RUNNING HEAD: PRODUCTIVE PROCRASTINATION AND ALCOHOL

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Productive Procrastination: Procrastination Style Predicts Alcohol and Academic Outcomes

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Abstract

**Objective:** The study used a person-centered analysis to identify adaptive and maladaptive procrastination styles associated with drinking and academic outcomes.

**Method:** Participants were 1106 undergraduates (449 men, 654 women, 2 transgender, 1 declined to answer) between the ages of 18 and 25 ($M = 20.40, SD = 1.60$) at a large public university in the Pacific Northwest. College undergraduates completed an online survey of alcohol outcomes, GPA, and procrastination measures as part of a larger study on alcohol use and cognition.

**Results:** Cluster analysis identified five unique procrastination styles—*non-procrastinators, productive procrastinators (academic), productive procrastinators (non-academic), non-academic procrastinators* (individuals engaging in high levels of both unproductive and productive non-academic procrastination) and *classic procrastinators (non-academic unproductive only)*. Controlling for gender, procrastination style predicted alcohol-related problems, risk of alcohol use disorders, and GPA (all $p < .01$). Non-academic procrastinators were most likely to report greater alcohol-related problems and risk of alcohol use disorders and lower GPA. Lower GPA among non-academic procrastinators was mediated by alcohol cravings, AUDIT and RAPI scores. Productive procrastinators (academic) and non-procrastinators reported fewer negative alcohol and better academic outcomes.

**Conclusions:** Although procrastination is widespread, not all forms of procrastination are associated with negative outcomes. In particular, *productive procrastinators* were no more likely than *non-procrastinators* to experience negative alcohol or academic outcomes, while *non-academic procrastinators* were at an increased risk of both. Hazardous drinking mediated the
relationship. These findings suggest that certain maladaptive styles of procrastination may be a useful risk indicator for preventative and intervention efforts.
Imagine a college student faced with an upcoming chemistry exam. She dreads the exam and, as a result, decides to delay the inevitable by going out to a bar with her friends and drinking instead of studying. As a result, she receives a poor grade on her exam. This behavior—typical of classic conceptualizations of procrastination—is rampant among college students. Approximately 80% to 95% of college students report regularly procrastinating in their courses (Steel, 2007; Soloman and Rothblum, 1984). Procrastination is associated with a slew of negative outcomes, including poor health, financial instability, depressed mood, stress, and guilt (Steel, 2007; Zarick and Stonebraker, 2009). These effects are especially pronounced in academic domains, and impact performance, work quality, and information retention (Zarick and Stonebraker, 2009).

Of particular concern is the potential link between procrastination and another ubiquitous behavior in college populations: drinking (Steel, 2007; Johnston et al., 2010). Procrastination and drinking are both serious issues facing college populations (Johnston et al., 2010; Perkins, 2004; Steel, 2007), and drinking has been tentatively linked to increased procrastination (Phillips and Ogeil, 2009). This relationship has been especially difficult to assess because previous research has ignored and conflated different styles of procrastination. Our goal is to evaluate the relation between college students’ procrastination, drinking, and academic achievement by identifying specific types of problematic procrastination. We will also investigate whether hazardous drinking mediates the relationship between problematic procrastination and academic outcomes.

A New View: Productive Procrastination

Procrastination is the decision “to voluntarily delay an intended course of action despite expecting to be worse off for the delay” (Steel, 2007, p. 66). Traditionally, it has been cast as a failure of self-regulation and motivation, and linked to third-party variables (e.g., academic
disengagement) and risk factors for poor alcohol and academic outcomes (Phillips and Ogeil, 2009). Surprisingly few published studies have examined the relationship between procrastination and drinking. Alcohol consumption has been tentatively linked with increased procrastination, (Sirois & Pychyl, 2002) and alcohol use may be a strategy for self-handicapping through procrastination (Berglas and Jones, 1978; Richards, Zhang, Mitchell, & de Wit, 1999). Frequent drinkers show greater discounting of delayed losses and gains, a phenomenon which is also associated with procrastination (Takahashi, T., Ohmura, Y., Oono, H., & Radford, M., 2008), and male undergraduates who procrastinate report more alcohol-related problems (Jamrozinski, Kuda, & Mangholz, 2009).

