Spring 2018

Temporal and Intensity Relationships between Physical Activity and Drunkorexia Behaviors among First-Year College Students

Robert E. Booker Jr
Missouri State University, Booker1@live.missouristate.edu

TEMPORAL AND INTENSITY RELATIONSHIPS BETWEEN PHYSICAL ACTIVITY AND DRUNKOREXIA BEHAVIORS AMONG FIRST-YEAR COLLEGE STUDENTS

A Masters Thesis

Presented to

The Graduate College of

Missouri State University

In Partial Fulfillment

Of the Requirements for the Degree

Master of Science, Health Promotion and Wellness Management

By

Robert Edward Booker, Jr.

May 2018

TEMPORAL AND INTENSITY RELATIONSHIPS BETWEEN PHYSICAL ACTIVITY AND DRUNKOREXIA BEHAVIORS AMONG FIRST-YEAR COLLEGE STUDENTS

Kinesiology

Missouri State University, May 2018

Master of Science

Robert Edward Booker, Jr.

ABSTRACT

The purpose of this research was to examine the temporal element of physical activity (PA) in relation to drunkorexia occurrences and how PA intensities predict severity of drunkorexia behaviors. No research, to our knowledge, has explored if students are proactively or reactively engaging in PA to reduce the effects of calories consumed from alcohol nor if there exists a dose relationship among PA intensities (sedentary, moderate, vigorous) and severity of drunkorexia behaviors. A convenience sample of first-year college students living in residence halls was selected to participate in the current study. Participants completed an online survey including The Drunkorexia Motives and Behaviors scales, The International Physical Activity Questionnaire – Short Form, and typical daily PA and alcohol participation. Inclusion criteria for statistical analysis included participants who had engaged in drunkorexia behaviors within the past four weeks prior to the commencement of the fall semester. Results indicate first-year college students who are pre-drinking exercisers to consume higher quantities of alcohol and engage in higher levels of moderate and vigorous PA. Additionally, vigorous PA significantly predicts severity of drunkorexia behaviors. This research helps to discern PA's role within first-year college students who engage in drunkorexia behaviors.

KEYWORDS: drunkorexia, physical activity, alcohol consumption, college students, weight management

This abstract is approved as to form and content

_____

Riley Galloway, PhD
Chairperson, Advisory Committee
Missouri State University

TEMPORAL AND INTENSITY RELATIONSHIPS BETWEEN PHYSICAL ACTIVITY AND DRUNKOREXIA BEHAVIORS AMONG FIRST-YEAR COLLEGE STUDENTS

By

Robert Edward Booker, Jr.

A Masters Thesis
Submitted to the Graduate College
Of Missouri State University
In Partial Fulfillment of the Requirements
For the Degree of Master of Science, Health Promotion and Wellness Management

May 2018

Approved:

_____
Riley Galloway, PhD

_____
Melinda Novik, PhD

_____
Jacob Gdovin, PhD

_____
Sarah McCallister, EdD

_____
Julie Masterson, PhD: Dean, Graduate College

ACKNOWLEDGEMENTS

I would like to express my gratitude to my committee members for their constant support and pushing me to refine my skills as a researcher during my graduate studies. I would also like to thank my family for always supporting me in all I do.

TABLE OF CONTENTS

LIST OF TABLES

EXAMINATION OF THE TEMPORAL RELATIONSHIP BETWEEN PHYSICAL ACTIVITY AND DRUNKOREXIA BEHAVIORS AMONG FIRST-YEAR COLLEGE STUDENTS

ABSTRACT

Introduction: Drunkorexia, alcohol misuse and inappropriate compensatory behaviors, is common among college students. The purpose of the current study is to examine the temporal element of physical activity (PA) in relation to drunkorexia occurrences. To date, no research has examined when students are engaging in PA to compensate for calories consumed from alcohol.

Methods: A convenience sample of first-year college students living in residence halls was selected to participate. Participants completed an online survey including The Drunkorexia Motives and Behaviors Scale, The International Physical Activity Questionnaire – Short Form, and typical daily PA and alcohol participation. Inclusion criteria for statistical analysis included participants who have engaged in drunkorexia behaviors within the past four weeks prior to the commencement of the fall semester. A one-way ANOVA was implemented to examine relationship between drunkorexia participation and PA of at least moderate intensity. All analyses was conducted using SPSS software (Version 24, SPSS, Inc., Chicago, IL) with an alpha level set at 0.05 for statistical significance.

Results: Fifty-three participants were classified as pre-drinking exercisers compared to 74 as post-drinking exercisers. Pre-drinking exercisers consumed more alcohol on Fridays and Saturdays than pre-drinking exercisers. Additionally, pre-drinking exercisers engaged in significantly higher amounts of both moderate and vigorous PA than post-drinking exercisers. Females accounted for all observed significances between temporal classifications.

Discussion: Pre-drinking exercisers, while fewer in numbers, consumed more alcohol and engaged in significantly higher levels of PA. Timing of PA in relation to alcohol consumption may be varying motivations. Guilt and body image motivate PA to ensue post-alcohol consumption while celebration and work hard play hard motive PA to occur pre-alcohol consumption.

INTRODUCTION

Alcohol consumption on college campuses throughout the nation has remained high in recent years with nearly 40% of college students binge drinking at least once in the past two weeks. Previous research states this contributes to the majority of alcohol consumed (Babiaz, Ward, & Brinkman, 2013; Burke, Cremeens, Vail-Smith, & Woolsey, 2010; Hunt & Forbush, 2016). The utmost influence of college student morbidity and mortality is alcohol consumption contributing to approximately 1,825 yearly deaths accompanied by other unwanted consequences such as alcohol poisoning, violence, unwanted sexual activity, blacking out, and weight gain (Babiarz, 2012; Babiaz et al., 2013; Eisenberg & Fitz, 2014; Hingson, Zha, & Weitzman, 2009; Hunt & Forbush, 2016; Leasure, Neighbors, Henderson, & Young, 2015; Lupi, Martinotti, & Di Giannantonio, 2017; Monette, 2012).

First-year college students are a high-risk population for binge drinking as 60-70% of first-year college students did not report consistent consumption of alcohol however 50% reported binge drinking when consuming alcohol (Borsari, Murphy, & Barnett, 2007; Burke et al., 2010). Binge drinking and other unhealthy behaviors, such as time spent sedentary, cluster among college students suggesting an inverse relationship between physical activity (PA) and alcohol consumption (Dinger, Brittain, & Hutchinson, 2014). Conversely, extant research indicates PA frequency is positively associated with alcohol consumption (Barry & Piazza-Gardner, 2012; Dinger et al., 2014; French, Popovici, & Maclean, 2009; Leasure et al., 2015). This relationship may be the result of sensation-seeking, socialization, coping, conformity, or calorie compensation (French et

al., 2009; Leasure et al., 2015). Barry and Piazza-Gardner (2012), using secondary data, obtained from the American College Health Association's 2008 National College Health Assessment, examined whether PA and disordered eating behaviors could predict the drinking behaviors among college students, where binge drinkers were classified as reporting at least one binge drinking occurrence in the past two weeks (Over the last two weeks, how many times have you had five or more drinks of alcohol at a sitting). PA was evaluated using three items measuring number of days in the past week respondents performed moderate-intensity activity, vigorous-intensity cardio or aerobic training, and strength training. Using hierarchical logistic regression Barry and Piazza-Gardner observed PA intensity to be positively related to binge drinking with resistance training the strongest predictor of binge drinking and vigorous physical activity (VPA) to be a stronger predictor than moderate physical activity (MPA). French et al. (2009) using 2005 Behavioral Risk Factor Surveillance System data conducted Ordinary Least Squares to estimate average minutes of PA per week based on drinking category (abstainers, light, moderate, heavy drinkers). The researchers found both women and men who consume alcohol heavily are active 10 minutes more per week than moderate consumers and 20 minutes more active than abstaining individuals (95.99 ± 113.3 minutes, 84.56 ± 87.29 minutes, and 70.29 ± 92.29 minutes; 128.4 ± 150.7 minutes, 110.8 ± 117.2 minutes, and 95.75 ± 114.1 minutes, respectfully).

Drunkorexia is a colloquial term used to describe the combination of alcohol misuse and inappropriate compensatory behaviors (PA, calorie restriction, and purging) to avoid weight gain from alcohol consumption, accelerate intoxication, and intensify the effects of alcohol (Babiaz et al., 2013; Buenger, 2013; French et al., 2009; Hunt &

Forbush, 2016; Leasure et al., 2015; Piazza-Gardner & Barry, 2013). Research from Eisenberg and Fitz (2014) observed 38.3% of all students reported to restrict calories prior to alcohol consumption an average of 2.43 days in the past 30 days with 29.2% participating in drunkorexia behaviors prior to all drinking occasions. Women were found to restrict more than men in an effort to control weight gain. Drunkorexia is 1.5-fold more prevalent among female college students, who have increased body-image anxiety arising from societal pressures, as it allows for alcohol consumption without weight gain (Babiarz, 2012; Buenger, 2013; Eisenberg & Fitz, 2014; Leasure et al., 2015; Monette, 2012). While recent research has examined the characteristics of drunkorexia among college students, to our knowledge, no research has examined the timing of PA used to compensate for calories consumed from alcohol consumption. The purpose of this research was to test if PA is used proactively or reactively among first-year college students engaging in drunkorexia behaviors.

