Mental health in vegans: the importance of accounting for identities, stereotypes, and experiences of discrimination

Sydney Heiss  
*University at Albany, State University of New York*, sheiss@albany.edu

The University at Albany community has made this article openly available.  
**Please share** how this access benefits you.

Follow this and additional works at: https://scholarsarchive.library.albany.edu/legacy-etd

Part of the **Psychology Commons**

**Recommended Citation**
https://scholarsarchive.library.albany.edu/legacy-etd/2704

This Dissertation is brought to you for free and open access by the The Graduate School at Scholars Archive. It has been accepted for inclusion in Legacy Theses & Dissertations (2009 - 2024) by an authorized administrator of Scholars Archive.  
Please see **Terms of Use**. For more information, please contact scholarsarchive@albany.edu.
MENTAL HEALTH IN VEGANS: THE IMPORTANCE OF ACCOUNTING FOR IDENTITIES, STEREOTYPES, AND EXPERIENCES OF DISCRIMINATION

by

Sydney Heiss

A Dissertation
Submitted to the University at Albany, State University of New York
In Partial Fulfilment of the Requirements
for the degree of Doctor of Philosophy

College of Arts and Sciences
Department of Psychology
August 2021
ABSTRACT

Introduction. Academic work on vegans is biased towards studying educated White women, despite evidence that vegans having varying identities. The lack of diversity in research has implications for our understanding of psychological issues that affect vegans. Data regarding mental health of vegans is mixed, due to a failure to account for differing identities and experiences. Past work has shown gender, sexual orientation, ethnicity/race, and experiences with discrimination to impact mental health. More work is needed to examine moderators of mental health outcomes among diverse groups of vegans.

Methods. This cross-sectional study surveyed a demographically diverse sample of vegan participants (n = 2,220) via an online battery of questions regarding demographics, mental health, and experiences with discrimination and stereotype threat. This study also surveyed a sample of undergraduate college students (n = 392) via an online questionnaire examining implicit bias towards vegans.

Results. Vegan participants were diverse in terms of demographics and motivations. Aim 1. Neither the general population nor vegans endorsed common stereotypes about vegans as being predominantly White, female, and privileged (all ps > 0.05). Nonvegans did not hold biases towards vegans (p = 0.67), while vegans tended to attribute more positive adjectives to other vegans (p < 0.001; $\eta_p^2 = 0.47$). Aim 2. Gender and sexual orientation relate to mental health outcomes, such that cisgender women, gender nonconforming participants (p < 0.001; $\eta_p^2 = 0.01$), and sexual minorities (p < 0.001; $\eta_p^2 = 0.02$) tended to experience worse mental health outcomes compared to cisgender men and heterosexuals. Race (p = 0.18) and ethnicity (p = 0.11) were not related to mental health outcomes but moderated the relationship between experienced threat and
aggression on anxiety, such that BIPOC participants who faced increased discrimination in the general population ($R^2 = 0.03, p < 0.001$; interaction $p = 0.03$) and among other vegans ($R^2 < 0.01, p < 0.01$; interaction $p = 0.02$) experienced increased anxiety. **Aim 3.** BIPOC participants, especially Black participants, were more likely to experience discrimination and stereotype confirmation concerns, though it appears as though these experiences are less pronounced in interactions with other vegans compared to the general population (all $ps < 0.001$). Gender and sexual orientation interact with race to influence experiences with discrimination/stereotype threat. Race did not impact mental health outcomes, but experiences with discrimination/stereotype confirmation concerns accounted for a significant amount of the variance in negative mental health, with experiences interacting with the general public accounting for a greater amount of the variance in depression, anxiety, and stress, compared to from the vegan community ($R^2 = 0.04$ vs $R^2 = 0.02$).

**Discussion.** Findings provide preliminary evidence that vegans are a diverse group of individuals. A failure to account for the diversity of the vegan community may explain the previously mixed findings on mental health in vegans. Identity features interact to influence faced discrimination and stereotype threat, and these experiences accounted for worse mental health outcomes in BIPOC vegans. Despite discrimination and stereotype threat being less extreme when interacting with vegans compared to the general population, it still is related to worse mental health outcomes in BIPOC vegans. Advocacy organizations and White vegans more broadly must consider the way in which racism continues to impact their fellow vegans and their work.
INTRODUCTION

Veganism\(^1\) has been gaining popularity in recent years, skyrocketing approximately 3,000% between 2004 and 2019, with 9.7 million individuals living within the United States currently stating they adhere to a vegan diet (IPSOS Retail Performance, 2019). Popular interest in veganism, as reflected in Google Trend Searches, has consistently increased since 2004 and scholarly interest in veganism and plant-based diets has similarly shown growth, with the number of peer-reviewed publications on the subject growing annually (Medawar et al., 2019). Concomitantly, recent work has focused on the influence of an array of dietary choices on mental health outcomes (Dutheil et al., 2016; Godos et al., 2020; O’Neil et al., 2014; Quirk et al., 2013; Sanchez-Villegas et al., 2006). Despite the recent focus in understanding the prevalence of veganism in the United States, a dearth of knowledge remains regarding the influence of veganism on mental health, and more specifically, the way in which various identity features may moderate mental health outcomes within this population. While preliminary work on the relationship between veganism and depression, anxiety, stress exists, results are mixed, and the way in which sex/gender, sexual orientation and race/ethnicity may interact with veganism to impact mental health outcomes is not yet understood.

The primary purpose of this study was to explore the possible moderators of mental health in vegans. This work is important for at least two reasons: 1. The majority of studies on meat restriction and mental health either do not include vegans or combine them with other groups of meat restrictors (e.g., vegetarian, pescatarian). This is problematic, due to the findings that meaningful and measurable differences exist between vegans and vegetarians (Lund et al.,

---

\(^1\) For the purposes of this paper, “veganism” will refer to the restriction of all animal products (i.e., meats, dairy, and egg) from one’s diet. It is important to note that many consider veganism an ethical stance and a lifestyle, which includes refraining from using any non-food item made from animals (e.g., leather, fur), the use of animals in entertainment, and products tested on animals.
2. Many studies with vegan participants are largely comprised of White female participants (e.g., Beezhold et al., 2015; Forrestell & Nezlek, 2018; Neumark-Sztainer et al., 1997; Norwood et al., 2018; Timko et al., et al., 2012). This is similarly problematic, because vegans are not a monolith, and in fact, veganism is currently more common in non-White individuals. For example, in 2015, 8.0% of Black Americans identified as vegan or vegetarian, compared to only 3.4% of the general population (Stahler, 2015). Further, men and women are similarly likely to be vegetarian (3.4% and 3.0%, respectively; Stahler, 2015). This is meaningful, as in the general population there are consistent differences in mental health outcomes by gender and race (discussed in detail below), but studies on vegans fail to include sufficient numbers of non-White non-women to make meaningful comparisons.

While recent work has focused on the interplay between meat restriction and mental health considerations, few have examined these issues in vegans specifically. Most studies to date often include all types of vegetarians (i.e., individuals who restrict meat but consume eggs and/or dairy) and sometimes include semi-vegetarians (i.e., individuals who restrict some meat but consume others, for example, eats eggs, dairy, and products made from chickens but not products made from cows) and/or pescatarians (i.e., individuals who consume products made from fish, eggs, and dairy, but restrict all other meat intake). Studies on mental health in vegetarians will be used to set the stage for the following discussion regarding veganism specifically, but wherever possible, findings specific to vegans will be discussed explicitly.

**Vegetarians and mental health**

There are various mechanisms by which dietary intake is thought to impact mental health, ranging from the gut biome (Dash et al., 2015; Dawson et al., 2016; Kaplan et al., 2015) to inflammation (Godos et al., 2020; Kaplan et al., 2015; Oddy et al., 2018) to adiposity (Oddy et
Existing research regarding the relationship between meat restriction and mental health is decidedly mixed. In fact, three recent systematic reviews of relevant studies came to three different conclusions. In a systematic review of 14 studies that looked at mental health concerns (i.e., depression, anxiety, and related phenomenon) as outcome measures, one group of researchers found that seven studies reported a higher prevalence or risk of psychopathology in individuals who avoided some degree of meat, three studies found no differences, two reported mixed results, and two showed decreased prevalence/risk in meat avoiders (Dobersek et al., 2021). Based on these findings, and weighing the studies based on methodological rigor, the researchers concluded that there was “clear evidence that meat abstention is associated with higher rates or risk of depression, anxiety, and self-harm” (Dobersek et al., 2021, p. 630).

A systematic review published just one year earlier came to a different conclusion: that there was no clear evidence of any relationship between vegetarianism and depression, anxiety, and stress (Askari et al., 2020). Of the 13 observational studies identified for systematic review, the researchers found that 3 reported no significant associations between meat restriction and mental health risk or increased symptomology, 7 studies showed an inverse relationship such that vegetarianism was associated with lower risk/symptomology of mental health concerns, and 2 studies indicated vegetarianism was related to increased risk/symptomology. In addition to completing a systematic review, a meta-analysis was conducted on 11 of the 13 studies (two were excluded due to lack of risk estimate reporting; Askari, 2020). The meta-analysis assessed the association between vegetarianism and depression and the association between vegetarianism and anxiety separately, and the results mirrored findings from the systematic review: based on pooled effect sizes, the literature suggested no relationship between vegetarianism and either
depression or anxiety (Askari et al., 2020). It should be noted that the authors caution that the certainty of the evidence is low based on the quality and quantity of available data.

One study included a temporal nature of vegetarianism and mental health concerns, though the nature of the study was not longitudinal (Michalak et al., 2012). Respondents were asked about the timing of the start of their mental health concern and the start of adherence to a vegetarian diet. Overall, 65.6% of participants stated that depression preceded vegetarianism, and 90.7% stated anxiety preceded vegetarianism (Michalak et al., 2012). These data are preliminary, but authors posit a range of explanations, including the possibility that individuals with mental health difficulties may be “sensitize[d] to the suffering of other living beings, including animals” (Michalak et al., 2012, p. 8). It is also possible that alternative variables may explain this finding, such as the ability to experience and regulate negative emotions, level of responsibility and perfectionism, or social values (Michalak et al., 2012).

In 2019, a third systematic review focused on the impact of diet on mood included four studies (none of which were examined in the previous reviews) on vegetarian or vegan participants and stated that despite being unable to establish a “firm link” between vegetarianism and mental health, it appeared as though vegetable-based diets may enhance mood based on observed lower depression and anxiety in those avoiding meat and other animal-derived products (Arab et al., 2019).

In compiling all relevant studies that focused on vegetarianism included in these systematic reviews and available unincluded studies, the data regarding vegetarianism and mental health does indeed appear heterogenous. Of the currently available studies, seven indicated that vegetarianism is associated with an heightened risk of depression and/or anxiety (Baines et al., 2007; Burkert et al., 2014; Hibbeln et al., 2018; Larsson et al., 2002; Lindeman,
2001; Michalak et al., 2012; Paslakis et al., 2020; Stokes et al., 2011), four reported null findings (Beezhold et al., 2014; Boldt et al., 2018; Norwood et al., 2019; Timko et al., 2012), and two described lower depressive/anxiety symptoms in vegetarians (Beezhold et al., 2010; Jin et al., 2019). It is important to note that the majority of available studies were cross-sectional in design. One study included a longitudinal aspect, in which 13 individuals were randomized into each of the following groups: vegetarian, pescatarian, and omnivore (Beezhold & Johnston, 2012). Over time, vegetarians reported decreased stress compared to pescatarians and omnivores, but did not differ significantly on measures of depression and anxiety (Beezhold & Johnston, 2012).

When vegetarianism is assessed using a food frequency questionnaire rather than categorical group membership, results appear similarly inconclusive. Some choose to use a food frequency questionnaire rather than asking individuals if they identify as vegetarian/vegan, as dietary adherence to a vegetarian/vegan diet is often overreported while meat consumption continues (Haddad & Tanzman, 2003). Women in the highest tertile of vegetarian patterns (i.e., described as most frequent use of meat substitutes, pulses, nuts and herbal tea; lower frequency of meat and poultry) exhibited higher anxiety compared to the lowest tertile of women in one study (dos Santos Vas et al, 2013), yet greater vegetarianism appeared to be protective against depression in women in another (Hosseinzadeh et al., 2015) and fully unrelated when taking confounds into consideration in yet another study (Northstone et al., 2017). When assessing plant food and consumptions of grains and vegetables more broadly, higher intake tends to be associated with lower depression (Liu et al., 2016; Wang et al., 2018).

Further, many studies reported mixed findings within their own results, often highlighting the need for specificity in defining vegetarianism and considering additional aspects of identity.
when assessing this relationship as possible moderating variables. For example, vegetarian women were shown to score higher on a measure of anxiety than non-vegetarian women, but this same result was not found in participants who were men (Baş et al., 2005). A more recent study seems to contradict these finding, showing that while vegetarians and semi-vegetarians scored significantly higher on a measure of depression compared to omnivores, vegetarian women were not significantly different than omnivores (Forestell & Nezlek, 2018). Another study showed that type of vegetarian mattered, with depression scores being higher in vegetarians and pescatarians compared to omnivores, but not vegans (Matta et al., 2018).

**Vegans and mental health**

Data regarding the relationship between veganism and mental health is far more sparse than within vegetarianism. This is likely in large part due to difficulty with recruitment, with many studies stating they combined vegan and vegetarian participants due to the infrequency of vegan participation (e.g., Hibbeln et al., 2018; Pfeiler et al., 2018). Similar to the information on vegetarianism more broadly, research regarding mental health in vegans is mixed, though does tend to indicate that veganism may be more consistently associated with no differences or positive mental health outcomes compared to omnivores. In total, one study showed that veganism was associated with decreased depression (Beezhold et al., 2015) and 3 reported null findings (Matta et al., 2018; Norwood et al., 2019; Timko et al., 2012). In a systematic review of the physical (weight status, inflammation, metabolism) and cognitive/emotional impacts (memory performance, depression, anxiety, stress, mood disturbances) of plant-based diets interventions (i.e., individuals prescribed to consume a diet free from animal products), it appears as though veganism either does not impact mental health or aids in improving symptoms of anxiety/depression (Medawar et al., 2019). Specifically, in a repeated measures design, one
study found that there was no difference in depression symptoms when non-vegetarians followed a vegan diet or their standard diet (Olabi et al., 2012). Another longitudinal design found that after adherence to a raw vegan diet, anxiety decreased, though these findings were difficult to attribute to the diet change as participants also received stress reduction activities, psychotherapy, and exercise intervention (Link et al., 2008).