Despite rampant procrastination among college populations, not every student who procrastinates goes on to drink hazardously. Known moderators of procrastination, including gender, big five personality traits, and task characteristics (Steel, 2007), do not account for the discrepancy between procrastination and alcohol rates. What other factors could explain why procrastination is not always linked to hazardous drinking?

The discrepancy may be partly due to the specific way in which students are procrastinating. Until recently, procrastination was treated as a monolithic and exclusively negative behavior (Ferrari, 1993). Researchers have begun to challenge this traditional view, suggesting ways in which procrastination may be beneficial (Chu and Choi, 2005). For instance, students may deliberately procrastinate to motivate intense last-minute efforts (Bernstein, 1998). We propose a theoretical framework that distinguishes between two forms of productive procrastination in academic settings: 1) academically productive procrastination, in which students procrastinate on one assignment by working on a less important or easier assignment, and 2) non-academic productive procrastination, in which students do non-classwork-related
activities that are important but not necessarily enjoyable (e.g., washing dishes, exercising, paying bills).

In contrast to traditional procrastination, which replaces adaptive behaviors with maladaptive behaviors, productive forms of procrastination replace one adaptive behavior with another (albeit less important) adaptive behavior (e.g., organizing notes instead of studying for an exam). The distinguishing factor between academic and non-academic productive procrastination is whether the important academic activity is replaced by a behavior in the academic domain (e.g., organizing notes) or outside it (e.g., exercising). We predict that the effects of substituting one adaptive (but less desirable) behavior for another will be much less severe than substituting neutral or maladaptive behaviors. In particular, individuals who engage in productive forms of procrastination are, by definition, not using alcohol as a means of procrastinating. Similarly, students who engage in academic procrastination are completing academic tasks and should perform better academically than students who procrastinate with non-academic tasks. Preliminary evidence suggests that college students regularly engage in both academic and non-academic productive procrastination (Wormington, Westgate, Call, Harati, Moshontz de la Rocha, & Oleson, 2011), but whether these procrastination styles are associated with hazardous drinking or academic outcomes is unknown.

**Different Strokes for Different Folks: Identifying Procrastination Styles using Person-Centered Analysis**

Another reason for the inconsistent associations between procrastination and alcohol use is that students may not always respond with the same type of procrastination. They may choose whether to procrastinate—or employ different forms of procrastination—depending on the circumstances. This unique combination of responses to an academic task—or a person’s
“procrastination style”—may be particularly important for research on complex outcomes like hazardous drinking, which depend on many individual and situational factors. Imagine two students: Alexa and Calvin. Both Alexa and Calvin react to difficult academic tasks by engaging in non-academic productive procrastination, such as doing laundry or going to the gym. Alexa, however, also engages in academic productive procrastination (e.g., studying for a different class), while Calvin does not. Likewise, Calvin often responds with unproductive procrastination (e.g., surfing the internet), while Alexa does not. Will Alexa and Calvin report similar alcohol and academic-related outcomes? Their procrastination styles may play a role.

In this study, we evaluate students’ “procrastination styles” using a person-centered correlational approach. Person-centered approaches examine how variables—in this case, procrastination strategies—combine and predict outcomes of interest (Bergman and Trost, 2006). This approach captures different information than variable-centered analyses (e.g., regression analysis), which focus on unique contributions of predictor variables. The present study investigated productive procrastination using a person-centered correlational approach to determine whether there are distinct patterns of procrastination (i.e., “procrastination styles”) and if so, whether those patterns predict differential alcohol outcomes. Despite its potential, person-centered approaches have rarely been used in procrastination or alcohol studies (but see Hill, White, Chung, Hawkins, & Catalano, 2000; Malmbert et al., 2012).

**The Current Study**

The current study investigated 1) whether a person-centered correlational analysis reveals distinct combinations of procrastination strategies (i.e., procrastination styles) and 2) whether such procrastination styles were uniquely related to individuals’ self-reported hazardous drinking (i.e., greater alcohol consumption, alcohol-related problems, AUDIT scores, and alcohol
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We chose to examine alcohol cravings due to the recent inclusion of cravings as a criterion for alcohol use disorders in *The Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM–5*; American Psychiatric Association, 2013).