METHODS

Participant Selection

Subsequent approval from the Institutional Review Board (August, 08, 2017; study #: IRB-FY2018-10), students were recruited for participation from a comprehensive email list of first-year college students living in residence halls at a public Midwestern university (n=2,896) obtained from Residence Life staff. First-year students were selected due to their lack of exposure to the culture of college campuses. An initial participation email consisting of a description of inclusion criteria, a description of the study, a link to the survey, and investigator's contact information was distributed one week prior to the start of the fall semester along with three reminder emails to participate in the study. Participants provided informed consent and completed the survey (Appendix) online via SurveyMonkey Inc. Height, weight, PA history, and experienced consequences of others' alcohol consumption data were collected. Students were asked if they had consumed alcohol within the past four weeks. Those who had consumed alcohol finished the remainder of the survey detailing experienced consequences of one's own drinking. 560 surveys were completed of which 136 participants met inclusion criteria (score ≥1 on the Drunkorexia Motives and Behaviors Scale). Nine outliers were removed from statistical analysis. The administered survey can be found in the appendix.

Alcohol

Students were provided the definition of a standard drink which was 12 oz. bottle or can of beer, five oz. glass of wine or a wine cooler, one-and-a-half oz. shot of hard

liquor such as rum, gin, vodka, or whiskey straight or in a mixed drink, or similar portion of alcohol (National Institute on Alcohol Abuse and Alcoholism, 2004). Questions referenced the past four weeks and included previous alcohol consumption (yes/no) and consequences of others' alcohol consumption. If participants had consumed alcohol within the past four weeks, questions regarding consequences of own alcohol consumption, substance use, binge drinking, daily use, and frequency of alcohol related behaviors. Binge drinking frequency (How many days did you have 5 or more drinks (male) or 4 or more drinks (female) in a two-hour period) was measured on 7-point Likert scale: None, 1 or 2 days, 3-5 days, 6-9 days, 10-19 days, 20-29 days, and all 30 days. Daily use (How many drinks did you consume on each day of the week) was measured using a 6-point Likert scale: None, one drink, 2 drinks, 3 drinks, 4 drinks, 5 or more drinks.

Drunkorexia

The Drunkorexia Motives and Behaviors scales consist of four sections: Drunkorexia Motives and Behaviors Scales, Drunkorexia Fails Scale, Drunkorexia During an Alcohol Consumption Event Scale, and Post-Drinking Compensation Scale. The 23-item Drunkorexia Motives and Behaviors Scale measures motives and behaviors (Because it helps you enjoy a party; By eating less all day, respectfully). The 10-item Drunkorexia Fails Scale measures avoidance and approach behaviors (Pretend I am drinking; Drink to fit in, respectfully). The 9-item Drunkorexia During an Alcohol Consumption Event Scale measures drunkorexia behaviors during drinking and calorie consciousness (Drink as much as my friends drink; Count calories, respectfully). The 10-

item Post-Drinking Compensation Scale measures behaviors after drinking (Make sure to exercise). Responses for each scale are on a 5-point Likert scale: Never, Almost Never, Sometimes, Almost Always, and Always. Standardized Cronbach's alpha was 0.96 for the current sample. All subscales are aggregated where higher total scores (0-260) indicate more severe drunkorexia behaviors (Ward & Galante, 2015). Ward and Galante (2015) reported Cronbach's alphas ranging 0.87-0.98 and good validity during the development and initial validation of the Drunkorexia Motives and Behaviors scales. Pompili and Laghi (2018) using only the 11-items concerning motives of the Drunkorexia Motives and Behaviors Scale subscale found good internal consistency for both conformity (0.81) and enhancement motives (0.87).

International Physical Activity Questionnaire - Short Form (IPAQ-S)

The International Physical Activity Questionnaire – Short Form (IPAQ-S) is a 7-item self-reported recall of PA of the previous week. Participants report the frequency (number of days) and duration (time per day) spent sitting, walking, performing MPA (carrying light loads), and VPA (digging, aerobics). The IPAQ-S has strong test-retest reliability (ρ=0.75) and moderate criterion validity (ρ=0.30) (Craig et al., 2003). Regarding the current population, sedentary and walking were combined into a new variable, inadequate PA, due to current research supporting the recommendation of at least moderate intensity to confer significant health benefits (Garber et al., 2011).

Temporal Classification

While the Drunkorexia Motives and Behaviors Scales inquires about PA tendencies before and after drinking occurrences not all participants answered these questions, so we categorized individuals using our own criteria. Pre-drinking exercise was defined as a day in which a participant exercised and also consumed alcohol. Days in which participants consumed alcohol but did not engage in PA were classified as post-drinking exercise. The higher frequency of pre- or post-drinking exercise days throughout a week per participant was used to classify each participant.

Data Analysis

A one-way ANOVA was implemented to examine differences between temporal classifications and levels of PA intensities. All analyses were conducted using SPSS software (Version 24, SPSS, Inc., Chicago, IL) with an alpha level set at 0.05 for statistical significance.

RESULTS

Table 1 reports characteristics for all participants and Table 2 reports participant characteristics separated by temporal classification. Tables 3 to 5 report overall (Table 3), pre-drinking exercisers (Table 4), and post-drinking exercisers (Table 5) participants reported typical amounts of alcohol. Tables 6 to 9 report minutes per day at each PA intensity for all participants (Table 6), all participants by temporal classification (Table 7), female participants by temporal classification (Table 8), and male participants by temporal classification (Table 9). A total of 560 surveys were completed of which 136 participants met inclusion criteria (score ≥1 on the Drunkorexia Motives and Behaviors Scale). Nine outliers were removed from the statistical analysis leaving a total of 127 participants (68.5% female, 97.6% Non-Hispanic or Latino, 94.5% White) considered for statistical analysis (Table 1). Fifty-three participants (41.7%) were classified as pre-drinking exercisers and 74 as post-drinking exercisers. Pre-drinking exercisers were predominately female (n=32, 60.4%), currently trying to maintain current weight (n=27, 50.9%), and had an average BMI of 23.81±5.38. Pre-drinking exercisers also averaged 2.04±1.12 days of binge drinking the past 30 days and average a drunkorexia score of 74.70±23.13 (range from 0 to 260). Post-drinking exercisers were primarily female (n=55, 74.3%), currently trying to lose weight (n=37, 50.0%), and averaged a BMI of 23.73±4.87. Post-drinking exercisers averaged 1.69±0.91 days of binge drinking in the past 30 days and an average drunkorexia score of 69.00±22.67. There were no statistical differences between pre- and post-drinking exercisers regarding BMI, binge drinking days in the past 30 days, or drunkorexia scores (p=0.932; p=0.056; p=0.168,

respectfully). Table 3 shows daily alcohol amounts consumed for all participants. A significant proportion of alcohol consumed among all participants per week was regulated to Friday and Saturday followed by Thursday (59.1%, 65.4%, and 18.9%, respectfully). Friday and Saturday were primary days for alcohol consumption of 5 or more drinks (14.2% and 15.0%, respectfully) while Thursday was third with 5.5% of drinkers consuming 5 or more drinks. Significant differences were observed between pre- and post-drinking exercisers regarding amount of alcohol consumed on Friday ($p<0.001$). Statistical significance differences were observed between pre- and post-drinking exercisers with 77.4% of pre-drinking exercisers consuming alcohol on Friday compared to 52.7% of post-drinking exercisers ($p<0.001$). Significant temporal classification differences were observed as a higher percentage of pre-drinking exercisers consumed alcohol on Saturdays than post-drinking exercisers (73.6% and 60.8%, respectfully) ($p=0.041$).

Participants engaged in VPA 2.84±1.86 days per week averaging 58.77±72.06 minutes per day. Significant differences were observed in regard to both days per week and minutes per day between pre-drinking (3.36±1.7 days, 79.52±76.64 minutes) and post-drinking exercisers (2.47±1.89 days, 43.91±65.12 minutes) ($p=0.008$ and $p=0.006$, respectfully). Participants spent 4.11±1.83 days per week averaging 99.08±103.92 minutes per day of MPA with significant differences between pre-drinkers (4.85±1.66 days, 129.92±116.96 minutes) and post-drinkers (3.58±1.77 days, 76.99±87.80 minutes) ($p<0.000$ and $p=0.004$, respectfully). Although no significant differences were found regarding inadequate PA ($p=0.758$) or sedentary time ($p=0.386$) between pre- and post-drinking exercisers it is worth mentioning. Participants averaged 487.80±292.43 minutes

of inadequate PA per day of which 345.55±258.35 minutes were spent completely sedentary. Pre-drinking exercisers spent 321.98±229.92 minutes per days sedentary while post-drinking exercisers averaged 362.43±277.23.

Statistical significant differences were observed between pre- and post-drinking exercisers among female participants in regard to VPA with pre-drinking exercisers averaging 60.94±53.07 minutes per day compared to 32.00±47.13 minutes per day on average for post-drinking exercisers ($p=0.01$). When examining MPA, statistical significant differences were observed with pre-drinking exercisers averaging 118.44±100.61 minutes per day and post-drinking exercisers averaging 67.67±83.1 minutes ($p=0.013$). There were no statistical significant differences observed among male pre- and post-drinking exercisers regarding any PA intensities.

