

RACE AND ETHNICITY AS A MODERATOR OF THE ASSOCIATION BETWEEN
STEREOTYPE THREAT AND ALCOHOL USE

by

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DISSERTATION ABSTRACT

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Title: Race and Ethnicity as a Moderator of the Association Between Stereotype Threat and Alcohol Use

Drinking is common among college students but has different social meanings and consequences for students of color. Using data from first-time U.S. resident students gathered pre-matriculation, end-of-first-year, and fall second-year, I examined the association between expectations for stereotype threat (using an identity and stereotype nonspecific measure) over the first year ($N = 260$) and the relationship between anticipated stereotype threat and alcohol outcomes (total drinks per week and total consequences over the past 3 months) as a main effect and as moderated by Asian and Latinx racial and ethnic identities ($Ns = 221-257$). Pre-matriculation and end-of-first-year stereotype threat scores were correlated ($r = .34, p < .001$), supporting use of pre-matriculation (anticipated) stereotype threat scores for other planned analyses. No significant associations were detected between anticipated stereotype threat and either alcohol outcome, either as a main or moderated effect. Recommendations for future studies and lessons drawn from the present study are discussed.

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CHAPTER I

INTRODUCTION

College Student Alcohol Use

Young adulthood is a period of increased drinking and associated risk for negative consequences (Kuntsche et al., 2017; Patrick et al., 2020). The percentage of individuals who report consuming alcohol during the past month shows a steep incline from 12th grade (34%; Miech et al., 2021) to the minimum legal drinking age (ages 21-22; 65%), with the peak (73%) occurring at ages 25-26 (Schulenberg et al., 2021). Within this developmental period, attending college represents an acutely risky context that promotes drinking, in part due to inaccurate media and other cultural representations that perpetuate a heavy drinking college culture. For example, movies such as *National Lampoon's Animal House* (1978), *National Lampoon's Van Wilder* (2002), *Old School* (2003), and *Neighbors* (2013) among many others, promote the perception that college life mainly functions around parties that involve excessive alcohol consumption with few or, mainly, desirable consequences. Consistent with this, college is often portrayed as a period of experimentation with alcohol and other substances, as best exemplified by the character Jerome 'Chef' McElroy in the animated television series *South Park* who while warning the main characters about the dangers of substance use during childhood said, "There's a time and a place for everything, and it's called *college*" (Parker et al., 1998).

The potency, as well as the inaccuracy, of perceived college alcohol norms is evident as college students are routinely observed overestimating how much and how frequent the "typical" college student is drinking and how acceptable the "typical" college student would find heavy drinking (Dumas et al., 2019), and these misperceptions of behavioral norms are associated with increased alcohol use (McBride et al., 2014). For example, compared with their same-age peers

who do not attend college, a greater percentage of young adult college students report alcohol use (e.g., monthly drinking: 56% of college students vs. 49% of noncollege peers; Schulenberg et al., 2021). College attenders also report being drunk more often (Slutske et al., 2004) and are also more likely to experience serious problems at home, work, or school that were caused by alcohol use compared to their noncollege peers (Slutske, 2005), including hangovers, blackouts, risky sexual behaviors, driving while intoxicated, and academic impairment or disruption (Barnett et al., 2014; Patrick et al., 2020).

Colleges and universities, themselves, may engage in actions that further reinforce imagined norms of the “heavy-drinking college student.” For example, at the University of Oregon, where *National Lampoon’s Animal House* (1978) was filmed, a video recreating a popular scene of the movie with prominent alumni is shown at all university sporting events, and the University of Oregon’s iconic “O” is licensed to alcoholic beverage companies for use in advertising and branding of alcohol products, both of which tacitly condone alcohol use and may increase the incentive salience of alcohol cues for students (Bartholow et al., 2018).

Underscoring the influence of the college environment on drinking behavior, the historical disparities between college students and their same-age noncollege peers with respect to rates of heavy episodic drinking were eliminated in 2020 (e.g., 24% of each group reported consuming 5+ drinks in a row in the past 2 weeks; Schulenberg et al., 2021) following implementation of strategies to mitigate the spread of the COVID-19 virus, which removed many college students from the college context.

Racialized Drinking Stereotypes

While many incoming students may hold neutral or positive attitudes towards the imagined heavy drinking college culture (e.g., 25%, 9%, and 12% of students in one sample saw

getting a hangover, vomiting, and blacking out, all of which stem from heavier drinking, as *positive* drinking outcomes; Mallett et al., 2008) and, in fact, some students may actively seek said experiences (e.g., choosing a “party” school; The Princeton Review, n.d.). Students with identities that are marginalized within a particular college context may experience the college drinking culture more negatively. This may be particularly true for students with marginalized racial and ethnic identities that are associated with negative alcohol-related stereotypes that may be made more salient within the context of a Predominantly White Institution (PWI).

A *stereotype* is “a standardized mental picture that is held in common by members of a group and that represents an oversimplified opinion, prejudiced attitude, or uncritical judgment” (Merriam-Webster, n.d., para. 2). Stereotypes vary in relation to different behaviors and different social identities. With respect to alcohol use, heavier drinking is interpreted differently and has different social or other consequences for students based on their racial or ethnic identity. For example, a common alcohol-related stereotype that is projected onto American Indian and Alaskan Native individuals is the “biological vulnerability to alcohol misuse” stereotype, sometimes referred to as the *firewater myth* (Gonzalez et al., 2021). This stereotype inaccurately and harmfully casts American Indian and Alaskan Native individuals as unable to drink in moderation and to be more prone on the basis of entirely fictitious biological differences to develop addiction to alcohol. Asian American students also contend with an alcohol-related stereotype related to face and neck redness that results from consuming alcohol (i.e., the alcohol flush reaction or “flushing;” Hamada et al., 2022). The alcohol flush reaction is present in some percentage of individuals of all racial and ethnic backgrounds but it more common among those of East Asian descent compared with other racial and ethnic groups (Eng et al., 2007) due to greater population-level prevalence of having at least one inactive allele for the enzyme aldehyde

dehydrogenase (Hurley & Edenberg, 2012), which is involved in alcohol metabolism. Specifically, Asian college students in one study (Hamada et al., 2022) expressed worry that their White counterparts would misinterpret the alcohol flush reaction to mean that they are not “competent” drinkers and are on the verge of “losing control,” which some noted influenced their drinking behavior. Similarly, extant research has largely focused on heavy drinking while ignoring absenteeism and lighter drinking in African American communities, which has contributed to the projection of the stereotype that African Americans tend to engage in heavy drinking (Bass & Kane, 1993; Caetano et al. 1998). The projected drinking stereotype is further strengthened when research ignores or fails to highlight community and individual resiliency and the ability to resist alcohol and drug involvement (Bass & Kane, 1993).

Alcohol use is often viewed by college students as facilitating social interactions and increasing social fit (Litt et al., 2012; Schick et al., 2022). However, to the extent that students are aware of negative drinking stereotypes projected onto their racial and ethnic identities and fear others will interpret their drinking based on these stereotypes (e.g., Gonzalez et al., 2021; Hamada et al., 2022), drinking with their fellow students may pose a personal and social threat, especially in spaces where one’s racial and ethnic identity is experienced as more salient. Worry that one’s drinking behavior will be interpreted in stereotyped ways is likely reinforced through direct interactions with peers. Specifically, consuming alcohol significantly impairs one’s cognitive ability to inhibit race-biased responses (Bartholow et al., 2006). That is, to the extent that individuals implicitly believe in negative racialized alcohol-related stereotypes, they are more likely to express that bias when they drink (Loersch et al., 2015) and to act in ways that may confirm a person’s fears of being stereotyped. Thus, for students of color attending PWIs, the potential for *stereotype threat* is likely heightened in college drinking environments.

Stereotype Threat

Stereotype threat is a situational phenomenon in which perceived risk of confirming pre-existing negative stereotypes related to one's social identities (e.g., race or ethnicity) impacts behavior (Steele & Aronson, 1995). A large portion of the research on stereotype threat has focused on how racial and ethnic stereotypes regarding academic functioning are associated with performance on testing (Appel & Kronberger, 2012; Danaher & Crandall, 2008), academic progress in college settings (Johnson-Ahorlu, 2013; Taylor & Walton, 2011), and associated constructs, such as sense of belonging in academic environments (Mallett et al., 2011; Mello et al., 2012), as these are important metrics of how well institutions are meeting their educational mission and domains in which pronounced inequities exist (Fischer, 2010; Johnson-Ahorlu, 2013; Owens & Massey, 2011). Despite the existence of racialized drinking stereotypes, the likelihood that the existence of these stereotypes will be felt as more salient by students of color in PWI college drinking contexts, and the potential contribution of stereotype threat in explaining individual differences in alcohol use and the experience of alcohol-related consequences, very limited research has explored the relationship between stereotype threat and alcohol outcomes.

In the only study to date that has directly assessed the association between stereotype threat and alcohol use, Gonzalez and colleagues (2021) established that the internalization of the aforementioned “biological vulnerability to alcohol misuse” stereotype was positively associated with depressive symptoms within their sample of college students who identified as American Indian and Alaskan Native, but only for those who reported average or higher levels (but not low levels) of heavy episodic drinking. Additionally, greater depressive symptoms were associated with drinking to cope (see O'Hara et al., 2014 for discussion of this construct), which, in turn, contributed to the experience of alcohol consequences (Gonzalez et al., 2021). For college

students, drinking to cope with stereotype threat may serve to exacerbate the negative effects of stereotype threat on academic outcomes or contribute to other negative consequences (e.g., independent of experiences of stereotype threat, alcohol use among college students is associated with low motivation for academic performance [El Ansari et al., 2013] and heavier alcohol use is associated with lower grade point averages [Piazza-Gardner et al., 2016]; experiencing these alcohol-related consequences may exacerbate fears of confirming academic-related stereotypes).

Though the study by Hamada et al. (2022) did not directly assess activation of stereotype threat among Asian American students or its relationship with alcohol outcomes, its findings highlight the potential for worries about being stereotyped to influence alcohol use. For example, a separate study showed that Asian American students that attempted to hide their alcohol flush reaction consumed significantly more alcohol than participants that did not experience flushing (Chartier et al, 2019). Moreover, the findings of Hamada et al. (2022) suggest that any level of drinking may result in the experience of greater alcohol-related consequences through violation of the “model minority” stereotype. The “model minority” stereotype refers to the perception that Asian students are able to excel in academics and overcome obstacles without outside assistance (Lee et al., 2009). Activation of this “positive” stereotype places pressure on individuals to live up to the stereotype (Lee et al., 2009), which creates marginalization stress (Sue et al., 2007) and attendant consequences, which, for some, may include drinking to cope. The existence and activation of such stereotypes has also been posited to explain inequities in the experience of alcohol-related consequences among African American college students. Specifically, studies have documented that Black students may abstain from alcohol use or drink less to avoid reinforcing stereotypes associated with their racial identity and being targeted by/receiving unequal punishment from college authorities (Peralta, 2005; Peralta & Steele, 2009; Thorpe et

al., 2020; Wade & Peralta, 2017), as well as to avoid experiences of explicit racism from drunk White peers (Peralta, 2005), yet may nonetheless experience more negative alcohol-related consequences (Desalu et al., 2019; Thorpe et al., 2020).

Similar studies exploring the association between fear of reinforcing stereotypes and alcohol use for college students from other racial and ethnic groups (e.g., Latinx students) have yet to be conducted. However, there have been studies examining how phenomena that may create the context for experiences of stereotype threat (i.e., microaggressions and discrimination regarding students' race or ethnicity) impact alcohol consumption for targeted college students (Boynton et al., 2014; Chae et al., 2008; Grekin, 2012). For example, López and colleagues (2022) found that perceived discrimination resulted in more problematic alcohol use among Latinx college students. Otiniano Verissimo and colleagues (2014) also found that discrimination was significantly related to increased risk for harmful alcohol use among members of the Latinx community. Thus, research that directly examines how stereotype threat is related to alcohol use and associated consequences among students with diverse racial and ethnic identities is warranted.

