Published in final edited form as:

J Res Pers. 2020 October ; 88: . doi:10.1016/j.jrp.2020.104002.

Psychological and Social Functioning Are Associated with Reports of Perceived Weight Discrimination Across Eight Years

Angelina R. Sutin¹, Mary A. Gerend¹, Jon K. Maner¹, Yannick Stephan², Antonio Terracciano¹

¹Florida State University

²Euromov, University of Montpellier

Abstract

This research uses the Health and Retirement Study to identify psychological and social factors that prospectively predict new reports of perceived weight discrimination among individuals who measure in the obese weight category. Participants ($M_{age}=66.89$, $SD=8.33$; 58% women) reported on their personality and social isolation, had a body mass index (BMI) ≥ 30 , reported no perceived weight discrimination at baseline, and completed at least one assessment over the up to 8-year follow-up ($N=3,064$). Eleven percent of participants reported new experiences of perceived weight discrimination. Higher Neuroticism and loneliness at baseline were associated with new reports; Conscientiousness was protective. This research adds to models of weight stigma by identifying psychological and social factors that contribute to reporting new instances of perceived weight discrimination.

Keywords

Perceived Discrimination; Stigma; Personality; Loneliness; Social contact; Obesity

The physical and mental health correlates of perceived weight discrimination are well documented (see Tomiyama et al., 2018 for a review): Individuals who experience unfair treatment based on their weight have a greater risk of weight gain and obesity over time (Bernardo, Bastos, González-Chica, Peres, & Paradies, 2017), are prone to higher allostatic load (Vadiveloo & Mattei, 2017), and are less able to manage their diabetes (Tsenkova, Carr, Schoeller, & Ryff, 2011). Perceived weight discrimination also undermines mental health and contributes to more symptoms of depression (Robinson, Sutin, & Daly, 2017), greater loneliness and declines in well-being over time (Sutin, Stephan, Carretta, & Terracciano, 2015), and risk of dementia (Sutin, Stephan, Robinson, Daly, & Terracciano, 2019). The end result is a greater risk of premature mortality for individuals who report that they have been treated unfairly because of their weight (Sutin, Stephan, & Terracciano, 2015).

Much of the research on correlates of perceived weight discrimination has focused on the downstream correlates of having been treated unfairly. Less work has addressed factors

associated with who is more likely to report experiences with perceived discrimination based on weight. Theoretical models of weight stigma tend to focus on the reciprocal (Major, Tomiyama, & Hunger, 2018) and cyclical (Tomiyama, 2014) nature of weight stigma and poor health outcomes. For example, the COBWEBS model conceptualizes weight stigma as a stressor that activates biological, psychological, and behavioral responses that increase the risk of subsequent weight gain, which then increases risk of experiencing more weight stigma (Tomiyama, 2014). Such models have been critical for elucidating the pathways through which aspects of weight stigma contribute to poor health outcomes, including risk of further weight gain. These models are also valuable for explaining how obesity feeds back into increased risk of weight stigma. Notably absent from such models, however, is a focus on how factors other than body weight may confer risk or protection from experiencing perceived discrimination. The purpose of the current research is to integrate two constructs with strong theoretical underpinnings – personality and social isolation – into models of weight stigma to identify psychological and social factors associated with new reports of unfair treatment based on weight.

Among aspects of psychological functioning, personality traits, an individual's characteristic ways of thinking, feeling, and behaving (McCrae & John, 1992), may contribute to new reports of perceived weight discrimination. Personality traits may shape both the likelihood of events and subjective evaluations of events. Individuals who score higher in Neuroticism (the general tendency to experience negative emotions), for example, tend to experience more objectively negative events, such as the illness or death of a family member or close friend (Lüdtke, Roberts, Trautwein, & Nagy, 2011; Magnus, Diener, Fujita, & Pavot, 1993) and are more likely to evaluate ambiguous situations as negative and threatening (Serfass & Sherman, 2013). In contrast, individuals who score higher in Extraversion (the general tendency to be sociable and active) tend to experience more positive events, such as a friend or sibling getting married (Lüdtke et al., 2011; Magnus et al., 1993) and also tend to make more positive evaluations of their lives (Soto, 2013) and relationships (Malouff, Thorsteinsson, Schutte, Bhullar, & Rooke, 2010). Finally, individuals higher in Conscientiousness (the general tendency to be organized and disciplined) are less likely to experience negative events (Lüdtke et al., 2011) and are more likely to construe ambiguous situations as opportunities rather than limitations (Serfass & Sherman, 2013). As such, either through the greater likelihood of experiencing objective events or through a subjective interpretation of the events, these traits may contribute to who is more likely to perceive weight discrimination.

Aspects of the individual's social environment may also contribute to whether an individual experiences perceived weight discrimination. Social isolation is defined by both frequency of contact with important social groups and the subjective evaluation of those contacts (i.e., loneliness; Cacioppo & Patrick, 2008). Theoretical models of loneliness, in particular, highlight how feelings of social isolation shape interactions in the social environment (Cacioppo & Cacioppo, 2018). Loneliness, for example, increases an individual's motivation to connect with others, but it also increases vigilance and sensitivity to threats in the social environment. That vigilance shapes cognitive processes that increase attentional focus on and sensitivity to confirmatory biases (Cacioppo & Hawkey, 2009). One result is that individuals who are lonely have heightened sensitivity to hostile social interactions

(Cacioppo & Hawkley, 2009). This subjective evaluation of one's social integration has stronger associations with health outcomes than more objective measures of isolation (Holt-Lunstad, Smith, Baker, Harris, & Stephenson, 2015). People who already feel disconnected socially may be sensitive to unfair treatment that makes them feel even more alienated. Similar to personality, therefore, social isolation may be associated with new reports of perceived weight discrimination, and that association may work through both objective and subjective mechanisms.