There appears to be increasing interest in assessing the mediators and moderators of the impact of diet on mental health specifically in vegans to aid in explaining disparate prior findings. For example, it appears as though “healthy” vegan diets (i.e., frequent consumption of whole grains, fruits, vegetables, nuts, legumes, vegetable oils, and tea/coffee) are related to decreased depression and anxiety when compared to “unhealthy” vegan diets (i.e., frequent consumption of fruit juice, sugar-sweetened beverages, refined grains, potatoes, and sweets/desserts; Zamani et al., 2020). In addition to the healthfulness of the diet, there is preliminary evidence that within meat restrictors, including those who are vegan, vegetarian, and semi-vegetarian, various aspects of identity influence mental health outcomes. Specifically, age appears to be inversely related with depression and anxiety scores in vegans, such that increased age has been shown to be associated with decreased depression/anxiety (Beezhold et al., 2015). Similarly, as discussed, among vegetarians, gender appears to moderate the relationship between veganism and mental health outcomes, such that men and women tend to have differential outcomes in regard to anxiety and depression (e.g., Baş et al., 2005; Beezhold et al., 2015). These findings begin to highlight the importance of accounting for various identity aspects when studying mental health in vegans.

Identity features as moderators of mental health outcomes
There are a host of reasons that may aid in explaining the reported differential outcomes across studies between veganism and mental health outcomes. On factor that remains understudied is the way in which various aspects of identity may related to mental health specifically in vegans. The vast majority of participants in studies assessing the mental health of vegans have been comprised of young White females, and other aspects of identity (e.g., sexuality) often remain unreported despite their documented associations with anxiety, depression, and stress on studies of non-vegan samples (e.g., Abate, 2013; Cohen et al., 2019; McClean et al., 2011). It is vital to gain an understanding of the way in which various aspects of identity interact with one another to impact mental health in order to better target prevention and intervention approaches.

**Gender.** A large body of research documents consistent gender differences in the risk for psychopathology. In the general population within the United States, women have been shown to be approximately twice as likely to develop depression compared to men (Abate, 2013; Kessler et al., 1993; Weissman et al., 1993) and at heightened risk of developing an anxiety disorder (McClean et al., 2011). There are a variety of mechanisms that may explain this increased risk (for reviews see McClean & Anderson, 2009 and Piccinell & Wilkinson, 2000), including lack of social power/vulnerability to major life traumas (Nolen-Hoeksema & Hilt, 2009), sensitivity to unpredictable threat (Burani & Nelson, 2020), social factors, and biological factors (Parker & Brotchie, 2010). Specifically, it appears that women are more prone to neuroticism, stress responsiveness, and limbic system hyperactivity (Parker & Brotchie, 2010).

Further, transgender and gender nonconforming individuals appear to be at heightened risk for anxiety and depressive disorders when compared to their cisgender counterparts (Millet et al., 2017; Reisner et al., 2016). A host of mechanisms may aid in explaining these findings,
including avoidant coping strategies (Budge et al., 2013), experiences of stigma and discrimination (Hughto et al., 2015), and lack of social support (Budge et al., 2013). To date, few studies have assessed the interaction of gender and veganism in impacting mental health outcomes, and none have included gender nonconforming participants’ experiences.

**Sexual orientation.** Overall, past work indicates that individuals who identify as a sexual minority group member (e.g., gay, bisexual, pansexual, etc.) are more likely to have a mood disorder, including anxiety and depression (Bostwick et al., 2010; Cohen et al., 2019). One exception to these findings was that women who indicate they have only dated women have the lowest rates of mood disorders of all other sexual minority groups and compared to heterosexual women (Bostwick et al., 2010). A primary hypothesized explanation for the increased mental health concerns among sexual minority populations is the “minority stress model,” which shows that increased stigma, prejudice, and discrimination towards a minority group (i.e., sexual minorities) creates a hostile environment, leading to increased stress and overall mental health concerns (Meyer, 2003). Further, increased likelihood of experiencing victimization, rejection, shame, and loneliness may additionally explain the observed differences in mental health outcomes (Burton et al., 2013; Feinstein, 2019; Mereish & Poteat, 2015). Similarly, to date, no studies have considered sexual orientation as a moderating factor in mental health outcomes in vegans, which may in part explain past disparate findings.

**Race/Ethnicity.** The relationships between prevalence of mental health disorders and race are complex. In one U.S.-based national study assessing differences in depressive disorders between White individuals, African Americans, and Mexican Americans, the highest prevalence of depression was among White individuals, but dysthymic disorders were more common among African Americans and Mexican Americans (Riolo et al., 2005). In another nationally
representative study, 9.2% of Black individuals were diagnosed with depression, compared to 8.0% of White individuals, 3.1% of Asian individuals, 7.6% of Mexican Hispanic individuals, and 13.0% of “other” Hispanic individuals (Lim et al., 2020). The overall trends are clear regarding depression: prevalence is increasing in the United States (Weinberger et al., 2018). Between 2005 and 2015, depression became significantly more common, but in terms of race, this increase was only observed in Non-Hispanic White individuals (Weinberger et al., 2018). It is important to highlight that the long history of racism may, for example, have fostered a specific distrust in White individuals active in studying depression among Black individuals, which may aid in explaining the mixed findings specific to comparing depression across races (Nicolaidis et al., 2010). Further, cultural differences in presentation of depression, and the degree to which they may be captured by common assessment tools, may further impact prevalence rates (Bailey et al., 2019).

Data regarding anxiety disorders in members of different ethnic/racial groups is similarly mixed. Overall, individuals who are White are more likely to be diagnosed with social anxiety disorder, generalized anxiety disorder, and panic disorder than Black, Hispanic, and Asian Americans, and individuals who are Black are more likely to be diagnosed with post-traumatic stress disorder (PTSD) than individuals who are Hispanic (Asnaani et al., 2010). Others have reported null findings, showing that Black and White Americans do not differ in the prevalence of diagnosis of anxiety disorders (Brown et al., 1999). While inconsistencies remain, overall studies tend to point to White Americans being more likely to be diagnosed with a mood disorder. Despite Non-Hispanic Whites being more likely to have a 12-month diagnosis, it appears as though racial/ethnic minority groups have more persistent mood disorders when compared to White individuals (Vilsaint et al., 2019).
When examining the diagnoses of both depression and anxiety across races, it is important to consider the cultural appropriateness of screening instruments, which may have influenced results (Asnaani et al., 2010). For example, many anxiety screening measures have been validated in primarily White samples. Given evidence for cultural differences in anxiety presentations, language barriers, and differing interpretations of prompts (Asnaani et al., 2010), reliability and validity of these screening measures in Black, Indigenous, and People of Color (“BIPOC”) participants are therefore questionable (Asnaani et al., 2010).

**Ethnic/racial stereotypes and discrimination as mediators of mental health outcomes**

There are a host of possible explanations for why individuals with differing intersecting identities may exhibit differential outcomes in mental health. This discussion focuses on two mechanisms with substantial empirical support in mediating the relationship between ethnicity/race and adverse mental health outcomes, namely stereotypes and discrimination.

**Racial stereotypes.** Stereotypes are defined as a cognitive link between two social or personal concepts (e.g., the Self, social groups, identities, attributes, traits, behaviors) that are not defining features for another (Cox et al., 2012). For example, associating a female gender identity with “nurturing” or a Black racial identity with “criminal” would be considered stereotypes (Cox et al., 2012). Individuals who are stereotyped may experience “stereotype threat,” defined as “being at risk of confirming, as self-characteristic, a negative stereotype about one’s group” (Steele & Aronson, 1995). Further, some have defined stereotype threat as having anxiety regarding confirming a negative stereotype about one’s group (Shapiro & Neuberg, 2007). While much work has been done on the impact of stereotype threat on academic performance (Aronson et al., 2001; Steele & Aronson, 1995) and physical health/health
disparities (Aronson et al., 2013; Burgess et al., 2010), less work has focused on the impact of stereotype threat on mental health.

It appears as though anxiety is the moderating factor between stereotype threat and test performance, such that fears regarding stereotype threat leads to increased physiological arousal, which then negatively impacts cognitive performance (Osborne, 2001; Osborne, 2007). Preliminary data suggests that increased fears about confirming a negative stereotype about one’s group is related to increased social anxiety, though unexpectedly this relationship was more pronounced in White participants compared to Black (Johnson & Anderson, 2015). Further, stereotype threat predicts increased attrition in treatment for social anxiety disorder (Johnson et al., 2014).

Little work has focused on the impact of stereotype threat and mental health more broadly – specifically, the way in which it may impact both depressive and anxiety symptomology. Based on past work it is likely that stereotype confirmation may be related to anxiety, but the relationship with depression specifically appears less well-defined. One possible way in which stereotype confirmation may be linked to depression within individuals in BIPOC communities, and more specifically in Black communities, is through the concept of “John Henryism.” John Henryism is the idea that those faced with stereotype threat may overcompensate in order to disconfirm the bias (Hudson et al., 2016). Individuals who score higher on a measure of John Henryism are at increased odds of experiencing depression (Hudson et al., 2016). One explanation for this finding is that individuals expect their overcompensation to lead to achievement – that hard work leads to success. When they still face bias and potential underachievement due to discrimination, this may negatively impact mental health (Hudson et al., 2016).
Racial discrimination. In addition to stereotypes leading to stereotype confirmation fears within marginalized groups, stereotypes also lead to discrimination (Cox et al., 2012). Discrimination is different from stereotypes in that the latter refers to beliefs about a person or group whereas the former involves actions and behaviors. Racial discrimination is considered to be “unfair, differential treatment on the basis of race” (Ong et al., 2009). Racial discrimination is common, with almost half of Black Americans encountering some form of discrimination throughout their lifetime (Kessler et al., 1999). The relationship between racial discrimination and mental health outcomes is clear: increased experiences with discrimination are associated with increased depression, anxiety, and suicidal ideation (Gaylord-Harden et al., 2009; O’Keefe et al., 2015; Odom et al., 2010; Ong et al., 2009), to the point where the severity of adverse mental health outcomes related to racial discrimination mirror those associated with the experience of traumatic lifetime event such as sexual assault (Kessler et al., 1997; Kessler et al., 1999).

Intersectionality. In addition to individuals facing mental health difficulties based on their marginalized status as a result of stereotype threat and discrimination, intersecting identities often amplify these concerns. The idea of intersectionality was first presented by Kimberlé Crenshaw, and is defined as “intersecting effects of race, class, gender, and other marginalizing characteristics that contribute to social identity and affect health” (Seng et al., 2012). In fact, increased numbers of marginalized identities coupled with frequency of discrimination has been shown to be associated with significantly decreased quality of life (Seng et al., 2012). It is because of this, and because veganism has been shown to be a marginalized identity, that we are interested in the impact of discrimination and stereotype threat specifically within a vegan sample.
Recent work has classified vegans as a “social minority” who often experience teasing, bullying, stereotyping, and discrimination (Nezlek et al., 2018). Across studies, vegans tend to be perceived as more negatively than other groups, including compared to other groups that are commonly targets of prejudice and discrimination (e.g., Black individuals) and other “nutritional outgroups” (e.g., individuals who are gluten intolerant; MacInnis & Hodson, 2017). These negative perceptions appear to be amplified if the vegan/vegetarian is motivated by animal rights/welfare or identifies as male (MacInnis & Hodson, 2017). Stereotypes about vegans and vegetarians appear consistent across studies, and often are negative in nature. For example, vegetarians are considered less masculine (Rozin et al., 2012; Ruby & Heine, 2011), lacking protein and nutrients, having fewer food choices, thin, weak, and strict (Burgess et al., 2014).

Despite vegetarianism and veganism being associated with some positive traits, such as being virtuous (Ruby & Heine, 2011) and being healthy, an animal rights activist, and organic (Burgess et al., 2014), the negative ascriptions often outweighed the positive (Burgess et al., 2014; Branković & Budžak, 2021; Minson & Monin, 2012). Even among individuals who rated vegetarians positively, vegans were rated more negatively in comparison (Corrin et al., 2019; MacInnis & Hodson, 2017). While veganism does appear to be associated with negative stereotypes and bias, current data suggests that these perceptions may not in fact lead to discrimination (MacInnis & Hodson, 2017).

Individuals who are part of the BIPOC community discussed their experiences within the vegan community in prior qualitative work. It appears as though they experience stigma and stereotypes both within the broader vegan movement and within their ethnic/racial communities (Greenebaum, 2018). Some explain that the general perception is that veganism is related to Whiteness, privilege, elitism, and in many cases appears incompatible with their own
ethnicity/race (Greenbaum, 2018), while others deny that veganism conflicts with their African American identity (Botchway et al., 2020). Despite this perception, individuals state that they often feel welcomed and included by the vegan community at large, but that “normative Whiteness” must be challenged (Chatila, 2018). Individuals discussed the need to focus on including an array of ethnic/racial groups in research in order to highlight the specific needs and exclusion factors faced by their community, understanding that culture and identity are of vital importance (Greenebaum et al., 2018). While qualitative work has explored the experiences of BIPOC vegans, little quantitative research exists in this domain.

**Current study**

In summary, work has consistently shown that diet type is differentially associated with mental health outcomes, but the understanding of the impact of veganism on mental health is limited. Further, many studies are limited in their sample’s diversity despite veganism becoming more mainstream and common across ethnicity/races, genders, and sexual orientations. While various identity features influence mental health outcomes, it is uncertain whether these trends will be similar when intersecting with a vegan identity. Further, individuals with a social minority identity often experience stereotype threat and discrimination, both of which are deleterious to mental health. While this relationship has been observed in the general population, vegans’ experience of stereotype threat and discrimination, from both the general population and from within vegan spaces, and the impact on mental health is not yet understood. We aimed to fill the gaps in current literature in order to better understand the experiences of BIPOC, gender nonconforming, and sexual minority vegans in order to better advocate for improved care and more inclusivity from researchers and advocates.