Assessment of Stereotype Threat

Studies of stereotype threat have typically utilized measures that assess individual dimensions of identity separately (e.g., gender *or* racial and ethnic identity) and focus on a single domain (e.g., academic performance) (e.g., Baysu & Phalet, 2019; Harrison et al., 2006; Owens & Massey, 2011). Such an approach necessarily limits the ability to feasibly evaluate the full range of domains in which students with differing identities may experience stereotype threat within the context of a single study. A measure of stereotype threat that is not specific to a single identity or stereotype domain may be particularly important to understanding the associations

between stereotype threat and alcohol use, given the potential for differing experiences across students. Using such a measure, Jones et al. (2021) found that first-year students who identified as American Indian or Alaska Native, Black or African American, Hispanic or Latino/a, or Native Hawaiian or Other Pacific Islander, when examined collectively as a group, and students who, separately, identified as Asian American, reported greater stereotype threat at baseline than White students. Jones et al. (2021) likewise found that women reported greater stereotype threat than did men on this measure at baseline and demonstrated that greater stereotype threat at baseline was associated with increased stress at the end of the academic year, providing initial evidence for the measure's validity, as these results are consistent with the extant literature on the effects of stereotype threat. Of note, as the identity and stereotype non-specific measure of stereotype threat in the study by Jones et al. (2021) was administered prior to matriculation, it can be more accurately described as a measure of worry about being stereotyped, which could create the conditions for stereotype threat (i.e., *anticipated* stereotype threat). Thus, further research is needed to establish the strength of the association between this measure when administered pre-matriculation and after exposure to the college environment and potential *experiences* of stereotype threat in that context.

Study Purpose and Research Questions

Despite the clear existence of racialized stereotypes in relation to alcohol use and the potential for these to create conditions of stereotype threat that paradoxically serve to influence alcohol use or associated consequences among college students that are the target of those stereotypes, no study to date has assessed the relationships between stereotype threat and alcohol use and alcohol-related consequences among college students, particularly those attending a PWI where stereotypes associated with racial and ethnic identities may feel more salient for students

of color. Moreover, how these associations vary across different racial and ethnic groups has not been evaluated. Finally, the strength of association between anticipated stereotype threat (prior to student matriculation) and potentially experienced stereotype threat (after experiencing the college environment) using an identity and stereotype nonspecific measure of stereotype threat has not been established, which is an important step toward expanding our understanding of factors that contribute to student outcomes across their first year in college. Thus, the purpose of the present study is to establish the association between anticipated and potentially experienced stereotype threat (see Figure 1) and to test a model of the association between anticipated stereotype threat and alcohol use and alcohol-related consequences moderated by race and ethnicity (see Figure 2). Specifically, this study will interrogate the following research questions:

- (1) What is the association between anticipated stereotype threat and potentially experienced stereotype threat?
- (2) What is the relationship between anticipated stereotype threat and subsequent alcohol use?
- (3) What is the relationship between anticipated stereotype threat and alcohol-related consequences?
- (4) How do the relationships between anticipated stereotype threat and alcohol use and consequences differ based on race and ethnicity?

While composite scores on the anticipated and potentially experienced stereotype threat measures are hypothesized to be positively correlated, due to limited current research exploring stereotype threat, race and ethnicity, and alcohol use and related consequences for college students, all other research questions are exploratory. That is, while significant associations are expected between anticipated stereotype threat and both alcohol outcomes, specific predictions

about the direction and magnitude of the associations were not made due to the limited and conflicting nature of the existing literature.

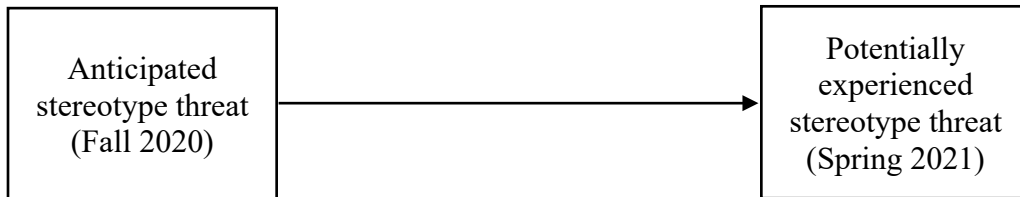


Figure 1. Conceptual model for research question 1.

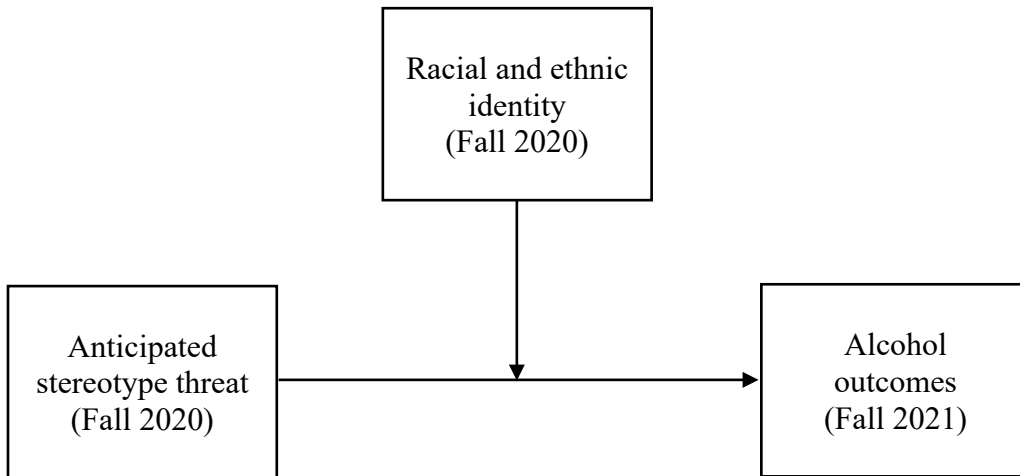


Figure 2. Conceptual model for research questions 2 and 3 (main effects on alcohol use and alcohol-related consequences, using the full sample) and research question 4 (moderation, restricted to Asian American, Hispanic/Latinx, and White students).

CHAPTER II

METHOD

Participants and Procedure

All undergraduate students anticipated to matriculate at the University of Oregon in the fall of 2020 were instructed in an email sent by Student Orientation Programs during the summer prior to matriculation to complete the *What is it like coming to UO?* activity via Qualtrics. The *What is it like coming to UO?* activity included an assessment component, which served as the baseline survey for the Student Wellbeing and Success Initiative (SWaSI). The purpose of the SWaSI is to holistically understand institutional contributions to undergraduate students' wellbeing and success across the college experience with an overarching focus on improving institutional programs and services that support students' learning and development and foster their achievement and persistence. An email containing the link to the baseline SWaSI survey was sent to participants' university email addresses by Student Orientation Programs.

After clicking the survey link, students were first asked to login using their university credentials. Once authenticated, participants were presented with introductory pages generally describing the *What is it like coming to UO?* activity followed by a consent form, which asked students who were at least 18 years old to make two choices. One choice was whether students would allow their data, including those collected in the survey itself and other institutional records data, to be used for research purposes beyond routine institutional purposes. The other choice was whether participants would allow researchers to contact them for end-of-year follow-up assessments during subsequent spring terms. Consent was indicated by clicking *yes* or *no* to each of the two parts of consent.

Students who consented to being contacted for the end-of-year follow-ups were invited

via email to complete the regular end-of-year follow-up in spring of 2021, assessing similar constructs to those assessed at baseline. Individuals who did not respond to the initial invitation for the spring 2021 assessment received up to a total of three reminder emails asking them to complete the assessment. Regardless of whether they participated in the spring 2021 assessment, first-time students who were classified as “U.S. residents,” who matriculated in the fall of 2020, and who consented to be contacted for end-of-year follow-ups were invited via email in the fall of 2021 to complete a one-time assessment of alcohol use and alcohol-related consequences. Transfer students were not included because the present study is focused on the first-year college experience, as the transition from high school to college marks a socio-development change associated with risk of increased alcohol consumption (Fromme et al., 2008; Tremblay et al., 2010). Only students who were U.S. residents were included because the focus of the present study is on the potential threat posed by activation of stereotypes that exist within the cultural context of the United States. As the fall 2021 assessment was an extension of the existing SWaSI protocol, the consent process for which only covered the baseline and regular end-of-year follow-ups, participants were asked to separately provide consent using a similar mechanism to the main study prior to being directed to the survey questions. Individuals who did not respond to the initial invitation for the fall 2021 assessment received up to a total of three reminder emails asking them to complete the assessment. No compensation was provided for participation in the baseline assessment. The first 1,100 students who completed the regular end-of-year follow-up in the spring of 2021 each had \$5 added to their *Duck Bucks* accounts (the University’s debit card program). Participants who completed the fall 2021 assessment were entered into a drawing for one of five \$100 electronic Amazon gift cards.

Of the students who were instructed to complete the *What is it like coming to the UO?*

activity in connection with their matriculation in fall of 2020 ($N = 6,059$), 3,167 students provided responses to the two consent items, of which 2,432 students consented to being contacted for the end-of-year follow-up assessments. Of these, 2,304 students ultimately matriculated at the university and 1,935 fit the inclusion criteria for the present study. After excluding three additional participants who opted out of further assessment during the regular end-of-year follow-up in spring of 2021, there was a panel of 1,932 students eligible for the fall 2021 assessment. Of these, 1,860 students provided consent to use their data for research purposes. One invited student indicated they were a non-U.S. resident, so their data were removed from the dataset, leaving a final sample of 1,859 eligible for analysis. See Figure 3 for flow of study procedures. See Table 1 for sample demographics and final sample sizes used in analyses.

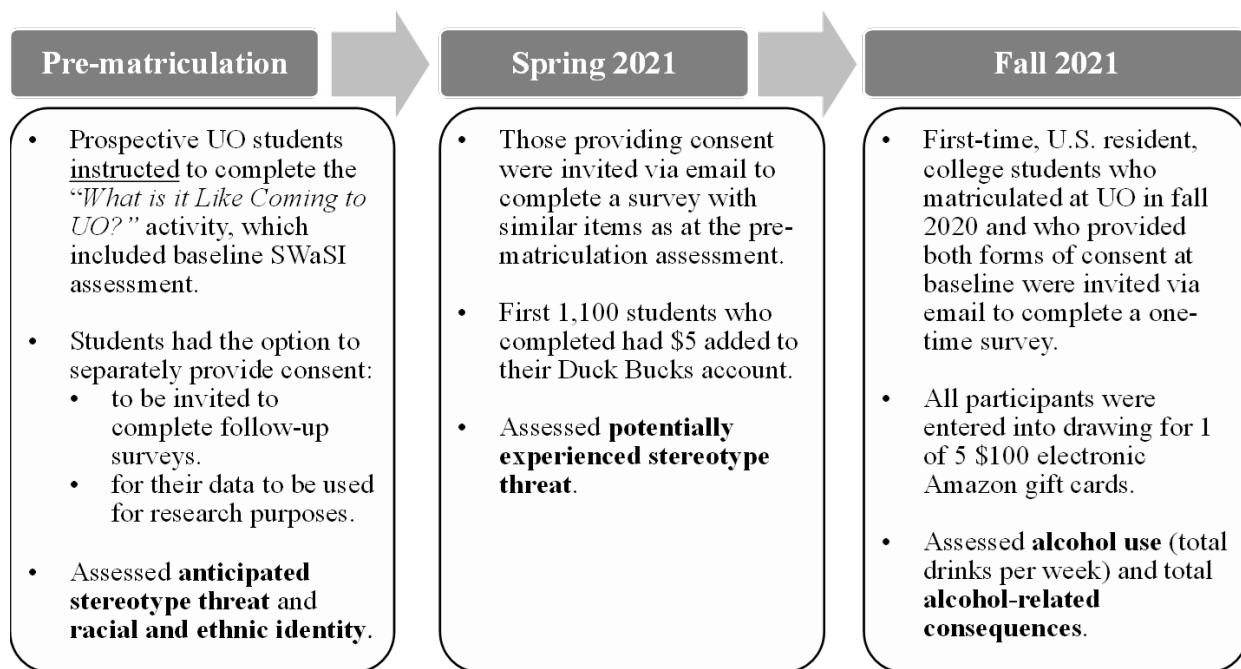


Figure 3. Flowchart of study procedures.