DISCUSSION

The present study sought to further discern drunkorexia behaviors regarding use of PA to compensate for alcohol-related calories by quantifying amounts of PA in relation to timing of alcohol consumption. The higher prevalence of drinking among pre-drinking exercisers compared to post-drinking exercisers may be explained by participants perceiving heightened control over calories consumed thus allowing themselves to indulge more frequently in alcohol consumption. Alcohol consumption can be a medium to facilitate socialization among college students and feeling in control of calories may allow students to participate more frequently in these events or to consume more alcohol. Previous research has shown peer acceptance to be reliant on both alcohol consumption and body image (Boarsari et al., 2007; Piazza-Gardner & Barry, 2014). In the current sample peer acceptance could be reliant on alcohol consumption and body image equally, leading students to exercise before drinking to feel control over calories to be consumed. In the current sample pre-drinking exercisers consumed significantly more alcohol Fridays supporting the hypothesis that the participants felt more in control of their calories and allowed themselves to consume more alcohol. Piazza-Gardner and Barry (2014) observed through focus groups college students premeditating calorie restriction for future alcohol-related calories. Peralta (2002) found, through semi-structured interviews, students observing the school gym to be congested on Thursday and Friday early evenings ("party nights") and Sundays ("recovery days") with students compensating for calories. Buchholz and Crowther (2014) posit the planned behavior of burning calories before drinking to account for future calories to be may lead to females

consuming more alcohol. Dinger et al. (2014) found college students who meet MVPA recommendations to also partake in elevated levels of binge drinking in the past two weeks compared to students who did not meet MVPA recommendations.

Regarding temporal classification differences in PA levels, pre-drinking exercisers engaged in higher levels of both moderate and VPA than post-drinking exercisers even though more participants exercised post-alcohol consumption. These results suggest post-drinking exercisers attempt to compensate for alcohol-related calories in effort to regain feeling control over calories consumed. Previous research has found students modifying PA due to feelings of guilt about loss of control and indulging in excess calorie consumption (Piazza-Gardner & Barry, 2014). The present results support these observations but contributes to the literature as it quantifies amounts of PA at different intensities. The differences observed between temporal classifications may be due to post-drinking exercisers inhibited by the adverse short-term effects of alcohol. Lethargy, trouble concentrating, weakness, and lack of coordination are short-term symptoms experienced after alcohol consumption that create an uninviting, unsuitable environment for PA (Schrojenstein Lantman, Mackus, Loo, & Verster, 2017). While participants utilize PA in effort to ameliorate feelings of guilt, the cognitive and physiological short-term impairments from alcohol may stifle the compulsion to exercise thus reducing duration of PA.

Female participants accounted for all statistical differences between temporal classifications suggesting female students, more so than male, are plagued by guilt to compensate alcohol-related calories, possibly in effort to maintain body type dictated by societal standards. Participation in alcohol consuming events and body acceptance

comprise social acceptance among college students. The current results indicate that female students believe poor body acceptance is better than abstaining from alcohol consuming events. Several previous studies have found drunkorexia positive women to be more likely than men to employ PA as a means of compensate for excessive calories (Hunt & Forbush, 2017; Holland et al., 2014). Women engaging in drunkorexia behaviors have been found to be motivated by enhancement of effects from alcohol, weight control, body dissatisfaction, and societal pressures to engage in PA and alcohol consumption (Barry, 2012; Bryant, Darkes, & Rahal, 2012; Buchholz & Crowther, 2014; Eisenberg & Fitz, 2014; Peralta, 2002; Pompili & Laghi, 2018). Earlier research has indicated that women with eating disorders incur higher instances of intoxication and score higher on scales measuring alcohol-related problems while consuming alcohol less frequently than women not affected by eating disorders (Mustelin et al., 2016; Buchholz & Crowther, 2014). These results are similar to results from Burke et al. (2010) who observed college freshmen who engaged in drunkorexia behaviors in preemption of alcohol consumption to be more likely to binge drink. Buchholz and Crowther (2014) found when examining PA motivations between drunkorexia and non-drunkorexia positive female college students that drunkorexia positive students tend to exercise more frequently due to weight concerns and physical appearance.

This study relied on the ability of students to recall PA from the past seven days and alcohol behaviors from the past 30 days. Although representative of the university, the current sample was comprised predominately of White Non-Hispanic females, all of which were first-year college students, limiting the generalizability of the findings to other college students. It is also possible due to alcohol consumption's illegality among

our sample and the university seen as an authoritative figure first-year college student did not want to divulge having consumed alcohol, thus limiting our response rate. Future research should consider objectively measuring both PA, alcohol consumption, drunkorexia behaviors.

The current study also contains several strengths. To our knowledge, this is the first study to quantify PA in individuals who were positive for drunkorexia behaviors in relation to when they consumed alcohol and engaged in PA. Also, this study investigated the PA and drunkorexia behaviors of first-year college students pre-matriculation. First-year college students have been identified as increasing their alcohol consumption throughout their first year in college, thus the pre-matriculation prevalence of drunkorexia behaviors is of utmost importance. Finally, in measuring severity of drunkorexia behaviors we used the Drunkorexia Behaviors and Motives scales (Ward & Galante, 2015) a more comprehensive measure to assess drunkorexia compared to other research utilizing a single item (Eisenberg & Fitz, 2014; Giles et al., 2009).

This study highlights when first-year college students might be utilizing PA in conjuncture with drunkorexia behaviors. Current practitioners should consider these findings when developing programs to address alcohol use and protective behavioral strategies for students prior to matriculation through graduation. Due to alcohol's propensity to be present on and around college campuses, educating students how to be safe before, during, and after drinking, as opposed to abstaining, is recommended.

REFERENCES

Babiarz, S. (2012). Work Your Cock-tail Off: Calorie Restriction and Exercise Output in College Students Participating in Extreme Drinking. *2012 NCUR*.

Babiaz, S., Ward, R. M., & Brinkman, C. (2013). Examination of drunkorexia, excessive exercising, and extreme drinking. *Journal of Young Investigators, 25*(4), 52-56.

Barry, A. E., & Piazza-Gardner, A. K. (2012). Drunkorexia: understanding the co-occurrence of alcohol consumption and eating/exercise weight management behaviors. *Journal of American College Health*, *60*(3), 236-243.

Borsari, B., Murphy, J. G., & Barnett, N. P. (2007). Predictors of alcohol use during the first year of college: Implications for prevention. *Addictive Behaviors*, *32*(10), 2062-2086.

Buenger, D. E. (2013). Drinking your way to success? Discovering the correlation between academic major and Drunkorexic tendencies. *2013 NCUR*.

Burke, S. C., Cremeens, J., Vail-Smith, K., & Woolsey, C. (2010). Drunkorexia: calorie restriction prior to alcohol consumption among college freshman. *Journal of Alcohol and Drug Education*, *54*(2), 17.

Buchholz, L. J., & Crowther, J. H. (2014). Women who use exercise as a compensatory behavior: How do they differ from those who do not?. *Psychology of Sport and Exercise*, *15*(6), 668-674.

Craig, C. L., Marshall, A. L., Sjorstrom, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., ... & Oja, P. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine and Science in Sports and Exercise*, *35*(8), 1381-1395.

Dinger, M. K., Brittain, D. R., & Hutchinson, S. R. (2014). Associations between physical activity and health-related factors in a national sample of college students. *Journal of American College Health, 62*(1), 67-74.

Eisenberg, M. H., & Fitz, C. C. (2014). "Drunkorexia": Exploring the who and why of a disturbing trend in college students' eating and drinking behaviors. *Journal of American College Health, 62(*8), 570-577.

French, M. T., Popovici, I., & Maclean, J. C. (2009). Do alcohol consumers exercise more? Findings from a national survey. *American Journal of Health Promotion, 24*(1), 2-10.

Hingson, R. W., Zha, W., & Weitzman, E. R. (2009). Magnitude of and trends in alcohol-related mortality and morbidity among US college students ages 18-24, 1998-2005. *Journal of Studies on Alcohol and Drugs, Supplement*, (16), 12-20.

Hunt, T. K., & Forbush, K. T. (2016). Is "drunkorexia" an eating disorder, substance use disorder, or both?. *Eating Behaviors, 22*, 40-45.

Schrojenstein Lantman, M., Mackus, M., Loo, A. J., & Verster, J. C. (2017). The impact of alcohol hangover symptoms on cognitive and physical functioning, and mood. *Human Psychopharmacology: Clinical and Experimental*, *32*(5).

Leasure, J. L., Neighbors, C., Henderson, C. E., & Young, C. M. (2015). Exercise and alcohol consumption: what we know, what we need to know, and why it is important. *Frontiers in Psychiatry*, 6, 156.

Lupi, M., Martinotti, G., & Di Giannantonio, M. (2017). Drunkorexia: an emerging trend in young adults. Eating and Weight Disorders-Studies on Anorexia, *Bulimia and Obesity, 22*(4), 619-622.

Monette, M. (2012). Obtaining sustenance through spirits.

Mustelin, L., Latvala, A., Raevuori, A., Rose, R. J., Kaprio, J., & Keski-Rahkonen, A. (2016). Risky drinking behaviors among women with eating disorders—A longitudinal community-based study. *International Journal of Eating Disorders, 49*(6), 563-571.

National Institute on Alcohol Abuse and Alcoholism (2004). National Institute of Alcohol Abuse and Alcoholism Council approves definition of binge drinking. *NIAAA Newsletter*, *Winter 2004*(3). Retrieved from https://pubs.niaaa.nih.gov/publications/Newsletter/winter2004/Newsletter_Number3.htm#council

Peralta, R. L. (2002). Alcohol use and the fear of weight gain in college: Reconciling two social norms. *Gender Issues*, *20*(4), 23-42.

