔR^2
Step 1.	Alcohol Consumption	−0.01	−0.09	13.5%
	DMQ – Social	0.23	1.76	
	DMQ - Enhancement	0.07	0.53	
	DMQ - Conformity	0.22	2.36*	
Step 2.	Anxiety Sensitivity	0.22	2.50*	9.1%
	Posttraumatic Stress Symptom Severity	0.21	2.37*	
Step 3.	Light-Intensity Exercise	0.01	0.17	2.6%
	Moderate-Intensity Exercise	−0.04	−0.47	
	Vigorous-Intensity Exercise	−0.19	−2.01*	

* $p <= .05$,

** $p <= .01$;

β = Standard beta weight ; *t* = t statistic