**Aims and Hypotheses**
**Aim 1.** Characterize stereotypes about vegans from the general population and within vegans. **Hypothesis 1a:** Veganism is associated with being White, female, and privileged in both groups. **Hypothesis 1b:** Veganism is associated with more negative attitudes from the general population and more positive attitudes from within vegans. **Hypothesis 1c:** White vegans exhibit negative stereotypes against Black vegans.

**Aim 2.** Quantify the impact of identity features and experience with stereotype threat/discrimination on mental health outcomes. **Hypothesis 2a:** Cisgender women, nonbinary, transgender, and sexual minority vegans experience worse mental health outcomes compared to men, cisgender, and heterosexual participants. Based on the mixed findings of past work, we did not have a specific hypothesis mental health outcome in different ethnic/racial groups. Race, gender, and sexual orientation interact to impact depression, anxiety, and stress, such that BIPOC participants who are also cisgender women, gender nonconforming, or sexual minorities experience worse mental health outcomes. **Hypothesis 2b:** Increased experiences with stereotype threat/discrimination are related to worse mental health outcomes, as moderated by race.

**Aim 3.** Assess what identity factors impact concerns regarding stereotype threat and experiences of discrimination from the general population and/or from within vegans. **Hypothesis 3a:** BIPOC vegans experience more stereotype threat and discrimination than White vegans in the general population, and from within the vegan community. **Hypothesis 3b:** BIPOC vegans face less stereotype threat/prejudice from other vegans compared to the general population. An exploratory aim of this study is to assess if additional identity features (i.e., gender and sexual orientation) similarly impact experiences with stereotype threat and discrimination.
METHODS

All methods were reviewed and approved by the local Institutional Review Board. Participants were informed of the nature and purpose of the research and consented prior to completion of questionnaires.

Study 1 Methods

Participants

Participants were recruited as part of a study of eating behaviors in college students at a large university in the Northeastern United States. The study included questions specifically designed to assess general population stereotypes about vegans. Inclusion criteria were being fluent in English and at least 18 years of age or older.

Data collection

Participants were enrolled via an online participant recruitment website for college students. They received class credit for a psychology course in return for participation.

Measures

Demographics. Participants were asked general demographic questions regarding age, sex/gender (with response options including: cisgender male, cisgender female, transgender female, transgender male, nonbinary, and other), ethnicity (Hispanic, Latino, or Spanish origin; not Hispanic, Latino, or Spanish origin), race (African American or Black, Asian, Caucasian or White, Middle Eastern, Indigenous, Asian, Pacific Islander, multi-racial or bi-racial, other), an sexual orientation (heterosexual, gay, bisexual, pansexual, other).

Asch Impression Task. The Asch Impression Task was included to assess implicit bias towards vegans from the general population. Participants were randomized to read one of two paragraphs that were identical with the exception of one key feature changed in order to test
implicit assumptions regarding that one feature (Asch, 1946; Rozin et al., 2012). To test implicit assumptions regarding vegans in study participants from the general population, two paragraphs presented here were identical except for the reported dietary status of the individual (vegan or omnivore; see below). After reading this paragraph, participants were asked to rate the individual on the following bipolar dimensions using a visual analog scale from 0-100, in which the following word pairs represented the opposing scale endpoints: healthy-unhealthy, weak-strong, attractive-unattractive, man-woman, liberal-conservative, Black (African American)-White (Caucasian), mean-nice, thin-overweight, ethical-unethical, rich-poor, straight (heterosexual)-gay (homosexual), annoying-enjoyable, smart-stupid, old-young, humble-arrogant, religious-atheist. Cronbach’s alpha for the scale ratings in this sample was 0.69.

“A.” is a cashier at a local store who lives in a suburban neighborhood in the Midwest. They live with their partner of 5 years, with whom they hope to start a family in the near future. Their long-term goals include returning to college to get a degree in Business Administration and Management. In their free time, A. enjoys hiking with their two dogs and watching comedies on Netflix. A. has many friends and an active social life, frequently going out to movie theaters and local restaurants and bars. A. loves to cook and (eats an exclusively vegan diet/ has a strong interest in health and wellness). A. has a strong interest in health and wellness, and their primary source of (protein is chickpeas and tofu/protein is chicken breast and lean beef). A.’s mother recently passed away, and they are struggling with grief. They are receiving support from their family and siblings, but still feels strong feelings of sadness when seeing pictures of their mother.

**Study 2 Methods**
Participants

Inclusion criteria for this study were being over the age of 18, past month adherence to a vegan diet, and living in the United States. To confirm eligibility, prior to participation participants were asked to indicate their age. They also were asked “Do you consider yourself vegan” with the definition “refrain from eating or using food or other products derived from animals” provided. Vegan status was confirmed by asking participants to select which, if any of the following foods they consumed in the past month: beef, chicken, turkey, pork, fish/shellfish, milk/dairy, eggs, other meat, and paper (as an attention check); if any options indicating consumption of animal products in the past month were selected, participants were excluded from the analyses presented here. Finally, participants were asked to provide the state in which they reside to confirm United States residency to assess culture-specific stereotypes and experiences with discrimination.

Data Collection

Participants were recruited via convenience sampling on Facebook groups that focused on veganism. Recruitment posts included the researcher’s contact information, inclusion criteria, estimated survey length, and survey link. Participants were provided with inclusion criteria, survey length, researcher email, and stated we were looking for a “diverse sample” to research “experiences within the vegan community.” No personal identifying information was collected from participants.

Measures

Asch Impression Task. The Asch Impression Task was used to quantify implicit bias about vegans by vegans and also to assess implicit racial bias within White vegans. Participants first completed an Asch Impression Task similar to that administered in Study 1 in which they
were shown identical paragraphs with one key feature changed in order to test implicit assumptions regarding that one feature (Asch, 1946; Rozin, Hormes, Faith, & Wansink, 2012). In total approximately 25% of participants each were randomized to view one of four paragraphs. To test implicit assumptions regarding vegans, two paragraphs were identical except for the reported dietary status of the individual (vegan or omnivore as described above in Study 1; Cronbach’s alpha = 0.21).

To test implicit race bias two paragraphs were identical except for changing the name of the individual from a stereotypically White and Black name (Ebony or Emily; see below; Cronbach’s alpha = 0.79). After reading the paragraph they were randomized to view, participants were asked to rate the individual described in the paragraph as a supervisor on the following bipolar dimensions using a visual analog scale from 0-100, with the endpoints being one of the following two-word pairs: strict-relaxed, mean-kind, stupid-smart, humble-arrogant, weak-strong, lazy-hard working, loud-quiet. Further, participants were asked how much they would like to work for this supervisor on a rating scale from 0-100 (would strongly not like to work for—would strongly like to work for).

(*Ebony/Emily*) graduated with a master’s degree in nonprofit management. She was inspired to work within the field of animal advocacy after watching a documentary regarding farmed animal suffering. (*Ebony/Emily*) was hired directly after graduation and began to lead a team who conducted undercover investigations at factory farms and produce videos from the footage. (*Ebony/Emily*) tends to take a warm but strict approach, and expects her supervisees to consistently arrive on time for their position and go above and beyond in order to produce high-quality work. Despite this, (*Ebony/Emily*) is also
accommodating to her supervisee’s needs, especially during times of family crisis, and does not expect them to work more than 8 hours a day.

**Demographics.** Participants were asked general demographic questions regarding their age, sex/gender (cisgender female, cisgender male, transgender female, transgender male, nonbinary, intersex, other), ethnicity (Hispanic, Latino, or Spanish origin; not Hispanic, Latino, or Spanish origin), race (African American or Black, Asian, Caucasian or White, Indian, Middle Eastern, Indigenous, Pacific Islander, multi-racial or bi-racial, other), and sexual orientation (heterosexual, gay, bisexual, pansexual, asexual, other).

**Vegan-Specific Questions.** Participants were asked non-standardized questions regarding various aspects of veganism and animal advocacy. They were asked if they worked within the animal advocacy field, at what age they first began restricting any animal products and age they first became vegan (to calculate length of time at first restriction and at transition to full vegan). Further, participants were asked to select from the following options to indicate their initial primary, initial secondary, current primary, and current secondary motivations for adherence to a vegan diet: animal rights/welfare, environmental, health, weight control, religion/spiritual, financial, taste preference, other. This list of options is similar to that presented in comparable prior studies to assess motives for adherence to a vegan diet (Heiss, Coffino, & Hormes, 2017).

**Depression, Anxiety and Stress Scale.** The Depression, Anxiety and Stress Scale (DASS-21) was used to test the hypothesized relationship between identity features (i.e., ethnicity/race, gender, and sexual orientation) and mental health as well as the hypothesized relationship between stereotype threat/discrimination and mental health outcomes in vegans. The DASS-21 is a 21-item questionnaire rated on a 4-point Likert scale (0 = did not apply to me at
all, 3 = applied to me very much most of the time) that assesses the three emotional states of depression (e.g., “I couldn’t seem to experience any positive feelings at all”), anxiety (e.g., “I felt scared without any good reason”), and stress (e.g., “I found myself getting agitated”; Lovibond & Lovibond, 1995). Scores were calculated by summing scores and multiplying by two, and thus each individual scale score ranges from 0-56. Cronbach’s alpha for the depression subscale in the present sample was 0.90, 0.79 for the anxiety subscale, and 0.89 for the stress subscale, indicating satisfactory internal consistency.

**Perceived Ethnic Discrimination Questionnaire.** The Perceived Ethnic Discrimination Questionnaire (PEDQ) was included to quantify experiences with discrimination, including as a potential mediator of the relationship between identity factors and mental health outcomes. The PEDQ is a 17-item questionnaire rated on a 7-point Likert scale (1 = never, 7 = very often) that quantifies experienced ethnic discrimination on the following four factors: disvaluation (e.g., “How often have others had low expectations of you because of your ethnicity?”), threat/aggression (e.g., “How often have others damaged your property because of your ethnicity?”), verbal rejection (e.g., “How often have you been subjected to offensive ethnic comments aimed directly at you, spoken either in your presence or behind your back?”), and avoidance (e.g., “How often have others avoided social contact with you because of your ethnicity?”; Contrada et al., 2001). One question was changed to remove the provided examples of ethnic name calling\(^2\). Scale scores were calculated by taking the mean of individual items and all items were averaged to calculate a global discrimination score. Participants were asked to complete the PEDQ twice. The first set of instructions stated “For the following questions, please consider your GENERAL EXPERIENCES, specifically, NOT your experiences from within the

---

\(^2\) There was language in the scale item giving an example of ethnic name calling that would likely be perceived as offensive by participants and was therefore removed
vegan community. You will be asked about your experiences from within the vegan community on the following page.” Cronbach’s alpha for ratings of experiences of discrimination from the general population (PEDQ-Gen) was as follows: disvaluation subscale = 0.92, threat/aggression subscale = 0.86, verbal rejection subscale = 0.88, and avoidance subscale = 0.83. The participants were then given the same questionnaire, but with the instructions “For the following questions, please consider your EXPERIENCES FROM WITHIN THE VEGAN COMMUNITY, specifically, NOT your general experiences.” All participants completed both versions of this questionnaire. Cronbach’s alpha from the vegan community (PEDQ-Veg) was as follows: disvaluation subscale = 0.92, threat/aggression subscale = 0.90, verbal rejection subscale = 0.89, and avoidance subscale = 0.84.

**Stereotype Confirmation Scale.** The Stereotype Confirmation Scale (SCS) was included to quantify differential experiences with discrimination by race, as well as the role of stereotype threat as a potential mediator in the relationship between identity factors and mental health outcomes. The SCS is an 11-item questionnaire rated on a 7-point Likert scale (1 = never, 7 = always) that quantifies the level to which an individual is concerned that they may appear to be conforming to a stereotype about their ethnic group (Contrada et al., 2001). Examples of questions on the SCS include “How often have you been concerned that by eating certain foods you might appear to be confirming a stereotype about your ethnic group?” and “How often have you been concerned that the way you look (your physical appearance) might appear to confirm a stereotype about your ethnic group?” Responses are averaged to calculate a global score. Similar to the PEDQ, participants were asked to complete the SCS twice – once in reference to their general experience and once in reference to their experience within the vegan community. They
received the same instructions for the SCS as for the PEDQ. Cronbach’s alpha for the general population (SCS-Gen) was 0.92 and for the vegan community (SCS-Veg) was 0.94.

**Statistical Analysis and Power**

Statistical analyses were conducted using SPSS version 27. Participants’ data were compared in a series of chi-square tests, analyses of variances (ANOVA), multivariate analyses of variance (MANOVA), Pearson’s correlations, paired-sample t-tests, and tests of moderation (tests used for each specific hypothesis described below). If an individual did not fully complete a questionnaire or did not identify a feature of their identity they were removed from that individual analysis. Power analysis was conducted in G*Power version 3.1.

**Demographics.** Differences in initial age of first restriction and initial age of adhering to a vegan diet by race were assessed using an ANOVA and significant main effects were followed by a planned post-hoc Tukey test to determine the direction and magnitude of any group differences. Differences in likelihood of working in the animal advocacy field and differences in motivations by race were assessed using chi-square tests.

**Hypotheses 1a – 1c.** To test Hypotheses 1a – 1c (Veganism associated with being White, female, and privileged in both groups; more negative attitudes from the general population and more positive attitudes from within vegans; White vegans exhibit negative stereotypes against Black vegans) we used a MANOVA to determine group differences on ratings in the Asch Impression Task from Study 1 and Study 2. The independent variables were group membership of the target described in the paragraph (presumed diet being vegan/omnivore or presumed race being Black/White) and the dependent variables were the rating of the bipolar adjectives (described above). To reach statistical power of 0.80 with a medium effect size and alpha level set at 0.5, a total sample size of 322 was needed for the presumed vegan/omnivore comparison
and 249 in the presumed Black/White comparison. This was met. To test possible interaction of race of the rater on group membership and race on outcomes, a sample size of 214 was needed in the presumed diet comparison and 161 was needed in the presumed race comparison. This was met in both comparisons.