We predicted that distinct naturally occurring combinations (i.e., styles) of procrastination would emerge, some of which would be more adaptive than others. Specifically, we hypothesized that students with procrastination styles characterized by high levels of non-procrastination and/or productive procrastination (adaptive procrastination styles) would be associated with lower levels of hazardous drinking and better academic performance. We also hypothesized that procrastination styles characterized by high levels of unproductive procrastination (maladaptive procrastination styles) would be associated with higher rates of hazardous drinking and worse academic performance. Additionally, we conducted mediation analyses to investigate whether the relationship between procrastination style and GPA might be mediated by drinking, reasoning that maladaptive procrastination styles may lead to hazardous drinking, which may in turn harm academic achievement.

**Method**

**Procedure**

Procedures were approved by the university’s Institutional Review Board. Participants were recruited from a randomized list of 2500 current, full-time undergraduate students between the ages of 18-25 and invited via email to participate in a study about cognitive processes and alcohol. Forty-four percent of the students went on to participate via a web site where they underwent informed consent and completed a battery of questionnaires as part of a larger study. Participants were compensated $15.
Participants

Participants consisted of 1106 undergraduates (654 women, 449 men, 2 transgender, 1 declined to answer) between the ages of 18 and 25 ($M = 20.40$, $SD = 1.60$) at a large university in the Pacific Northwest. Fifty-nine percent of students identified as White/Caucasian, 27% as Asian, 8% as bi- or multi-racial, and the remaining 6% as either Black/African American, American Indian/Alaska Native, Native Hawaiian/Other Pacific Islander, unknown, or declined to answer. Two participants were excluded from analyses due to suspect data, leaving a final sample of 1104 participants.

Measures

**Procrastination.** The Procrastination Styles Questionnaire measured the perceived likelihood of engaging in four behavioral responses to ten difficult academic scenarios (e.g., “You planned to work on a particular assignment this afternoon but you find that it is going to be much more difficult than expected”; see Table 1). The four responses were non-procrastination (“Get started on it right away”; $\alpha = .93$), academic productive procrastination (“First work on an academic easier task that is due relatively soon”; $\alpha = .94$), non-academic productive procrastination (“First do something non-academic but productive [clean your room, do the dishes, exercise, etc.]”; $\alpha = .96$), and classic procrastination (“First do some non-academic, not necessarily productive task (check Facebook, watch television, socialize with friends, etc.”; $\alpha = .96$). For each scenario, participants rated the likelihood that they would engage in each of the four behavioral responses (percentages did not have to add up to 100%).

------------------------------------Insert Table 1 about here-------------------------------------

**Academic performance.** Participants self-reported their most recent GPA on a 0 to 4.0 scale. Self-report measures of grades are well-validated and correlate strongly with actual grades.
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**Alcohol consumption.** The Daily Drinking Questionnaire [DDQ; Collins et al., 1985] assesses typical weekly alcohol consumption over the past month. Participants reported how many US standard drinks they consumed on each day of a typical week. Scores reflect the total number of drinks consumed per week in the past month. Participants were provided with common standard drink equivalencies. Cronbach’s alpha for the sample was .69.

**Alcohol Problems.** The Rutgers Alcohol Problem Index [RAPI; White and Labouvie, 1989] asks participants to report how many times in the past 3 months (from 0 “never” to 4 “more than 10 times”) they experienced 23 symptoms of problem drinking and negative consequences as a result of drinking. Severity of problems ranged from mild (“Had a bad time”) to serious (“Suddenly found yourself in a place that you could not remember getting to”). Two additional items were added asking participants how often they had driven shortly after consuming two and four drinks, respectively. Cronbach’s alpha for the sample was .93.

**Alcohol Use Disorders.** The Alcohol Use Disorders Identification test [AUDIT; Babor et al., 2001] is a widely used 10-item clinical measure that can identify individuals at risk for meeting criteria for alcohol use disorders. Participants are asked how much and how often they typically drink on a typical day, as well as how often they report cravings and problems due to

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1,2 Three items on the AUDIT and four items on the RAPI could be construed as possible instances of procrastination (e.g., “How often during the last year have you failed to do what was normally expected from you because of drinking?”). To rule out possible confounding effects, the AUDIT and RAPI were scored with and without these items for preliminary analysis. Results did not differ as a function of item inclusion, thus all AUDIT and RAPI items were retained in final analyses.
alcohol^2. Answer choices range from 0 “never” to 4 “daily or almost daily.” Cronbach’s alpha for the sample was .79.