Piazza-Gardner, A. K., & Barry, A. E. (2013). Appropriate terminology for the alcohol, eating, and physical activity relationship. *Journal of American College Health, 61*(5), 311-313.

Piazza-Gardner, A. K., & Barry, A. E. (2014). A qualitative investigation of the relationship between consumption, physical activity, eating disorders, and weight consciousness. *American Journal of Health Education*, *45*(3), 174-182.

Pompili, S., & Laghi, F. (2018). Drunkorexia among adolescents: The role of motivations and emotion regulation. *Eating Behaviors, 29,* 1-7.

Ward, R. M., & Galante, M. (2015). Development and initial validation of the Drunkorexia Motives and Behaviors scales. *Eating Behaviors*, *18*, 66-70.

RELATIONSHIP BETWEEN PHYSICAL ACTIVITY INTENSITIES AND DRUNKOREXIA SEVERITY AMONG FIRST-YEAR COLLEGE STUDENTS

ABSTRACT

Introduction: Drunkorexia, alcohol misuse combined with inappropriate compensatory behaviors, is ordinary among college students. The purpose of this research was to examine how physical activity (PA) intensities predict severity of drunkorexia behaviors. No research, to our knowledge, has examined if there exists a dose relationship among PA intensities (sedentary, moderate, and vigorous) and severity of drunkorexia behaviors (low, moderate, severe).

Methods: A convenience sample of first-year college students living in residence halls was chosen to participate. Participants completed an online survey including the International Physical Activity Questionnaire – Short Form, the Drunkorexia Motives and Behaviors scales, and typical daily alcohol participation and PA habits. Inclusion criteria for statistical analysis included participants who have participated in drunkorexia behaviors in the past four weeks before the start of the fall semester. Hierarchical linear regression analysis was implemented to determine how PA intensities predict severity of drunkorexia behaviors. Categories of drunkorexia severity (low, moderate, high) were established from summed score of the Drunkorexia Motives and Behaviors scales of the current sample. All analyses will be conducted using SPSS software (Version 24, SPSS, Inc., Chicago, IL) with an alpha level set at 0.05 for statistical significance.

Results: Vigorous physical activity (VPA) was the only PA intensity to be a significant predictor of severity of drunkorexia behaviors.

Discussion: As VPA increases the observed curve changed directions twice suggesting lower amounts of VPA to be used to regain control of caloric overindulgences, moderate amounts of VPA to be used as part of a healthy lifestyle, and high amounts of VPA to be part of secondary exercise addiction.

INTRODUCTION

Routinely engaging in physical activity (PA) at of least moderate-to-vigorous intensities (Matthews, et al., 2016), has consistently been associated with decreased risk of morbidity (Arem et al., 2015) and all-cause mortality (Loprinzi, 2015). The American College of Sports Medicine (ACSM) (2013) recommends 150 to 300 minutes per week (30 minutes per day) of moderate intensity physical activity (MPA), 75 to 150 minutes per week of vigorous intensity physical activity (VPA) (20 minutes per day), or a comparable combination of moderate and vigorous intensity physical activity. Research has identified positive relationships between alcohol consumption and PA (Barry & Piazza-Gardner, 2012; Dinger, Brittain, & Hutchinson 2014; French, Popovici, & Maclean, 2009; Leasure, Neighbors, Henderson, & Young, 2015) or the he more an individual engages in PA the more alcohol they consume. Using data from Fall 2008 and Spring 2009 of the National College Assessment II, Dinger et al. (2014) found that students who binge drink were 13.3% more likely to meet ACSM recommended levels of PA than those who do not binge drink. Many college students believe their alcohol consumption behaviors will lead to unwanted weight gain and utilize PA in effort to diminish the weight gaining negative consequence of alcohol (Ward & Galante, 2015).

Likewise, positive relationships between PA and disordered eating have also been observed (Barry & Piazza-Gardner, 2012; Cook et al., 2016; Eisenberg & Fitz, 2014; Giles, Champion, Sutfin, McCoy, & Wagoner, 2009; Holland, Brown, & Keel, 2014; Hunt & Forbush, 2016; Lupi, Martinotti, & Di Giannantonio, 2017; Mustelin et al., 2016). Cook et al. (2014) found, when assessing the impact of eating disorder severity

and exercise on health-related quality of life, that eating disorders and exercise dependence both impact health related quality of life. Furthermore, eating disorders and exercise dependence interact to further negatively impact health related quality of life.

Drunkorexia is an informal term to describe the combination of alcohol misuse and inappropriate compensatory behaviors (PA, calorie restriction, and purging) to avoid weight gain from alcohol consumption, accelerate intoxication, and intensify the effects of alcohol (Babiaz, Ward, & Brinkman, 2013; Buenger, 2013; French et al., 2009; Hunt & Forbush, 2016; Leasure et al., 2015; Piazza-Gardner & Barry, 2013). Utilizing an online survey among college undergraduate students, Eisenberg et al. (2014) examined 38.3% of students reported restricting food before alcohol consumption at least once in the past 30 days averaging 2.43 days. Examining the relationship between excessive obligatory exercise and drunkorexia behaviors, Babiaz et al. (2013) found these two behaviors to be correlated, albeit weakly ($r(130)=0.37$, $p<0.001$). Since this study's publication, a more comprehensive measure for drunkorexia, encompassing the current drunkorexia scale, has been developed (Ward & Galante, 2015). The Drunkorexia Motives and Behaviors scales (Ward & Galante, 2015) was created to measure motivations of college students to engage in drunkorexia behaviors; conceptually based on Lynn Cooper's alcohol consumption motivational model, but also includes drunkorexia measures mimicking Burke, Cremeenslic, Vail-Smith, and Woolsey's (2010) five items (two and three pertaining to alcohol use and food restriction prior to drinking, respectfully) initially used to evaluate drunkorexia. Few studies to date, of our knowledge, have examined PA's contribution to drunkorexia behaviors (Babiaz et al., 2013).

The current study also aims to define categories of drunkorexia severity (low, moderate, high) based from Ward and Galante's (2015) Drunkorexia Motives and Behavior Scale and using these newly defined categories examine the correlation among PA intensities and severity of drunkorexia behaviors.

METHODS

Participant Selection

Following approval from the Institutional Review Board (August, 08, 2017; study #: IRB-FY2018-10), a complete email list of first-year college students living in residence halls was obtained from Residence Life staff at a public Midwestern university. First-year college students were selected as participants due to their lack of exposure to the environment of college campuses. Emails seeking participation included the study description, why the participants were included, a link to the survey, and contact information of the primary investigator. The first email was delivered to participants one week prior to the start of the fall semester and was followed by three reminder emails over the next six days reminding students to participate in the present study. Participants provided informed consent and undertook the survey online via SurveyMonkey Inc. Anthropometric data, typical PA habits, and encountered effects of others' alcohol consumption data were collected. Students were asked if they had consumed alcohol within the past four weeks as a delimiting question for the remainder of the survey detailing encountered effects of one's own alcohol consumption behaviors. A copy of the survey can be located in the appendix.

Drunkorexia

The Drunkorexia Motives and Behaviors Scale is comprised of four sections: Drunkorexia Motives and Behaviors Scale, Post-Drinking Compensation Scale, Drunkorexia Fails Scale, and Drunkorexia During an Alcohol Consumption Event Scale.

The 23-item Drunkorexia Motives and Behaviors Scale measures motives and behaviors (Because my friends pressure me to restrict my eating; To keep my caloric level under a certain level, respectfully). The 10-item Post-Drinking Compensation Scale measures behaviors after drinking (Will workout for an extended period of time to work off the extra calories). The 10-item Drunkorexia Fails Scale measures approach and avoidance behaviors (Drink more because I want to get as drunk as possible; Not drink as much because I don't want the extra calories, respectfully). The 9-item Drunkorexia During an Alcohol Consumption Event Scale measures drunkorexia behaviors during drinking and calorie consciousness (Only drink hard liquor; Will make myself throw up so I can continue drinking, respectfully). Responses for each scale are on a 5-point Likert scale: Never, Almost Never, Sometimes, Almost Always, and Always. Cronbach's alphas for The Drunkorexia Motives and Behaviors Scale range from 0.87 to 0.98 throughout all scales (Ward & Galante, 2015). Total drunkorexia score ranging from 1 to 260 will be used to define categories (1-52, low; 53-104, moderate; and 105-260, high).

International Physical Activity Questionnaire - Short Form (IPAQ-S)

The International Physical Activity Questionnaire – Short Form (IPAQ-S) consists of self-reported 7-items recalling PA of the prior week. Participants report the duration (time per day) and frequency (number of days) spent engaged in sitting, walking, MPA (bicycling), and VPA (aerobics). The IPAQ-S has moderate criterion validity (ρ=0.30) and strong test-retest reliability (ρ=0.75) according to Craig et al. (2003) who tested for validity and reliability among 12 countries. For the purpose of this

study, total PA per category (sedentary, inadequate, moderate, and vigorous) per week will be used for analysis.

Data Analysis

A series of hierarchical linear regression was implemented to examine how PA intensities (vigorous, moderate, inadequate, and sedentary) predict severity of drunkorexia behaviors (0 to 260). For VPA the first block included VPA minutes per day and the next higher quadratic term (VPA minutes per day^2) was added for ensuing blocks up to the cubic term (i.e. VPA minutes per day, VPA minutes per day^2, and VPA minutes per day^3). Each model individually analyzed PA intensity and subsequent regressions were structured identically as VPA. Due to small sample size (n=127) control variables were not entered into the first block of each model. Data were analyzed using SPSS software (Version 24, SPSS, Inc., Chicago, IL) with an alpha level set at 0.05 for statistical significance.