It is important to note that perceived weight discrimination is typically measured with self-report scales that assess individuals' perceived experiences with unfair treatment (Puhl, Andreyeva, & Brownell, 2008; Sutin & Terracciano, 2013). With such measures it is not possible to disentangle whether an individual has experienced objective discrimination and/or whether the individual perceives an interaction, even an ambiguous one, as discriminatory. Despite this limitation, however, the self-reports are clearly detecting important information about the person and situation, since such reports reliably predict poor health outcomes (Tomiya et al., 2018).

This research uses data from the Health and Retirement Study to identify personality and social isolation factors that predict new reports of perceived weight discrimination among individuals at high risk for perceived weight discrimination – people with higher BMI. As such, our population of interest had to meet two criteria: have a body mass index (BMI) equal to or over 30 and have not reported experiences with perceived weight discrimination at baseline. Perceived weight discrimination is most commonly reported among individuals with a BMI greater than 30 kg/m² (the clinical threshold for obesity; see Dutton et al., 2014). We thus focused on participants in this group at high risk of perceived weight discrimination. We focused on participants who had not yet reported perceived weight discrimination at baseline because we aimed to identify factors that prospectively predict who will report new experiences with perceived weight discrimination over an up to 8-year follow-up. We expect that participants who score higher in Neuroticism and participants who report more loneliness will be at increased risk for reporting new reports with perceived weight discrimination whereas participants who score higher in Extraversion and Conscientiousness and participants who are more socially integrated (either subjective or objective) will be less likely to report new instances of perceived discrimination. We do not expect an association for either Openness or Agreeableness.

Method

Participants and Procedure

Participants were drawn from three cycles of the Leave-Behind Questionnaire from the Health and Retirement Study (HRS).¹ The HRS is a longitudinal study of the health and well-being of Americans aged 50 years and older and their spouses that was initiated in 1992. The overall purpose of the HRS is to provide data to researchers and policymakers to help improve aging in America. HRS data are available for public download here: <http://hrsonline.isr.umich.edu/>.

¹This study was not preregistered.

Personality, social isolation, and perceived discrimination were first measured in the HRS in 2006 with a random half of the sample; the other half was first tested in 2008. Participants completed questionnaires again every four years. There are currently three complete waves of personality, social isolation, and perceived discrimination data in the HRS (2006/2008, 2010/2012, 2014/2016). Participants were included in the sample for analysis if they had information on personality and social isolation at baseline, measured in the obesity range of BMI (BMI ≥ 30 kg/m²) at baseline, reported no perceived weight discrimination at the baseline assessment, and reported on their experience of perceived discrimination (or lack thereof) in at least one additional assessment. A total of 3,064 participants met these criteria. This subsample is derived from the 14,302 participants who had some information on personality across the 2006–2008 assessments. Of those participants, 515 did not have complete data on all of the personality and social isolation variables at baseline, 2,329 participants did not have valid measured BMI at baseline, 7,328 did not measure in the obesity category at baseline, 1,159 participants reported perceived weight discrimination at baseline, and 3,595 did not have data on perceived discrimination at either follow-up assessment. Note that these numbers add up to more than the difference between the full sample and analytic sample because participants could be in more than one category.

Measures

Personality.—Personality was measured with the Midlife Development Inventory (MIDI; Lachman & Weaver, 1997), a 26-item adjective measure of five factor model personality traits. Neuroticism was measured with four items (e.g., moody; $\alpha=.71$; mean interitem $r=.38$), Extraversion (e.g., outgoing; $\alpha=.74$; mean interitem $r=.37$), Agreeableness (e.g., caring; $\alpha=.78$; mean interitem $r=.42$), and Conscientiousness (e.g., organized; $\alpha=.66$; mean interitem $r=.29$) were each measured with five items, and Openness was measured with seven items (e.g., creative; $\alpha=.79$; mean interitem $r=.35$). Items were measured on a scale from 1 (*at lot*) to 4 (*not at all*) and reverse scored when necessary in the direction of the label of the trait.

Social isolation.—The HRS included measures of both subjective and objective social isolation. Subjective social isolation was assessed as loneliness. Specifically, participants reported on 3 items from the UCLA Loneliness Scale (e.g., “How much of the time do you feel that you lack companionship?”) that were validated for use in large-scale epidemiological studies (Hughes, Waite, Hawkey, & Cacioppo, 2004). Each item was measured on a scale from 1 (*often*) to 3 (*hardly ever or never*) and reverse scored in the direction of greater loneliness ($\alpha=.88$; mean interitem $r=.58$). Objective social isolation was measured as lack of contact with four types of relationships: spouse, children, other family, and friends (Ertel, Glymour, & Berkman, 2008). Participants were asked about frequency of contact (in person, phone, letters/emails) within each relationship (except for spouse). For each relationship, participants who had at least monthly contact were scored 0 and those who had less than monthly contact were scored 1. For spouse only, contact was coded as 0 for lives with a spouse and 1 for does not live with a spouse. Consistent with previous HRS research (Ertel et al., 2008), lack of contact was scored as the sum across the four relationships, with a possible range from 0 (*strong social integration*) to 4 (*social isolation*). The correlation between social isolation and loneliness was .24 ($p<.01$).