**Alcohol Cravings.** Cravings were measured using the Alcohol Craving Questionnaire Short Form-Revised [ACQ; Singleton et al., 1995]. Twelve items measured current alcohol craving (e.g., “If I had some alcohol I would probably drink it”), including alcohol use intentions, anticipated effects of drinking, and lack of control. Responses were measured on a seven-point scale ranging from -3 (strongly disagree) to 3 (strongly agree). The final item of the ACQ was not administered due to a programming error. Cronbach’s alpha for the sample was .80.

**Analysis Plan**

In the first step, cluster analysis was conducted to identify naturally-occurring patterns of procrastination (i.e., procrastination styles). With cluster analysis, participants are assigned to a single type of procrastination style. These procrastination styles were then used as a categorical variable in subsequent analyses. For non-normally distributed alcohol variables (i.e., alcohol consumption, AUDIT, alcohol problems), data were entered into a count regression model with a negative binomial log link. For data that were normally distributed (i.e., academic performance, alcohol cravings), one-way analysis of co-variance (ANCOVA) and one-way analysis of variance (ANOVA) were used to analyze the relationship between procrastination style and outcome variables. For all alcohol analyses, gender was included as a covariate to control for known effects of gender on drinking outcomes. Following our primary analyses, we tested whether the alcohol variables mediated the relationship between procrastination style and GPA.

**Results**
**Descriptive Statistics**

Descriptive alcohol statistics for the sample are shown in Table 2. On average, participants reported consuming six drinks per week on a typical week during the last month and experiencing approximately five alcohol-related consequences over the last three months. Participants reported a 66.74% likelihood of engaging in non-procrastination, 50.69% likelihood of engaging in productive academic procrastination, 40.04% likelihood of engaging in productive non-academic procrastination, and 44.02% likelihood of engaging in classic procrastination in response to the procrastination scenarios. These values were not mutually exclusive. Overall, 89.8% of participants reported at least one anticipated instance of procrastination (i.e., a > 50% chance of procrastination in at least one scenario).

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**Cluster Analysis of Procrastination Styles**

We identified procrastination styles using cluster analysis. We used composite raw scores for the four types of procrastination responses—i.e., non-procrastination, academic productive procrastination, non-academic productive procrastination, and classic procrastination—for the ten academic scenarios. To account for individuals’ general tendency to respond higher or lower to items as a whole, we centered each individual’s response to the scenarios around his or her individual average—that is, we examined the relative likelihood of an individual selecting that response in relation to other procrastination responses.

Following the recommendations of Hair, Anderson, Tatham, and Black (1998), we ran a two-step cluster analytic technique—hierarchical (Ward’s linkage) followed by nonhierarchical
Hierarchical clustering is used to identify the number of clusters that best describes the sample. The optimal cluster solution is based on whether clusters represent a sizable portion of the sample, are theoretically meaningful, successfully group individuals with similar patterns of values, and relate differentially to outcomes of interest. A nonhierarchical clustering algorithm fine tunes the hierarchical clusters by optimizing within-cluster homogeneity and between-cluster heterogeneity; in other words, it groups together individuals with the most similar patterns of values and ensures that they are distinct from other clusters. Because hierarchical cluster analysis is sensitive to outliers, we first probed for significant univariate outliers using Grubb’s test; no outliers were detected.

**Procrastination Style Profiles**

Given these factors, a five-cluster solution was determined to best represent the data in the present sample. All data are presented in terms of centered z-scores (see Figure 1). Students in these five profiles represented unique combinations of procrastination strategies. Students in the *non-procrastinator* profile ($n = 200$) reported above average non-procrastination and lower levels of both academic and nonacademic procrastination. Students in the *academic productive procrastinator* profile ($n = 201$) reported both non-procrastination and academic productive procrastination, with an absence of non-academic forms of procrastination. Students in the *nonacademic productive procrastinator* profile ($n = 350$), by contrast, reported high levels of both academic and non-academic productive procrastination. Students in the *non-academic procrastinator* profile ($n = 190$) reported mostly non-academic procrastination (both productive and unproductive). Finally, students in the *classic procrastinator profile* ($n = 160$) reported high levels of non-academic unproductive procrastination only, without other forms of procrastination. It is interesting to note that this last group is the only form of procrastinators
studied in the majority of past procrastination research but was the smallest of the five profiles identified, representing only 18% of all procrastinators. Thus, our findings suggest that many students (indeed, the vast majority of procrastinators in our sample) have not been adequately represented in past studies of procrastination or may have been lumped together under the umbrella term of “procrastination.”