**Hypothesis 2a.** To test Hypothesis 2a (cisgender women, gender nonconforming, and sexual minority vegans experience worse mental health outcomes), a MANOVA was used to explore differences on the DASS-21 by ethnicity/race, gender, and sexual orientation and to assess interaction effects. As per census guidelines, questions regarding ethnicity were asked separately from questions regarding race (Brown, 2020). Significant main effects were followed by post-hoc Tukey tests. To reach statistical power of 0.80 with a medium effect size and alpha level set at 0.05, a total sample size of 87 was needed, which was exceeded.

**Hypothesis 2b.** In order to test Hypothesis 2b (increased experiences with stereotype threat/discrimination are related to worse mental health outcomes, as moderated by ethnicity/race), a Pearson’s correlation coefficients were used to evaluate the strength of the relationships between experiences with discrimination (PEDQ-Gen, PEDQ-Veg)/stereotype confirmation (SCS-Gen, SCS-Veg) and mental health outcomes (DASS-21). To reach statistical power of 0.80 in a two-tailed correlation with medium effect size and an alpha of 0.05, a total sample size of 82 was needed. This was met. The correlation was followed up by a regression to better understand the explained variance of experiencing discrimination/stereotype confirmation from the general population (PEDQ-Gen, SCS-Gen) compared to within other vegans (PEDQ-Veg, SCS-Veg) on mental health outcomes. To reach power of 0.8 in the individual regressions with medium effect size and alpha set at 0.05, a total sample size of 85 was needed.
Hayes PROCESS v. 3.5 was used to determine whether race (White/BIPOC) moderates the relationship between discrimination/stereotype confirmation and mental health outcomes. To reach power of 0.80 in the moderation analysis with a medium effect size and alpha set at 0.05, a total sample size of 55 was needed. This was met.

**Hypothesis 3a.** To test Hypothesis 3a, (BIPOC vegans experience more stereotype threat and discrimination than White vegans in the general population and from within the vegan community) we used MANOVAs to determine group differences by all ethnicities and races on PEDQ-Gen/PEDQ-Veg and ANOVAs to determine group differences by race/ethnicity on the SCS-Gen/SCS-Veg. To reach statistical power for the PEDQ comparisons a total sample size of 196 was needed, and to reach statistical power on the SCS comparisons a total sample size of 249 was needed, both of which were met. Significant main effects were followed up by post-hoc Tukey tests.

**Hypothesis 3b.** Hypothesis 3b (BIPOC vegans face less stereotype threat/prejudice from other vegans compared to the general population) was tested using a paired-sample t-test, comparing PEDQ-Gen to PEDQ-Veg and comparing SCS-Gen to SCS-Veg (i.e., comparing frequency of experiences of discrimination and stereotype confirmation concerns from the general population versus from within the vegan community). To reach statistical power of 0.80 in a matched pair/two dependent means t-test assuming a medium effect size and alpha level of 0.05, a total sample size of 27 was needed. Hypothesis 3b was thus adequately powered.

**Exploratory aim 3.** Possible interaction effects of race/gender and race/sexual orientation on experiences with discrimination were assessed in univariate and multivariate analyses of variance. For ease of interpretation, and based on findings from Hypotheses 3a and 3b, race, gender, and sexual orientation were recoded into either dichotomous or three-factor...
variables. We compared BIPOC and White participants for race/ethnicity, heterosexual and sexual minority (i.e., anyone who indicated they were not heterosexual) for sexual minority, and cisgender female, cisgender male, and gender nonconforming for gender. Significant interactions were interpreted using graphical representations. We followed these tests up to assess for interaction effects in collapsed groups. To reach statistical power for the PEDQ comparisons, a total sample size of 97 was needed, and to reach statistical power for SCS comparisons a total sample size of 158 was needed, both of which were met.

RESULTS

Study 1 Demographics

Participants

A total of 392 participants met inclusion criteria for the study (i.e., over the age of 18, fluent in English). Data were collected between February 13th, 2021 and May 3rd, 2021.

Demographics

Participants’ mean age was 19.01 ± 1.22 years old (range 18 – 26). The sample was comprised of 43.8% (n = 171) cisgender male participants, 54.9% (n = 214) cisgender female participants, 0.8% (n = 3) nonbinary participants, and 0.5% (n = 2) participants who indicated their gender identity was “other.” Regarding sexual orientation, 85.6% (n = 334) identified as heterosexual, 1.8% (n = 7) as gay, 8.7% (n = 34) as bisexual, 0.8% (n = 3) as pansexual, and 3.1% (n = 12) indicated their sexuality was “other” or preferred not to say. A total of 18.9% of participants (n = 74) indicated they were Hispanic, Latino/a, or of Spanish origin. Regarding race, 53.4% of participants (n = 166) indicated they were White, 22.2% (n = 69) were Black, 19.6% (n = 61) were Asian, 0.3% (n = 1) were Pacific Islander, 3.9% (n = 12) were multiracial/biracial, and 0.6% (n = 2) were Middle Eastern.
Study 2 Demographics

Participants

A total of 2,929 participants initially met inclusion criteria for the study (i.e., over the age of 18, vegan, and living within the United States). From this sample, 384 were excluded for not finishing any other questions besides the inclusion criteria and 23 were removed for submitting duplicate surveys (determined if the IP address, age, gender, race/ethnicity, and age at first animal restriction/veganism were the same; IP address was deleted after this analysis). This resulted in a final sample of 2,220 respondents. Data were collected between February 3rd, 2021 and April 24th, 2021.

Demographics

Participants’ mean age was 38.61 ± 13.11 years and ranged from 18 years old to 85 years old. The sample was comprised of 80.3% (n = 1,783) cisgender female participants, 12.3% (n = 273) cisgender male participants, 0.2% (n = 5) transgender females, 0.5% (n = 10) transgender males, 3.8% (n = 85) nonbinary participants, and 0.8% (n = 17) who identified their gender as “other” (e.g., “two-spirit,” “questioning”). Groups were merged to facilitate meaningful analyses as follows: 12.3% (n = 273) cisgender males, 80.3% (n = 1783) cisgender females, and 5.3% (n = 117) gender nonconforming participants. Regarding sexual orientation, 68.3% (n = 1,517) identified as heterosexual, 4.3% (n = 95) as gay, 14.6% (n = 324) as bisexual, 6.8% (n = 151) as pansexual, 2.2% (n = 49) as asexual, 0.9% (n = 20) as queer, and 1.1% (n = 24) as “other” (e.g., “fluid,” “demisexual”). Again, groups were merged to simplify analyses and interpretation of data as follows: 68.3% (n = 1517) heterosexual participants and 29.9% (n = 663) sexual minority participants. A total of 9.2% (n = 204) of participants identified their ethnicity as Hispanic. Further, 2.1% of participants’ race was African American or Black (n = 42), 1.7% (n = 34) were
Asian, 89.3% \((n = 1,762)\) were Caucasian or White, 1.1% \((n = 21)\) were Indian, 0.7% \((n = 13)\) were Middle Eastern, 0.5% \((n = 10)\) were Indigenous, 0.1% \((n = 1)\) was Pacific Islander, and 3.5% \((n = 69)\) were multi-racial or bi-racial. The sample was dichotomized for analyses by race, comparing 18.5% \((n = 411)\) BIPOC participants to 79.4% \((n = 1763)\) White participants.

**Behaviors and attitudes regarding veganism**

On average, participants first began restricting animal products at the age of 21.76 ± 11.58 years old (range from age 0 to age 68) and reported having restricted animal products for an average of 16.73 ± 12.78 years (range from 0 to 75 years). The average age of participants adhering to a vegan diet was 30.00 ± 12.07 years old (range 0 to 75 years old) and the average length of time of adherence to a vegan diet was 8.59 ± 8.55 years (range 0 to 75 years). A total of 10.1% \((n = 218)\) of participants reported currently working in the animal advocacy field.

**Differences in vegan behaviors and attitudes by race/ethnicity.** Hispanic individuals on average had restricted any animal intake for a significantly shorter length of time \((12.13 ± 10.57\text{ years})\) than those who were not Hispanic \((17.18 ± 12.90; F(1,2143) = 28.50; p < 0.001; \eta_p^2 = 0.01;\text{ for full details see Table 6})\). Similarly, those who were Hispanic on average adhered to a vegan diet for a significantly shorter length of time \((6.51 ± 6.94\text{ years})\) compared to those who were not Hispanic \((8.79 ± 8.66; F(1,2156) = 13.01; p < 0.01; \eta_p^2 = 0.01)\). Animal rights/welfare was by far the most common primary reason for veganism endorsed by the entire sample of participants (for full details regarding motives for adopting veganism in this sample please refer to Table 1). Individuals who were Hispanic were more likely than other participants to indicate weight control was a secondary initial motivation \((\chi^2 (1) = 5.61, p = .02, \Phi = .02;\text{ adjusted residual } = 2.4)\). For full details, please refer to Tables 2-5.
Initial age of first restriction of animal products differed significantly by race \((F(7,1917) = 2.69; p < 0.01; \eta^2_p = 0.01; \text{ for full details please refer to Table 6})\). Post hoc analyses revealed that Black respondents on average started restricting significantly later than Indian individuals. Length of time restricting animal products differed by race \((F(7,1917) = 3.47; p < 0.01; \eta^2_p = 0.01)\), such that individuals who were Asian on average restricted animal products for a shorter length of time \((10.18 \pm 10.18 \text{ years})\) than White individuals \((17.41 \pm 12.79 \text{ years}; \text{ post-hoc } p = .02)\) and Indian individuals \((21.00 \pm 15.22; p = .04)\). Age at first going vegan, length of time of being vegan, and likelihood of working within the animal advocacy field did not differ by race.

Initial primary \((\chi^2 (36) = 136.11, p < .001, \Phi = .27; \text{ see table 2})\), secondary reason (see Table 3), current primary reason \((\chi^2 (42) = 126.83, p < .001, \Phi = .26; \text{ see Table 4})\), and current secondary reason (see Table 5) reason for adhering to a vegan diet all varied by race.

**Aim 1:** Characterize stereotypes about vegans from the general population and within vegans.

**Hypothesis 1a.** Veganism is associated with being White, female, and privileged in the general population and in vegan individuals

**Asch Impressions Task – Study 1.** Participants in Study 1 were undergraduate students from the general population. There was no main effect of the presumed diet of the target (i.e., the description of a vegan person vs. a non-vegan person) on combined ratings of assumed characteristics of the target \((F(16,133) = 0.81; p = 0.67; \eta^2_p = 0.09)\). Inclusion of race \((p = .01)\) and gender \((p = .01)\) of the respondent as covariates did not change the results \((p = 0.94; \eta^2_p = 0.06)\). On a scale of 0-100, where higher scores represented a higher perceived likelihood of the target being White compared to Black, participants rated vegans as 59.73 ± 23.90 and omnivores as 60.29 ± 24.26. Higher likelihood of being female compared to male was represented by higher
scores. Participants rated vegans as 58.36 ± 32.04 and omnivores as 49.96 ± 34.09. The likelihood of being rich versus poor was represented by lower scores. Participants rated vegans as 38.57 ± 17.53 and omnivores as 45.07 ± 22.17.

**Asch Impressions Task – Study 2.** In the vegan respondents, there was a significant multivariate main effect of presumed diet of the target (i.e., those who were presented with a description of a vegan person vs. a non-vegan person) on combined ratings of assumed characteristics of that target ($F(16,642) = 34.84; p < 0.001; \eta^2_p = 0.47$), but none of the between-subjects comparisons reached statistical significance, including comparisons of ratings of assumed gender, race, income, sexuality, or age of the target (all $p$s > .05).

**Hypothesis 1b.** Veganism is associated with more negative attitudes from the general population and more positive attitudes from within vegans.

**Asch Impressions Task – Study 1.** There was no main effect of presumed diet of the target (i.e., those who were presented with a description of a vegan person vs. a non-vegan person) on combined ratings from the general population ($F(16,133) = 0.81; p = 0.67; \eta^2_p = 0.09$). For example, scores ranging from weak to strong (vegan = 68.24 ± 24.64; omnivore = 68.03 ± 22.17), attractive to unattractive (vegan = 48.42 ± 29.44; omnivore = 48.10 ± 27.19), mean to nice (vegan = 70.56 ± 25.83; omnivore = 72.91 ± 23.45), ethical to unethical (vegan = 28.16 ± 24.77; omnivore = 28.13 ± 26.56), annoying to enjoyable (vegan = 65.86 ± 22.65; omnivore = 69.34 ± 23.48), smart to stupid (vegan = 35.41 ± 25.68; omnivore = 35.34 ± 29.49), and humble to arrogant (vegan = 64.30 ± 23.21; omnivore = 68.00 ± 22.96) did not differ by characteristics of the target.

**Asch Impressions Task – Study 2.** There was a significant multivariate main effect of presumed diet of the target (i.e., those who were presented with a description of a vegan person
vs. a non-vegan person on combined ratings from vegan study participants ($F(16,642) = 34.84; p < 0.001; \eta^2_p = 0.47$). Those shown the description of a vegan person on average rated them as significantly more healthy ($20.41 \pm 16.67$ vs $41.26 \pm 22.24$), strong ($67.10 \pm 16.45$ vs $60.35 \pm 14.99$), attractive ($36.00 \pm 17.35$ vs $44.11 \pm 14.73$), liberal ($29.96 \pm 16.89$ vs $45.12 \pm 17.65$), nice ($73.69 \pm 16.58$ vs $66.49 \pm 16.59$), thin ($35.69 \pm 14.85$ vs $43.07 \pm 16.17$), ethical ($19.79 \pm 18.41$ vs $52.20 \pm 20.83$), enjoyable ($69.28 \pm 19.23$ vs $63.10 \pm 18.18$), smart ($23.24 \pm 16.63$ vs $38.83 \pm 17.73$), humble ($64.75 \pm 16.66$ vs $58.53 \pm 16.44$), and atheist ($56.91 \pm 15.82$ vs $48.25 \pm 15.77$) than the non-vegan target (all $ps < .001$).