Perceived weight discrimination.—Participants completed a six-item version of the Everyday Experiences with Discrimination scale (Williams, Yu, Jackson, & Anderson, 1997). After reporting on whether they had ever been treated unfairly in a number of situations (e.g., “You receive poorer service than other people at restaurants or stores.” $\alpha=.82$; mean interitem $r=.44$), participants were asked to indicate why they thought those experiences happened to them. Participants could attribute those experiences to their weight (yes/no). In addition, participants could attribute the experiences to ancestry or national origin, gender, race, age, a physical disability, another aspect of physical appearance, or sexual orientation. Participants could select as many attributions as necessary. Because participants could attribute multiple reasons for the perceived discriminatory experiences, it was not possible to combine the continuous measure with the attributions (i.e., it was not possible to identify which experiences were perceived to be due to each attribution). The same scale was administered at all three time points. New reports of perceived weight discrimination were defined as not reporting perceived weight discrimination at the baseline assessment but reporting it at either the second or third follow-up assessment. Participants who newly reported perceived weight discrimination were compared against participants who did not report perceived weight discrimination at baseline and both of the follow-ups.

BMI/Obesity.—As part of the in-person interview in 2006/2008, trained staff took height and weight measurements. Participants removed their shoes for the height measurement, and height was recorded to the nearest quarter inch. Participants were in light clothing and no shoes for the weight measurement, and weight was recorded to the nearest half pound. These measurements were used to derive BMI (kg/m^2). Obesity was classified as BMI ≥ 30 .

Covariates.—Participants self-reported their sociodemographic information. Age was self-reported in years at the baseline assessment (2006/2008). Gender was self-reported male ($=0$) or female ($=1$). Race was self-reported as white, Black or African American, other, or not obtained and dummy-coded into two variables that compared Black/African American ($=1$) and other/unknown ($=1$) to white ($=0$). Ethnicity was self-reported Hispanic ($=1$) compared to non-Hispanic ($=0$) across all races. Education was years of education. Some analyses also controlled for depressive symptoms experienced in the last week measured with an 8-item version of the Center for Epidemiologic Studies Depression scale (CESD; Radloff, 1977). Participants responded yes/no to each item (e.g., felt depressed), and the sum was taken across the items ($\alpha=.80$; mean interitem $r=.34$).

Statistical Approach

Survival analysis was used to predict perceived weight discrimination from each of the personality traits and two social isolation measures, controlling for BMI and the sociodemographic covariates. All variables were standardized to a mean of zero and standard deviation of one to facilitate comparisons across predictors. Survival analysis was used because there were multiple assessments of perceived weight discrimination, and it accounts for the time differences between those assessments. Time was coded from the year of the baseline assessment to the first new report of weight discrimination. Time was censored at the last available assessment for participants who did not report weight discrimination at any of the follow-ups. Each predictor (personality traits and social isolation

measures) was entered individually into the analysis while simultaneously controlling for the sociodemographic covariates and BMI. The analysis was then repeated with all personality and social isolation predictors entered simultaneously into the analysis as well as the covariates, and again with depressive symptoms as an additional covariate. We also repeated the full model using logistic regression on the entire baseline sample of HRS participants who had all relevant data to be included in the analysis ($N=11,560$). Logistic regression was used because it was a cross-sectional analysis with a dichotomous outcome.²

A sensitivity analysis to evaluate power indicated that with 3,064 participants and 345 events, we had 80% power to detect a standardized main effect of $HR=1.10$ at $p<.05$. For survival analysis, it has also been argued that there should be at least 20 events per variable included in the analysis (Ogundimu, Altman, & Collins, 2016). Our sample size also exceeded this threshold.

Results

Over the up to 8-year follow-up, 11% ($n=345$) of participants with obesity at baseline reported perceived weight discrimination. Table 1 provides descriptive statistics for all study variables. Table 2 shows the bivariate correlations for all study variables. The results of the Cox regressions are shown in Table 3. Several of the sociodemographic covariates had associations with new reports of perceived weight discrimination. There was, for example, a negative association between age and perceived weight discrimination and a positive association between BMI and perceived weight discrimination. These associations indicated that relatively younger participants in the sample and participants with relatively higher BMI in the sample were more likely to report experiencing perceived weight discrimination over the follow-up. African American participants, relative to white participants, and Hispanic participants, relative to non-Hispanic participants, were less likely to report perceived weight discrimination. Gender and education were unrelated to new reports of perceived weight discrimination.

Several personality traits were associated with new reports of perceived weight discrimination (Table 3). Specifically, every standard deviation score higher in Neuroticism at baseline was associated with a nearly 30% increased risk of a new report of perceived weight discrimination across the 8-year follow-up. In contrast to Neuroticism, Conscientiousness conferred a lower risk: Every standard deviation higher in Conscientiousness was associated with a more than 25% decreased risk of reporting a new experience. Finally, both Extraversion and Openness were associated with reduced risk. When all predictors were entered into the model at the same time, however, the effects of Extraversion and Openness were reduced to non-significance.