Table 1. Demographics for the analytic samples based on explanatory and outcome variables.

	Anticipated Stereotype Threat (<i>N</i> = 1,853)		Potentially Experienced Stereotype Threat (<i>N</i> = 260)		Total Drinks per Week (<i>N</i> = 257)		Alcohol- related Consequences (<i>N</i> = 248)	
	<i>n</i>	Percent	<i>n</i>	Percent	<i>n</i>	Percent	<i>n</i>	Percent
Racial & Ethnic Identity								
AI/AN	7	0.38%	1	0.38%	1	0.39%	1	0.40%
Asian American	113	6.10%	22	8.46%	22	8.56%	22	8.87%
Black or AA	45	2.43%	4	1.54%	4	1.56%	4	1.61%
Hispanic/Latinx	284	15.33%	33	12.69%	35	13.62%	33	13.31%
NH/OPI	6	0.32%	2	0.77%	1	0.39%	1	0.40%
Multiracial	150	8.09%	15	5.77%	22	8.56%	20	8.06%
White	1238	66.81%	181	69.62%	171	66.54%	166	66.94%
Did not report	10	0.54%	2	0.77%	1	0.39%	1	0.40%
Gender: Registrar's Data								
Male	732	39.50%	83	31.92%	79	30.74%	74	29.84%
Female	1121	60.50%	177	68.08%	178	69.26%	174	70.16%
Gender: SWaSI								
Man	533	28.76%	61	23.46%	62	24.12%	57	22.98%
Woman	831	44.85%	130	50.00%	137	53.31%	133	53.63%
Gender Diverse	25	1.35%	7	2.69%	7	2.72%	7	2.82%
Did not report	464	25.04%	62	23.85%	51	19.84%	51	20.56%

Note. AI/AN = American Indian or Alaska Native; AA = African American; NH/OPI = Native Hawaiian or Other Pacific Islander. Consistent with the analyses reported, *Ns* reflect the number of individuals providing data for a given variable as opposed to the total sample size at a given assessment point. *N* for potentially experienced stereotype threat reflects the sample used to answer research question 1. *Ns* for total drinks per week and alcohol-related consequences reflect the samples used in main effects models (research questions 2 and 3). Only participants who identified as Asian American, Hispanic/Latinx, or White were included in the moderation models (*Ns* = 228 and 221; research question 4).

Measures

Demographics

Race and ethnicity were separately assessed through individual items as part of students' admissions application. First, participants were asked to report if they were Hispanic or Latino/a.

Second, participants were asked to indicate if they were Asian or Asian American, Black or African American, American Indian or Alaska Native, Native Hawaiian or Pacific Islander, White, or Multiracial. Participants' residency status (i.e., U.S. resident, nonresident) was also provided as part of admission application data. Participants were also asked to report their gender as part of the admissions application but were only offered binary response options of *male* or *female*. Gender was separately assessed in the SWaSI, with response options including: *Agender*; *Genderqueer*; *Man*; *Nonbinary, including gender fluid, gender nonconforming, etc.*; *Transgender*; *Trans Man*; *Trans Woman*; *Woman*; *Questioning or unsure*; *None of these describe me well, this is better: [text box]*; and *Prefer not to respond*. Responses of *Man* and *Woman* may or may not reflect cisgender identities, as this was not specified. Students reporting gender identities outside of these two categories were aggregated into a single "gender diverse" category for the purpose describing the sample.

Stereotype Threat

Anticipated stereotype threat was measured in the baseline SWaSI survey (pre-matriculation during the summer of 2020, at which point students were not yet on campus) with four items adapted from those used by Walton and Cohen (2011), three of which were initially published by Cohen and Garcia (2005). The original items referred specifically to racial identity (e.g., "At [university] I worry that people will draw conclusions about me, based on what they think about my racial group"). Items were adapted to refer to students' identities in a general way, focused on students' expectations (e.g., "At [the university], I worry that people will draw conclusions about me, based on what they think about people with backgrounds like mine"), with response options of *strongly disagree* (1), *moderately disagree* (2), *slightly disagree* (3), *slightly agree* (4), *moderately agree* (5), and *strongly agree* (6) (see Appendix for all measures used to

derive data for analyses in the current study). Items were averaged to form a composite variable, with higher scores corresponding to greater anticipated stereotype threat. Composite scores derived from responses to this identity and stereotype non-specific version of the items administered pre-matriculation have been shown to be significantly higher among students of color and women compared to White students and men (Jones et al., 2021), consistent with what would be expected based on existing literature on stereotype threat (e.g., Cromley et al., 2013; Dennehy et al., 2018), supporting the preliminary construct validity of this adapted version. Internal consistency reliability for the four items at baseline was high in the current sample ($\alpha = .87$, bootstrapped 95% CI [0.85, 0.88]).

Slightly adapted items were administered in the spring of 2021, after students had directly engaged with the university community (e.g., participated in classes, received academic evaluations) for over two academic terms. Specifically, the word “will,” which appeared in the pre-matriculation version of all items, was removed from the spring 2021 version of the items to capture students’ actual experiences (e.g., “At [the university], I worry that people draw conclusions about me, based on what they think about people with backgrounds like mine”), using the same response options of *strongly disagree* (1), *moderately disagree* (2), *slightly disagree* (3), *slightly agree* (4), *moderately agree* (5), and *strongly agree* (6) (see Appendix). Responses to the end-of-year spring-term follow-up assessment, therefore, likely reflect students’ lived experiences of stereotype threat in the university context (i.e., potentially experienced stereotype threat) as well as anticipation of future experiences of stereotype threat. Internal consistency reliability for the four items during the spring 2021 follow-up was high ($\alpha = 0.90$, bootstrapped 95% CI [0.87, 0.93]).

Alcohol Consumption

The Daily Drinking Questionnaire (DDQ; Collins et al., 1985) was administered in the fall of 2021. Participants were asked to indicate the number of standard drinks they consumed on each day of a typical week over the past 3 months. Participants were presented with a United States-specific definition for a standard drink before providing their responses (i.e., 0.6 oz of pure alcohol, which translates to 12 oz of 5% alcohol by volume [ABV] beer, 4 oz of 15% ABV wine, or 1.25 oz of 40% ABV liquor). Responses were summed to create a count variable representing total drinks per week, which, among all possible indices of alcohol consumption (e.g., average drinks per day, total drinking days), is a good predictor of problems experienced from alcohol consumption among college students (Borsari et al., 2001). The DDQ is highly correlated with other self-reported measures of alcohol consumption (Kivlahan et al., 1990).

Alcohol-Related Consequences

A modified version of the Brief Young Adult Alcohol Consequences Questionnaire (B-YAACQ) was administered in the fall of 2021. The original B-YAACQ (Kahler et al., 2005) has 24 items documenting negative consequences associated with alcohol use (e.g., “I have passed out from drinking”) that have occurred over the past month. Four items were added based on prior research in college populations (Lee et al., 2023) assessing “When drinking, I felt sexier than usual,” “When drinking, I was overly emotional,” “I drunk texted/dialed,” and “When drinking, I posted something on social media that I wouldn’t have normally posted.” For each of the 28 total items, participants are asked to indicate *yes* (1) or *no* (0) to whether they had experienced each consequence over the prior 3 months, to match the assessment timeframe for the DDQ. Affirmative responses were summed to create a count variable reflecting total alcohol-related consequences experienced.

Data Analytic Plan

All analyses were conducted in R Studio 4.2.2 (2022). Internal reliability coefficients were calculated using the *alpha* function of the *psych* package (Revelle, 2023).

Data Missingness

Prior to analyses, missingness was assessed visually through the *gg_miss_upset* and *vis_miss* functions of the *naniar* package (Tierney & Cook, 2023). The *gg_miss_upset* function creates a graphical depiction that quantifies the number of different patterns of missingness within the data, whereas *vis_miss* creates a graphical depiction of total missingness across all variables. Different methods of addressing missing data were considered using the decision-tree provided by Newman (2014). The *mcar_test* function in the *naniar* package (Tierney & Cook, 2023) was used to determine if missing responses could be considered missing completely at random (MCAR).

Research Question 1

The linear relationship between anticipated and potentially experienced stereotype threat was assessed using the *cor.test* function within the base *stats* package (R Core Team, 2022) after first evaluating data to ensure they met the assumptions for Pearson's product-moment correlation (Laerd Statistics, n.d.). The first assumption was met, as the composite measures created from the individual anticipated and potentially experienced stereotype threat items are continuous variables. The second and third assumptions, that the two variables have a monotonic relationship without potentially influential outliers, was confirmed via a scatterplot and boxplot created with the *ggplot2* package (Wickham, 2016). The final assumption, that the two variables are normally distributed, was confirmed via histograms created with the *ggplot2* package (Wickham, 2016) and by acceptable skewness (0.27 for both) and kurtosis (-0.70 and -0.85 for anticipated and potentially experienced stereotype threat) values (Kim, 2013), which were

requested via the *describe* function of the *psych* package (Revelle, 2023).

Research Questions 2, 3, and 4

All students who provided data on variables included in a given model were included in analyses related to research questions 2 and 3. Owing to the relatively smaller number of participants who identified as Black or African American, American Indian or Alaskan Native, or Native Hawaiian or Other Pacific Islander, only students who reported their ethnicity as Hispanic or Latino/a (Latinx) or their race as White or Asian American were included in the analyses related to research question 4 examining moderation of the association between anticipated stereotype threat and alcohol outcomes by race and ethnicity (see Table 1 for relevant *ns*). Students who reported being Multiracial were also excluded from moderation analyses, because these participants were not given the opportunity to specify with which specific racial and/or ethnic groups they identify. The nominal variable representing race and ethnicity was relevelled using the *fact_relevel* function of the *forcats* package (Wickham, 2023) that is included within the *tidyverse* package (Wickham et al., 2019), such that White was the first level, making it the reference category when interactions terms with anticipated stereotype threat were subsequently generated. Prior to conducting analyses, anticipated stereotype threat scores were mean centered (using only the complete cases associated with a given analysis; Hayes, 2018), meaning that the average value of the anticipated stereotype threat variable was subtracted from each individual anticipated stereotype threat composite score to form new values (with a mean of 0) without changing the scale. This step aids in the interpretation of parameter estimates, especially if the model includes an interaction (Atkins & Gallop, 2007; Grace-Martin, n.d.).

Given that total drinks per week and total alcohol-related consequences reflect count data (i.e., values are whole integers that cannot be negative; Muench et al., 2017), data were evaluated

to determine whether a Poisson or negative binomial regression approach, or a zero-inflated version of these approaches (Atkins et al., 2013), was most appropriate to determine the relationships between anticipated stereotype threat and each of these two outcomes. Poisson regression assumes equidispersion, meaning that the conditional mean and variance of a given count outcome variable are identical; overdispersion is said to be present when the conditional variance of the count variable is greater than the conditional mean (Setyawan et al., 2022). Overdispersion was formally tested using the *odTest* function within the *pscl* package (Jackman, 2020a) as applied to the negative binomial regression model (which includes code that simultaneously and invisibly runs the Poisson model). The negative binomial model was calculated using the *glm.nb* function within the *MASS* package (Venables & Ripley, 2002). The *odTest* function performs a likelihood ratio test, reported as a χ^2 value with 1 degree of freedom, comparing the log-likelihood of a negative binomial regression model with the log-likelihood of a Poisson model to evaluate the null hypothesis that the conditional variance and mean of the count variable are equivalent. A significant result, therefore, suggests the data are overdispersed.