**Hypothesis 1c.** White vegans exhibit negative stereotypes against Black vegans.

**Asch Impression Task – Study 2.** There was no significant multivariate main effect of presumed race of the described target (i.e., those who were presented with a description of a boss with a stereotypically Black name, “Ebony,” or stereotypically White name, “Emily”) on combined ratings from all the vegan study participants ($F(8,1030) = 1.27; p = 0.26; \eta^2_p = 0.01$). These findings were replicated in the White participants alone, with no significant differences in impression between the two descriptions ($F(8,871) = 1.39; p = 0.20; \eta^2_p = 0.01$). There was no significant interaction between presumed race of the target described and dichotomized race of the study participants/raters (BIPOC vs White) on perceptions towards the target ($p = 0.47; \eta^2_p < 0.01$).

**Aim 2: Quantify the impact of identity features and experience with stereotype threat/discrimination on mental health outcomes.**

**Hypothesis 2a.** Cisgender women, gender nonconforming, sexual minority, and White vegans experience worse mental health outcomes compared to cisgender men and heterosexual participants.
**Differences in DASS-21 scores by race/ethnicity.** A multivariate ANOVA revealed no significant main effects of race or ethnicity on combined DASS-21 subscale scores.

**Differences in DASS-21 scores by sexual orientation.** There was a significant multivariate main effect of sexual orientation on combined DASS-21 subscale scores ($F(18,5052) = 5.37; p < 0.001; \eta^2_p = 0.02$), with significant between group differences in all three subscales, including Depression ($F(6,1684) = 10.58; p < 0.001; \eta^2_p = 0.04$), Anxiety ($F(6,1684) = 7.93; p < 0.001; \eta^2_p = 0.04$), and Stress ($F(6,1684) = 12.27; p < 0.001; \eta^2_p = 0.04$). On the depression subscale, those who were bisexual (11.65 ± 9.53), pansexual (11.15 ± 9.94), asexual (12.23 ± 9.93), and queer (14.11 ± 12.11) all scored significantly higher than those who were heterosexual (8.03 ± 8.23; all post hoc ps < .05). On the anxiety subscale, those who were bisexual (7.38 ± 7.18) and pansexual (8.26 ± 8.20) both scored significantly higher than those who were heterosexual (5.28 ± 6.10; both ps < .001). Similarly on the stress subscale, those who were bisexual (14.49 ± 8.72) and pansexual (14.60 ± 8.37) scored higher than those who were heterosexual (10.54 ± 7.99; both ps < .001).

**Differences in DASS-21 scores by gender.** A significant multivariate main effect of gender on combined DASS-21 subscale scores was found ($F(15,5046) = 4.83; p < 0.001; \eta^2_p = 0.01$), with significant between group differences in all three subscales, including Depression ($F(5,1682) = 8.59; p < 0.001; \eta^2_p = 0.03$), Anxiety ($F(5,1682) = 9.60; p < 0.001; \eta^2_p = 0.03$), and Stress ($F(5,1682) = 9.21; p < 0.001; \eta^2_p = 0.03$). On the depression subscale, nonbinary participants scored significantly higher (13.94 ± 9.31) than both cisgender females (8.92 ± 8.88) and cisgender males (8.03 ± 7.50; both ps < .001). Individuals who identified their gender as “other” scored higher on the depression subscale (18.20 ± 12.35) than cisgender females ($p = .01$) and cisgender males ($p < .01$). Transgender men scored higher (17.25 ± 13.85) than
cisgender men on the depression subscale ($p = .04$). On the anxiety subscale, nonbinary individuals scored significantly higher ($9.63 \pm 7.58$) than both cisgender females ($6.01 \pm 6.62$) and cisgender males ($4.03 \pm 4.74$; both $ps < .001$). Further, cisgender men scored significantly lower on the anxiety subscale than cisgender females ($p < .001$) and those who identified their gender as “other” ($10.40 \pm 9.97$; $p = .03$). Finally, on the stress subscale, nonbinary individuals scored significantly higher ($16.73 \pm 9.27$) than both cisgender females ($11.64 \pm 8.31$) and cisgender males ($9.34 \pm 7.65$; both $ps < .001$). Cisgender females scored higher than cisgender males ($p = .02$). There were no significant interactions of race, gender, and sexual orientation.

Hypothesis 2b. Increased experiences with stereotype threat/discrimination are related to worse mental health outcomes, as moderated by race.

Subscales of the PEDQ-Gen, PEDQ-Veg, SCS-Gen, and SCS-Veg were significantly and positively correlated with DASS-21 subscale scores (see Table 7), with the exception of nonsignificant relationships between: Depression and the PEDQ-Gen Disvaluation subscale and both Depression and Stress on the PEDQ-Veg Threat/Aggression subscale. Please refer to Table 7 for full details.

Experiences with discrimination and stereotype threat from the general population accounted for a significant amount of the variance in total DASS-21 scores ($F(5,1578) = 12.73; p < 0.001, R^2 = 0.04$). While the overall model was significant, only the SCS-Gen was significantly predictive of DASS-21 scores ($B = 3.03, p < 0.001$). In a stepwise regression analysis, controlling for gender, race, ethnicity, and sexuality (Step 1), addition of the PEDQ-Gen and SCS-Gen (Step 2) accounted for a significant increase in the amount of variance in mental health concerns accounted for ($F change (5,1566) = 11.52, p < 0.001, R^2 change = 0.03$).
Similarly, experiences of discrimination and stereotype threat from within the fellow vegans accounted for a significant amount of the variance in reported mental health concerns \( (F(5,1533) = 6.61; \ p < 0.01, \ R^2 = 0.02) \). Both the PEDQ-Veg Threat/Aggression subscale \( (B = 4.66, \ p = 0.02) \) and the SCS-Veg \( (B = 3.09, \ p < 0.001) \) were predictive of mental health difficulties. When controlling for gender, race, ethnicity, and sexuality in a stepwise regression model (Step 1), PEDQ-Veg and SCS-Veg (Step 2) accounted for a significant increase in mental health concerns \( (F \text{ change}(5,1522) = 5.25, \ p < 0.001, \ R^2 \text{ change} = 0.02) \). Of note, experiences from the general population accounted for more variance than from within other vegans.

Finally, we were interested in the way in which race/ethnicity may moderate the relationship between stereotype threat/discrimination and mental health outcomes. We found that race (BIPOC vs. White) moderates the relationship between threat/aggression and anxiety both in the general population (model \( R^2 = 0.03, \ F(3,1690) = 14.66; \ p < 0.001; \ interaction \ p = 0.03 \)) and within other vegans (model \( R^2 < 0.01, \ F(3,1655) = 4.11; \ p < 0.01; \ interaction \ p = 0.02; \) see Figure 1 for additional information). In both cases, BIPOC vegans who experienced more threat/aggression experienced higher levels of anxiety. Further, we found that stereotype threat from within vegans interacts with race to impact anxiety levels (model \( R^2 = 0.02, \ F(3,1634) = 11.90; \ p < 0.001; \ interaction \ p = 0.01; \) see Figure 2). Race did not moderate the relationship between any other types of discrimination or stereotype threat in the general population or vegan community and any other mental health outcomes (all \( ps > 0.05 \)).

**Aim 3:** Assess if identity factors that deviate from the stereotypical vegan identity increase concerns regarding stereotype threat and experiences of discrimination from the general population and/or from within vegans.
Hypothesis 3a. BIPOC vegans experience more stereotype threat and discrimination than White vegans in the general population and from within the vegan community.

Perceived Ethnic Discrimination Scale-General Overall Results. In their interactions with the general population on the PEDQ (PEDQ-Gen), the full sample scored an average of 1.71 ± 1.17 on the Verbal Rejection subscale, 1.46 ± 0.89 on the Avoidance subscale, 1.33 ± 0.83 on the Disvaluation subscale, and 1.20 ± 0.56 on the Threat/Aggression subscale. (Possible scores range from 1 to 7 on each subscale).

Differences in Perceived Ethnic Discrimination Scale-General scores by race/ethnicity. There was a significant multivariate main effect of ethnicity on PEDQ-Gen \(F(4,1867) = 56.02; p < 0.01; \eta_p^2 = 0.11\). Individuals who were Hispanic, Latino/a, or of Spanish origin scored higher than those who were not on all four subscales (see Table 8).

There were similar findings on the impact of race on PEDQ-Gen scores, such that there was a significant multivariate main effect of ethnicity on combined subscale scores \(F(28,6696) = 22.01; p < 0.01; \eta_p^2 = 0.08\), with significantly higher scores in individuals of Hispanic, Latino/a, or of Spanish origin on the Verbal Rejection subscale \(F(7,1674) = 40.97; p < 0.001; \eta_p^2 = 0.15\), Avoidance subscale \(F(7,1674) = 32.23; p < 0.001; \eta_p^2 = 0.21\), Disvaluation subscale \(F(7,1674) = 24.94; p < 0.001; \eta_p^2 = 0.21\), and the Threat/Aggression subscale \(F(7,1674) = 11.84; p < 0.001; \eta_p^2 = 0.05\). For additional details, refer to Table 8.

Stereotype Confirmation Scale-General Overall Results. When rating their interactions with the general population on the SCS (SCS-Gen), the full sample scored an average of 1.71 ± 1.00 (range 1.00 – 7.00).

Differences in Stereotype Confirmation Scale-General by race/ethnicity. A main effect of ethnicity was found on the SCS-Gen \(F(1,1882) = 6.94; p < 0.01; \eta_p^2 < 0.01\), such that
those who were of Hispanic, Latino/a, or Spanish origin scored higher (i.e., experienced greater stereotype confirmation concerns) than those who were not (see Table 9). A main effect was also found on the SCS-Gen by race \((F(7,1684) = 26.61; p < 0.01; \eta^2_p = 0.10; \text{see Table 9})\).

**Differences in Perceived Ethnic Discrimination Scale-Vegan scores by race/ethnicity.** There was a significant multivariate main effect of ethnicity on PEDQ-Veg \((F(4,1673) = 6.21; p < 0.01; \eta^2_p = 0.02)\). Individuals who identified as being of Hispanic, Latino/a, or of Spanish origin scored higher than those who did not on the Verbal Rejection, Avoidance and the Disvaluation subscales (for additional details see Table 8).

Similarly, race had a significant impact on PEDQ-Veg scores, such that there was a significant multivariate main effect \((F(28,6024) = 5.52; p < 0.001; \eta^2_p = 0.03)\), with significant between subjects differences on the Verbal Rejection subscale \((F(7,1506) = 7.30; p < 0.001; \eta^2_p = 0.03)\), Avoidance subscale \((F(7, 1506) = 13.82; p < 0.001; \eta^2_p = 0.06)\), and the Disvaluation subscale \((F(7,1506) = 11.40; p < 0.001; \eta^2_p = 0.05)\). For additional details please refer to Table 8.

**SCS-Veg Overall Results.** In their interactions with the vegan population on the SCS (SCS-Veg), the full sample scored an average of 1.35 ± 0.77 (range 1.00 – 6.91).

**Differences in SCS-Veg by race/ethnicity.** A main effect of ethnicity was not found on the SCS-Veg by ethnicity \((F(1,1695) = 2.66; p = 0.10; \eta^2_p < 0.01)\) but was found on race \((F(7,1526) = 6.14; p < 0.001; \eta^2_p = 0.03; \text{see Table 9})\).

**Hypothesis 3b.** BIPOC vegans face less stereotype threat/prejudice from other vegans compared to the general population

We expected BIPOC vegans will experience more stereotype threat and discrimination than White vegans in the vegan population compared to the general population.
Differences in discrimination in the general population compared to vegans. A paired samples t-test was used to compare subscale scores on the PEDQ-Gen and PEDQ-Veg while excluding Non-Hispanic White participants. All four subscales were significant, such that participants scored higher on the PEDQ-Gen, indicating more frequent experiences of discrimination from the general population than from the vegan community. Specifically, on the Verbal Rejection subscale, participants scored higher on the PEDQ-Gen ($2.70 \pm 1.57$) than on the PEDQ-Veg ($1.56 \pm 1.13$; $t(308) = 14.20; p < 0.001$). On the Avoidance subscale, participants scored higher on the PEDQ-Gen ($2.16 \pm 1.38$) than on the PEDQ-Veg ($1.44 \pm 1.01$; $t(310) = 11.31; p < 0.001$). On the Disvaluation subscale, participants scored higher on the PEDQ-Gen ($2.00 \pm 1.40$) than on the PEDQ-Veg ($1.37 \pm 0.92$; $t(303) = 9.58; p < 0.001$). On the Threat/Aggression subscale, participants scored higher on the PEDQ-Gen ($1.43 \pm 0.81$) than on the PEDQ-Veg ($1.11 \pm 0.41$; $t(298) = 7.96; p < 0.001$). These findings did not change when including White participants in the analyses.

Differences in stereotype confirmation scales in the general population compared to vegans. A paired samples t-test was used to compare subscale scores on the SCS-Gen and SCS-Veg on the full sample. Participants scored significantly higher on the SCS-Gen ($2.12 \pm 1.30$) than on the SCS-Veg ($1.52 \pm 1.01$; $t(296) = 10.45; p < 0.001$), suggesting greater perceived stereotype threat from the general population, compared to the vegan community. These findings did not change when including White participants in the analysis.