RESULTS

For this study, 127 participants were included in statistical analysis were predominately Non-Hispanic or Latino, White females (97.6%, 94.5%, and 68.5%, respectfully) with an average age of 18.23±1.19 years. Average drunkorexia score was 71.38±22.94 ranging from 9-168; regarding drunkorexia classifications, 2 participants were classified as 'low', 108 as 'moderate', and 17 as 'high' (Table 1).

Tables 10 through 13 show the results of the regression analysis for VPA (Table 10), MPA (Table 11), sedentary (Table 12), and inadequate PA (Table 13) intensities. Regarding VPA, the first block (VPA minutes per day) approached but did not reach statistical significance in explaining 2.2% of the variance in severity of drunkorexia behaviors and motives ($p=0.093$). The addition of the quadratic term in the second block resulted in significantly explaining an additional 3.6% of the variance ($p=0.024$). Lastly, the addition of the cubic term in the third block accounted for a further significant 3.1% of the variance accounted for ($p=0.009$). No other PA intensities were statistically significant in explaining variance in drunkorexia behaviors and motives.

DISCUSSION

Recent research has investigated the drunkorexia phenomena among college students (Babiaz, Ward, & Brinkman, 2013, Barry & Piazza-Gardner, 2012; Bryant, Darkes, & Rahal, 2012; Buenger, 2013; Dierks, 2013; Eisenberg & Fitz, 2014; Giles et al., 2009; Hunt & Forbush, 2016; Lupi et al., 2017; Pompili & Laghi, 2018; Wilkerson, Hackman, Rush, Usdan, & Smith, 2017). The purpose of the current study was to identify if PA intensity could predict drunkorexia severity. The majority of participants (85%) scored within 'moderate' classification of drunkorexia behavior severity (score ranging from 53 to 104 of a possible 260). The high percentage of participants scoring moderate drunkorexia severity suggests the desire to participate in alcohol consuming events whether for social acceptance, enhancement of experience, or to become more intoxicated. We hypothesize the motivation behind these behaviors varies among individuals. Leasure and colleagues (2015) propose four motives for drinking and exercising: guilt, body image, work hard play hard, and celebration; work hard play hard and celebration place PA before alcohol consumption whereas guilt and body image place PA and alcohol consumption in inverse order. Previous research among first-year college students has indicated alcohol as an important facilitator of socialization and high peer acceptance to binge drinking (Borsari, Murphy, & Barnett, 2007).

Due to the nature of the curve, we hypothesize that individuals who utilize lower levels of VPA do so as part of sporadic drunkorexia behaviors; specifically, either preparing for an exceptionally heavy drinking occurrence or compensation for consuming more alcohol-related calories than anticipated. The relationship between lower duration

VPA and drunkorexia severity may be explained by compulsion to regain control over calories originating from guilt. If an individual uses VPA to attain caloric balance due to planning to drink slightly more than normal or had marginally more alcohol-related calories than anticipated, they may use what they feel is slightly more VPA than normal. Whereas individuals who indulged more profoundly may reciprocate accordingly with VPA duration. Previous research has indicated as alcohol consumption increases so does PA (Leasure et al., 2015) which corroborates the findings of the present study in individuals who are positive for drunkorexia behaviors.

The decrease in drunkorexia severity observed as VPA duration increases may be explained by individuals who normally exercise as part of a healthy lifestyle (Garber et al., 2011) consuming alcohol during socialization (i.e. interacting with peers) and increasing their standard duration of PA. Research has observed individuals who consume alcohol to also engage in higher amounts of PA (French et al., 2009; Leasure et al., 2015). These individuals may primarily exercise for health benefits, explaining the increased total minutes per day of VPA, as opposed to guilt or body image concerns and celebrate a physical accomplishment with alcohol. Although still engaging in drunkorexia behaviors, individuals who engage in increasing PA but have a reduction in drunkorexia severity could be explained by celebratory or work hard play hard motivations instead of guilt or body image, where alcohol is the medium used to reward PA or another special occasion (Leasure et al., 2015).

Individuals engaging the highest amounts of VPA see an increase in drunkorexia severity. The presence of drunkorexia behaviors in conjunction with extreme amounts of VPA minutes per day suggests these individuals are symptomatic of secondary exercise

addiction. Secondary exercise addiction is defined as excessive exercise in presence of eating disorder (Hausenblas & Mann, 2018). These individuals may be compelled by body image and guilt motivations to compensate for calories, similar to those at the lowest levels of VPA, but to a degree it consumes all leisure time. This observation coincides with prior research which has found associations between excessive levels of PA and increased levels of body dissatisfaction, guilt, or eating disorders (Babiaz, et al., 2013; Leasure et al., 2015; Mond, Myers, Crosby, Hay, & Mitchell, 2008). Comparable to the present study, Babiaz and colleagues (2013) found excessive exercise and drunkorexia to be significantly correlated among a sample of college students. Lichtenstein, Christiansen, Elklit, Bilenberg, and Støving (2014) observed individual addicted to exercise to score higher on The Eating Disorder Inventory compared to non-addicted individuals.

The current study is not without limitations. First, while representative of the university population, the current sample was contained primarily of Non-Hispanic White females. Also, all participants were first-year college students which limits the generalizability of the observations to other populations. Secondly, the study's reliance on the self-report of students' alcohol and drunkorexia behaviors from the past 30 days and PA from the past seven days. Future research should attempt to objectively measure these behaviors. Lastly, it is also possible students excluded themselves from the study due to not wanting to divulge having consumed alcohol to the university, thus limiting our response rate.

This study also contains several strengths. To our knowledge, this is the first study to investigate the correlation between PA and severity of drunkorexia behaviors,

specifically composite score on the Drunkorexia Behaviors and Motives scales (Ward & Galante, 2015). Additionally, the current study examined the drunkorexia and PA behaviors of first-year college students prior to arriving on campus. Research has acknowledged first-year college students to increase their consumption of alcohol during their first year in college, therefore research investigating pre-matriculation behaviors is vital. Finally, the Drunkorexia Behaviors and Motives scales (Ward & Galante, 2015), being a more complete measure to evaluate drunkorexia severity comparatively to prior drunkorexia research that used a single item (Eisenberg & Fitz, 2014; Giles et al., 2009), was utilized in determining severity of drunkorexia behaviors.

Due to drunkorexia research's novelty, a dearth of research investigating the relationship between PA and the severity of drunkorexia behaviors exists. The current findings offer significant observations on PA's involvement within the paradigm of drunkorexia, our findings imply VPA significantly predicts drunkorexia severity. These results suggest motivation for engaging in VPA to compensate for excess caloric may differ as VPA increases.

REFERENCES

American College of Sports Medicine (Ed.). (2013). *ACSM's guidelines for exercise testing and prescription.* Lippincott Williams & Wilkins.

Arem, H., Moore, S. C., Patel, A., Hartge, P., De Gonzalez, A. B., Visvanathan, K., ... & Linet, M. S. (2015). Leisure time physical activity and mortality: a detailed pooled analysis of the dose-response relationship. *JAMA Internal Medicine*, *175*(6), 959-967.

Babiaz, S., Ward, R. M., & Brinkman, C. (2013). Examination of drunkorexia, excessive exercising, and extreme drinking. *Journal of Young Investigators, 25*(4), 52-56.

Barry, A. E., & Piazza-Gardner, A. K. (2012). Drunkorexia: understanding the co-occurrence of alcohol consumption and eating/exercise weight management behaviors. *Journal of American College Health*, *60*(3), 236-243.

Borsari, B., Murphy, J. G., & Barnett, N. P. (2007). Predictors of alcohol use during the first year of college: Implications for prevention. *Addictive Behaviors*, *32*(10), 2062-2086.

Bryant, J. B., Darkes, J., & Rahal, C. (2012). College students' compensatory eating and behaviors in response to alcohol consumption. *Journal of American College Health*, *60*(5), 350-356.

Buenger, D. E. (2013). Drinking your way to success? Discovering the correlation between academic major and Drunkorexic tendencies. *2013 NCUR*.

Burke, S. C., Cremeens, J., Vail-Smith, K., & Woolsey, C. (2010). Drunkorexia: calorie restriction prior to alcohol consumption among college freshman. *Journal of Alcohol and Drug Education*, *54*(2), 17.

Cook, B. J., Wonderlich, S. A., Mitchell, J. E., Thompson, R., Sherman, R., & Mccallum, K. (2016). Exercise in eating disorders treatment: systematic review and proposal of guidelines. *Medicine & Science in Sports & Exercise, 48*(7), 1408-1414.

Cook, B., Engel, S., Crosby, R., Hausenblas, H., Wonderlich, S., & Mitchell, J. (2014). Pathological motivations for exercise and eating disorder specific health-related quality of life. *International Journal of Eating Disorders*, *47*(3), 268-272.

Craig, C. L., Marshall, A. L., Sjorstrom, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., ... & Oja, P. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine and Science in Sports and Exercise*, *35*(8), 1381-1395.

Dierks, A. (2013). A risky cocktail: An examination of Drunkorexia behaviors and alcohol consumption based on gender. *2013 NCUR*.

Dinger, M. K., Brittain, D. R., & Hutchinson, S. R. (2014). Associations between physical activity and health-related factors in a national sample of college students. *Journal of American College Health, 62*(1), 67-74.

