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Honors College Thesis

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Abstract

This study investigated the interaction between the perception of weight stigma, sleep quantity, and BMI/self-perceived body weight. We hypothesized that participants with higher BMIs and individuals who perceived themselves as overweight would be more likely to interpret mistreatment of an overweight person as a result of weight-stigma if they are sleep deprived. Participants completed an online survey in which they were presented with a vignette depicting a situation in which an individual was discriminated against. The vignette was accompanied by either an obese or thin image of the individual who was being discriminated against. Participants were asked a series of questions about the what the main reason for discrimination was as well as how important of a factor body weight was in propagating the discrimination. The survey included questions about the participants sleep habits and dieting habits as well. Results showed that participants recognized that body weight was an important factor in why the individual was discriminated against, however, there was no significant interaction found between the perception of weight stigma, sleep quantity, and BMI/self-perceived body weight. The findings suggest that people have the ability to recognize that body weight can cause an individual to be discriminated against.

Sleep Quantity and the Perception of Weight-Stigma Threat

The discrimination and stigmatization of overweight individuals in American society is as common as race and gender stigmatization (Puhl, Moss-Racusin, Schwartz, & Brownell, 2007). Weight-stigma refers to negative attitudes and beliefs toward people who are overweight. A person who is stigmatized possesses an attribute or characteristic that is linked to a socially devalued identity, such as obesity (Puhl et al., 2007). Overweight individuals are commonly depicted as lazy, incompetent, and lacking willpower (Puhl et al., 2007). These stereotypes create an atmosphere in which overweight individuals are likely to be stigmatized. This stigmatization toward overweight individuals can occur in a variety of ways such as name-calling or teasing and has been observed in school-settings, at the workplace, and in healthcare facilities (Puhl et al., 2007). Individuals who experience weight-stigmatization have been shown to be more vulnerable to depression, anxiety, and unhealthy-eating patterns (Hunger, Major, Blodorn, & Miller, 2015; Puhl et al., 2007).

Individuals who are stigmatized are commonly aware that they possess an attribute that is not valued in society (Puhl et al., 2007). Thus, people who are overweight have reported feeling threatened by negative stereotypes and have actively avoided places, such as gyms, where they may be have a greater chance at experiencing stigmatization (Carels et al., 2013; Hunger et al., 2015). If an individual is aware that he/she possesses a characteristic that is devalued in society and feels the need to actively avoid locations where stigmatization may occur, it is likely that a certain level of anxiety and stress is elicited. Schvey, Puhl, and Brownell (2014) found that overweight participants who were exposed to weight-stigmatizing stimuli exhibited negative emotions such as anxiety. Another study investigated the physiological effects of appearance-based stigma by using ambulatory blood pressure as a measure of anxiety and stress (Eysenck,

Derakshan, Santos, & Calvo, 2007). Situations that stigmatized participants based on their physical appearance resulted in a higher ambulatory blood pressure and a greater state of stress and anxiety. This suggests that overweight individuals possess feelings of anxiety and stress when they encounter situations where they may be stigmatized due to their weight.

Anxiety has been linked to deficits attentional control (Eysenck et al., 2007). It is hypothesized that anxiety has the ability to impair what we pay attention to in our everyday lives. According to Eysenck's Attentional Control Theory, anxiety decreases our brain's response to goal-directed behavior and increases the response to stimulus-driven behavior. When attentional control is decreased, the brain is more likely to notice threat-related stimuli in the surrounding environment due to the lack of attentional control (Eysenck et al., 2007). Thus, individuals with higher BMIs/individuals who perceive themselves as overweight are likely to be actively avoiding or monitoring their surroundings. This avoiding and monitoring elicits anxiety which in turn decreases attentional control, making that individual more susceptible to noticing weight-stigma threats and feeling even more stigmatized.

While anxiety has the ability to alter attentional processes, sleep has this ability as well. Sleep deprivation has been shown to cause greater amygdala activation to aversive images as well as weaken the connection between the amygdala and the medial-prefrontal cortex (Yoo, Gujar, Hu, Jolesz, & Walker, 2007). The amygdala is well known to be a part of the brain that is responsible for emotional processing (Yoo et al., 2007). The medial prefrontal cortex (mPFC) is hypothesized to be responsible for the top-down or efficient processing of the emotions in the amygdala. The disconnect between the two inhibits the ability of the amygdala to appropriately respond to stimuli. Another study found that sleep deprivation impairs the mPFC and the posterior cingulate cortex. Both of these structures are responsible for mediating spatial attention

(Mander et al., 2008). Thus, sleep deprived individuals are more susceptible to stimuli distraction.