Exploratory aim 3. Assess if identity features (i.e., gender and sexual orientation) impact experiences with stereotype threat and discrimination

We aimed to assess if additional identity features (i.e., gender and sexuality) differentially impact experiences with stereotype threat and discrimination by ethnicity and race.
**PEDQ-Gen interactions with race/ethnicity.** Overall, found a significant multivariate interaction of sexual orientation (heterosexual vs. sexual minority) and race (White vs. BIPOC) on experiences with discrimination ($F(4,1861) = 3.38; p < 0.01; \eta^2_p < 0.01$). This was observed on all four subscales (all $ps < 0.05$; see Figure 3). Overall, White participants experienced less discrimination. BIPOC participants experienced significantly more discrimination if they also identified as a sexual minority. We found that sex (cisgender male vs. cisgender female vs. gender nonconforming) significantly interacted with race on PEDQ-Gen ($F(8,3708) = 3.95; p < 0.001; \eta^2_p < 0.01$). This was observed on all four subscales (all $ps < 0.01$). Overall, White participants experienced less discrimination. BIPOC participants experience significantly more discrimination if they also identified as cisgender females or non-gender conforming (See Figure 4 for further details).

**SCS-Gen interactions with race/ethnicity.** There were no significant interaction between race and sexual orientation ($p = 0.23$) in SCS-Gen scores. Race and gender did significantly interact to impact scores ($F(2,1867) = 8.50; p < 0.001; \eta^2_p < 0.01$), such that White participants experienced the least concern, and BIPOC participants experience significantly more stereotype confirmation concerns if they also identify as cisgender female and gender nonconforming (see Figure 5 for additional details).

**PEDQ-Veg interactions with race/ethnicity.** We found multivariate main effects across both tested identity features and race, including race by sexual orientation ($F(4,1669) = 3.53; p < 0.01; \eta^2_p = 0.01$) on the verbal rejection ($p < 0.01$) and avoidance ($p < 0.01$) subscales, such that BIPOC sexual minorities were more likely to experience these forms of discrimination (see Figure 6 for additional details). Further, we found a significant interaction between race and gender on experiences with discrimination ($F(8,3328) = 5.53; p < 0.001; \eta^2_p = 0.01$) on all four
subscales (all $p < 0.01$), such that BIPOC participants who also identify as cisgender females and nonbinary participants experienced the higher levels of discrimination (see Figure 7 for additional details).

SCS-Veg interactions with race/ethnicity. We did not find a main interaction between race and sexual orientation on SCS scores ($F(1,1692) = 1.34; p = 0.25; \eta^2_p < 0.01$). We did find an interaction between race and gender ($F(2,1688) = 8.74; p < 0.001; \eta^2_p = 0.01$), such that White participants experienced the least concern, and BIPOC participants who also identify as cisgender female or gender nonconforming participants experienced the higher concern (see Figure 8 for additional details).

DISCUSSION

Summary of differences in behaviors and attitudes regarding veganism across identities

Our demographic data, information regarding length of time vegan, and motivations for vegan adherence support the idea that vegans are comprised of a diverse and multifaceted group of individuals. Our sample consisted of vegans of all ages, racial/ethnic identities, sexual orientation, and gender identities. Participants had been adhering to veganism for a wide range of time frames and reported being motivated by diverse ideas and causes. One way in which diversity appears to manifest in the vegan community is by the breadth of motivations for dietary adherence cited by participants in the study. There were marked differences in motivations across genders, ethnicities, races, and sexual orientations.

Overall, we found that Black participants tended to indicate both health and weight control more frequently than other races, and less frequently indicated that animal rights/welfare or the environment was a motivation. This is contrasted by White and Indian participants, who largely indicated that animal rights/welfare was an important motivation for their diet. Further,
compared to other races White participants were largely less likely to indicate that religion or spirituality was a motivation for dietary adherence.

**Implications.** In summary, we found substantial differences in motivation for adhering to a vegan diet across genders, sexual orientations, and ethnicity/race, supporting the idea that vegans are comprised of diverse and differentially motivated individuals. The Vegan Society defines veganism as a “philosophy and way of living,” (The Vegan Society, 2021) which may not apply to individuals across identity features. Importantly, it appears as though adhering to a vegan diet for animal rights/welfare is more common among White individuals, but BIPOC participants noted a wider range of initial and current motivations. Therefore, the common definition of veganism should be revised to be more inclusive of the host of reasons for and methods of adherence across all individuals. Further, for groups who are interested in increasing veganism, strategies to increase motivations should be tailored to the individual. For example, it may be more effective to take a health-targeted approach in groups of Black individuals who are interested in veganism.

**Aim 1. Characterize stereotypes about vegans from the general population and within vegans.**

The first aim of this study was to determine the nature and prevalence of stereotypes regarding vegans both from the general population and within vegans, in part to test the hypothesis that those who do not fit these stereotypes may experience heightened mental health concerns. As part of the assumption that vegans are still thought of as predominantly White and lacking racial and ethnic diversity, we were also interested in assessing potential racial biases within a vegan sample.
While we expected vegans to be perceived as more likely to be White, female, and privileged compared to non-vegans from both the general population and within other vegans, this hypothesis was not supported. We found no observable preconceived differences between vegans and non-vegans on perceptions of vegans’ race, gender, sexual orientation, or expected income.

We also expected veganism to be perceived negatively (e.g., mean, annoying, arrogant) from the general population and positively (e.g., nice, enjoyable, humble) from within our vegan sample. This hypothesis was partially supported. We found no evidence of any stereotypes about vegans from the general sample, but we did find that vegans rated their in-group (i.e., another vegan) as more positively as their out-group (i.e., an omnivore), such that the vegan was rated as more healthy, strong, attractive, nice, thin, ethical, enjoyable, smart, and humble.

Finally, having been raised in the United States, we expected White vegans to exhibit negative stereotypes against Black vegans (that is, no by virtue of being vegan, but instead by virtue of being raised in a racist society). This hypothesis was not supported, as we did not find evidence of any implicit bias or stereotypes of Black vegans by White vegans.

**Implications.** These findings are uniquely interesting, as past work has shown that individuals tend to exhibit more negative feelings towards vegans (e.g., Branković, & Budžak, 2021; Burgess et al., 2014; Minson & Monin, 2012; Ruby & Heine, 2011). Our current findings may be indicative of a shifting opinion of vegans in the general public, in part possibly due to the increased popularity of the diet, such that the contact effect (i.e., having a relationship with an out-group member fostering more positive inter-group attitudes) may be more likely to take effect (Page-Gould et al., 2008; Wright et al., 1997). While non-vegans’ opinions do not appear to differ between vegans and omnivores, vegans appear to think more positively of other vegans.
It is further important to highlight that across both studies, there was no evidence of implicit stereotypes regarding vegans’ race, gender, or sexual orientation. Our original aim of testing the impact of deviating from the stereotypical vegan should be interpreted with some caution as the vegan community is now incredibly diverse, and perceptions of vegans appear to have incorporated these demographic shifts.

These data provide preliminary evidence of a shifting perception of vegans from the general population. Past work has indicated that non-vegans have an overall negative perception of vegans. It is possible that with the increasing popularity of the diet, and thus more frequent personal exposure to individuals adhering to a vegan diet and lifestyle, these opinions are changing. Further, there is no evidence of implicit assumptions regarding race, gender, or sexual orientation of vegans. This is not in line prior findings and with individuals’ description with their experience that veganism is “White” (Greenbaum, 2018). Again, it is a possible that this finding is a feature of a greater number of individuals adhering to the diet, but it is important not to discount individual experiences and perceptions.

Additionally, our data provide preliminary evidence that White vegans overall do not exhibit implicit bias against Black vegans. We also found that BIPOC vegans experience lower rates of discrimination and stereotype confirmation concerns within other vegan groups compared to others more broadly (discussed in detail below). These findings are encouraging, providing initial evidence that as a whole, vegans may be a less biased group compared to the general population.

Aim 2. Quantify the impact of identity features and experience with stereotype threat/discrimination on mental health outcomes.
Our second aim was twofold: first, we aimed to determine the relationship between various identity features (i.e., race/ethnicity, gender, sexual orientation) and mental health outcomes, and understand the potential interactions between them. Second, we aimed to determine the way in which experiences with stereotype threat and discrimination (both from the general population and from within vegans) impacts mental health more broadly.

Initially we expected to find those who do not fit the “stereotypical vegan” model to experience worse mental health. Because we did not find any evidence of stereotypes regarding identity features of vegans from both within the vegan sample and more generally, we thus expected women, nonbinary, transgender, sexual minority participants to experience worse mental health outcomes based on past research.

Overall, our hypotheses were largely supported. We found that mental health differed by gender identity in vegans, and is in line with past work (Abate, 2013; Kessler et al., 1993; Millet et al., 2017; Reisner et al., 2016; Weissman et al., 1993). Cisgender males tended to exhibit better mental health compared to other gender identities. It is important to note that despite all other comparisons not reaching significance, a trend was observed in which cisgender men scored lower on all mental health subscales compared to all other genders. Further, gender nonconforming participants tended to exhibit the highest levels of mental health concerns compared to their cisgender counterparts.

We also found that overall, sexual minorities experienced higher rates of depression, anxiety, and stress compared to heterosexual individuals. These findings are in line with past work showing that individuals who identify as sexual minorities experience worse mental health outcomes (e.g., Bostwick et al., 2010; Cohen et al., 2019). It is important to note that despite all
other comparisons not reaching significance, a trend was observed in which every sexual minority group scored higher than heterosexual participants on each subscale.

Despite finding considerable differences in mental health outcomes by gender and sexual orientation, and past work describing the impact of intersecting identities, we did not find that identity features interacted to influence mental health outcomes.

While we did not find a significant difference across race/ethnicity on mental health outcomes, we did find that experiences with stereotype threat/discrimination and stereotype confirmation to be related to worse mental health outcomes. Overall, we found a positive relationship with experiences with stereotype threat/discrimination from both the general population and within the vegan community, with few exceptions (see Table 7). We also found that these increases in mental health concerns are better explained by experiences in the general population compared to experiences from within the vegan community. Further, we found ethnicity/race to moderate the relationship between stereotype confirmation concerns within other vegans and threat/aggression from the general population and vegans and experienced anxiety.

**Implications.** Overall, our hypotheses were partially supported. Our findings largely mirror past work. Importantly, we found that experiencing stereotype confirmation concerns and discrimination from the general population and more generally negatively impacted mental health. Despite our finding that BIPOC participants overall experience less discrimination/stereotype confirmation from vegans compared to the general population, it is meaningful that they were more likely to experience negative outcomes on anxiety based on stereotype confirmation concerns within fellow vegans, but not in the general population. This is again a cause for call for inclusivity and active anti-racist practices within vegans.
It is possible that prior work regarding mental health in vegans is inconclusive because it has not yet taken into account the demographic diversity of the vegan community, which, as illustrated in Aim 1, deviates from previously held stereotypes. In future research, it is thus vital to consider described identity features as possible moderators of mental health outcomes, while similarly considering experiences with stereotype confirmation concerns and discrimination as possible mediators. This work provides preliminary evidence that mental health concerns may not differ in vegans from the general population by virtue of being vegan, but instead that vegans from groups that are frequently discriminated against (i.e., BIPOC, sexual minority, cisgender woman, and gender nonconforming) may suffer worse outcomes due to experiences of discrimination.

**Aim 3. Assess if identity factors impact concerns regarding stereotype threat and experiences of discrimination from the general population and/or from within vegans.**

Based on findings from Aim 1, we aimed to determine if deviating from the stereotypical image of a vegan, and demographic majority groups in general, resulted in increased concerns regarding stereotype threat and discrimination both from the general population and from within vegans. Because we did not find any differences in expectations of stereotypical identity features of vegans, we thus elected to assess if identity aspects (i.e., gender, sexual orientation) differentially impacted experiences with stereotype confirmation concerns and discrimination within participants who were part of the BIPOC community more broadly.

Unsurprisingly, we found consistent trends that White vegans experience the least discrimination/stereotype threat, whereas Black vegans experience the most. These trends were observed from the general population more broadly and from within the vegan community. While we did observe increased discrimination in BIPOC vegans compared to White within...
other vegans, we also found that overall BIPOC vegans experienced lower rates of discrimination and stereotype confirmation concerns when among other vegans.

We were also interested in determining whether identity features (i.e., gender and sexuality) differentially impact BIPOC vegans’ experiences with stereotype threat and discrimination. Overall, we found that BIPOC cisgender women were more likely to face more discrimination and stereotype confirmation concerns compared to cisgender men, and nonbinary participants were experienced more discrimination/stereotype confirmation than both cisgender groups. We also found that on the whole, BIPOC sexual minorities were more likely to face discrimination, though this relationship was less pronounced when interacting with other vegans. Further, no interaction was found within interactions with other vegans on half of the discrimination subscales and also stereotype confirmation concerns by sexual orientation.

**Implications.** It is unsurprising to find that BIPOC participants face more prejudice and stereotype confirmation concerns across the board, but it is also important to note that participants indicate they experience them less within vegans while compared to the general population. There are a variety of possible explanations for this, but one possible explanatory factor is social dominance orientation (Dhont et al., 2014). Specifically, recent work has shown that increased support of a hierarchical/oppressive society (Pratto et al., 1994; Sidanius & Pratto, 1999) is positively related to both speciesism (i.e., the philosophical construct that posits humans hold prejudice towards the out-group members of non-human animals; Singer, 1973; Singer 1977) and racism (i.e., as defined as “negative attitudes towards ethnic outgroups;” Dhont et al., 2014). It therefore follows that individuals who are less in support of a social dominance orientation would be less biased towards both non-human animals and racial/ethnic outgroups. This idea is supported by both our finding that White vegans do not appear to hold negative
attitudes towards Black vegans compared to White, and that BIPOC participants experience less prejudice/stereotype confirmation threat from other vegans compared to people more broadly. It appears possible that the vegan community racially discriminates less frequently, as evidenced by reported BIPOC experiences and a lack evidence regarding bias towards Black vegans by White participants (Hypothesis 1c).

It is nevertheless important to highlight that White participants did experience less discrimination and stereotype confirmation concerns than other races across the board. It appears that even among vegans, BIPOC participants were more likely to face increased discrimination and concern, which is related to worse mental health outcomes. Future efforts should be made within the vegan community to ensure that spaces are safe and inclusive for all.