Eisenberg, M. H., & Fitz, C. C. (2014). "Drunkorexia": Exploring the who and why of a disturbing trend in college students' eating and drinking behaviors. *Journal of American College Health, 62(*8), 570-577.

French, M. T., Popovici, I., & Maclean, J. C. (2009). Do alcohol consumers exercise more? Findings from a national survey. *American Journal of Health Promotion, 24*(1), 2-10.

Garber, C. E., Blissmer, B., Deschenes, M. R., Franklin, B. A., Lamonte, M. J., Lee, I. M., ... & Swain, D. P. (2011). Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: guidance for prescribing exercise. *Medicine & Science in Sports & Exercise*, *43*(7), 1334-1359.

Giles, S. M., Champion, H., Sutfin, E. L., McCoy, T. P., & Wagoner, K. (2009). Calorie restriction on drinking days: An examination of drinking consequences among college students. *Journal of American College Health,* 57(6), 603-610.

Hausenblas, H. A., & Mann, D. T. Y. (2018). Exercise Addiction. *Journal of Addictive Behaviors and Therapy*, *2*(1), 1-2.

Holland, L. A., Brown, T. A., & Keel, P. K. (2014). Defining features of unhealthy exercise associated with disordered eating and eating disorder diagnoses. *Psychology of Sport and Exercise*, *15*(1), 116-123.

Hunt, T. K., & Forbush, K. T. (2016). Is "drunkorexia" an eating disorder, substance use disorder, or both?. *Eating Behaviors, 22*, 40-45.

Leasure, J. L., Neighbors, C., Henderson, C. E., & Young, C. M. (2015). Exercise and alcohol consumption: what we know, what we need to know, and why it is important. *Frontiers in Psychiatry*, 6, 156.

Lichtenstein, M. B., Christiansen, E., Elklit, A., Bilenberg, N., & Støving, R. K. (2014). Exercise addiction: a study of eating disorder symptoms, quality of life, personality traits and attachment styles. *Psychiatry Research*, *215*(2), 410-416.

Loprinzi, P. D. (2017). Light-intensity physical activity and all-cause mortality. *American Journal of Health Promotion*, *31*(4), 340-342.

Lupi, M., Martinotti, G., & Di Giannantonio, M. (2017). Drunkorexia: an emerging trend in young adults. Eating and Weight Disorders-Studies on Anorexia, *Bulimia and Obesity, 22*(4), 619-622.

Matthews, C. E., Keadle, S. K., Troiano, R. P., Kahle, L., Koster, A., Brychta, R., ... & Berrigan, D. (2016). Accelerometer-measured dose-response for physical activity, sedentary time, and mortality in US adults–3. *The American Journal of Clinical Nutrition*, *104*(5), 1424-1432.

Mond, J., Myers, T. C., Crosby, R., Hay, P., & Mitchell, J. (2008). 'Excessive exercise' and eating-disordered behaviour in young adult women: further evidence from a primary care sample. *European Eating Disorders Review*, *16*(3), 215-221.

Mustelin, L., Latvala, A., Raevuori, A., Rose, R. J., Kaprio, J., & Keski-Rahkonen, A. (2016). Risky drinking behaviors among women with eating disorders—A longitudinal community-based study. *International Journal of Eating Disorders, 49*(6), 563-571.

Piazza-Gardner, A. K., & Barry, A. E. (2013). Appropriate terminology for the alcohol, eating, and physical activity relationship. *Journal of American College Health, 61*(5), 311-313.

Pompili, S., & Laghi, F. (2018). Drunkorexia among adolescents: The role of motivations and emotion regulation. *Eating Behaviors, 29,* 1-7.

Ward, R. M., & Galante, M. (2015). Development and initial validation of the Drunkorexia Motives and Behaviors scales. *Eating Behaviors*, *18*, 66-70.

Wilkerson, A. H., Hackman, C. L., Rush, S. E., Usdan, S. L., & Smith, C. S. (2017). "Drunkorexia": Understanding eating and physical activity behaviors of weight conscious drinkers in a sample of college students. *Journal of American College Health*, *65*(7), 492-501.

Table 1. Participant characteristics

Age	18.23±1.19 (n=127)
Sex	68.5% Female (n=87)
Ethnicity	97.6% Non-Hispanic or Latino (n=124)
Race	94.5% White (n=120)
Body Mass Index	23.76±5.07
Binge Drinking Days	1.83±1.01
Drunkorexia Score	71.38±22.94
Drunkorexia Classification Frequencies	2 Low, 108 Moderate, 17 High

Table 2. Participant characteristics - temporal classification

	Pre	Post
Sex	32 Female, 21 Male	55 Female, 19 Male
Weight Status	23 Lose, 27 Maintain, 3 Gain	37 Lose, 30 Maintain, 7 Gain
Body Mass Index	23.81±5.38	23.73±4.87
Binge Drinking Days	2.04±1.12	1.69±0.91
Drunkorexia Score	74.70±23.13	69.00±22.67
Physical Activity Total	365.77±277.96	253.05±241.09

Table 3. Typical amount of alcohol consumed each day - all participants

	None	1 drink	2 drinks	3 drinks	4 drinks	5 or more drinks
Sunday	107	5	3	3	2	1
Monday	105	3	2	5	0	3
Tuesday	107	4	3	2	1	0
Wednesday	102	5	2	2	2	4
Thursday	94	6	7	3	2	7
Friday	47	19	17	14	7	18
Saturday	43	23	16	14	11	19

Table 4. Typical amount of alcohol consumed each day - pre-drinking exercisers

	None	1 drink	2 drinks	3 drinks	4 drinks	5 or more drinks
Sunday	48	1	1	1	2	0
Monday	45	1	2	4	0	1
Tuesday	48	2	2	1	0	0
Wednesday	42	4	0	1	2	4
Thursday	37	3	4	2	2	5
Friday	12	9	8	5	3	16
Saturday	14	9	9	5	3	13

Table 5. Typical amount of alcohol consumed each day - post-drinking exercisers

	None	1 drink	2 drinks	3 drinks	4 drinks	5 or more drinks
Sunday	59	4	2	2	0	1
Monday	60	2	0	1	0	2
Tuesday	59	2	1	1	1	0
Wednesday	60	1	2	1	0	0
Thursday	57	3	2	1	0	2
Friday	35	10	9	9	4	2
Saturday	29	14	7	9	8	6

Table 6. Physical activity intensity minutes per day

	Sedentary	Walk	Inadequate	Moderate	Vigorous
Sunday	127.32±228.49	118.19±164.11	245.51±270.46	37.44±79.35	8.82±45.89
Monday	56.69±199.61	127.60±165.14	184.29±261.08	56.58±87.83	36.22±66.68
Tuesday	49.61±172.89	128.90±164.79	178.50±237.88	48.43±81.61	29.61±60.48
Wednesday	56.69±199.61	127.48±165.10	183.70±259.44	55.64±87.19	37.32±69.37
Thursday	49.61±172.89	128.45±165.14	176.54±238.82	56.11±90.87	28.54±58.50
Friday	56.22±198.96	127.80±165.35	194.88±263.56	65.91±97.17	27.44±63.89
Saturday	99.92±227.46	123.94±166.19	223.86±276.99	54.45±103.68	18.98±54.47

Table 7. Minutes of each physical activity intensity by temporal classification

Physical Activity Intensity	Pre (n=53)	Post (n=74)	Combined (n=127)	Significance
Vigorous	79.53±76.64*	43.91±65.12	58.77±72.06	p=0.006
Moderate	129.92±116.96*	76.99±87.80	99.08±103.92	p=0.004
Inadequate	478.30±237.87	494.59±327.39	487.80±292.43	p=0.758
Sedentary	321.98±229.92	362.43±277.23	345.55±258.35	p=0.386

Table 8. Female minutes of physical activity intensity level by temporal classification

Physical Activity Intensity	Pre (n=32)	Post (n=55)	Combined (n=87)	Significance
Vigorous	60.94±53.07*	32.±47.13	42.64±51.06	p=0.01
Moderate	118.44±100.61*	67.67±83.1	86.34±92.69	p=0.013
MVPA	179.38±139.91*	99.67±110.64	128.99±127.42	p=0.004
Walking	159.38±133.98	150.73±188.53	153.91±169.73	p=0.82
All Physical Activity	338.75±247.71	250.4±259.94	282.9±257.64	p=0.124
Sedentary	335.94±194.24	375.27±296.43	360.8±262.94	p=0.504
Inadequate	495.31±188.34	526.±354.04	514.71±302.84	p=0.651

MVPA = Moderate-to-vigorous physical activity

Table 9. Male minutes of physical activity intensity level by temporal classification

Physical Activity Intensity	Pre (n=21)	Post (n=19)	Combined (n=40)	Significance
Vigorous	107.86±97.51	78.37±94.08	93.85±95.83	p=0.338
Moderate	147.43±139.09	103.95±97.53	126.78±121.63	p=0.264
MVPA	255.29±186.5	182.32±154.74	220.63±173.93	p=0.189
Walking	151.67±164.66	78.42±77.82	116.88±134.43	p=0.085
All Physical Activity	406.95±320.67	260.74±181.49	337.5±270.93	p=0.088
Sedentary	300.71±279.6	325.26±214.77	312.38±248.06	p=0.759
Inadequate	452.38±301.6	403.68±216.64	429.25±262.52	p=0.565

MVPA = Moderate-to-vigorous physical activity

Table 10. Hierarchical linear regression model predicting drunkorexia score - vigorous physical activity