In a larger study conducted by looking at the effects of weight-stigma stress on psychological, physiological, and behavioral responses, results showed that participants with higher BMIs/self-perceived overweight showed greater attention to weight stigma-related threat when they had experienced weight-stigma threat. However, this only occurred when participants with a high BMI/self-perceived overweight had little sleep in the past 24 hours (McClearly-Gaddy, Hodge, & Miller, C.T., 2015). The study conducted by McCleary-Gaddy et al. used reaction time to a dot-probe task as a measure of attention to weight-stigma threat. The current study will expand on this research by investigating whether heavy people who lack sleep also are more likely to interpret an ambiguous behavior toward and overweight person as weight discrimination. I will do this by having participants read a scenario in which an overweight person is treated badly by another person. They then will answer questions about why the overweight person was treated badly.

Sleep deprivation causes individuals to be more easily distracted by stimuli and impairs the ability to appropriately respond to stimuli. Studies have shown that overweight individuals are sensitive to weight-stigma threats and actively avoid places where they made experience stigmatization. Thus, overweight individuals who lack sleep should be more vulnerable to attentional distraction by weight-stigma. Based on this previous literature, I hypothesize that participants with higher BMIs and individuals who perceive themselves as overweight will be more likely to interpret mistreatment of an overweight person as a result of weight-stigma if they are sleep deprived (See Figure 2).

With more than one-third of the United States population being obese, it is vital to examine the psychological and physiological effects of obesity. Obese people are commonly blamed for their weight and stereotyped as being lazy, unmotivated, and lacking willpower (Puhl et al., 2007). Health professionals and individuals sometimes use weight-stigma as tool for motivating obese individuals and inspiring behavior change. However, this is not an effective approach. Based on the research that has been conducted on weight-stigma, highlighting negative stereotypes and creating weight-stigmatizing situations does nothing more than impair physical and emotional health while promoting weight-gain over time (Hunger et al., 2015). The perception of weight-stigma is an under examined field, especially when it comes to the effects of sleep deprivation and the perception of weight-stigma. If sleep quantity is found to be the moderator of the relationship between BMI/self-perceived obesity and the perception of weight-stigma threat, targeting sleep habits may be an effective way to combat the obesity in America and promote greater health.

Methods

Participants

Individuals who were between the ages of 18-55 were invited to voluntarily participate in the study. Participants were recruited through Facebook as well as a an electronic bulletin board (Front Porch Forum) posting for a town in northern Vermont . The posting explained the purpose of the study was to examine how characteristics of individuals are related to the perception of discrimination. The posting explained that participation was voluntary and would take less than ten minutes to complete. Two hundred and eighty-two participants (233 females, 49 males) participated in the study. 82.4% of participants identified as White, 2.2% Hispanic/Latino, 1.6% Asian, .6% American Indian, and 1.6% identified as other. Participants ranged in age from 18-55

with 52% of the participants ranging between the ages of 18-25, 8.5% ranging between the ages of 25-34, 9.7% ranging between the ages of 35-44, and 17.2% ranging between the ages of 45-55. In the online questionnaire, participants reported their quality of sleep in the past 24 hours (1=very poor, 5=very good, $M = 3.22$, $SD = .80$). Participants also reported their average quantity of sleep in the past 24 hours ($M = 7.46$, $SD = 1.71$). At the end of the study, participants were asked to report their height and weight in order to calculate their BMI (BMI: $16.70 - 52.93$, $M = 25.70$, $SD = 6.51$).

Procedure

The online study took an average of 10 minutes to complete. Participants were randomly presented with one eight vignettes in which a woman was discriminated against, accompanied by a picture supposedly of the woman, who was either fat or thin. Following the presentation of a vignette and an image of a fat or thin woman, participants were asked to select the main reason for the discrimination against the woman in the vignette (gender, age, race, or body weight). Participants were then asked on a 1-5 scale (1 = not at all important 5 = very important) how important of a factor body weight was in the discrimination against the woman. Participants answered a series of questions about their sleep habits and sleep quantity. The final questions in the survey asked participants for their height, weight, perceived weight, and whether they were trying to lose weight or enrolled in a dieting program. After completing the survey, participants viewed a debriefing form and were directed back to Facebook or Front Porch Forum.