When count data are overdispersed, a negative binomial regression should be used (Setyawan et al., 2022), as Poisson regression would likely lead to invalid conclusions due to biased parameter estimation and underestimated standard error (Saputro et al., 2021). Negative binomial regression, unlike Poisson regression, allows for more flexibility in model fitting as the conditional variance of the output variable can be greater than the conditional mean (Yang & Berdine, 2015). However, when overdispersion is caused by inflation of the variance by the presence of *structural* zeros, it necessitates the use of a zero-inflated negative binomial (ZINB) regression model (Rehder & Bowen, 2019). *Random* (sampling) zeros represent events that *could potentially occur* but did not occur during the sampling window, whereas *structural* zeros

represent events that *could never occur* (Blasco-Moreno et al., 2019). For example, if a person abstains from alcohol use, the count *event* of drinking cannot potentially occur for them (i.e., their data represents a structural zero), which is different than when a person who drinks alcohol reports they consumed 0 drinks during a given assessment period (i.e., their data represents a random/sampling zero). Zero counts are quite common when alcohol use and alcohol-related consequences are used as outcomes (e.g., Buu et al., 2012; Regan et al., 2020) and frequently reflect a mixture of sampling and structural processes.

To determine whether a negative binomial or ZINB model was most appropriate for modeling the relationship between anticipated stereotype threat and total drinks per week, as a main effect and as moderated by race and ethnicity, I used the *zeroinfl* function in the *pscl* package (Jackman, 2020a) to conduct the ZINB regression analyses. Following guidance by Atkins and Gallop (2007), I then used the *vuong* function within the *pscl* package (Jackman, 2020a) to request the Vuong Test (Jackman, 2020b; Vuong, 1989), which compared the ZINB model with the previously computed negative binomial model (which was conducted in the process of computing the likelihood ratio test assessing overdispersion). The Vuong Test compares the goodness of fit of two competing non-nested models with the null hypothesis that “the expected value of their log-likelihood ratios equals zero” (Wilson, 2015; p. 53), meaning the models are indistinguishable (Jackman, 2020b). Though Wilson (2015) and others have questioned the validity of applying the Vuong Test to the comparison of negative binomial and ZINB models, this is a generally accepted practice within the field (e.g., Mehdizadeh et al., 2023; Pittman et al., 2020; Yang et al., 2007). The Vuong Test produces a raw statistic, an Akaike Information Criterion (AIC)-corrected statistic, and a Bayesian Information Criterion (BIC)-corrected statistic, which are indices of model fit. “The BIC is more useful in selecting a correct

model while the AIC is more appropriate in finding the best model for predicting future observations” (Chakrabarti & Ghosh, 2011, p. 603). For the present study, I utilized the BIC-corrected Vuong statistic along with BIC statistics produced for each model using the *BIC* function of the *stats* package (R Core Team, 2022) to determine the best fitting model for each analysis.

CHAPTER III

RESULTS

Data Preparation

Data Missingness

Prior to analyses, data were evaluated to assess amount and patterns of missingness within the data relevant to analytical models. As seen in Table 2, the current study had a high attrition rate from the fall 2020 baseline assessment to the spring 2021 follow-up assessment (85.5%) and a similarly high attrition rate from the fall 2020 baseline assessment to the fall 2021 follow-up assessment (85.7%), most likely due to the fact that students were instructed to complete the baseline assessment by Student Orientation Programs as part of the matriculation process and could opt-out (not consent) to receiving subsequent invitations for the spring 2021 end-of-year follow-up assessment and fall 2021 assessment. However, as depicted in Figure 4, among the 269 individuals who participated in the spring 2021 assessment, there was limited missingness in assessments of stereotype threat that appeared to be at random, which was confirmed through the MCAR test, $\chi^2(6) = 6.51, p = .369$. Moreover, nonparticipation in the spring 2021 assessment does not appear to have systematically differed as a function of anticipated stereotype threat scores or as a function of racial and ethnic identity (see Figure 5)

Similarly, as depicted graphically in Figure 6, among the 266 individuals who participated in the fall 2021 assessment, there was limited missingness in the assessment of drinks per week and alcohol consequences that appeared to be at random, which was confirmed through the MCAR test, $\chi^2(14) = 10.8, p = .703$. Moreover, nonparticipation in the fall 2021 assessment does not appear to have systematically differed as a function of anticipated stereotype threat scores (see Figure 7) or as a function of racial and ethnic identity (see Table 3).

Table 2. Number of participants by assessment by variable.

	Began Assessment	Provided Data	Univariate Missing	Complete Cases
Fall 2020 (baseline)				
Race and ethnicity	1859	1849	10	
Anticipated stereotype threat	1859	1854	5	
Spring 2021				
Potentially experienced stereotype threat	269	261	8	260
Fall 2021				
Total drinks per week	266	258	8	257
Alcohol-related consequences	266	248	18	248

Note. For potentially experienced stereotype threat, *n* reflects those individuals who provided data for both anticipated and potentially experienced stereotype threat. For alcohol outcomes, *ns* reflect those individuals who provided data on anticipated stereotype threat and the stated alcohol outcome.

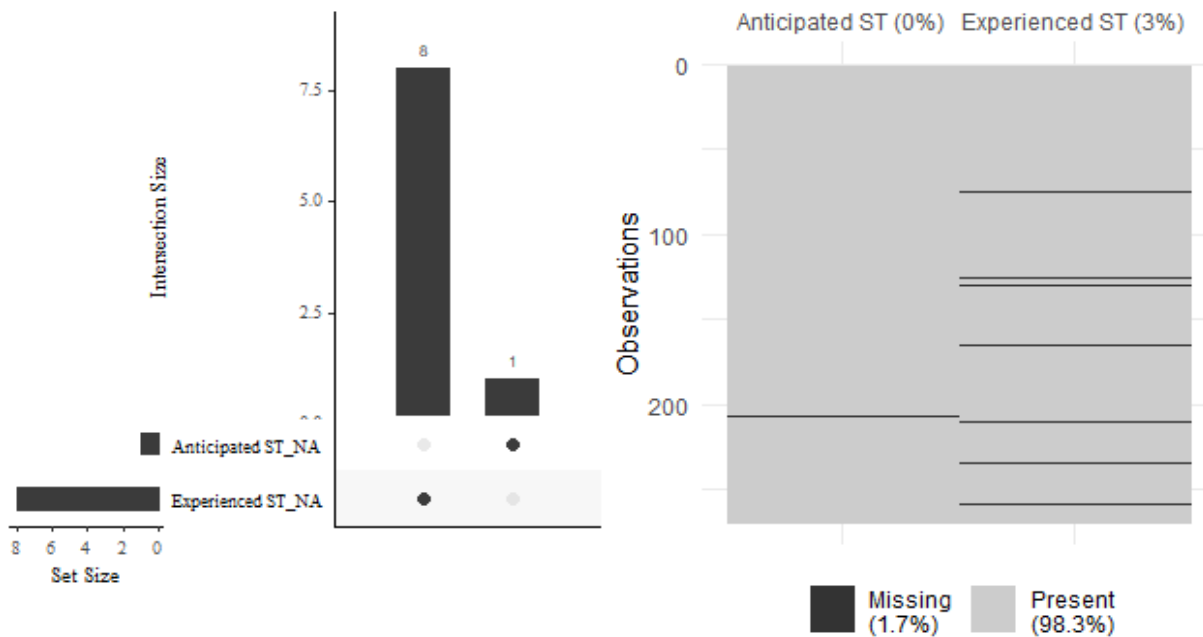


Figure 4. Amount and pattern of missingness in anticipated and potentially experienced stereotype threat composite scores among those completing the spring 2021 assessment.

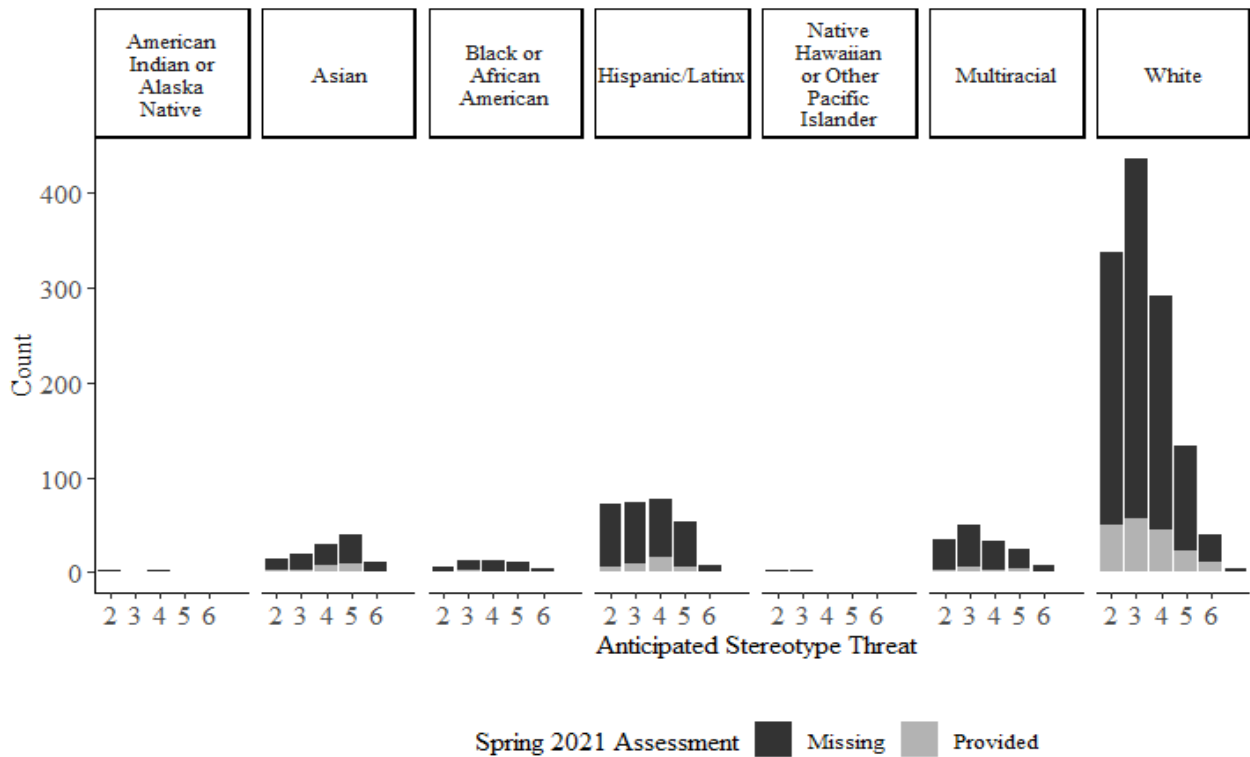


Figure 5. Pattern of completion (began the assessment) vs. nonresponse (data missing) to the spring 2021 assessment as a function of anticipated stereotype threat composite score at baseline and race and ethnicity.