Analytic Plan

Due to non-normality in the distribution of several of the outcomes, count regression models with a negative binomial log link (see Atkins and Gallop, 2007) were used to investigate whether procrastination style predicted three of the drinking outcomes (drinks per week, RAPI scores, and AUDIT scores). Generalized linear models are theoretically similar to ordinary least squares regression, but have been extended to accommodate dependent variables with non-normal distributions, such as negative binomial distributions. The model provided good fit for each of the dependent variables—i.e., the ratio of deviance to degrees of freedom was close to 1. Procrastination style was coded using “non-procrastinators” as the contrast category (0 = Non-procrastinators, 1 = Academic Productive Procrastinators, 2=Non-academic Productive Procrastinators, 3=Non-academic Procrastinators, 4=Classic Procrastinators). Gender was entered as a dummy-coded (0 = men, 1 = women) control variable in all alcohol analyses. Alcohol cravings was normally distributed, therefore a one-way analysis of co-variance (ANCOVA) was used to investigate alcohol cravings.. A one-way analysis of variance (ANOVA) was used to investigate GPA due to its normal distribution and lack of covariates. See Table 3 for regression model statistics.
Alcohol-related problems. Procrastination style uniquely predicted self-reported alcohol-related problems (Wald $\chi^2 = 40.77, p < .001$) in an overall test of the model. Specifically, relative to non-procrastinators, non-academic procrastinators reported significantly more alcohol-related problems ($p < .001$), and academic productive procrastinators reported marginally fewer problems ($p = .07$). No other groups differed significantly from non-procrastinators. Gender also accounted for significant variance in alcohol-related problems. See Table 3 for generalized linear regression statistics.

AUDIT scores. Procrastination style significantly predicted AUDIT scores (Wald $\chi^2 = 21.47, p < .001$) in an overall test of the model. Specifically, relative to non-procrastinators, non-academic procrastinators reported significantly higher AUDIT scores ($p < .01$). None of the other groups differed significantly from non-procrastinators. Gender also accounted for significant variance in AUDIT scores. See Table 3.

Alcohol cravings. A one-way analysis of covariance (ANCOVA) revealed that procrastination style significantly predicted Alcohol Cravings, $F(4,1086) = 5.95, p < .001$, $\eta^2 = .02$. Specifically, non-academic procrastinators reported significantly stronger alcohol cravings ($p < .001$). Likewise, classic procrastinators ($p = .06$) and non-academic productive procrastinators ($p = .08$) reported marginally stronger alcohol cravings. Academic productive procrastinators did not differ from non-procrastinators ($p = .84, ns$). Gender also accounted for significant variance in alcohol cravings. See Table 3.

Drinks per week. Procrastination style did not predict overall alcohol consumption (Wald $\chi^2 = 6.26, ns$) in an overall test of the model. Gender accounted for significant variance in alcohol consumption. See Table 3 for generalized linear regression statistics.
**Academic outcomes.** A one-way ANOVA revealed that procrastination style was a significant predictor of students’ most recent GPA, $F(4,1086) = 11.54, p < .001, \eta^2_p = .04$.

Overall, classic procrastinators ($M = 3.32, SD = .46$) and non-academic procrastinators ($M = 3.30, SD = .42$) reported lower GPAs overall than non-procrastinators ($M = 3.51, SD = .41$), academic productive procrastinators ($M = 3.52, SD = .37$), and non-academic productive procrastinators ($M = 3.44, SD = .40$). Post-hoc Tukey tests revealed that these differences were significant, $ps < .001$. The GPA of academic productive procrastinators did not differ from non-procrastinators ($p = .99$).

**Mediation of academic outcomes**

*Hazardous drinking as a mediator of academic outcomes.* In follow-up analyses, we tested whether hazardous drinking mediated the relationship between procrastination and academic outcomes for non-academic procrastinators. We focused on three alcohol outcomes—alcohol cravings, AUDIT, and RAPI scores—given the previously described findings. Membership in the non-academic procrastination style was dummy-coded ($0 =$ Non-member, $1 =$ Non-academic procrastinator). Sobel tests indicated that hazardous drinking— as measured by AUDIT and RAPI scores—and alcohol cravings all significantly mediated the association between procrastination and grade point average. The relation between the non-academic procrastination style and grade point average ($b = -.146, p < .0001$) decreased when controlling for AUDIT scores ($b = -.009, p = .002$), RAPI scores ($b = -.008, p = .001$), and alcohol cravings ($-.006, p < .001$). Overall, the AUDIT and RAPI accounted for 17.43% and 10.26% of the association between non-academic procrastination and grade point average, respectively, and cravings accounted for 12.46% of the variance.