Measures

  BMI and Sleep Measure. A set of general demographic questions were used to assess participants' gender, age, ethnicity, body-weight, self-perceived body weight, height, sleep quality and quantity, and dieting habits.

  Weight Stigma Measure. In order to increase generalizability, photographs of two different overweight women and two different thin women were used to represent the woman's weight. In addition, two different scenarios in which the woman was treated poorly were used. In one scenario a salesperson in a clothing store ignored the woman to provide service to another customer, and in the other scenario the woman was boarding a flight and heard the passenger seated in the row to which she was assigned express dissatisfaction that she would be seated next to him. Photographs and scenarios were randomly assigned, such that a participant received one of eight combinations of the women's weight and the scenario they experienced (See Appendix A and B). The eight vignettes were randomly presented to participants with each participant reading one vignette.

<center>**Results**</center>

Analytic Strategy

  We conducted moderation analyses using Hayes's PROCESS macro model 3 (Hayes, 2013) (see Figure 1). In one analysis, we used BMI as a moderator (see Figure 2) and in the other we used self-perception of weight as a moderator (see Figure 3). We also ran a Pearson's Chi Square test to see whether participants recognized if overweight individuals were more likely to be discriminated against.

Discrimination Against Overweight Individuals

Results revealed, using Pearson's Chi Square, that participants recognized that overweight individuals were more likely to be discriminated against, $X^2(1) = 67.13$, p < .001. 81.8 % of participants said that weight was the main reason that the woman was discriminated against versus any other explanation when the overweight picture was presented. 31.3% of participants said that weight was the main reason for discrimination versus any other explanation when the woman in the image appeared to be thin.

Results showed that participants said that body weight was the most important factor in why the individual was discriminated against versus any other form of discrimination, $X^2(1) = 46.93$, p < .001. Our results also showed that among the participants who thought that the individual was discriminated against (i.e. discrimination due to gender, age, height, or body weight), 95.9% of participants said that weight was the main reason that the woman was discriminated against versus any other type of discrimination when the overweight picture was presented. 57% of participants said that weight was the main reason for discrimination versus any other type of discrimination when the woman in the image appeared to be thin.

BMI as the Moderator

Analyses revealed a non-significant 3-way interaction between weight threat condition, BMI and quantity of sleep, $R^2 = .16$, $t(7, 262) = .57$, $p = .57$. None of the two-way interactions were significant.

Self- Perceived Weight as the Moderator

There was a non-significant 3-way interaction between weight threat condition, self-perceived weight and quantity of sleep, $R^2 = .16$, $t(7, 262) = .91$, $p = .36$. None of the two-way interactions were significant.

We conducted various analyses using Hayes's Macro model with different measures of sleep (sleep quantity in the past 24 hours, sleep quality in the past 24 hours, sleep quantity in the past 72 hours, sleep quality in the past 72 hours). None of our interactions were significant regardless of what sleep measure we used. We also conduced analysis using two different measures of discrimination. These measures were the questions "what was the main reason for the discrimination against the individual," and "to what extent did body weight contribute to the discrimination against the individual." Regardless of whether we used weight discrimination or discrimination in general as our dependent variable, the interactions were not significant.

Discussion

Our results indicate that people recognize that body weight is the reason why overweight individuals are discriminated against in a situation. 81% of participants that were presented with a vignette accompanied by an image of an overweight women said that body weight was the main reason for the discrimination against the woman versus any other general explanation. 95.9% of participants that selected a form of discrimination as the primary reason for the unfair treatment of the individual (gender, age, height, or body weight) said that weight was the main reason that the woman was discriminated against versus any other type of discrimination when the overweight picture was presented. These are important findings because it shows that people are aware of the stigma against overweight individuals and that being overweight can serve as a reason for someone to be discriminated against.