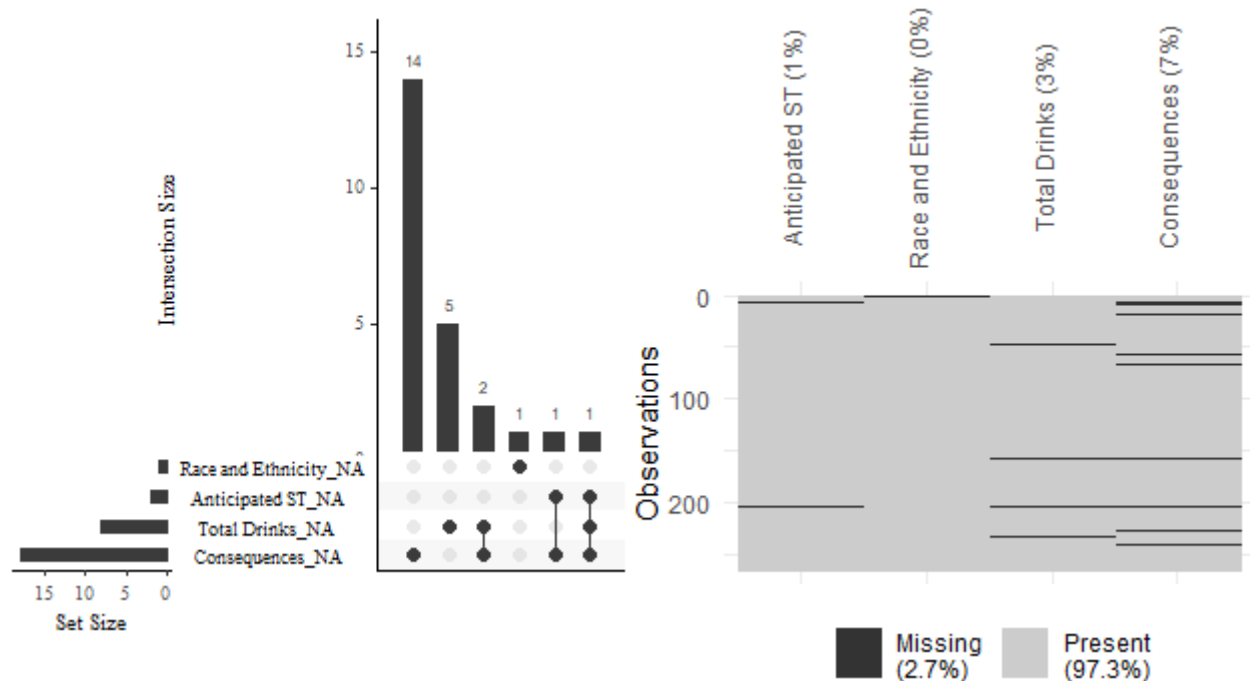


Figure 6. Amount and pattern of missingness in anticipated stereotype threat, alcohol outcome, and racial and ethnic identity data among those completing the fall 2021 assessment.

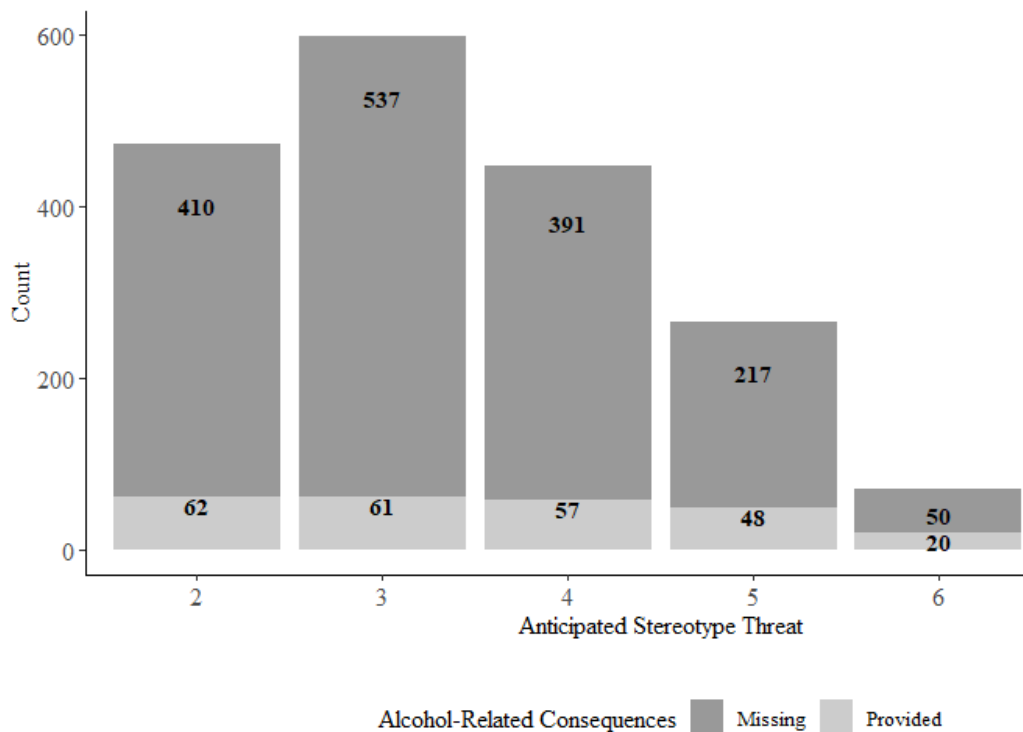
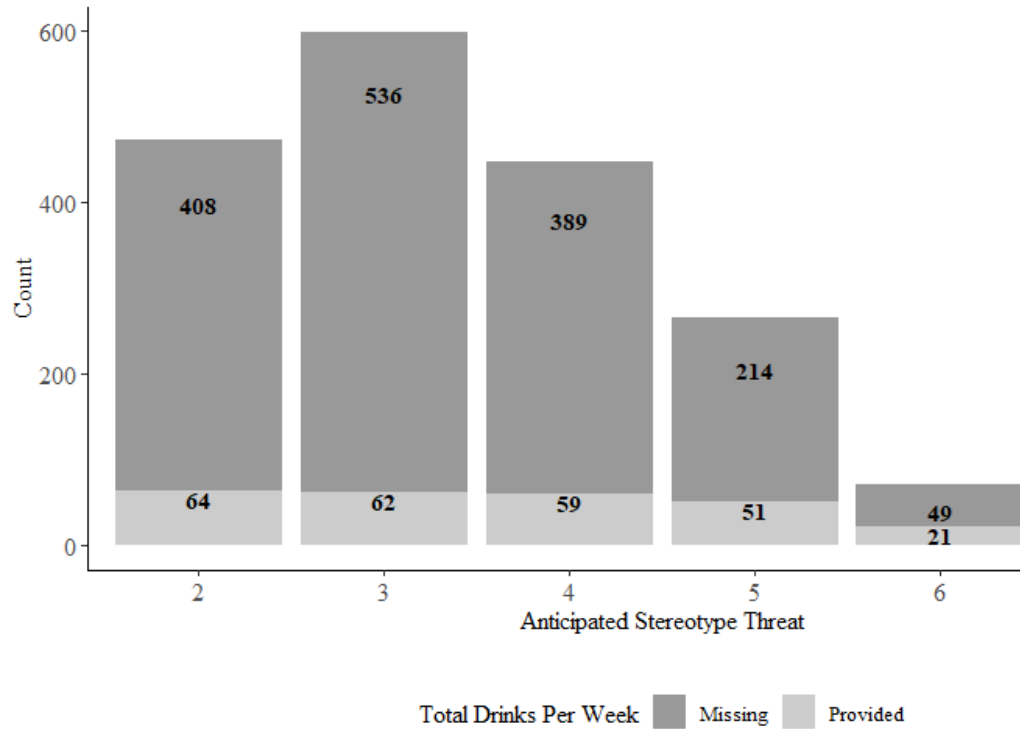


Figure 7. Distribution of missingness (assessment attrition and item nonresponse) in total drinks per week (*top*) and alcohol-related consequences (*bottom*) as a function of baseline anticipated stereotype threat composite score.

Table 3. Percentage of missingness (assessment attrition and item nonresponse) in total drinks per week and alcohol-related consequences as a function of racial and ethnic identity.

	<i>n</i>	Total Drinks per Week		Alcohol-related Consequences	
		Provided	Missing	Provided	Missing
American Indian and Alaska Native	7	14.29%	85.71%	14.29%	85.71%
Asian American	113	19.47%	80.53%	19.47%	80.53%
Black or African American	46	8.70%	91.30%	8.70%	91.30%
Hispanic/Latinx	284	12.32%	87.68%	11.62%	88.38%
Native Hawaiian or Other Pacific Islander	6	16.67%	83.33%	16.67%	83.33%
Multiracial	151	15.23%	84.77%	13.25%	86.75%
White	1242	13.77%	86.23%	13.37%	86.63%

Note. Percentages based on total respondents to the baseline assessment within each racial and ethnic group.

As variables were not included in the baseline assessment that could be reasonably used to impute missing values for the alcohol outcome measures (Dong & Peng, 2013), and the total amount of data missing due to item nonresponse in a given assessment wave was low (1.7%-2.7%), pairwise deletion based on the variables in a given analysis was deemed appropriate (Ayilara et al., 2022; Bennett, 2001; Buhi et al., 2008; Newman, 2014; Schaffer, 1999). Pairwise deletion was selected over listwise deletion to maximize power (McNeish, 2017), as only 91 participants completed the baseline, spring, and fall assessments.

Assessing Outcome Variable Dispersion and Zero-Inflation

As noted in Table 4, as well as depicted graphically in Figure 8, total drinks per week and alcohol-related consequences appeared overdispersed (sample variance > sample mean) with a significant percentage of zeros, suggesting ZINB would be the appropriate approach. This was confirmed for both main effects models and the moderation model with total drinks per week as the outcome by subsequent likelihood ratio tests, relative BIC values, and Vuong tests (see Table 5). The Vuong test for the main effect model with total drinks per week as the outcome was

Table 4. Descriptive statistics for model variables.

Variable	N	Zeros	% Zeros	Mean	SD	Var
Anticipated stereotype threat						
Baseline sample	1,853			2.68	1.16	1.34
Included in RQ1 analyses	260			2.83	1.21	1.45
Race and Ethnicity						
AI/AN	1			—	—	
Asian American	22			3.57	0.92	
Black or AA	4			3.81	1.61	
Hispanic/Latinx	33			2.92	0.98	
NH/OPI	2			—	—	
Multiracial	15			2.69	1.34	
White	181			1.88	1.21	
Gender: Registrar's Data						
Male	83			2.79	1.33	
Female	177			2.85	1.15	
Gender: SWaSI						
Man	61			2.64	1.29	
Woman	130			2.76	1.15	
Gender Diverse	7			3.14	0.82	
Potentially experienced stereotype threat	260			2.97	1.34	1.78
Race and Ethnicity						
AI/AN	1			—	—	
Asian American	22			3.60	1.31	
Black or AA	4			3.75	2.15	
Hispanic/Latinx	33			2.58	1.11	
NH/OPI	2			—	—	
Multiracial	15			3.47	1.38	
White	181			2.62	1.30	
Gender: Registrar's Data						
Male	83			2.85	1.38	
Female	177			3.02	1.31	
Gender: SWaSI						
Man	61			2.68	1.32	
Woman	130			2.98	1.33	
Gender Diverse	7			2.71	1.59	
Total drinks per week	257	144	56.03%	3.65	5.89	34.68
Race and Ethnicity						
AI/AN	1			—	—	
Asian American	22			2.14	3.94	
Black or AA	4			4.25	7.85	
Hispanic/Latinx	35			3.23	4.97	
NH/OPI	1			—	—	
Multiracial	22			4.14	7.98	
White	171			3.89	5.98	

Table 4. Continued.

Variable	N	Zeros	% Zeros	Mean	SD	Var
Total drinks per week (cont.)						
Gender: Registrar's Data						
Male	79			4.46	7.59	
Female	178			3.30	4.94	
Gender: SWaSI						
Man	62			4.19	7.27	
Woman	137			3.26	4.77	
Gender Diverse	7			0.29	0.76	
Alcohol consequences	248	106	42.74%	3.06	4.17	17.41
Race and Ethnicity						
AI/AN	1			—	—	
Asian American	22			2.05	2.66	
Black or AA	4			5.50	4.93	
Hispanic/Latinx	33			3.64	4.43	
NH/OPI	1			—	—	
Multiracial	20			2.30	3.33	
White	166			3.13	4.37	
Gender: Registrar's Data						
Male	74			2.78	3.66	
Female	174			3.17	4.38	
Gender: SWaSI						
Man	57			2.58	3.59	
Woman	133			3.11	4.17	
Gender Diverse	7			0.29	0.76	

Note. AI/AN = American Indian or Alaska Native; AA = African American; NH/OPI = Native Hawaiian or Other Pacific Islander; SD = standard deviation; Var = variance; RQ = research question. Where <3 participants with a given identity provided data, values are omitted ("—").