Measures of social isolation were also associated with risk of new reports of perceived weight discrimination (Table 3): Every standard deviation score higher on the loneliness measure was associated with an about 25% increased risk of new reports of perceived weight

²Author contributions will be listed here when the manuscript is unblinded. This information is currently listed on the unblinded title page.

discrimination and every standard deviation increase in lack of social contact was associated with a 12% increased risk. This latter association, however, was reduced to non-significance when both measures of social isolation were included in the model. The association between loneliness and risk of perceived discrimination was independent of the five personality traits.

The pattern of associations was similar when depressive symptoms was included as an additional covariate. Specifically, Conscientiousness remained protective and Neuroticism and loneliness were associated with increased risk but fell just short of conventional statistical significance (Table 3). Finally, a similar pattern was observed on the total baseline sample: Higher Neuroticism and loneliness and lower Conscientiousness were associated with greater risk of reporting perceived weight discrimination ($p < .01$), independent of sociodemographic covariates, BMI, and depressive symptoms (Supplemental Table S1).

Discussion

The present research indicates that, in a population at high risk for experiencing perceived weight discrimination, aspects of personality and social functioning are associated with experiencing new instances of perceived weight discrimination over an up to 8-year period. Individuals who score higher in Neuroticism and individuals who experience loneliness are more vulnerable to experiencing perceived weight discrimination, whereas individuals higher in Conscientiousness are less likely to report new experiences with perceived weight discrimination. In interpreting this research, it is critical to note that the burden of reducing weight discrimination should fall on the people who perpetuate unfair treatment based on weight, rather than on the people who are vulnerable to experiencing weight discrimination. There is, however, little indication that weight stigma and discrimination are declining (Andreyeva, Puhl, & Brownell, 2008; Tomiyama et al., 2015). As such, there is a need to better understand the psychological and social factors that predict this form of unfair treatment to be able to design interventions for the people who are the target of weight-based discrimination.

Current models of weight stigma tend to focus on the mechanisms through which discrimination leads to poor health outcomes (Major et al., 2018; Tomiyama, 2014). Such models help to identify the consequences of these experiences. These models, however, do not address factors that may make people more or less likely to experience or perceive unfair treatment. The present research is thus a step toward a more comprehensive model that considers the antecedents, as well as the consequences, of perceived weight discrimination. We integrate relevant constructs from well-established theoretical models of trait psychological functioning (McCrae & John, 1992) and social isolation (Cacioppo & Cacioppo, 2018) into models of weight stigma to better address the psychological and social factors that shape experiences with unfair treatment.

The purpose in expanding these models is to provide a comprehensive understanding of the antecedents, as well as the consequences, of perceived weight discrimination. The purpose is not to assign responsibility for such experiences to the person who had them. There are clear societal factors that are responsible for the prevalence of poor treatment due to weight (e.g., the widespread belief that weight is controllable and thus people with obesity are personally

responsible for their weight). Perceptions of weight discrimination are likely embedded in people's personal experiences with being subjected to unfair treatment from others. Indeed, working to quantify the role of individual differences in who reports perceived weight discrimination does not deny that there are significant social factors outside the individual's control that unfortunately lead to these experiences. Identifying individual differences in vulnerability and resilience to weight stigma will help inform future intervention strategies and identify those individuals who may benefit the most from intervention. It is important to identify individual difference factors that may increase vulnerability/resilience to perceived weight discrimination that can help to work against the harmful effects of these experiences as we also work toward eliminating this unfair treatment at its source.

Personality, a key aspect of trait psychological functioning, was implicated in new reports of perceived weight discrimination. Conscientiousness was the strongest personality trait predictor: Individuals who score higher on this trait are less likely to report new experiences of perceived unfair treatment on the basis of body weight. Individuals higher in Conscientiousness may be less likely to report new experiences with perceived weight discrimination through both objective and subjective mechanisms. Conscientiousness is thought to shape, in part, the environment in which an individual lives (Friedman, 2000). Individuals higher in Conscientiousness may gravitate toward environments that are more hospitable and less threatening (Rauthmann, Sherman, Nave, & Funder, 2015). And, even if individuals higher in Conscientiousness do experience perceived unfair treatment based on weight, they may be less likely to perceive and label it as such. Individuals higher in Conscientiousness, for example, are more likely to interpret ambiguous situations as opportunities (Serfass & Sherman, 2013) and may not interpret potential unfair treatment as discriminatory.

In addition to Conscientiousness, Neuroticism was a predictor of perceived discrimination. Like Conscientiousness, Neuroticism may increase risk of unfair treatment through both subjective and objective mechanisms, though in the opposite direction from Conscientiousness. Individuals higher in Neuroticism, for example, are more likely to infer ambiguous situations as negative and threatening (Serfass & Sherman, 2013) and perceive experiences in their everyday life as less positive (Rauthmann et al., 2015). Further, Neuroticism is associated with a hypervigilance to social cues and a tendency to evaluate even non-threatening situations as aversive (Rauthmann et al., 2015). This tendency likely extends to experiences that could be interpreted as discriminatory. Finally, the current findings are consistent with related literature on bullying that finds that individuals higher in Neuroticism tend to be targets of victimization, starting from childhood (Bollmer, Harris, & Milich, 2006) and continuing into the workplace in adulthood (Glasø, Matthiesen, Nielsen, & Einarsen, 2007).