Contrary to previous studies, our results did not indicate that BMI or self-perceived weight had an effect on the relationship between the fat/thin condition and perceived weight stigma. This was surprising because previous studies have found that participants with higher BMIs/self-perceived overweight show greater attention to weight stigma-related threat when they

had little sleep in the previous 24 hours (McClearly-Gaddy, Hodge, & Miller, C.T., 2015). However, unlike the study conducted by McCleary-Gaddy et al., the current study examined a deliberative judgment task (reading a vignette and answering questions) rather than using an attentional task (the dot-probe task). It is possible that sleep deprivation and a higher BMI/self-perceived weight have an effect on perceived weight-stigma when the task requires little attention and not deliberative judgements. Having to take the steps to process a vignette, think about why the individual was discriminated against, and answer questions about the reason for that discrimination, may not be subconscious and quick enough to show that participants have greater attention toward weight-stigma threat.

Surprisingly, in our sample, participants reported getting an average of 7.46 hours of sleep in the past 24 hours. The National Sleep Foundation recommends that people get an average of 7-9 hours of sleep a night. Our sample fell right in the middle of that recommendation, around 7.5 hours of sleep a night. It could very well be that our sample was not sleep deprived enough in order to increase attention to weight stigma threat. Although the sample in the study conducted by McCleary-Gaddy et al. had an average of 7.26 hours of sleep per night, it could be that 7.26 hours of sleep a night is enough to cause bias to be shown in an attentional task, but not in a task that requires deliberate judgement. It would be interesting to take a sample of college students or individuals who had an average of 5-6 hours of sleep per night, and see whether fewer hours of sleep would be sufficient to make our interaction significant.

It is also very possible that participants experienced feelings of hesitancy when having to answer what the main reason for the discrimination against the individual was. Weight stigmatization and negative stereotypes about weight are shown to be as common as gender and

race discrimination (Puhl, Moss-Racusin, Schwartz, & Brownell, 2007). However, a study conducted by Puhl et al., 2007 showed that a majority of discrimation actions that occur against overweight individuals are subtle and occur in places such as healthcare facilites or family settings. Overweight individuals reported being discrimited against by healthcare individuals telling them to limit food intake, or by family members referring to them as lazy or inadaqute (Puhl et al., 2007). It could be that participants who were reading about an overweight individual felt uncomfortable or did not feel like they had the right to admit that weight would be a reason for that individual to be discriminated against.

Some limitations to the current study include not pretesting the images of the women that we displayed along with the vignettes. It could be that the images that we presented were not either obese or thin enough to cause an effect. 31.3% of participants that were shown an image of the thin women stated that the main reason for discrimination was her body weight. Due to the current standards in society for women, the image of the thin woman may not have been thin enough for participants to believe that she was not chubby or a little bit overweight.

Future studies should examine samples consisting of a more sleep deprived population to see whether fewer hours of sleep would have an effect on the perception of weight-stigma in a deliberative judgment task. Although our 3-way interactions using BMI/self-perceived weight and sleep quantity as moderators were not statistically significant, the current study did show that participants were able to recognize weight as being the main reason for discrimination against an overweight individual. With little research on weight stigmatization and with over one-third of the United States population being overweight, it is important to continue to examine the stereotypes that exist toward people who are overweight.

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Model 3
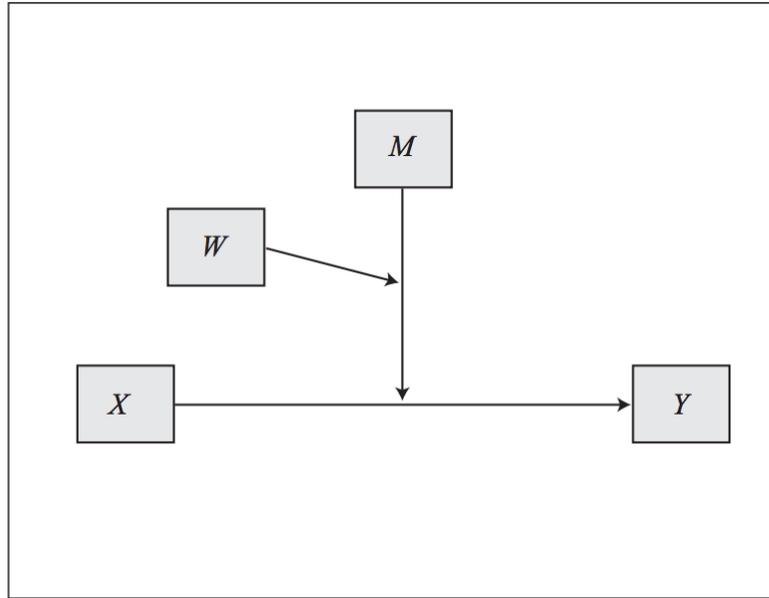
Conceptual Diagram