	β	SE	R^2	R^2Change
Vigorous				
Block 1			0.022	0.022
VPA Minutes/Day	0.048	0.028		
Block 2			0.059	0.036
VPA Minutes/Day	0.195**	0.073		
VPA Minutes/Day^2	-0.001**	0.000		
Block 3			0.089	0.031
VPA Minutes/Day	0.416**	0.131		
VPA Minutes/Day^2	-0.003*	0.001		
VPA Minutes/Day^3	5.76E-06*	0.000		

VPA = Vigorous physical activity SE = Standard Error * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Table 11. Hierarchical linear regression model predicting drunkorexia score - moderate physical activity

	β	SE	R^2	R^2Change
Moderate				
Block 1			0.000	0.022
MPA Minutes/Day	0.001	0.02		
Block 2			0.005	0.005
MPA Minutes/Day	0.046	0.6		
MPA Minutes/Day^2	0.000	0.000		
Block 3			0.006	0.001
MPA Minutes/Day	0.014	0.11		
MPA Minutes/Day^2	0.000	0.001		
MPA Minutes/Day^3	-3.96E-07	0.000		

MPA = Moderate physical activity SE = Standard Error * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Table 12. Hierarchical linear regression models predicting drunkorexia score - sedentary

	β	SE	R^2	R^2Change
Sedentary				
Block 1			0.007	0.007
Sed Minutes/Day	-0.007	0.008		
Block 2			0.023	0.016
Sed Minutes/Day	-0.037	0.022		
Sed Minutes/Day^2	2.85E-05	0.000		
Block 3			0.023	0.000
Sed Minutes/Day	-0.047	0.048		
Sed Minutes/Day^2	5.13E-05	0.000		
Sed Minutes/Day^3	-1.30E-08	0.000		

Sed = Sedentary SE = Standard Error * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Table 13. Hierarchical linear regression models predicting drunkorexia score - inadequate physical activity

	β	SE	R^2	R^2Change
Inadequate				
Block 1			0.010	0.010
IPA Minutes/Day	-0.008	0.007		
Block 2			0.023	0.012
IPA Minutes/Day	-0.034	0.022		
IPA Minutes/Day^2	2.15E-05	0.000		
Block 3			0.023	0.001
IPA Minutes/Day	-0.022	0.048		
IPA Minutes/Day^2	-2.09E-06	0.000		
IPA Minutes/Day^3	1.26E-08	0.000		

IPA = Inadequate physical activity SE = Standard Error * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

APPENDIX

FOR QUESTIONS ABOUT THE STUDY, CONTACT:

Melinda Novik, PhD
Associate Professor
Department of Kinesiology
Office: MCD 206
Phone: 836-3168
Email: melindanovik@missouristate.edu

DESCRIPTION: You are invited to participate in a research study aimed at obtaining information about the health and wellness behaviors of Missouri State University first-year college students. You will be asked to respond to specific items about your health behaviors including exercise, diet, and substance use. This web-based survey is expected to take no longer than 20 minutes to complete and will provide critical information to help inform educational programs for future students.

RISKS AND BENEFITS: The risks associated with this study are minimal but may include some discomfort in thinking about your health-related behaviors. Your identity and survey responses will be kept completely confidential. The benefits expected to you as a result from participation in this study are minimal as well. Your decision whether or not to participate in this study will in no way affect your academic or residential situations.

TIME INVOLVEMENT: The completion of the survey should take no more than twenty minutes.

PARTICIPANT'S RIGHTS: If you have read this form and have decided to participate in this project, please understand your participation is voluntary and you have the right to withdraw your consent or discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled. You have the right to refuse to answer particular questions. Your individual privacy will be maintained in all published and written data resulting from the study.

Contact Information:

·If you have any questions, concerns or complaints about this study, its procedures, risks and benefits, you may contact Melinda Novik at 836-3168 or melindanovik@missouristate.edu.

·If you feel you have been hurt by being a part of this study, or need immediate assistance please contact the Counseling and Testing Center at 836-5116 or Melinda Novik at 836-3168.

·If you are not satisfied with the manner in which this study is being conducted, or if you have any concerns, complaints, or general questions about the research or your rights as a research study subject, please contact the Missouri State University Institutional Review Board (IRB).

* 1. What is the month of your birth?

* 2. What day of the month were you born?

* 3. What are the LAST 5 digits of your M-Number?

4. Age

5. Sex

- Female
- Male

6. Ethnicity

- Hispanic or Latino
- Not Hispanic or Latino

7. Race *(Choose the one that best represents you)*

- American Indian or Alaska Native
- Asian
- Black or African American
- Native Hawaiian or Other Pacific Islander
- White
- Mixed

8. Have you joined a Greek organization this fall?

- Yes
- No

9. Have you participated in any Greek events this fall?

- Yes
- No

10. Do you participate in Intercollegiate Athletics?

- Yes
- No

11. How tall are you?

	Feet	Inches
Height		

12. What is your current weight in pounds?

13. Which of the following best describes your current situation?

- Trying to lose weight
- Trying to maintain current weight
- Trying to gain weight

14. During a typical week since arriving at MSU for this semester, on which days do you perform the following types of physical activities?

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Moderate *Moderate physical activities make you breathe somewhat harder than normal and may include carrying light loads, bicycling at a regular pace, or doubles tennis.*	☐	☐	☐	☐	☐	☐	☐
Vigorous *Vigorous activities make you breathe much harder than normal and may include heavy lifting, digging, aerobics, or fast bicycling.*	☐	☐	☐	☐	☐	☐	☐
Walking *Including at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure?*	☐	☐	☐	☐	☐	☐	☐
Nothing	☐	☐	☐	☐	☐	☐	☐

15. **During the last 7 days,** think about the activities you did at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport. Think only about those physical activities that you did for at **least 10 minutes at a time.**

	Days
On how many days did you do **vigorous** physical activities? *Vigorous activities make you breathe much harder than normal and may include heavy lifting, digging, aerobics, or fast bicycling.*	
On how many days did you do **moderate** physical activities? *Moderate physical activities make you breathe somewhat harder than normal and may include carrying light loads, bicycling at a regular pace, or doubles tennis.*	
On how many days did you **walk for at least 10 minutes** at a time? *Including at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure?*	

16. How much time over the past 4 weeks have you usually spent, on one of those days from the previous question, performing the following physical activities?

	Hours	Minutes
Doing **vigorous** physical activities? *Vigorous activities make you breathe much harder than normal and may include heavy lifting, digging, aerobics, or fast bicycling.*		
Doing **moderate** physical activities? *Moderate physical activities make you breathe somewhat harder than normal and may include carrying light loads, bicycling at a regular pace, or doubles tennis.*		
Walking? *This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.*		
How much time in total did you usually spend **sitting on a week day?** *This includes time spent sitting at a desk, visiting friends, reading traveling on a bus or sitting or lying down to watch television.*		

17. How often did you experience any of the following as a result of **others' alcohol use** in the past 4 weeks?

	None	1 time	2 times	3 or more times
I was harassed, insulted, or humiliated	○	○	○	○
I had a serious argument or quarrel	○	○	○	○
I was pushed, hit, or assaulted	○	○	○	○
I had my property damaged	○	○	○	○
I had to "baby-sit" or take care of another student	○	○	○	○
I had my studying or sleep interrupted	○	○	○	○
I experienced an unwanted sexual advance	○	○	○	○
I was the victim of sexual assault or date rape	○	○	○	○
I was inconvenienced from vomit in the hallway or bathroom	○	○	○	○
I was affected by the behavior of guests who are drinking	○	○	○	○

18. How many days did you use the following substances over the past 4 weeks?

	None	1 or 2 days	3-5 days	6-9 days	10-19 days	20-29 days	All 30 days
Prescription medication without a prescription (Vicodin, Percoset, OxyContin, Ritalin, Adderol)	○	○	○	○	○	○	○
Other non-prescription drugs (Marijuana, Cocaine, Amphetamines, Hallucinogens, etc.)	○	○	○	○	○	○	○

19. Have you drank any type or any amount of alcohol in the past 4 weeks?

- ○ Yes
- ○ No

20. How many days did you use the following substances over the past 4 weeks?

	None	1 or 2 days	3-5 days	6-9 days	10-19 days	20-29 days	All 30 days
Beer	○	○	○	○	○	○	○
Wine or wine coolers	○	○	○	○	○	○	○
Liquor or Spirits (straight or mixed in a drink)	○	○	○	○	○	○	○
Combine drinking alcohol with taking drugs	○	○	○	○	○	○	○
Alcohol of any type	○	○	○	○	○	○	○

21. During the past 4 weeks, on how many days did you have 5 or more drinks (MALE) or 4 or more drinks (FEMALE) of alcohol in a two hour period.

- ○ None
- ○ 1 or 2 days
- ○ 3-5 days
- ○ 6-9 days
- ○ 10-19 days
- ○ 20-29 days
- ○ All 30 days

22. Please keep in mind that a drink is a 12 oz bottle or can of beer, a 5 oz glass of wine or a wine cooler, a 1.5 oz shot of hard liquor such as rum, gin, vodka or whiskey straight or in a mixed drink, or similar portion of alcohol. Use your best estimate of drinks based on this definition.

During a typical week in the past 4 weeks, how many drinks did you consume on each day of the week?