We had hypothesized that Extraversion would be associated with reduced risk of perceived weight discrimination because individuals higher on this trait are more likely to experience positive events (Lüdtke et al., 2011) and are more likely to positively evaluate social interactions (Tov, Nai, & Lee, 2016). Although we did find some support for this hypothesis, Extraversion was not an independent predictor of perceived discrimination. In addition, although not hypothesized, Openness also emerged as a protective factor. Individuals high in

Openness are less likely to hold prejudicial attitudes (Sibley & Duckitt, 2008). The present research suggests that open individuals are also less likely to be on the receiving end of such attitudes. Similar to Extraversion, however, this association was not independent of the other traits.

Social isolation is a key aspect of interpersonal functioning that can be defined by both degree of social contact (social integration) and subjective feelings of isolation (loneliness) (Cacioppo & Patrick, 2008). In the present research, both aspects of social isolation were associated with new reports of perceived weight discrimination but only loneliness was an independent predictor: Individuals who feel lonely are more likely to report new experiences with perceived weight discrimination over time, independent of their degree of contact with others. Individuals who are lonely are motivated to reach out and reconnect with people (Cacioppo & Cacioppo, 2018), which may raise their exposure and thus vulnerability. The maladaptive cognitive processes associated with loneliness, however, may impede the individual's ability to make connections (Cacioppo & Hawkley, 2009). Most relevant for the current work is the increased sensitivity to threats in the social environment. Such sensitivity may lead to greater perceptions of unfair treatment because those perceptions would fit with the individual's worldview. It may also be the case that individuals who are already socially isolated are even more vulnerable to attacks on their weight. In contrast, degree of social contact was not an independent predictor. This pattern suggests that individuals' subjective evaluation of their loneliness, rather than how often interactions with close others occur, is a stronger predictor of reporting new perceived weight discrimination.

The association between both Neuroticism and loneliness and perceived weight discrimination was reduced somewhat when depressive symptoms were added to the model. This reduction may have to do with the overlap between these constructs and/or that depressive symptoms may be one mechanism of this association. Neuroticism is a recognized risk factor for depression (American Psychiatric Association, 2013). Loneliness is typically considered a symptom of depression and is often included as an item on measures of depressive symptoms (Radloff, 1977), including the one used in HRS. This conceptual, clinical, and psychometric overlap may explain why the effect of these two factors was reduced when depressive symptoms were included in the model. Further, depressive symptoms may be one mechanism of the relation between Neuroticism and loneliness and perceived weight discrimination. That is, Neuroticism and loneliness may increase risk for perceived weight discrimination through more depressive symptoms. In such a theoretical causal model, depressive symptoms are expected to be more proximal to the outcome (perceived weight discrimination) than Neuroticism or loneliness and thus should have a stronger relation and reduce the relation of the more distal predictors.

The present research also adds information on the demographic and BMI predictors of perceived weight discrimination. Whereas such predictors have been identified previously in cross-sectional samples, the current research shows that they prospectively predict experiences of perceived weight discrimination. For example, consistent with previous research on body weight and weight stigma (Puhl et al., 2008), BMI was a predictor of new reports of perceived weight discrimination. Participants were selected into the analytic sample if they weighed in the BMI category of obesity at baseline, and even within this

higher weight group, participants with relatively higher BMI were at greater risk for experiencing perceived discrimination. This pattern is consistent with the greater risk for perceived weight discrimination associated with class 2 and 3 obesity compared to class 1 (Dutton et al., 2014). In addition to BMI, relatively younger participants were more likely to report weight discrimination whereas African American and Hispanic participants were less likely to experience it. These findings suggest that individuals who are older and individuals who are from a racial or ethnic minority population may be more likely to attribute unfair treatment, especially if it is ambiguous, to their age or race/ethnicity, respectively, than to their weight.

The present study had several strengths, including a relatively large sample, a long follow-up, and well-validated measures of personality and social isolation. There are also some limitations to consider. First, the measure of perceived weight discrimination relied on subjective reports of these experiences, not objective measurements. Such measurements are difficult to obtain but without them it is not clear whether individuals with certain characteristics are more vulnerable to having this experience or whether they are more likely to evaluate negative interactions – especially any that could be interpreted as ambiguous – as discriminatory (Gerend, Sutin, Terracciano, & Maner, 2020). It would be helpful to complement this correlational work with experimental evidence. Still, it is important to note that perceived weight discrimination is associated with a range of poor health outcomes, including depression (Jackson, Beeken, & Wardle, 2015), chronic disease burden (Sutin et al., 2015), and premature mortality (Sutin et al., 2015). As such, even in the absence of objective measures, there are significant consequences to these perceptions. Second, the sample included middle-aged and older adults but not younger adults. Given that there may be age differences in the experience of perceived weight discrimination, it would be helpful for future research to include younger adults. Inclusion of younger participants would improve the generalizability of the findings. Finally, participants in the current research reported whether they had experienced perceived unfair treatment based on their weight but were not asked to specify the context or when it occurred. The measure used in HRS asked about the frequency of several types of unfair treatment but because of how the attributions (e.g., weight, race) for that treatment are reported, it is not possible to link the attributions to the frequency. Future research could include more comprehensive measures that assess the perpetrator, the location, and the timing of the unfair treatment. Despite these limitations, the present research identifies aspects of psychological and social functioning associated with new reports of perceived weight discrimination. It thus adds to established models of perceived weight discrimination by addressing antecedents that may contribute to who experiences/perceives such discrimination.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgement:

This work was supported by the National Institute on Aging of the National Institutes of Health under Award Number R01AG053297. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. The Health and Retirement Study (HRS) is sponsored by the

National Institute on Aging (NIAU01AG009740) and conducted by the University of Michigan. HRS was approved by the University of Michigan Institutional Review Board. HRS data are available at: <http://hrsonline.isr.umich.edu/index.php>.