**Discussion**
Procrastination and alcohol use are ubiquitous problems in the college population, but surprisingly few studies have examined their relationship. We introduced a new concept of procrastination – productive procrastination - and proposed that students’ procrastination tendencies should be considered as a whole (i.e., procrastination styles) regarding drinking and academic outcomes. Students strongly endorsed these procrastination behaviors, suggesting that these are strategies students are familiar with and use regularly. Using cluster analysis, we found five distinct combinations of procrastination—or procrastination styles—within our sample. These findings support a new conceptualization of procrastination that should complement classical approaches. In other words, students do engage in an array of procrastination strategies and do not employ the same strategy in every situation.

However, we were interested not only in how students procrastinate, but more importantly – in the repercussions of that procrastination. We focused on two central outcomes: alcohol use and academic achievement. Procrastination styles were related to self-reported alcohol problems, risk of alcohol use disorders, alcohol cravings, and academic achievement, but not overall alcohol consumption. These relationships held even when controlling for known predictors of drinking.

What procrastination styles, then, were most adaptive? For both alcohol and academic achievement outcomes, adaptive procrastination styles were characterized by non-procrastination (i.e., non-procrastinators) and productive procrastination (i.e., academic productive procrastinators). Adaptive procrastination styles were associated with higher grades and decreased risk of alcohol problems, cravings, and risk of alcohol use disorders compared to maladaptive procrastination styles. Interestingly, academic productive procrastinators and non-
procrastinators did not differ; both reported positive alcohol and academic outcomes, suggesting that not all procrastination is necessarily maladaptive.

On the other hand, we did find maladaptive procrastination styles, consisting of three styles characterized by classic procrastination (i.e., classic procrastinators) and non-academic procrastination (e.g., non-academic procrastinators and non-academic productive procrastinators). Overall, students with maladaptive procrastination styles reported poorer academic and alcohol outcomes. In particular, non-academic productive procrastinators reported lower grades and more hazardous drinking than non-procrastinators. Classic procrastinators reported more alcohol related problems, a higher risk of alcohol use disorders, and lower grades than non-procrastinators. Non-academic procrastinators fared the worst, reporting the most alcohol-related problems, highest risk of alcohol use disorders, and lowest grades. In addition, we found that hazardous drinking (in the form of alcohol-related problems and risk for for alcohol use disorders) and alcohol cravings partially mediated the relationship between the non-academic procrastination style and GPA. Students who procrastinate using maladaptive behaviors may be more likely to engage in drinking as a form of procrastination. While not all forms of procrastination are harmful, maladaptive procrastination styles were associated with elevated risk of serious consequences, including hazardous drinking and poor academic performance.

Clinical Implications

Understanding the role of procrastination in college student drinking is important not only theoretically, but also in identifying individuals at risk and facilitating prevention and intervention efforts. Not all styles of procrastination are cause for concern, but certain maladaptive styles may signal an elevated risk of hazardous drinking. Educators are uniquely
situated to screen students for procrastination behaviors that have not only academic ramifications but health and substance-use implications as well. A better understanding of maladaptive procrastination styles could facilitate early identification of at-risk individuals.

Although procrastination style was a risk factor for alcohol-related problems and risk of alcohol use disorders, it notably did not predict weekly alcohol consumption. Non-procrastinators and adaptive procrastinators drank just as much as maladaptive procrastinators, but without the same negative consequences. Although non-procrastinators and adaptive procrastinators do not drink less, they may drink more responsibly, putting them at a lower risk of alcohol-related problems and clinical risk of alcohol disorders. Maladaptive procrastination may indicate an elevated risk of engaging in hazardous or risky drinking behaviors, such as partying, even if they are not consuming more than their peers. Future research is needed to determine what hazardous drinking behaviors drive these differences.