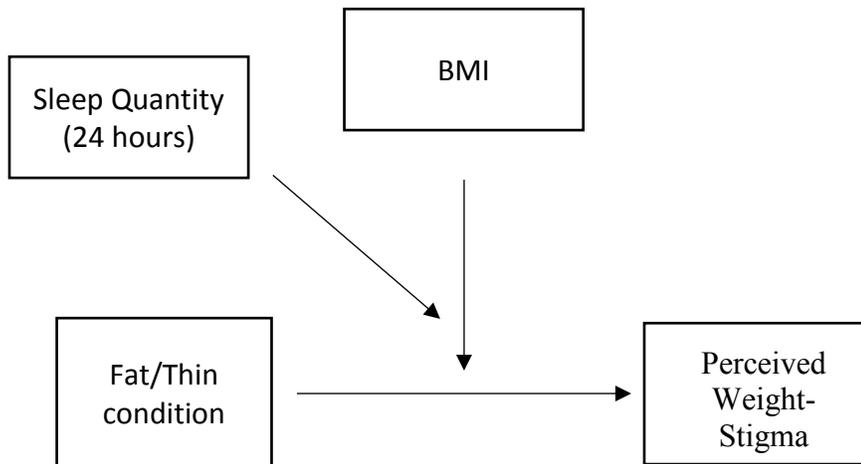**Figure 1**. Hayes's Macro Model for SPSS, model 3

Figure 2. Fat/thin condition and the perception of weight-stigma as moderated by sleep quantity and BMI
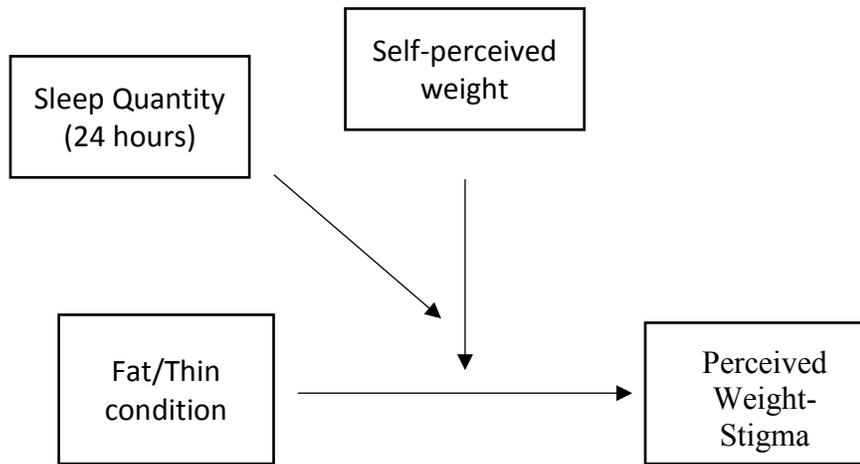
Figure 3. Fat/thin condition and the perception of weight-stigma as moderated by sleep quantity and self-perceived weight.

Appendix A

Cathy recently shopped at an upscale clothing store. She was looking for a new work outfit. When she entered the store there was one other customer in the store who was being assisted by a fashionably dressed sales associate. Realizing that the associate was busy Cathy began looking for clothes that she thought would be suitable for her to wear. She found a dress that looked like it would work very well for her and she made her way to the counter to make her purchase. She saw that the associate was no longer busy. Right as she saw that the sales associate was finished helping the previous customer, two other well-dressed women came into the store and arrived at the counter at the same time as Cathy. The associate looked up as Cathy and the two other women approached the counter. The associate looked up at Cathy unsmilingly, hesitated for a moment, and then turned with a smile to the two other women and asked how she could help them.

Appendix B

Veronica was flying to Los Angeles to visit her sister. She was running late and the passengers had already boarded. As she entered the plane, she examined her ticket and began to approach seat 12B. She noticed that she had been assigned a middle seat and a man was sitting by the window and another man was sitting in the aisle seat. Veronica put her bags in the overhead storage and the man sitting in the aisle seat moved so that she could get in to her seat. The man sitting by the window looked up at Veronica and muttered "just my luck".