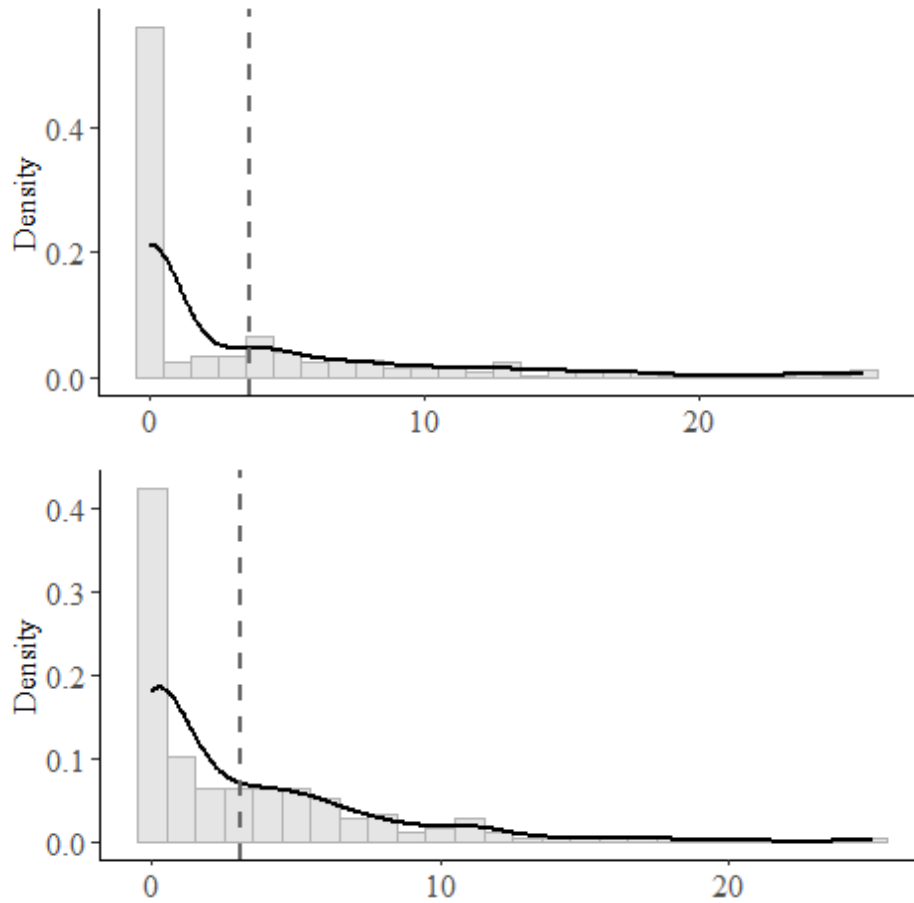


Figure 8. Histogram of total drinks per week (*top*) and alcohol-related consequences (*bottom*).

Table 5. Likelihood ratio test and Vuong test statistics for main effects and moderation models.

Outcome Variable	<i>N</i>	$\chi^2(1)$	<i>p</i>	NB BIC	ZINB BIC	<i>Z</i>	<i>p</i>
Main effects models							
Total drinks per week	257	1365.72	<.001	1097.44	1061.69	3.41	<.001
Post hoc model	85	489.19	<.001	324.29	317.27	1.04	0.149
Alcohol consequences	248	648.83	<.001	1100.11	1094.89	0.68	0.249
Post hoc model	81	188.77	<.001	360.75	356.09	0.62	0.267
Moderation models							
Total drinks per week	228	1104.05	<.001	1005.81	991.78	1.40	0.081
Alcohol consequences	221	572.16	<.001	1008.99	1028.70	-2.90	0.002

Note. NB = negative binomial. ZINB = zero-inflated negative binomial. The χ^2 statistic denotes the outcome of the overdispersion test. *Z* represents the BIC-corrected Vuong Test statistic. statistically significant, suggesting the ZINB model was a better fit. The Vuong test for the

moderation model with alcohol-related consequences as the outcome was also statistically significant, suggesting the negative binomial model was a better fit, as indicated by the negative sign on the Z statistic. The Vuong Test statistics were consistent with the lower BIC values for the ZINB and NB models across the two tests, respectively. When the Vuong Test statistic was not statistically significant, indicating the models were equivalent, the model with the lowest BIC was selected, which was ZINB for all other models.

Research Question 1

Bivariate associations for all numeric model variables are shown in Table 6. Anticipated and potentially experienced stereotype threat scores were positively correlated with a small-to-medium effect size, supporting the use of anticipated stereotype threat scores in answering remaining research questions. Although not directly relevant to research question 1, total drinks per week was positively correlated with alcohol-related consequences, with a medium effect size.

Table 6. Pearson product-moment correlations for numeric variables.

Variable	1	2	3
1. Anticipated stereotype threat			
2. Potentially experienced stereotype threat	.34 [.23, .45]*		
3. Total drinks per week	-.06 [-.18, .06]	.04 [-.18, .25]	
4. Alcohol-related consequences	-.01 [-.13, .12]	-.02 [-.23, .19]	.54 [.44, .62]*

Note. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014).

* indicates $p < .001$

Research Question 2

As shown in Table 7, ZINB results indicate that there is no significant relationship between anticipated stereotype threat and total drinks per week. Similar results were produced

when this analysis was repeated post-hoc including only students of color, to explore whether the large percentage of White participants may have masked effects (see Table 8). Similar to the main analysis, the relationship between anticipated stereotype threat and alcohol consumption was not significant. Effect sizes are presented as incidence rate ratios (IRR) for count models and odds ratios (OR) for zero-inflated models with corresponding 95% confidence intervals (CIs).

Table 7. ZINB regression model examining the main effect of anticipated stereotype threat on total drinks per week ($N = 257$).

Count Model	<i>B</i>	<i>SE</i>	<i>z</i>	<i>p</i>	<i>IRR</i>	95% CI
(Intercept)	2.07	0.08	26.34	<.001	7.93	[6.799, 9.252]
Stereotype Threat	-0.02	0.05	-0.43	0.666	0.98	[0.879, 1.086]
Zero-inflated Model	<i>b</i>	<i>SE</i>	<i>z</i>	<i>p</i>	<i>OR</i>	95% CI
(Intercept)	0.16	0.13	1.21	0.226	1.18	[0.904, 1.531]
Stereotype Threat	0.09	0.10	0.85	0.395	1.09	[0.895, 1.325]

Table 8. Post hoc ZINB regression model examining the main effect of anticipated stereotype threat on total drinks per week ($N = 85$).

Count Model	<i>b</i>	<i>SE</i>	<i>z</i>	<i>p</i>	<i>IRR</i>	95% CI
(Intercept)	2.16	0.14	15.00	<.001	8.63	[6.513, 11.441]
Stereotype Threat	-0.06	0.09	-0.66	0.511	0.94	[0.793, 1.122]
Zero-inflated Model	<i>b</i>	<i>SE</i>	<i>z</i>	<i>p</i>	<i>OR</i>	95% CI
(Intercept)	0.56	0.24	2.37	0.018	1.74	[1.1, 2.761]
Stereotype Threat	-0.04	0.17	-0.23	0.817	0.96	[0.69, 1.34]

Research Question 3

Results of the ZINB analysis, shown in Table 9, indicate no significant relationship between anticipated stereotype threat and total alcohol-related consequences. Similar results were produced when this analysis was repeated post-hoc including only students of color (see Table 10). Effect sizes and CIs are presented in a similar manner to Tables 7 and 8.

Table 9. ZINB regression model examining the main effect of anticipated stereotype threat on alcohol-related consequences ($N = 248$).

Count Model	<i>b</i>	<i>SE</i>	<i>z</i>	<i>p</i>	<i>IRR</i>	95% CI
(Intercept)	1.55	0.09	17.38	<.001	4.71	[3.954, 5.608]
Stereotype Threat	0.00	0.07	0.05	0.96	1.00	[0.883, 1.14]
Zero-inflated Model	<i>b</i>	<i>SE</i>	<i>z</i>	<i>p</i>	<i>OR</i>	95% CI
(Intercept)	-0.62	0.20	-3.15	0.002	0.54	[0.369, 0.793]
Stereotype Threat	0.03	0.12	0.22	0.824	1.03	[0.807, 1.309]

Table 10. Post hoc ZINB regression model examining the main effect of anticipated stereotype threat on alcohol-related consequences ($N = 81$).

Count Model	<i>b</i>	<i>SE</i>	<i>z</i>	<i>p</i>	<i>IRR</i>	95% CI
(Intercept)	1.64	0.12	14.02	<.001	5.13	[4.082, 6.449]
Stereotype Threat	-0.05	0.08	-0.62	0.536	0.95	[0.805, 1.12]
Zero-inflated Model	<i>b</i>	<i>SE</i>	<i>z</i>	<i>p</i>	<i>OR</i>	95% CI
(Intercept)	-0.29	0.25	-1.17	0.242	0.75	[0.457, 1.218]
Stereotype Threat	-0.05	0.18	-0.31	0.758	0.95	[0.672, 1.336]

Research Question 4

Table 11 reports statistics relevant to the ZINB regression exploring whether race and ethnicity had a moderating effect on the relationship between anticipated stereotype threat and total drinks per week. Results indicate that race and ethnicity did not play a significant moderating role in this relationship. Table 12 provides statistics from the negative binomial regression exploring whether race and ethnicity had a moderating effect on the relationship between anticipated stereotype threat and total alcohol-related consequences. Similar to the ZINB model with total drinks per week as the outcome, none of the interactions were statistically significant.

Table 11. ZINB regression model examining count of total drinks per week and likelihood of not drinking on stereotype threat, racial and ethnic identities, and their interaction ($N = 228$).

Count Model	<i>b</i>	<i>SE</i>	<i>z</i>	<i>p</i>	<i>IRR</i>	95% CI
(Intercept)	2.05	0.09	22.96	<.001	7.78	[6.527, 9.263]
Stereotype Threat	-0.02	0.07	-0.31	0.756	0.98	[0.859, 1.117]
RE (Asian American)	-0.53	0.55	-0.95	0.343	0.59	[0.200, 1.752]
RE (Hispanic/Latinx)	-0.01	0.23	-0.04	0.970	0.99	[0.634, 1.551]
RE (Multiracial)	0.50	0.30	1.67	0.096	1.65	[0.916, 2.961]
Stereotype Threat x RE (Asian)	0.22	0.29	0.75	0.455	1.25	[0.700, 2.217]
Stereotype Threat x RE (Latinx)	-0.11	0.15	-0.74	0.459	0.89	[0.660, 1.206]
Stereotype Threat x RE (Multiracial)	0.02	0.18	0.11	0.914	1.02	[0.717, 1.450]
Zero-inflated Model	<i>b</i>	<i>SE</i>	<i>z</i>	<i>p</i>	<i>OR</i>	95% CI
(Intercept)	0.02	0.16	0.13	0.895	1.02	[0.742, 1.408]
Stereotype Threat	0.08	0.13	0.61	0.542	1.08	[0.839, 1.397]
RE (Asian American)	1.16	0.99	1.17	0.244	3.18	[0.454, 22.297]
RE (Hispanic/Latinx)	0.32	0.39	0.81	0.418	1.37	[0.638, 2.957]
RE (Multiracial)	0.73	0.50	1.48	0.139	2.08	[0.789, 5.508]
Stereotype Threat x RE (Asian)	-0.44	0.61	-0.73	0.467	0.64	[0.196, 2.114]
Stereotype Threat x RE (Latinx)	-0.17	0.29	-0.56	0.575	0.85	[0.477, 1.508]
Stereotype Threat x RE (Multiracial)	-0.30	0.35	-0.85	0.397	0.74	[0.372, 1.481]

Note. RE = race and ethnicity, IRR = incidence rate ratio, OR = odds ratio, CI = confidence interval.