Limitations

A primary limitation to this research is limited sample sizes in BIPOC participants, non-cisgender females, and non-heterosexual participants. Despite recruiting the largest sample sizes of these groups in research, final sample sizes were still unbalanced, and future work should aim to further increase participation among these groups. Second, it is important to note that these data were collected during the COVID-19 pandemic. It is likely that mental health and experiences with discrimination have been substantially different in recent weeks compared to the past (i.e., worse mental health, less discrimination due to less human interaction or increased experiences of discrimination among some groups, specifically within Asian Americans and Pacific Islanders). These findings should thus be replicated in the future. Finally, while we did find that individuals experienced less discrimination and stereotype confirmation concerns within vegans compared to the general population, it is important to keep in mind that this may be by virtue of less frequent interactions with vegans rather than actual differences in vegans’
interactions. This is unlikely due to the finding that White vegans did not exhibit implicit bias against Black vegans in this sample, but future research should aim to assess frequency of interactions with other vegans in order to confirm these findings.

**Final summary**

Overall, our hypotheses were largely supported. We found that vegans are comprised of those who identify with a wide range of races, genders, and sexual orientation and who are motivated by an array of reasons. This work provides preliminary evidence to not only support the diversity within vegans, but of a possible shifting perspective away from the stereotype that veganism is associated with educated White women with privilege. It is therefore vital for future research to strive to represent the diversity within the vegan community and appropriately account these differences in identity and experiences when assessing relationships between veganism and various aspects of mental health. In moving away from the idea of “white veganism,” rooted in “saviorism” and “plac[ing] a group of marginalized beings (nonhumans) above People of Color and other oppressed groups” (Bruek, 2019; p. 1), we may begin to understand the true experiences and mental health outcomes within vegans.

While we did not find that individuals tend to hold implicit stereotypes about vegans, future work should aim to assess the impact of BIPOC perceptions of veganism and the impact of these perceptions on their self-perception and mental health.

It is important to note that BIPOC individuals, especially Black individuals more specifically, continue to experience and stereotype confirmation concerns and discrimination when interacting with other vegans, and that while we did not find differences in mental health outcomes across races, increases in these experiences are related to deleterious outcomes in depression, anxiety, and stress. Further, we found evidence of intersecting identities resulting in
a higher likelihood of experiencing discrimination, with BIPOC participants who were cisgender women, gender nonconforming, and sexual minorities at higher risk. We also found that across the board, experiences with threat and aggression within BIPOC participants puts them at heightened risk for increased anxiety. We therefore argue for the need for an increase in anti-racist work specifically within the vegan community.
References


*Public Health Nutrition, 10*(5), 436-442.


*Appetite, 44*(3), 309-315.


Perspectives and Experiences of African Americans Who Adopt Plant-Based Diets.


perspectives on the influence of violence and race on depression and depression care.

*American Journal of Public Health, 100*(8), 1470-1476.


<table>
<thead>
<tr>
<th>Motivation for veganism across all participants</th>
<th>Initial Primary</th>
<th>Secondary</th>
<th>Current Primary</th>
<th>Current Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>%total(n)</td>
<td>%yes(n)</td>
<td>%total(n)</td>
<td>%yes(n)</td>
<td>%total(n)</td>
</tr>
<tr>
<td>Animal rights/welfare</td>
<td>60.1 (1301)</td>
<td>34.7 (771)</td>
<td>68.2 (1474)</td>
<td>33.3 (739)</td>
</tr>
<tr>
<td>Environmental</td>
<td>7.7 (167)</td>
<td>61.2 (1358)</td>
<td>9.5 (206)</td>
<td>69.7 (1547)</td>
</tr>
<tr>
<td>Health</td>
<td>23.8 (515)</td>
<td>43.8 (972)</td>
<td>16.5 (356)</td>
<td>55.8 (1239)</td>
</tr>
<tr>
<td>Weight control</td>
<td>2.3 (49)</td>
<td>15.1 (335)</td>
<td>0.4 (8)</td>
<td>20.1 (446)</td>
</tr>
<tr>
<td>Religion/spirituality</td>
<td>1.5 (33)</td>
<td>11.8 (261)</td>
<td>1.6 (34)</td>
<td>15.7 (348)</td>
</tr>
<tr>
<td>Financial</td>
<td>0 (0)</td>
<td>1.9 (42)</td>
<td>0 (0)</td>
<td>4.6 (103)</td>
</tr>
<tr>
<td>Taste preference</td>
<td>1.2 (27)</td>
<td>14.3 (318)</td>
<td>1.2 (26)</td>
<td>29.4 (652)</td>
</tr>
<tr>
<td>Other</td>
<td>3.3 (71)</td>
<td>3.3 (74)</td>
<td>2.6 (56)</td>
<td>4.0 (89)</td>
</tr>
</tbody>
</table>
Table 2. Initial primary motivation by ethnicity/race

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Animal Rights/Welfare</th>
<th>Environmental Health</th>
<th>Weight Control</th>
<th>Religion/Spirtual</th>
<th>Financial</th>
<th>Taste</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hispanic</td>
<td>57.2 (115)</td>
<td>6.0 (12)</td>
<td>25.4 (51)</td>
<td>2.5 (5)</td>
<td>1.5 (3)</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Not Hispanic</td>
<td>60.4 (1183)</td>
<td>7.9 (155)</td>
<td>23.7 (464)</td>
<td>2.0 (44)</td>
<td>1.5 (30)</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>24.4 (10)*</td>
<td>0.0 (0)</td>
<td>51.2 (21)*</td>
<td>14.6 (6)*</td>
<td>7.3 (3)*</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Asian</td>
<td>47.1 (16)</td>
<td>17.6 (6)*</td>
<td>26.5 (9)</td>
<td>0.0 (0)</td>
<td>2.9 (1)</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>White</td>
<td>61.5 (1075)*</td>
<td>7.8 (137)</td>
<td>23.5 (410)</td>
<td>2.1 (37)</td>
<td>1.0 (17)*</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Indian</td>
<td>85.7 (18)*</td>
<td>0.0 (0)</td>
<td>4.8 (1)*</td>
<td>0.0 (0)</td>
<td>4.8 (1)</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Middle Eastern</td>
<td>84.6 (11)</td>
<td>0.0 (0)</td>
<td>7.7 (1)</td>
<td>0.0 (0)</td>
<td>7.7 (1)</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Indigenous</td>
<td>30.0 (3)*</td>
<td>20.0 (3)</td>
<td>20.0 (2)</td>
<td>0.0 (0)</td>
<td>20.0 (2)*</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Pacific Islander</td>
<td>0.0 (0)</td>
<td>0.0 (0)</td>
<td>100.0 (1)</td>
<td>0.0 (0)</td>
<td>0.0 (0)</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Multiracial/Biracial</td>
<td>53.6 (37)</td>
<td>4.6 (7)</td>
<td>20.3 (14)</td>
<td>2.3 (1)</td>
<td>7.2 (5)*</td>
<td>0.0 (0)</td>
</tr>
</tbody>
</table>

Note. Percent(n); *indicates adjusted standardized residual +/- 1.9
### Table 3. Initial secondary motivations by ethnicity/race

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Animal Rights/Welfare</th>
<th>Environmental Health</th>
<th>Weight Control</th>
<th>Religion/Spiritual</th>
<th>Financial</th>
<th>Taste</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hispanic</td>
<td>33.3 (136)</td>
<td>64.2 (131)</td>
<td>44.6 (91)</td>
<td>21.1 (43)*</td>
<td>11.3 (23)</td>
<td>1.5 (3)</td>
</tr>
<tr>
<td>Not Hispanic</td>
<td>35.6 (702)</td>
<td>62.1 (749)</td>
<td>44.5 (879)</td>
<td>14.8 (292)*</td>
<td>12.0 (273)</td>
<td>2.0 (39)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>35.7 (15)</td>
<td>42.9 (18)*</td>
<td>35.7 (15)</td>
<td>35.7 (15)*</td>
<td>9.5 (4)</td>
<td>7.1 (3)*</td>
</tr>
<tr>
<td>Asian</td>
<td>44.1 (15)</td>
<td>52.9 (18)</td>
<td>41.2 (14)</td>
<td>23.5 (8)</td>
<td>14.7 (5)</td>
<td>2.9 (1)</td>
</tr>
<tr>
<td>White</td>
<td>35.6 (627)</td>
<td>62.9 (1109)*</td>
<td>44.4 (783)</td>
<td>14.3 (252)*</td>
<td>11.1 (196)*</td>
<td>1.6 (29)*</td>
</tr>
<tr>
<td>Indian</td>
<td>14.3 (3)</td>
<td>90.5 (19)*</td>
<td>61.9 (13)</td>
<td>14.3 (3)</td>
<td>28.6 (6)*</td>
<td>4.8 (1)</td>
</tr>
<tr>
<td>Middle Eastern</td>
<td>30.8 (4)</td>
<td>76.9 (10)</td>
<td>38.5 (5)</td>
<td>7.7 (1)</td>
<td>46.2 (6)*</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Indigenous</td>
<td>60.0 (5)</td>
<td>30.0 (3)*</td>
<td>50.0 (5)</td>
<td>0.0 (0)</td>
<td>20.0 (2)</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Pacific Islander</td>
<td>0.0 (0)</td>
<td>0.0 (0)</td>
<td>0.0 (0)</td>
<td>100 (1)*</td>
<td>0.0 (0)</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Multiracial/Biracial</td>
<td>31.9 (22)</td>
<td>62.3 (43)</td>
<td>50.7 (35)</td>
<td>13.0 (9)</td>
<td>21.7 (15)*</td>
<td>7.2 (5)*</td>
</tr>
</tbody>
</table>

*Note. Percent yes(n); *indicates adjusted standardized residual +/- 1.9*
Table 4. Current primary motivation by ethnicity/race

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Animal Rights/ Welfare</th>
<th>Environmental Health</th>
<th>Weight Control</th>
<th>Religion/ Spiritual</th>
<th>Financial</th>
<th>Taste</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hispanic</td>
<td>65.2 (131)</td>
<td>9.5 (19)</td>
<td>17.9 (36)</td>
<td>0.0 (0)</td>
<td>3.5 (7)</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Not Hispanic</td>
<td>68.5 (1340)</td>
<td>9.6 (187)</td>
<td>16.4 (320)</td>
<td>0.4 (8)</td>
<td>1.4 (27)</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>35.0 (14)*</td>
<td>10.0 (4)</td>
<td>45.0 (18)*</td>
<td>5.0 (2)*</td>
<td>5.0 (2)*</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Asian</td>
<td>70.6 (24)</td>
<td>17.6 (6)</td>
<td>5.9 (2)</td>
<td>2.9 (1)*</td>
<td>0.0 (0)</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>White</td>
<td>69.1 (1207)</td>
<td>9.7 (169)</td>
<td>16.0 (279)</td>
<td>0.3 (5)*</td>
<td>1.3 (23)</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Indian</td>
<td>90.5 (19)*</td>
<td>4.8 (1)</td>
<td>4.8 (1)</td>
<td>0.0 (0)</td>
<td>0.0 (0)</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Middle Eastern</td>
<td>100.0 (13)*</td>
<td>0.0 (0)</td>
<td>0.0 (0)</td>
<td>0.0 (0)</td>
<td>0.0 (0)</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Indigenous</td>
<td>40.0 (4)</td>
<td>10.0 (1)</td>
<td>20.0 (2)</td>
<td>0.0 (0)</td>
<td>10.0 (1)*</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Pacific Islander</td>
<td>0 (0)</td>
<td>0.0 (0)</td>
<td>100 (1)*</td>
<td>0.0 (0)</td>
<td>0.0 (0)</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Multiracial/Biracial</td>
<td>64.7 (44)</td>
<td>8.8 (6)</td>
<td>20.6 (14)</td>
<td>0.0 (0)</td>
<td>0.0 (0)</td>
<td>0.0 (0)</td>
</tr>
</tbody>
</table>

Note. Percent(n); *indicates adjusted standardized residual +/- 1.9
Table 5. Current secondary motivations by ethnicity/race

<table>
<thead>
<tr>
<th></th>
<th>Animal Rights/ Welfare</th>
<th>Environmental Health</th>
<th>Weight Control</th>
<th>Religion/Spiritual</th>
<th>Financial</th>
<th>Taste</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>34.8 (71)</td>
<td>72.1 (147)</td>
<td>58.3 (119)</td>
<td>25.5 (52)</td>
<td>15.7 (32)</td>
<td>2.9 (6)</td>
</tr>
<tr>
<td>Not Hispanic</td>
<td>33.8 (667)</td>
<td>70.8 (1398)</td>
<td>56.7 (1119)</td>
<td>20.0 (394)</td>
<td>16.0 (315)</td>
<td>4.9 (97)</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>35.7 (15)</td>
<td>47.6 (20)*</td>
<td>40.5 (17)</td>
<td>33.3 (14)*</td>
<td>21.4 (9)</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Asian</td>
<td>38.2 (13)</td>
<td>70.6 (24)</td>
<td>55.9 (19)</td>
<td>35.3 (12)*</td>
<td>29.4 (10)*</td>
<td>5.9 (32)</td>
</tr>
<tr>
<td>White</td>
<td>33.7 (594)</td>
<td>71.0 (1251)</td>
<td>57.1 (1006)</td>
<td>19.1 (337)*</td>
<td>14.5 (255)*</td>
<td>4.8 (85)</td>
</tr>
<tr>
<td>Indian</td>
<td>23.8 (5)</td>
<td>90.5 (19)*</td>
<td>66.7 (14)</td>
<td>28.6 (6)</td>
<td>33.3 (7)*</td>
<td>9.5 (2)</td>
</tr>
<tr>
<td>Middle Eastern</td>
<td>15.4 (2)</td>
<td>84.6 (11)</td>
<td>76.9 (10)</td>
<td>15.4 (2)</td>
<td>38.5 (5)*</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Indigenous</td>
<td>50.0 (5)</td>
<td>60.0 (6)</td>
<td>40.0 (4)</td>
<td>10.0 (1)</td>
<td>10.0 (1)</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Pacific Islander</td>
<td>100 (1)</td>
<td>100 (1)</td>
<td>0.0 (0)</td>
<td>100 (1)*</td>
<td>0.0 (0)</td>
<td>0.0 (0)</td>
</tr>
<tr>
<td>Multiracial/Biracial</td>
<td>31.9 (22)</td>
<td>73.9 (51)</td>
<td>50.7 (35)</td>
<td>21.7 (15)</td>
<td>30.4 (21)*</td>
<td>8.7 (6)</td>
</tr>
</tbody>
</table>