**Methodological Implications**

Consider again our hypothetical students Alexa and Calvin. Both engage in non-academic productive procrastination (e.g., doing their laundry instead of their trigonometry assignment), but their outcomes are likely quite different. Calvin, who also engages in unproductive behaviors such as surfing the web, would have been classified in our study as a non-academic procrastinator. Alexa would not. Calvin, as non-academic procrastinator, is at a much greater risk of both hazardous drinking and poor academic outcomes than Alexa, even though both of them scored the same on a measure of non-academic productive procrastination.

When it comes to methodology, complex behaviors should not be examined in isolation. When people select from an array of potential behaviors —as is the case in procrastination and alcohol use —a person-centered approach may provide researchers with tools to more precisely
model students’ behavior across contexts, Person-centered approaches are rarely employed in work on procrastination or alcohol, and future research may benefit from implementing person-centered analyses alongside variable-centered approaches.

Limitations and Conclusion

Although this study offers an intriguing look at the riskiest types of procrastination, implications are constrained by several limitations. There is likely a bidirectional relationship between alcohol use and procrastination, with maladaptive procrastination leading to increased alcohol use and increased alcohol use spurring increased procrastination. However, causal influence cannot be either excluded or confirmed due to the study’s cross-sectional nature. Future longitudinal work and experimental designs are necessary to confirm our findings. Additional limitations include the use of a single sample of university students and self-reported measures of drinking, GPA, and procrastination. Although both the alcohol (AUDIT, DDQ, RAPI, and ACQ) and academic (GPA) self-report measures are well-validated in the research literature, they are not immune to response bias. Likewise, some items on the RAPI and AUDIT may be construed as procrastination, although analyses run with and without those items returned similar results. Finally, it is possible that participants included “drinking” as a form of classic procrastination behavior, thus inflating the relationship between unproductive procrastination and alcohol outcomes. Future research should address these limitations.

Finally, although our results are confined to an academic setting, procrastination is common in other contexts. Our general framework of productive procrastination - the substitution of an important and urgent task with an adaptive replacement behavior – likely exists in other domains. We expect such productive procrastination is common and associated with positive outcomes in those domains. Are the maladaptive procrastination styles identified in this
study indicative of alcohol outcomes in other populations at home or in the workplace? Would the way in which a person procrastinates on their tax return predict their risk of hazardous drinking? Future research should test these questions and directly examine third variables, such as conscientiousness and self-regulatory capacity.

This study represents an important step forward in understanding the role of procrastination in drinking, and in identifying and differentiating between adaptive and maladaptive procrastination. Considering only one static type of procrastination has limited researchers’ ability to understand procrastination outcomes. Alcohol outcomes among procrastinators may vary in part because procrastination strategies vary. Indeed, *academic productive procrastinators* in our study were at no greater risk for poor alcohol or academic outcomes than non-procrastinators. Trends in the data suggest that academic productive procrastination may even be potentially protective. On the other hand, some forms of procrastination are clearly maladaptive. In particular, *non-academic procrastinators* reported more alcohol-related problems, higher AUDIT scores, stronger alcohol cravings, and lower grades. This kind of procrastination - characterized by high levels of non-academic procrastination paired with very low levels of getting started on assignments - may be a prime target for future prevention and intervention programs.

In closing, it is critical to acknowledge that (1) students do not respond using the same strategies in all situations and 2) there are adaptive and maladaptive forms of procrastination, which may be uniquely linked to alcohol and academic outcomes. By ignoring these distinctions, researchers overlook important differences between adaptive and maladaptive forms of procrastination that can help us predict hazardous behaviors down the road. In short, when it comes to alcohol outcomes, some ways of procrastinating appear to be much worse than others.
References


*College Teaching, 57*, 211-215.
Table 1. Procrastination Styles Questionnaire.