Table 12. Negative binomial regression model regressing total alcohol-related consequences on anticipated stereotype threat, racial and ethnic identities, and their interaction ($N = 221$).

	<i>b</i>	<i>SE</i>	<i>z</i>	<i>p</i>	<i>IRR</i>	95% CI
(Intercept)	1.14	0.12	9.20	<.001	3.14	[2.475, 4.033]
Stereotype Threat	0.01	0.10	0.05	0.957	1.01	[0.814, 1.246]
RE (Asian American)	-0.63	0.67	-0.93	0.354	0.54	[0.170, 2.009]
RE (Hispanic/Latinx)	0.15	0.30	0.49	0.627	1.16	[0.659, 2.157]
RE (Multiracial)	-0.31	0.38	-0.81	0.416	0.73	[0.360, 1.646]
Stereotype Threat x RE (Asian)	0.14	0.44	0.32	0.750	1.15	[0.541, 2.566]
Stereotype Threat x RE (Latinx)	0.05	0.23	0.23	0.819	1.05	[0.646, 1.724]
Stereotype Threat x RE (Multiracial)	-0.05	0.27	-0.18	0.861	0.95	[0.583, 1.627]

Note. RE = race and ethnicity, IRR = incidence rate ratio, CI = confidence interval.

CHAPTER IV

DISCUSSION

As hypothesized, a significant positive correlation was detected between stereotype threat measured pre-matriculation and at the end of students' first academic year. Findings indicate that students who anticipate experiences of stereotype threat in college, even before attending their first class, tend to continue to anticipate and potentially actually have such experiences. To the extent anticipation of such experiences is relatively stable over time, pre-matriculation administration of this measure to gauge students' concerns and explore associations with other factors related to student success and wellbeing during the first year of college, including alcohol outcomes, seems reasonable.

This study was interested in how broad experiences of stereotype threat, including the stereotype threat created by potential social evaluation in drinking contexts and the stereotype threat created by academic evaluation in classroom contexts, may relate to alcohol use and associated consequences. It is important to note that though the relationship between anticipated and potentially experienced stereotype threat was significant and positive it was relatively weak (i.e., in the small to medium range of effect). The classroom setting during the spring 2021 assessment (i.e., predominantly remote and hybrid learning) may have contributed to the observed magnitude of the correlation. Though Zoom class settings could have elicited stereotype threat by exposing barriers that disproportionately impact underrepresented students, such as access to steady internet and having limited workspace at their place of residence (Castelli & Sarvary, 2021), and some underrepresented students have reported increased anxiety and feelings of danger associated with participation in Zoom classes (Cirucci, 2023; Gillis & Krull, 2021; Peper et al., 2021), attending class via Zoom versus in-person could have,

alternatively, reduced the experience of stereotype threat. Students had the option to turn their cameras off, which many did to reduce or alleviate anxiety about being judged for their physical appearance or visible signals of socioeconomic status (Castelli & Sarvary, 2021; Cirucci, 2023; Gherheş et al., 2021). It is possible the magnitude of association between anticipated and potentially experienced stereotype threat may have been stronger had the assessment of potentially experienced stereotype threat taken place when all classes were held in person or if camera use had been required.

Contrary to expectations, anticipated stereotype threat did not emerge as a significant predictor of either total drinks per week or total alcohol-related consequences in any of the planned models. Similar nonsignificant results were found when conducting post hoc analyses of models tested in relation to research questions 2 and 3, in which the sample was restricted to only students who identified as American Indian or Alaska Native, Asian American, Black or African American, Native Hawaiian or Pacific Islander, or Multiracial. Moreover, racial and ethnic identity (as Asian American, Latinx, or Multiracial, with students who identified as White as the reference group) did not emerge as significant moderators of the relationship between anticipated stereotype threat and either alcohol outcome variable in the models testing research questions 4a and 4b. The current findings diverge from the one study to date that indirectly assessed the association between stereotype threat and alcohol use (Gonzalez et al., 2021). Specifically, Gonzalez et al. (2021) found that internalization of the “biological vulnerability to alcohol misuse” stereotype by American Indian and Alaskan Native college students was positively associated with depressive symptoms among those reporting average or higher levels (but not low levels) of heavy episodic drinking, and that greater depressive symptoms were associated with drinking to cope, which, in turn, contributed to the experience of alcohol consequences.

There are several differences between the present study and the study conducted by Gonzalez and colleagues (2021) that likely contribute to the differing results.

To start, Gonzalez et al. (2021) measured belief in (i.e., internalization of) a specific stereotype related to a single behavior within a group that shared an identity as indigenous, whereas the present study used an identity and stereotype non-specific measure of stereotype threat in a racially and ethnically diverse sample. The broad stereotype threat measure could have overshadowed potential nuances among students with differing racial and ethnic identities, especially as different alcohol-related stereotypes are unfairly projected onto different racial and ethnic groups. It stands to reason that this may contribute to different associations with alcohol use and alcohol-related consequences. For example, despite contending with stereotypes that imply lack of self-control and high alcohol use (Bass & Kane-Williams, 1993; Caetano et al., 1998), African American college students typically consume less alcohol than their White peers yet may nonetheless experience more negative alcohol-related consequences (Desalu et al., 2019; Thorpe et al., 2020). By comparison, Asian American students that experience an alcohol flush reaction who worry that their White counterparts will misinterpret this response to mean that they are not competent drinkers (Gusfield, 1996, as cited by Hamada et al., 2022) and who attempt to hide the flush reaction may, paradoxically, engage in greater alcohol consumption (Chartier et al., 2019). Thus, administering an identity-specific stereotype threat measure that gauged participants' awareness and experience of alcohol-related stereotypes specifically associated with their racial and ethnic identities may have yielded different results.

Participants also had to identify as current drinkers in the study by Gonzalez and colleagues (2021), which was not true in the current study, and may have reduced power to detect associations among those who choose to drink. Gonzalez et al. (2021) also focused on

heavy episodic drinking, as opposed to total drinks per week as in the current study. It may be that experiences of stereotype threat have different associations with different indices of alcohol use, which is true for other outcomes (e.g., social anxiety; Terlecki et al., 2020). The longer version of the YAACQ used by Gonzalez et al. (2021) also may have better illuminated patterns of alcohol consequences that the brief version utilized the current study (i.e., adapted B-YAACQ) did not. Gonzalez et al. (2021) also examined drinking as a moderator of the association between stereotype internalization and depression as opposed to drinking as the outcome; however, small statistically significant positive correlations were shown between stereotype internalization and heavy episodic drinking and alcohol-related consequences ($r = .18-.27$), suggesting an association between stereotype threat and alcohol outcomes may exist, even if not detected in this study.

Another difference between the study by Gonzalez et al. (2021) and the current study is when the data were gathered (i.e., pre- versus mid-COVID-19 pandemic). In addition to many university courses being offered remotely to reduce the spread of COVID-19, several university and community policies changed students' living arrangements and social interactions, and may, therefore, have influenced the observed association between stereotype threat and alcohol consumption and alcohol-related consequences by virtue of reducing exposure to conditions that would create drinking-related stereotype threat. The University of Oregon reduced occupational density within residential housing during the 2020-2021 academic year ("COVID-19 Health and Safety Operational Plan," 2020), meaning more students had to live with parents or in off-campus housing. White et al. (2020) found that students who moved from living with peers to living with parents experienced a significant decrease in total drinks per week. The University of Oregon also implemented policies to discourage off-campus social gatherings, which likely

changed, though did not eliminate, parties where alcohol was present (e.g., Associated Press, 2021; Brown & Parafiniuk-Talesnick, 2021). The bars and breweries in the community surrounding the university were also subject to fluctuating rules for service across the 2020-2021 academic year (Murschel, 2023) that may have shifted students' drinking practices and potential alcohol-related consequences. Concordantly, one study found that COVID-19 mitigation policies and campus closures were associated with decreased quantity, drunkenness, and heavy drinking related to less access to alcohol and social opportunities (Jackson et al., 2021).

Limitations

The current study's findings must be understood within the context of certain methodological limitations. First, given the broadness of the identity and stereotype non-specific stereotype threat measure, it is possible that it may have partially or wholly measured other phenomena similar to stereotype threat, such as *stigma consciousness* (Pinel, 1999), rather than stereotype threat itself. "Stereotype threat refers to a concern about one's own behavior (e.g., 'Am I going to confirm the stereotype?')" (Pinel, 1999, p. 115). Stigma consciousness reflects "an expectation that one will be stereotyped, irrespective of one's actual behavior" (Pinel, 1999, p. 115). Whereas stereotype threat theories would generally suggest that increased anxiety about potentially confirming a stereotype would reduce existing self-regulatory resources within an evaluative context, thereby leading to the feared outcome (e.g., drinking more than intended; experiencing social or other alcohol-related consequences), if a person expects that they will be stereotyped *no matter how they drink*, they may experience comparatively less anxiety about their drinking behavior and exhaust less self-regulatory resources to successfully inhibit their drinking and avoid consequences in drinking contexts, which could produce null findings as in the current study.

Second, while the samples used for each analysis were relatively large for a study of this nature, the overall attrition rate from baseline to the end-of-year and fall surveys was substantial. This was not unexpected, as students were *instructed* to complete the baseline survey as part of new student orientation but were given the *option* to complete all follow-up surveys. Attrition poses a threat to both statistical conclusion and external validity. Specifically, while the sample demographics were relatively consistent with the overall composition of the student population at the University of Oregon, attrition limited the ability to conduct additional moderation analyses for students who identified in ways other than Asian American, Latinx, and Multiracial and may have introduced bias if that attrition was differential. Specifically, as alcohol use and consequences were not assessed at baseline, I could not determine if this attrition was related systematically to drinking behavior (e.g., as might be the case if those reporting heavier drinking were less likely to complete the follow-up surveys). It seems likely that students who do not drink or who abstained from drinking were over-represented in the current sample, as national estimates suggest only about 44% of college students report no drinking in the past month (vs. the 56% who reported no drinking in the current sample), potentially threatening generalizability. It is, however, important to note that the assessments asked about drinking and related consequences over the prior 3 months, which would have captured much of the summer months when students may have been living at home/off-campus. If students were not in the college environment, this could explain why students reported less alcohol consumption and fewer alcohol-related consequences than would be expected. However, as alcohol use and related consequences at baseline and participants' residential status (e.g., dorms, living with family/caregivers) in relation to alcohol outcome assessment window were not measured, this hypothesis cannot be evaluated. Findings may, thus, not fully generalize to other PWI college

populations.

Third, the current study did not track how students attended their classes (e.g., in-person versus remotely), leaving additional questions about how these factors may have influenced the results and imposing further potential constraints on generalizability. As mentioned earlier, the way in which class is attended can influence students' experience of stereotype threat. For instance, if the majority of the students in the current sample attended classes entirely or mostly remotely, findings may not extend to students who attend classes mostly or fully in person and might be experiencing different conditions of stereotype threat.