*Note.* Percent yes(n); *indicates adjusted standardized residual +/- 1.9
Table 6. Age at first animal restriction, length of time restricting any animal products, age at first veganism, and length of time vegan by race/ethnicity

<table>
<thead>
<tr>
<th>Race</th>
<th>Age restricting animal product</th>
<th>Length of animal product restriction</th>
<th>Age at first veganism</th>
<th>Length of veganism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hispanic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>22.89 ± 10.15</td>
<td>12.13 ± 10.57</td>
<td>28.57 ± 9.94</td>
<td>6.51 ± 6.94</td>
</tr>
<tr>
<td>No</td>
<td>21.66 ± 11.72</td>
<td>17.18 ± 12.90</td>
<td>30.17 ± 12.26</td>
<td>8.79 ± 8.66</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>25.51 ± 12.13</td>
<td>13.05 ± 11.89</td>
<td>31.44 ± 11.04</td>
<td>7.12 ± 5.84</td>
</tr>
<tr>
<td>Asian</td>
<td>22.41 ± 10.23</td>
<td>10.18 ± 10.18</td>
<td>25.97 ± 8.57</td>
<td>6.62 ± 9.01</td>
</tr>
<tr>
<td>White</td>
<td>21.73 ± 11.78</td>
<td>17.41 ± 12.79</td>
<td>30.30 ± 12.40</td>
<td>8.93 ± 8.73</td>
</tr>
<tr>
<td>Indian</td>
<td>14.38 ± 14.76</td>
<td>21.00 ± 15.22</td>
<td>26.52 ± 10.88</td>
<td>8.86 ± 9.70</td>
</tr>
<tr>
<td>Middle Eastern</td>
<td>16.50 ± 6.75</td>
<td>20.75 ± 11.23</td>
<td>29.38 ± 11.24</td>
<td>9.38 ± 7.79</td>
</tr>
<tr>
<td>Indigenous</td>
<td>25.78 ± 7.16</td>
<td>19.22 ± 16.95</td>
<td>35.10 ± 15.20</td>
<td>12.50 ± 12.59</td>
</tr>
<tr>
<td>Pacific Islander</td>
<td>5.00</td>
<td>32.00</td>
<td>30.00</td>
<td>7.00</td>
</tr>
<tr>
<td>Multi-Racial</td>
<td>29.64 ± 8.90</td>
<td>13.81 ± 12.66</td>
<td>28.32 ± 10.43</td>
<td>6.13 ± 6.26</td>
</tr>
</tbody>
</table>

Note. Results are represented by years ± standard deviation. Our sample had only one participant who identified as Pacific Islander, so standard deviations were not included.
### Table 7. Correlation between PEDQ/SCS and DASS-21 scores

<table>
<thead>
<tr>
<th>PEDQGen Verbal Rejection</th>
<th>DASS Depression</th>
<th>DASS Anxiety</th>
<th>DASS Stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>$r(1707) = 0.09; p &lt; 0.001$</td>
<td>$r(1712) = 0.17; p &lt; 0.001$</td>
<td>$r(1717) = 0.13; p &lt; 0.001$</td>
<td></td>
</tr>
<tr>
<td>PEDQGen Avoidance</td>
<td>$r(1706) = 0.08; p &lt; 0.001$</td>
<td>$r(1711) = 0.14; p &lt; 0.001$</td>
<td>$r(1715) = 0.13; p &lt; 0.001$</td>
</tr>
<tr>
<td>PEDQGen Disvaluation</td>
<td>$r(1701) = 0.02; p = 0.2$</td>
<td>$r(1709) = 0.12; p &lt; 0.001$</td>
<td>$r(1712) = 0.11; p &lt; 0.001$</td>
</tr>
<tr>
<td>PEDQGen Threat/Aggression</td>
<td>$r(1687) = 0.07; p &lt; 0.01$</td>
<td>$r(1696) = 0.15; p &lt; 0.001$</td>
<td>$r(1700) = 0.12; p &lt; 0.001$</td>
</tr>
<tr>
<td>SCSGen</td>
<td>$r(1664) = 0.10; p &lt; 0.001$</td>
<td>$r(1664) = 0.16; p &lt; 0.001$</td>
<td>$r(1674) = 0.19; p &lt; 0.001$</td>
</tr>
<tr>
<td>PEDQVeg Verbal Rejection</td>
<td>$r(1691) = 0.11; p &lt; 0.001$</td>
<td>$r(1686) = 0.11; p &lt; 0.001$</td>
<td>$r(1691) = 0.11; p &lt; 0.001$</td>
</tr>
<tr>
<td>PEDQVeg Avoidance</td>
<td>$r(1697) = 0.09; p &lt; 0.001$</td>
<td>$r(1697) = 0.11; p &lt; 0.001$</td>
<td>$r(1697) = 0.09; p &lt; 0.001$</td>
</tr>
<tr>
<td>PEDQVeg Disvaluation</td>
<td>$r(1676) = 0.09; p &lt; 0.001$</td>
<td>$r(1676) = 0.09; p &lt; 0.001$</td>
<td>$r(1676) = 0.09; p &lt; 0.001$</td>
</tr>
<tr>
<td>PEDQVeg Threat/Aggression</td>
<td>$r(1664) = 0.03; p = 0.18$</td>
<td>$r(1664) = 0.05; p = 0.04$</td>
<td>$r(1664) = 0.03; p = 0.18$</td>
</tr>
<tr>
<td>SCSVeg</td>
<td>$r(1635) = 0.09; p &lt; 0.001$</td>
<td>$r(1640) = 0.13; p &lt; 0.001$</td>
<td>$r(1643) = 0.14; p &lt; 0.001$</td>
</tr>
</tbody>
</table>

**Note:** PEDQ = Perceived Ethnic Discrimination Questionnaire; SCS = Stereotype Confirmation Scale; “Gen” = in the general population; “Veg” = in the vegan population
<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>PEDQ-Gen Verbal</th>
<th>PEDQ-Gen Avoidance</th>
<th>PEDQ-Gen Disvaluation</th>
<th>PEDQ-Gen Threat/Aggression</th>
<th>PEDQ-Veg Verbal</th>
<th>PEDQ-Veg Avoidance</th>
<th>PEDQ-Veg Disvaluation</th>
<th>PEDQ-Veg Threat/Aggression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hispanic</td>
<td>2.68 ± 1.49a</td>
<td>2.02 ± 1.25a</td>
<td>2.09 ± 1.39a</td>
<td>1.40 ± 0.81a</td>
<td>1.42 ± 0.91a</td>
<td>1.34 ± 0.83a</td>
<td>1.29 ± 0.72a</td>
<td>1.09 ± 0.34</td>
</tr>
<tr>
<td>Not Hispanic</td>
<td>1.60 ± 1.07a</td>
<td>1.39 ± 0.80a</td>
<td>1.26 ± 0.71a</td>
<td>1.18 ± 0.53a</td>
<td>1.26 ± 0.79a</td>
<td>1.14 ± 0.56a</td>
<td>1.14 ± 0.56a</td>
<td>1.07 ± 0.38</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>3.35 ± 1.67bf</td>
<td>3.53 ± 1.64bcdefg</td>
<td>3.27 ± 1.58bcdefg</td>
<td>1.73 ± 0.95bg</td>
<td>1.97 ± 1.59be</td>
<td>2.04 ± 1.55bcdefg</td>
<td>1.92 ± 1.57bcde</td>
<td>1.26 ± 0.67</td>
</tr>
<tr>
<td>Asian</td>
<td>2.94 ± 1.51c</td>
<td>2.15 ± 1.28hk</td>
<td>1.78 ± 1.29bg</td>
<td>1.50 ± 0.78c</td>
<td>1.77 ± 1.20c</td>
<td>1.37 ± 0.81b</td>
<td>1.38 ± 0.87b</td>
<td>1.19 ± 0.57</td>
</tr>
<tr>
<td>White</td>
<td>1.47 ± 0.90bcd</td>
<td>1.28 ± 0.63cchij</td>
<td>1.17 ± 0.51cgthi</td>
<td>1.14 ± 0.48bcdef</td>
<td>1.22 ± 0.71bcd</td>
<td>1.11 ± 0.47gh</td>
<td>1.11 ± 0.47c</td>
<td>1.06 ± 0.37</td>
</tr>
<tr>
<td>Indian</td>
<td>2.91 ± 1.68d</td>
<td>2.44 ± 1.31dil</td>
<td>1.95 ± 1.22dh</td>
<td>1.51 ± 0.70d</td>
<td>1.85 ± 0.38d</td>
<td>1.56 ± 1.14dikg</td>
<td>1.59 ± 1.46</td>
<td>1.16 ± 0.39</td>
</tr>
<tr>
<td>Middle Eastern</td>
<td>2.33 ± 1.02</td>
<td>1.90 ± 1.83e</td>
<td>1.57 ± 0.92e</td>
<td>1.62 ± 1.04e</td>
<td>1.19 ± 0.38</td>
<td>1.00 ± 0.00e</td>
<td>1.00 ± 0.00d</td>
<td>1.00 ± 0.00</td>
</tr>
<tr>
<td>Indigenous</td>
<td>1.97 ± 1.25f</td>
<td>1.30 ± 0.48fiklm</td>
<td>1.55 ± 0.78f</td>
<td>1.20 ± 0.42</td>
<td>1.43 ± 0.66</td>
<td>1.14 ± 0.26</td>
<td>1.24 ± 0.63</td>
<td>1.00 ± 0.00</td>
</tr>
<tr>
<td>Pacific Islander</td>
<td>4.00</td>
<td>3.67</td>
<td>1.67</td>
<td>2.4</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Multiracial/Biracial</td>
<td>2.74 ± 1.60e</td>
<td>2.08 ± 1.11gjm</td>
<td>1.90 ± 1.35g</td>
<td>1.37 ± 0.75fg</td>
<td>1.31 ± 1.05e</td>
<td>1.32 ± 0.98f</td>
<td>1.29 ± 0.75e</td>
<td>1.06 ± 0.30</td>
</tr>
</tbody>
</table>

*Note:* PEDQ = Perceived Ethnic Discrimination Questionnaire; “Gen” = in the general population; “Veg” = in the vegan population; pairwise letters indicate significant differences > 0.05.
Table 9. SCS-Gen and SCS-Veg scores by race

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>SCS-Gen</th>
<th>SCS-Veg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hispanic</td>
<td>1.90 ± 1.10&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.44 ± 0.88</td>
</tr>
<tr>
<td>Not hispanic</td>
<td>1.69 ± 0.99&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.34 ± 0.76</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>3.26 ± 1.84&lt;sup&gt;b&lt;/sup&gt;&lt;sup&gt;c&lt;/sup&gt;&lt;sup&gt;d&lt;/sup&gt;&lt;sup&gt;e&lt;/sup&gt;&lt;sup&gt;f&lt;/sup&gt;</td>
<td>2.10 ± 1.52&lt;sup&gt;a&lt;/sup&gt;&lt;sup&gt;b&lt;/sup&gt;&lt;sup&gt;c&lt;/sup&gt;&lt;sup&gt;d&lt;/sup&gt;&lt;sup&gt;e&lt;/sup&gt;&lt;sup&gt;f&lt;/sup&gt;</td>
</tr>
<tr>
<td>Asian</td>
<td>2.53 ± 1.21&lt;sup&gt;b&lt;/sup&gt;&lt;sup&gt;k&lt;/sup&gt;</td>
<td>1.59 ± 1.03</td>
</tr>
<tr>
<td>White</td>
<td>1.60 ± 0.88&lt;sup&gt;c&lt;/sup&gt;&lt;sup&gt;i&lt;/sup&gt;&lt;sup&gt;m&lt;/sup&gt;</td>
<td>1.31 ± 0.70&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Indian</td>
<td>3.04 ± 1.55&lt;sup&gt;b&lt;/sup&gt;&lt;sup&gt;h&lt;/sup&gt;&lt;sup&gt;i&lt;/sup&gt;&lt;sup&gt;j&lt;/sup&gt;</td>
<td>1.63 ± 0.90</td>
</tr>
<tr>
<td>Middle Eastern</td>
<td>1.92 ± 1.51&lt;sup&gt;d&lt;/sup&gt;&lt;sup&gt;g&lt;/sup&gt;</td>
<td>1.00 ± 0.00&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Indigenous</td>
<td>1.36 ± 0.55&lt;sup&gt;c&lt;/sup&gt;&lt;sup&gt;d&lt;/sup&gt;&lt;sup&gt;h&lt;/sup&gt;&lt;sup&gt;k&lt;/sup&gt;</td>
<td>1.16 ± 0.45&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Pacific Islander</td>
<td>4.09</td>
<td>1.00</td>
</tr>
<tr>
<td>Multiracial/Biracial</td>
<td>2.07 ± 1.31&lt;sup&gt;f&lt;/sup&gt;&lt;sup&gt;m&lt;/sup&gt;</td>
<td>1.52 ± 1.19&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

*Note:* SCS = Stereotype Confirmation Scale; “Gen” = in the general population; “Veg” = in the vegan population; pairwise letters indicate significant differences > 0.05.
Figure 1. Race/ethnicity moderation on PEDQGen Threat/Aggression subscale on Anxiety
Figure 2. Race/ethnicity moderation on SCS-Veg Anxiety
**Figure 3.** Interactions between sexual orientation and race on experiences with discrimination from the general population.
Figure 4. Interactions between race and gender on experiences with discrimination from the general population.
**Figure 5.** Interactions between race and gender on experiences with stereotype confirmation concern from the general population
Figure 6. Interactions between race and sexual orientation on experiences with discrimination from the vegan community.
Figure 7. Interactions between race and gender on experiences with discrimination from the vegan community
Figure 8. Interactions between gender and race on experiences with stereotype confirmation concern within vegans