References

- American Psychiatric Association (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Andreyeva T, Puhl RM, & Brownell KD (2008). Changes in perceived weight discrimination among Americans, 1995–1996 through 2004–2006. *Obesity*, 16, 1129–1134. [PubMed: 18356847]
- Bernardo CO, Bastos JL, González-Chica DA, Peres MA, & Paradies YC (2017). Interpersonal discrimination and markers of adiposity in longitudinal studies: a systematic review. *Obesity Reviews*, 18, 1040–1049. doi:10.1111/obr.12564 [PubMed: 28569010]
- Bollmer JM, Harris MJ, & Milich R. (2006). Reactions to bullying and peer victimization: Narratives, physiological arousal, and personality. *Journal of Research in Personality*, 40, 803–828.
- Cacioppo JT, & Cacioppo S. (2018). Loneliness in the modern age: An evolutionary theory of loneliness (ETL). *Advances in Experimental Social Psychology*, 58, 127–197. doi:10.1016/bs.aesp.2018.03.003
- Cacioppo JT, & Hawkley LC (2009). Perceived social isolation and cognition. *Trends in Cognitive Science*, 13, 447–454. doi:10.1016/j.tics.2009.06.005
- Cacioppo JT, & Patrick W. (2008). *Loneliness: Human nature and the need for social connection*. New York: W. W. Norton & Company.
- Dutton GR, Lewis TT, Durant N, Halanych J, Kiefe CI, Sidney S, . . . Lewis CE (2014). Perceived weight discrimination in the CARDIA study: differences by race, sex, and weight status. *Obesity*, 22, 530–536. doi:10.1002/oby.20438 [PubMed: 23512948]
- Ertel KA, Glymour MM, & Berkman LF (2008). Effects of social integration on preserving memory function in a nationally representative US elderly population. *American Journal of Public Health*, 98, 1215–1220. doi:10.2105/AJPH.2007.113654 [PubMed: 18511736]
- Friedman HS (2000). Long-term relations of personality and health: Dynamisms, mechanisms, tropisms. *Journal of Personality*, 68, 1089–1107. [PubMed: 11130733]
- Gerend MA, Sutin AR, Terracciano A, & Maner J. (2020). The role of psychological attribution in responses to weight stigma. *Obesity Science and Practice*. doi: 10.1002/osp4.437
- Glasø L, Matthiesen SB, Nielsen MB, & Einarsen S. (2007). Do targets of workplace bullying portray a general victim personality profile? *Scandinavian Journal of Psychology*, 48, 313–319. doi:10.1111/j.1467-9450.2007.00554.x
- Holt-Lunstad J, Smith TB, Baker M, Harris T, & Stephenson D. (2015). Loneliness and social isolation as risk factors for mortality: a meta-analytic review. *Perspectives in Psychological Science*, 10, 227–237. doi:10.1177/1745691614568352
- Hughes ME, Waite LJ, Hawkley LC, & Cacioppo JT (2004). A short scale for measuring loneliness in large surveys: results from two population-based studies. *Research in Aging*, 26, 655–672. doi:10.1177/0164027504268574
- Jackson SE, Beeken RJ, & Wardle J. (2015). Obesity, perceived weight discrimination, and psychological well-being in older adults in England. *Obesity*, 23, 1105–1111. doi:10.1002/oby.21052 [PubMed: 25809860]
- Lachman ME, & Weaver SL (1997). Midlife Development Inventory (MIDI) personality scales: Scale construction and scoring Unpublished Technical Report. In. Brandeis University.
- Lüdtke O, Roberts BW, Trautwein U, & Nagy G. (2011). A random walk down university avenue: Life paths, life events, and personality trait change at the transition to university life. *Journal of Personality and Social Psychology*, 101, 620–637. [PubMed: 21744977]
- Magnus K, Diener E, Fujita F, & Pavot W. (1993). Extraversion and neuroticism as predictors of objective life events: A longitudinal analysis. *Journal of Personality and Social Psychology*, 65, 1046–1053. [PubMed: 8246112]