<table>
<thead>
<tr>
<th>Scenarios</th>
<th>Response Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. It is Sunday afternoon and you recall that you have a paper due soon in your hardest class.</td>
<td>[For all scenarios] Rate the likelihood that you would:</td>
</tr>
<tr>
<td></td>
<td>a) Get started on it right away [0-100%]</td>
</tr>
<tr>
<td></td>
<td>b) First work on an easier academic task that is due relatively soon [0-100%]</td>
</tr>
<tr>
<td></td>
<td>c) First do something non-academic but productive (clean your room, do the dishes, exercise, etc.) [0-100%]</td>
</tr>
<tr>
<td></td>
<td>d) First do some non-academic, not necessarily productive task (check Facebook, watch television, socialize with friends, etc.) [0-100%]</td>
</tr>
<tr>
<td>2. You have a problem set that you are not sure you will do well on and it is due soon.</td>
<td></td>
</tr>
<tr>
<td>3. You just picked up a take-home exam from one of your classes that is due soon. You have as much time to work on it as you like, as long as you turn it in by 5pm the day it's due. The teacher has warned that due to its difficulty, many students may need much of that time in order to do well on it.</td>
<td></td>
</tr>
<tr>
<td>4. You have a few free hours. You were checking your email in the library/computer lab/coffee shop and your professor just assigned you a short but difficult assignment due soon.</td>
<td></td>
</tr>
<tr>
<td>5. The date of your midterm has just been announced for your most time-consuming class and it is a few days from now. You've heard from students in previous years that this midterm is particularly hard and that lots of people fail it.</td>
<td></td>
</tr>
<tr>
<td>6. You planned on working on a particular assignment this afternoon but you find out that it is going to be much more difficult than expected.</td>
<td></td>
</tr>
<tr>
<td>7. The reading for your next class is very long and particularly dense. Your professor has suggested that the class spend more time than usual discussing the reading, because students have struggled with understanding it in the past.</td>
<td></td>
</tr>
<tr>
<td>8. You check your email and your professor has just sent out the review sheet for the final in your most difficult class.</td>
<td></td>
</tr>
<tr>
<td>9. You are working on a lab report for one of your science classes. You've found your section of the report to be more complicated and difficult than you expected, and your lab group is waiting on you to finish your section of the report.</td>
<td></td>
</tr>
<tr>
<td>10. Your midterm for one of your classes is in the form of a paper, to be written over the course of one week. When the topic is announced, it is clear that the paper is going to be fairly lengthy and require a good bit of background research in an area you are not very familiar with.</td>
<td></td>
</tr>
</tbody>
</table>
Table 2

Descriptive statistics for academic and alcohol measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Drinks</td>
<td>6.48</td>
<td>9.00</td>
</tr>
<tr>
<td>2. RAPI</td>
<td>5.22</td>
<td>8.35</td>
</tr>
<tr>
<td>3. AUDIT</td>
<td>6.28</td>
<td>5.83</td>
</tr>
<tr>
<td>4. Cravings</td>
<td>-12.84</td>
<td>8.29</td>
</tr>
<tr>
<td>5. GPA</td>
<td>3.43</td>
<td>.42</td>
</tr>
</tbody>
</table>

Note: N = 1104. RAPI = total score on the Rutgers Alcohol Problems Index. AUDIT = total scores on the Alcohol Use Disorders Identification Test
Table 3. Procrastination as a cross-sectional predictor of drinking outcomes

<table>
<thead>
<tr>
<th></th>
<th>Drinks per week</th>
<th>RAPI scores</th>
<th>AUDIT scores</th>
<th>Cravings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>-.50</td>
<td>.08</td>
<td>0.61</td>
<td>6.25***</td>
</tr>
<tr>
<td>Procrastination Style</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-procrastinators</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Academically productive</td>
<td>-.07</td>
<td>.14</td>
<td>.93</td>
<td>-.50</td>
</tr>
<tr>
<td>procrastinators</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-academic productive</td>
<td>.03</td>
<td>.12</td>
<td>1.03</td>
<td>.25</td>
</tr>
<tr>
<td>procrastinators</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-academic procrastinators</td>
<td>.19</td>
<td>.13</td>
<td>1.21</td>
<td>1.46</td>
</tr>
<tr>
<td>Unproductive procrastinators</td>
<td>-.09</td>
<td>.15</td>
<td>.91</td>
<td>-.06</td>
</tr>
</tbody>
</table>

Note: N = 1104. Procrastination (0=non-procrastinators, 1=academically productive procrastinators, 2=non-academic productive procrastinators, 3=non-academic procrastinators, 4=unproductive procrastinators) and gender were dummy-coded (0 = men, 1 = women). Cohen’s $d = 2t / \sqrt{df}$. The regression models used generalized linear models with a negative binomial log link for all outcome variables other than cravings. The regression model for the cravings variable used ordinary least squares regression. * = $p < .05$, ** = $p < .01$, *** = $p < .001$. 
Figure 1. Five-cluster solution for procrastination styles with centered z-scores.