	No drinks	1 drink	2 drinks	3 drinks	4 drinks	5 or more drinks
Sunday	○	○	○	○	○	○
Monday	○	○	○	○	○	○
Tuesday	○	○	○	○	○	○
Wednesday	○	○	○	○	○	○
Thursday	○	○	○	○	○	○
Friday	○	○	○	○	○	○
Saturday	○	○	○	○	○	○

23. In the **past 4 weeks** how often have you consumed alcohol (beer, wine, wine coolers, or liquor):

	Never	Seldom	Occasionally	Frequently
At a bar or club	○	○	○	○
At a party with friends	○	○	○	○
To get drunk	○	○	○	○
With wing-mate(s)	○	○	○	○
As part of a drinking game	○	○	○	○
Before "going out" (ie to a party or bar)	○	○	○	○
To make it easier to go to bed with someone	○	○	○	○

24. How often did you do the following in the past **4 weeks**?

	Never	Rarely	Sometimes	Usually	Always
Alternate non-alcoholic beverages and alcoholic beverages	○	○	○	○	○
Determine, in advance, not toexceed a set number of drinks	○	○	○	○	○
Eat before and/or during drinking	○	○	○	○	○
Have a friend let you know when you'd had enough	○	○	○	○	○
Keep track of how many drinks you were having	○	○	○	○	○
Pace your drinks to 1 or fewer per hour	○	○	○	○	○
Avoid drinking games	○	○	○	○	○
Stop drinking at least 1-2 hours before going home	○	○	○	○	○
Limit money spent on alcohol	○	○	○	○	○
Only drink in safe environments	○	○	○	○	○
Make your own drinks	○	○	○	○	○
Avoid hard liquor or spirits	○	○	○	○	○
Refuse a drink from a stranger	○	○	○	○	○
Never leave your drink unattended	○	○	○	○	○
Drink an alcohol look-alike (nonalcoholic beer, juice, etc.)	○	○	○	○	○
Carry around a cup but did not drink any alcohol	○	○	○	○	○
Avoid situations where there was alcohol	○	○	○	○	○

25. How often did you experience any of the following as a result of your own alcohol use in the **past 4 weeks**?

	None	1 time	2 times	3 or more times
I missed or performed poorly in class	○	○	○	○
I was confronted by a residence hall staff member	○	○	○	○
I had a hangover	○	○	○	○
I became sick or vomited.	○	○	○	○
I passed out	○	○	○	○
I had memory loss or blackouts	○	○	○	○
I physically harmed myself or another person	○	○	○	○
I caused a disturbance (i.e., was noisy).	○	○	○	○
I damaged property	○	○	○	○
I had unprotected sex	○	○	○	○
I received a citation or was arrested	○	○	○	○
I regretted getting sexually involved with someone	○	○	○	○
I coerced another person into being sexual with me	○	○	○	○
I was ashamed by my behavior	○	○	○	○
I had a conflict with my roommate or another person	○	○	○	○
I fell behind in my studies	○	○	○	○
I regretted losing control of my senses	○	○	○	○
I was late for work or school	○	○	○	○

26. Have you experienced any of the following for violating the University's Code of Student Rights and Responsibilities as a result of your own alcohol use?

	Yes	No
Warning	○	○
Loss of Privileges	○	○
Fines	○	○
Restitution	○	○
Discretionary Consequences	○	○
Level One Probation	○	○
Level Two Probation	○	○
Denial of Privilege to Re-enroll	○	○
Residence Hall Probation	○	○
Parental Notification	○	○
Residence Hall Suspension	○	○
Residence Hall Expulsion	○	○
Suspension	○	○
Dismissal	○	○
Revocation of Admission and/or Degree	○	○
Withholding Degree	○	○

27. If I were under the influence of alcohol I would be

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
Sociable	○	○	○	○	○
Easier to talk to people	○	○	○	○	○
Calm	○	○	○	○	○
Better lover	○	○	○	○	○
Peaceful	○	○	○	○	○
Enjoy sex more	○	○	○	○	○
Aggressive	○	○	○	○	○
Brave and daring	○	○	○	○	○
Moody	○	○	○	○	○
Guilty	○	○	○	○	○
Clumsy	○	○	○	○	○
Dizzy	○	○	○	○	○
Take risks	○	○	○	○	○
Loud, boisterous, noisy	○	○	○	○	○
Courageous	○	○	○	○	○

28. In the **past 4 weeks** how many times have you experienced the following situations while you were drinking alcohol or because of your alcohol use:

	None	1 time	2 times	3+ times
Not able to do your homework or study for a test	○	○	○	○
Got into fights, acted bad or did mean things	○	○	○	○
Missed out on other things because you spent too much money on alcohol	○	○	○	○
Went to work or school high or drunk	○	○	○	○
Caused shame or embarrassment to someone	○	○	○	○
Neglected your responsibilities	○	○	○	○
Relatives avoided you	○	○	○	○
Felt that you needed more alcohol than you used to in order to get the same effect	○	○	○	○
Tried to control your drinking by trying to drink only at certain times of day or certain places	○	○	○	○
Had withdrawal symptoms, that is, felt sick because you stopped or cut down on drinking	○	○	○	○
Noticed a change in your personality	○	○	○	○
Felt that you had a problem with alcohol	○	○	○	○
Missed a day (or part of a day) of school or work	○	○	○	○
Tried to cut down or quit drinking	○	○	○	○

	None	1 time	2 times	3+ times
Suddenly found yourself in a place that you could not remember getting to	○	○	○	○
Passed out or fainted suddenly	○	○	○	○
Had a fight, argument or bad feelings with a friend	○	○	○	○
Had a fight, argument or bad feelings with a family member	○	○	○	○
Kept drinking when you promised yourself not to	○	○	○	○
Felt you were going crazy	○	○	○	○
Had a bad time	○	○	○	○
Felt physically or physiologically dependent on alcohol	○	○	○	○
Was told by a friend, neighbor or relative to stop or cut down on drinking	○	○	○	○

Think about the times, since arriving at MSU for the fall semester, you have restricted your calories or food intake because you were planning to drink alcohol later that day. How often would you say that you restricted your calories for each of the following reasons?

29. **On a day I planned to drink (in the past four weeks), I controlled my eating:**

	Never	Almost Never	Sometimes	Almost Always	Always
Because my friends pressure me to restrict my eating	○	○	○	○	○
Because my friends encourage me to restrict my calories	○	○	○	○	○
Because it helps you enjoy a party	○	○	○	○	○
Because it makes social gathering more fun	○	○	○	○	○
So that I can drink without feeling left out	○	○	○	○	○
So that others won't make fun of me for not drinking	○	○	○	○	○
To fit in with a group I like	○	○	○	○	○
So that I would get high when I drank	○	○	○	○	○
Because my friends restrict their calories	○	○	○	○	○
To be liked	○	○	○	○	○
Because it's fun	○	○	○	○	○
So that I wouldn't gain weight	○	○	○	○	○
By eating less all day	○	○	○	○	○
To keep my caloric level under a certain level	○	○	○	○	○
By eating less fat	○	○	○	○	○
By exercising more than normal	○	○	○	○	○
By avoiding fatty foods	○	○	○	○	○

	Never	Almost Never	Sometimes	Almost Always	Always
And made sure that I exercised/burned calories	○	○	○	○	○
By eating less at each meal	○	○	○	○	○
By exercising before I drank	○	○	○	○	○
So that I won't feel guilty about calorie content of my drinks	○	○	○	○	○
To save calories for alcohol	○	○	○	○	○
To deal with my anxiety about the calories in alcohol	○	○	○	○	○

30. **During the last four weeks, if I ate a normal amount on a day that I intended to drink, I would:**

	Never	Almost Never	Sometimes	Almost Always	Always
Not drink as much because I don't want the extra calories	○	○	○	○	○
Not drink because I have already taken in my caloric level for the day	○	○	○	○	○
Pretend I am drinking	○	○	○	○	○
Avoid drinking beer	○	○	○	○	○
Not go out	○	○	○	○	○
Drink more so I don't think about the calories	○	○	○	○	○
Drink more to cope with the anxiety	○	○	○	○	○
Drink more because I want to get as drunk as possible	○	○	○	○	○
Drink to fit in	○	○	○	○	○
Drink hard liquor because it has lower calories	○	○	○	○	○

31. **Over the past four weeks when I have been drinking, I would:**

	Never	Almost Never	Sometimes	Almost Always	Always
Drink until I feel really good	○	○	○	○	○
Drink as much as my friends drink	○	○	○	○	○
Only drink hard liquor	○	○	○	○	○
Only drink alcohol that has the fewest calories and will get me drunk the fastest	○	○	○	○	○
Only drink light beer	○	○	○	○	○
stop drinking once I hit a caloric level	○	○	○	○	○
make myself throw up so I can continue drinking	○	○	○	○	○
throw up so that I don't have as many calories in my system	○	○	○	○	○
Count calories	○	○	○	○	○

32. **Over the past four weeks, the day after I drink, I would:**

	Never	Almost Never	Sometimes	Almost Always	Always
workout for an extended period of time to work off the extra calories	○	○	○	○	○
compensate by eating less	○	○	○	○	○
Work out longer than normal	○	○	○	○	○
Set extra time aside for working out	○	○	○	○	○
Think about how many calories I consumed while drinking	○	○	○	○	○
Feel guilty for taking in unnecessary calories	○	○	○	○	○
Make sure to exercise	○	○	○	○	○
Can't concentrate because I am so hungry	○	○	○	○	○
Purge or vomit to get rid of the extra calories	○	○	○	○	○
Make myself throw up to get rid of the alcohol	○	○	○	○	○