- Major B, Tomiyama J, & Hunger JM (2018). The negative and bidirectional effects of weight stigma on health In Major B, Dovidio JF, & Link BG (Eds.), *The Oxford Handbook of Stigma, Discrimination, and Health* (pp. 499–519). New York: Oxford University Press.
- Malouff JM, Thorsteinsson EB, Schutte NS, Bhullar N, & Rooke SE (2010). The Five-Factor Model of personality and relationship satisfaction of intimate partners: A meta-analysis. *Journal of Research in Personality*, 44, 124–127.
- McCrae RR, & John OP (1992). An introduction to the five-factor model and its applications. *Journal of Personality*, 60, 175–215.
- Ogundimu EO, Altman DG, & Collins GS (2016). Adequate sample size for developing prediction models is not simply related to events per variable. *Journal of Clinical Epidemiology*, 76, 175–182. doi:10.1016/j.jclinepi.2016.02.031 [PubMed: 26964707]
- Puhl RM, Andreyeva T, & Brownell KD (2008). Perceptions of weight discrimination: prevalence and comparison to race and gender discrimination in America. *International Journal of Obesity*, 32. doi:10.1038/ijo.2008.22
- Radloff LS (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measures*, 1, 385–401.
- Rauthmann JF, Sherman RA, Nave CS, & Funder DC (2015). Personality-driven situation experience, contact, and construal: How people's personality traits predict characteristics of their situations in daily life *Journal of Research in Personality*, 55, 98–111. doi:10.1016/j.jrp.2015.02.003
- Robinson E, Sutin A, & Daly M. (2017). Perceived weight discrimination mediates the prospective relation between obesity and depressive symptoms in U.S. and U.K. adults. *Health Psychology*, 36. doi:10.1037/hea0000426
- Serfass DG, & Sherman RA (2013). Personality and perceptions of situations from the Thematic Apperception Test. *Journal of Research in Personality*, 47, 708–718. doi:10.1016/j.jrp.2013.06.007
- Sibley CG, & Duckitt J. (2008). Personality and prejudice: a meta-analysis and theoretical review. *Perspectives in Social Psychology Review*, 12, 248–279. doi:10.1177/1088868308319226
- Soto CJ (2013). Is happiness good for your personality? Concurrent and prospective relations of the big five with subjective well-being. *Journal of Personality*. doi:10.1111/jopy.12081
- Sutin AR, Stephan Y, Carretta H, & Terracciano A. (2015). Perceived discrimination and physical, cognitive, and emotional health in older adulthood. *American Journal of Geriatric Psychiatry*, 23, 171–179.
- Sutin AR, Stephan Y, Robinson E, Daly M, & Terracciano A. (2019). Perceived weight discrimination and risk of incident dementia. *International Journal of Obesity*, 43, 1130–1134. doi:10.1038/s41366-018-0211-1 [PubMed: 30250239]
- Sutin AR, Stephan Y, & Terracciano A. (2015). Weight discrimination and risk of mortality. *Psychological Science*, 26, 1803–1811. doi:10.1177/0956797615601103 [PubMed: 26420442]
- Sutin AR, & Terracciano A. (2013). Perceived weight discrimination and obesity. *PLoS One*, 8, e70048. doi:10.1371/journal.pone.0070048
- Tomiyama AJ (2014). Weight stigma is stressful. A review of evidence for the Cyclic Obesity/Weight-Based Stigma model. *Appetite*, 82, 8–15. doi:10.1016/j.appet.2014.06.108 [PubMed: 24997407]
- Tomiyama AJ, Carr D, Granberg EM, Major B, Robinson E, Sutin AR, & Brewis A. (2018). How and why weight stigma drives the obesity 'epidemic' and harms health. *BMC Medicine*, 16, 123. doi:10.1186/s12916-018-1116-5 [PubMed: 30107800]
- Tomiyama AJ, Finch LE, Belsky AC, Buss J, Finley C, Schwartz MB, & Daubenmier J. (2015). Weight bias in 2001 versus 2013: contradictory attitudes among obesity researchers and health professionals. *Obesity*, 23, 46–53. doi:10.1002/oby.20910 [PubMed: 25294247]
- Tov W, Nai ZL, & Lee HW (2016). Extraversion and agreeableness: Divergent routes to daily satisfaction with social relationships. *Journal of Personality*, 84, 121–134. doi:10.1111/jopy.12146 [PubMed: 25345667]
- Tsenkova VK, Carr D, Schoeller DA, & Ryff CD (2011). Perceived weight discrimination amplifies the link between central adiposity and nondiabetic glycemic control (HbA1c). *Annals of Behavioral Medicine*, 41, 243–251. doi:10.1007/s12160-010-9238-9 [PubMed: 21136227]
- Vadiveloo M, & Mattei J. (2017). Perceived weight discrimination and 10-year risk of allostatic load among US adults. *Annals of Behavioral Medicine*, 51, 91–104. doi:10.1007/s12160-016-9831-7

Williams DR, Yu Y, Jackson JS, & Anderson NB (1997). Racial differences in physical and mental health. Socio-economic status, stress and discrimination. *Journal of Health Psychology*, 2, 335–351. [PubMed: 22013026]

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Table 1

Descriptive Statistics for All Study Variables at Baseline for the Full Sample and by Weight Discrimination at Follow-up

Variables	Full Sample	New Reports of Weight Discrimination	
		No	Yes
Demographic factors			
Age (years)	66.89 (8.33)	67.30 (8.29)	63.72 (8.04)
Gender (female)	58%	57%	63%
Race (African American)	15%	16%	13%
Race (other/unknown)	2%	2%	1%
Hispanic ethnicity (yes)	9%	9%	6%
Education (years)	12.54 (2.95)	12.52 (2.97)	12.70 (2.76)
Body mass index (kg/m ²)	34.48 (2.95)	34.22 (3.97)	36.47 (4.91)
Depressive symptoms	1.28 (1.83)	1.22 (1.79)	1.70 (2.05)
Personality			
Neuroticism	1.99 (.58)	1.97 (.57)	2.15 (.58)
Extraversion	3.23 (.53)	3.24 (.53)	3.15 (.53)
Openness	2.96 (.54)	2.97 (.54)	2.92 (.55)
Agreeableness	3.55 (.46)	3.56 (.46)	3.55 (.47)
Conscientiousness	3.37 (.45)	3.38 (.45)	3.28 (.46)
Social Isolation			
Lack of social contact	.79 (.84)	.78 (.83)	.86 (.89)
Loneliness	1.45 (.52)	1.43 (.52)	1.58 (.57)

Note. $N=3,064$. $n=345$ new reports of weight discrimination. Coefficients are means (standard deviations) or percentages.