Finally, while the current study intentionally focused on the potential moderation of the association between stereotype threat and alcohol outcomes by race and ethnicity, these are not the only identity markers that are associated with drinking stereotypes in college contexts and with differences in drinking outcomes. Specifically, women contend with negative alcohol-related stereotypes and gender norms that increases the risk of being negatively stigmatized if they appear to be intoxicated (Greaves et al., 2022) and gender-based stereotypes and gender norms have been shown to impact alcohol consumption patterns (Greaves et al., 2022; Kaya et al., 2016). Consistent with this, Stappenbeck and colleagues (2010) examined how perceived alcohol consumption norms predicted drinking patterns for first-year college students, finding that men, compared to women, were more likely to associate heavy drinking with the "typical" college student and to engage in heavy drinking during their first year of college. Consistent with what might be expected based on existing stereotype threat literature, prior research has demonstrated that though women tend to consume less alcohol than men they are more susceptible to experience negative alcohol-related consequences (White, 2020) (see Notes section at end of this chapter). A different association between stereotype threat and alcohol

outcomes may have been observed had gender (or other identities outside of race and ethnicity) been examined as the moderator or had associations based on the intersectionality of multiple identities been considered (e.g., Hunt & Antin, 2019). While these variables were available in the data set, such analyses were outside the scope of the current dissertation and are important directions for future research.

Future Directions

Additional research is needed to determine the strength of association between responses on the identity and stereotype non-specific measure of stereotype threat used in this study and more established measures of stereotype threat (e.g., the Social Identities and Attitudes Scale; Picho & Brown, 2011) as well as measures of conceptually distinct, yet related, phenomena. This would provide greater confidence that the identity and stereotype non-specific measure is measuring stereotype threat. Future studies may also benefit from utilizing a more robust stereotype threat measure (e.g., Domain Identification Measure; Smith & White, 2001) that primes students for the specific stereotype thought to be creating conditions of stereotype threat (e.g., alcohol related stereotypes) and is tailored to the specific identity markers (e.g., race and ethnicity, gender) of the respondents. This would help future researchers more confidently test how stereotype threat created by potential social evaluation in drinking contexts is associated with alcohol outcomes.

Future studies examining the relationship between anticipated stereotype threat and alcohol outcomes should control for students' living arrangement as well as how students attend class (e.g., in-person, remotely), as doing so may help identify how these factors may impact the association between anticipated stereotype threat and the alcohol outcomes examined in this study. For example, it may be that the association between anticipated stereotype threat and

potentially experienced stereotype threat is stronger for students who attend in-person classes, and, consistent with the broader literature, the strength of this association may differ depending on students' racial and ethnic identities and their specific college context. It may also be that living arrangement moderates the relationship between anticipated stereotype threat and alcohol outcomes, such that the relationships only exist for students are living in shared housing (e.g., dormitories, fraternity houses, shared rentals) or in close proximity to the college context (e.g., in apartment complexes adjoining or near to campus).

Future longitudinal studies should assess alcohol use and alcohol-related consequences at baseline and all follow-up surveys to attempt to eliminate the possibility that differential attrition of those who engage in alcohol use led to the current null findings. Such studies could also be used to evaluate the temporal relationship between stereotype threat and alcohol outcomes over time. The worry that students experience about having their behavior perceived as conforming to stereotypes associated with their identity may wax and wane, impacting their alcohol consumption and experiences of alcohol-related consequences differentially over time. For example, the effects of anticipated stereotype threat on alcohol behavior may be most pronounced during the first term, as students are adjusting to the college environment, and then taper off as they become acclimated and find social groups that are experienced as supportive.

Future studies should also consider exploring the associations that were the focus of the current study in a sample of students who report at least occasionally drinking (i.e., eliminate structural zeros). Future studies may also wish to explore how stereotype threat is related heavy episodic (i.e., 4+/5+ drinks for those assigned female vs. male at birth, respectively) and high intensity drinking (i.e., 8+/10+ drinks for those assigned female vs. male at birth, respectively), as several studies have found that these drinking patterns are common among college students

and associated with significant alcohol-related consequences (Patrick & Azar, 2018; Patrick et al., 2016; Tremblay et al., 2010; Schulenberg et al., 2021). It could be that students who anticipate they will experience stereotype threat in college drinking environments may be more likely to avoid routine social drinking, instead exposing themselves to conditions that may provoke stereotype threat and its attendant consequences more rarely (e.g., going to only a specific party or sporting event), which would not be captured by a measure of “typical” weekly drinking. If rarer, these events could provoke even more acute anxiety about potentially having their behavior interpreted in ways that would confirm negative stereotypes (due to lack of exposure to the anxiety-provoking context), leading to even more depleted self-regulatory processes, and, thereby, occasional heavy episodic drinking and associated negative consequences. Examining frequency and magnitude of heavy episodic and high intensity drinking occasions in addition to total drinks per week may, therefore, expose different relationships between anticipated stereotype threat and alcohol outcomes (as in Gonzalez et al., 2021).

Finally, given that one can expect lower numbers of students of color at PWIs, future studies should consider utilizing a multi-university recruitment strategy to obtain a larger, more diverse sample if exploring associations with racial and ethnic identity and/or the intersectionality of multiple social identities. Of course, when choosing other colleges and universities from which to recruit, researchers could focus on illuminating possible associations between stereotype threat and alcohol outcomes for students attending PWIs alone or include other types of institutions, such as Tribal Colleges and University, Historically Black Colleges and Universities, and other types of federally defined minority-serving institutions to see how institution type may influence the association. This may be especially beneficial if exploring how

the intersection of multiple identities may influence the association. Even among just PWIs, colleges and universities environments can vary greatly in ways that differentially shape students' alcohol use (Presley, 2002). In addition, the communities in which a PWI (or other type of college or university) resides can vary substantially in terms of population size, density, and demographics; alcohol density; municipal laws; regional norms; and political climate, among other dimensions, all of which may impact participants' experience of stereotype threat and their alcohol-related behaviors. After recruiting colleges and universities for their sample, future studies should assess how these institutions vary in terms of size, type, presence of Greek life, presence of an athletic program, and sporting event promotion norms (i.e., pre-game events). Future research should also assess how the communities that the recruited colleges and universities reside in vary in terms of locality (i.e., rural, urban), access to alcohol serving venues, and city demographics (e.g., race and ethnicity, socioeconomic status).

Conclusion

The findings of the present study indicated that students who worry they will experience stereotype threat in college before attending their first class are likely to continue to have this worry after attending two full terms, potentially after having experienced stereotype threat in the college context, and provides additional, albeit limited, support for use of the identity and stereotype nonspecific measure in future investigations. No association between anticipated stereotype threat and either total drinks per week or total alcohol-related consequences was found, even when the sample was restricted to students reporting their racial or ethnic identity as American Indian or Alaska Native, Asian American, Black or African American, Latinx, Native Hawaiian or Pacific Islander, or Multiracial. Racial and ethnic identity (as Asian American, Latinx, or Multiracial, with White students as the reference group) did not moderate the

relationship between stereotype threat and either alcohol outcome variable. Future research that addresses the limitations of the present study is needed to potentially illuminate associations between stereotype threat and alcohol outcomes that were not observed in this study.

Notes

It must be noted that some of the aforementioned “gender” inequities in the experience of alcohol-related consequences are due to gender and associated power dynamics (e.g., women are more likely than men to experience alcohol-involved sexual assault; Fedina et al., 2018) while others are due to differences in biological factors associated with sex assigned at birth as opposed to gender. Due to genderism, gender and sex assigned at birth have been historically conflated in alcohol research (Gilbert et al., 2018). Specifically, the alcohol metabolizing enzyme alcohol dehydrogenase is generally higher in those assigned male versus female at birth (Ceylan-Isik et al., 2010) at least partially due to higher testosterone levels (Aasmoe & Aarbakke, 1999), especially within the gastric system (Baraona et al., 2001), resulting in less alcohol entering the bloodstream and associated lower blood alcohol concentrations (BACs) for males compared to females who are the same weight. Risk for experiencing certain alcohol-related consequences increases with BAC, but, consistent with the potential impact of stereotype threat, much of the variability in consequences cannot be explained by amount of alcohol consumed (Prince et al., 2018).

APPENDIX: STUDY MATERIALS

Identity and Stereotype Non-specific Measure of Stereotype Threat (Pre-matriculation)

<i>Strongly Disagree</i> (1)	<i>Moderately Disagree</i> (2)	<i>Slightly Disagree</i> (3)	<i>Slightly Agree</i> (4)	<i>Moderately Agree</i> (5)	<i>Strongly Agree</i> (6)
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1. At the [university], I worry that people will draw conclusions about people like me based on my performances.
2. At the [university], I worry that people will draw conclusions about people like me, based on the performances of other people with similar identities.
3. At the [university], I worry that people will draw conclusions about me, based on what they think about people with backgrounds like mine.
4. At the [university], I worry that people will draw conclusions about me, based on the performances of other people like me.

Identity and Stereotype Non-specific Measure of Stereotype Threat (Spring 2021)

<i>Strongly Disagree</i> (1)	<i>Moderately Disagree</i> (2)	<i>Slightly Disagree</i> (3)	<i>Slightly Agree</i> (4)	<i>Moderately Agree</i> (5)	<i>Strongly Agree</i> (6)
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1. At the [university], I worry that people draw conclusions about people like me based on my performances.
2. At the [university], I worry that people draw conclusions about people like me, based on the performances of other people with similar identities.
3. At the [university], I worry that people draw conclusions about me, based on what they think about people with backgrounds like mine.
4. At the [university], I worry that people draw conclusions about me, based on the performances of other people like me.

Typical Alcohol Use Items from the Daily Drinking Questionnaire (DDQ)

For all questions, *one standard drink* equals:

- 4oz. wine
- 10oz. wine cooler
- 12oz. beer (8oz. Of Canadian, Malt Liquor, or Ice Beers, or 10oz. of Microbrew)
- 1 Cocktail with 1 oz. of 100 proof liquor or 1 ¼ oz. of 80 proof liquor.

Consider a typical week during the past 3 months . How much alcohol, on average, (measured in number of standard drinks), do you drink on each day of a typical week ?	Drinks
On a typical Monday , I have...	
On a typical Tuesday , I have...	
On a typical Wednesday , I have...	
On a typical Thursday , I have...	
On a typical Friday , I have...	
On a typical Saturday , I have...	
On a typical Sunday , I have...	

Adapted Brief Young Adult Alcohol Consequences Questionnaire (B-YAACQ)

	Given the list of experiences below, please indicate if you have had each experience during the past 3 months .	No (0)	Yes (1)
1.	While drinking, I have said or done embarrassing things.		
2.	I have had a hangover (headache, sick stomach) the morning after I had been drinking.		
3.	I have felt very sick to my stomach or thrown up after drinking.		
4.	I often have ended up drinking on nights when I had planned not to drink.		
5.	I have taken foolish risks when I have been drinking.		
6.	I have passed out from drinking.		
7.	I have found that I needed larger amounts of alcohol to feel any effect, or that I could no longer get high or drunk on the amount that used to get me high or drunk.		
8.	When drinking, I have done impulsive things that I regretted later.		
9.	I've not been able to remember large stretches of time while drinking heavily.		
10.	I have driven a car when I knew I had too much to drink to drive safely.		
11.	I have not gone to work or missed classes at school because of drinking, a hangover, or illness caused by drinking.		
12.	My drinking has gotten me into sexual situations I later regretted.		
13.	I have often found it difficult to limit how much I drink.		
14.	I have become very rude, obnoxious or insulting after drinking.		
15.	I have woken up in an unexpected place after heavy drinking.		

Adapted B-YAACQ (cont.)

16.	I have felt badly about myself because of my drinking.		
17.	I have had less energy or felt tired because of my drinking.		
18.	The quality of my work or schoolwork has suffered because of my drinking.		
19.	I have spent too much time drinking.		
20.	I have neglected my obligations to family, work, or school because of drinking.		
21.	My drinking has created problems between myself and my boyfriend/girlfriend/spouse, parents, or other near relatives.		
22.	I have been overweight because of drinking.		
23.	My physical appearance has been harmed by my drinking.		
24.	I have felt like I needed a drink after I'd gotten up (that is, before breakfast).		
25.	When drinking, I felt sexier than usual		
26.	When drinking, I was overly emotional		
27.	I drunk texted/dialed		
28.	When drinking, I posted something on social media that I wouldn't have normally posted		

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