Table 2

Correlations Among All Study Variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Age	--															
2. Sex	-.04 [*]	--														
3. Race (African American)	-.04 [*]	.14 ^{**}	--													
4. Race (other/unknown)	-.06 ^{**}	-.01	-.06 ^{**}	--												
5. Ethnicity	-.09 ^{**}	.02	-.12 ^{**}	.24 ^{**}	--											
6. Education	-.10 ^{**}	-.10 ^{**}	-.06 ^{**}	-.10 ^{**}	-.34 ^{**}	--										
7. Body Mass Index	-.08 ^{**}	.14 ^{**}	.09 ^{**}	-.01	.00	-.02	--									
8. Depressive symptoms	-.03	.12 ^{**}	.05 ^{**}	.05 ^{**}	.13 ^{**}	-.21 ^{**}	.08 ^{**}	--								
9. Neuroticism	-.11 ^{**}	.06 ^{**}	-.06 ^{**}	.02	.13 ^{**}	-.15 ^{**}	.01	.38 ^{**}	--							
10. Extraversion	.01	.08 ^{**}	.06 ^{**}	.00	-.01	.08 ^{**}	-.01	-.18 ^{**}	-.22 ^{**}	--						
11. Openness	-.06 ^{**}	-.01	.02	.00	-.09 ^{**}	.28 ^{**}	-.01	-.12 ^{**}	-.18 ^{**}	.53 ^{**}	--					
12. Agreeableness	.00	.27 ^{**}	.02	-.01	-.04 [*]	.06 ^{**}	.08 ^{**}	-.05 ^{**}	-.12 ^{**}	.56 ^{**}	.40 ^{**}	--				
13. Conscientiousness	-.04 [*]	.08 ^{**}	-.01	.02	-.05 ^{**}	.16 ^{**}	.00	-.18 ^{**}	-.25 ^{**}	.40 ^{**}	.44 ^{**}	.43 ^{**}	--			
14. Social isolation	.10 ^{**}	.02	.03	.03	.00	-.06 ^{**}	.02	.14 ^{**}	.03	-.10 ^{**}	-.02	-.09 ^{**}	-.04 [*]	--		
15. Loneliness	-.03	.07 ^{**}	.07 ^{**}	.02	.04 [*]	-.10 ^{**}	.05 ^{**}	.42 ^{**}	.36 ^{**}	-.23 ^{**}	-.11 ^{**}	-.13 ^{**}	-.16 ^{**}	.24 ^{**}	--	
16. Weight discrimination	-.14 ^{**}	.03	-.02	-.02	-.04 [*]	.02	.17 ^{**}	.08 ^{**}	.10 ^{**}	-.05 ^{**}	-.03	.00	-.07 ^{**}	.03	.09 ^{**}	--

Note. N=3,064.

^{*} $p < .05$.^{**} $p < .01$.

Table 3

Survival Analysis Predicting Risk of Weight Discrimination

Predictors	Model 1	Model 2	Model 3
Demographic factors			
Age (years)	.68 (.61–.76) **	.70 (.62–.78) **	.70 (.62–.79) **
Gender (female)	1.04 (.93–1.6)	1.02 (.91–1.15)	1.02 (.91–1.15)
Race (African American)	.85 (.76–.96) **	.86 (.76–.97) *	.86 (.76–.96) *
Race (other/unknown)	.94 (.82–1.08)	.95 (.83–1.08)	.95 (.83–1.08)
Hispanic ethnicity (yes)	.83 (.72–.95) **	.79 (.69–.91) **	.79 (.69–.91) **
Education (years)	.96 (.85–1.09)	1.04 (.91–1.19)	1.05 (.92–1.20)
Body mass index (kg/m ²)	1.41 (1.31–1.53) **	1.42 (1.31–1.54) **	1.41 (1.30–1.53) **
Depressive symptoms	--	--	1.10 (1.05–1.16) **
Personality			
Neuroticism	1.27 (1.14–1.40) **	1.14 (1.02–1.28) *	1.13 (1.00–1.27)
Extraversion	.86 (.78–.96) **	.95 (.83–1.10)	.92 (.71–1.20)
Openness	.89 (.80–.99) *	.99 (.87–1.14)	.99 (.87–1.14)
Agreeableness	.94 (.84–1.04)	1.07 (.94–1.23)	1.07 (.93–1.23)
Conscientiousness	.79 (.71–.87) **	.83 (.73–.93) **	.83 (.74–.94) **
Social Isolation			
Lack of social contact	1.12 (1.01–1.24) *	1.06 (.95–1.18)	1.05 (.95–1.17)
Loneliness	1.23 (1.12–1.36) **	1.13 (1.01–1.26) *	1.11 (.99–1.24)

Note. $N=3,064$. Coefficients are hazard ratios (95% Confidence Intervals) from Cox regression. CI=Confidence Interval. Model 1 enters each of the personality and social isolation variables individually after controlling for the sociodemographic covariates. Model 2 is Model 1 with all personality and social isolation variables entered simultaneously. Model 3 is Model 2 with depressive symptoms as an additional covariate.

* $p<.05$.

** $p<.01$.