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SOCIAL NETWORK TIES AND WEIGHT STATUS: MECHANISMS, INDIVIDUAL  
DIFFERENCES, AND HEALTH-RELATED IMPLICATIONS

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## ABSTRACT

The prevalence of overweight and obesity is a public health burden, both due to health consequences associated with overweight/obesity as well as risks associated with negative psychosocial attitudes that may be associated with overweight/obesity. A comprehensive understanding of how individuals of higher weight are perceived by people similar to themselves could help inform health interventions in this marginalized group. This research contributes to the current scientific understanding of societal and psychosocial factors involved in the bias and stigmatization of higher-weight individuals, and whether they exhibit homophily in their social networks. Homophily refers to the principle that people of similar characteristics tend to form social ties with one another and is a construct which outlines the foundation of nearly all network ties (Carrarini, Jackson, & Pin, 2009). The underlying mechanisms of friendship selection are expanded herein to the context of homophily in the population of individuals with overweight and obesity (e.g., anti-fat attitudes, fat phobia, internalized weight bias, attitudes toward outward physical appearance, appreciation of self, personality traits, demographics). This study collected data on internal and external perceptions and biases within overweight and obese individuals and extrapolates those perceptions in the understanding of how self-image and personal characteristics may impact social network creation. Data collection took place on the Amazon Mechanical Turk (MTurk) platform for the administration of a web-based questionnaire to 150 survey-takers. The final sample (N=149) was 61.1% male, over 90% white, with a mean age of 40.64 years. Data was analyzed using the IBM SPSS program, with correlation tests as the primary form of data analysis. Findings showed that, in general, individuals with higher explicit or implicit weight biases tended to have network ties (i.e., spouses, friends) who were thinner

than themselves, and had social networks with generally lower levels of homophily, relative to individuals with low explicit and implicit weight biases. The construct of “appreciation of self” served as a protective factor against weight-based discrimination in social networks, such that individuals with high appreciation of self (e.g., self-esteem, body appreciation) were more likely to have more homophilous social networks and choose network ties of higher weight status. Neuroticism was significantly associated with both weight status and homophily. The present study serves as a foundation for future research related to interactional patterns and relationships between the current measures and outcomes. The current findings present an opportunity to inform strategies for weight stigma health promotion efforts and biopsychosocial weight reduction strategies.

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## **Chapter 1**

### **Introduction**

#### **Overweight and Obesity as a Public Health Concern**

The prevalence of overweight/obesity in the United States is a growing public health problem. The biological (e.g., cardiovascular and diabetic disease risks), psychosocial (e.g., depression, anxiety), and social (e.g., stigmatization) consequences related to overweight and obesity present significant risks for population health and an increased financial burden on the healthcare system (Haidar & Cosman, 2011). Overweight and obesity are measured using body mass index (BMI), which is measured in units of kg/m<sup>2</sup>. Overweight individuals have a BMI between 25 and 30, and obese individuals are defined as having a BMI greater than 30 (CDC, 2017). Obesity itself does not discriminate. It is seen in individuals of all age groups and socioeconomic statuses, impacting nearly 2.1 billion people around the world and 93 million people in the United States (Centers for Disease Control and Prevention [CDC], 2018; Haidar & Cosman, 2011; Smith & Smith, 2016).

The reduction of the prevalence of overweight and obesity in the world population is thus important. Overweight and obesity increase the risk for cardiovascular disease through multiple biological pathways, including a high caloric or fat content diet leading to plaque accumulation in the primary arteries, cardiopulmonary fitness related to low physical activity, and inflammation related to adipose tissue (National Heart Lung and Blood Institute, 2013). Further, adipose tissue is a large contributor to the physical health consequences of overweight and obesity, as it is directly related to systemic inflammation. Systemic inflammation is a known



contributor to risk for cardiovascular diseases (e.g., atherosclerosis, hypercholesterolemia), which is one of the leading causes of death, insulin resistance, and other serious health concerns (Berg & Scherer, 2005). The inflammation pathways associated with adipose tissue are linked with health concerns for members of the overweight and obese population. These comorbid physical conditions thought related to systemic inflammation accumulate to drive healthcare costs related to this community. It is projected that the direct financial impact of obesity on the healthcare system totals to nearly \$430 billion, with obese women accruing a healthcare cost directly due to obesity three times that of obese males (Meldrum, Morris, & Gambone, 2017).

Due to the increasing prevalence of overweight and obesity across all age groups, socioeconomic statuses, and genders, it is in the interest of public health to better understand the psychosocial correlates of increased weight and to use these findings to inform interventions tailored to this group (Klaczynski, Goold, & Mudry, 2004). In addition to physical health consequences of overweight and obesity, there are also interpersonal and intrapersonal health consequences that are significant contributors to healthcare costs and overall health and well-being. Notably amongst these are negative experiences related to weight, broadly referred to as weight stigma.

### **Weight Stigma**

Although the causes of obesity include complex processes, including both biological and behavioral, it is widely perceived by the public as being due to behavior alone; notably, this is reflected in a high level of perceived controllability (i.e., the perception that weight is entirely within a person's control). This is the misconception that being overweight or obese is entirely determined by one's behaviors, decisions, and actions (Weiner, Perry, & Magnusson, 1988).

Coupled with other aspects of being overweight or obese (e.g., generally seen as less physically attractive), overweight and obese individuals often experience social stigma based on their weight.

Weight stigma is defined as the devaluation of an individual based on weight status, and it is a potent predictor of health and well-being (De La Haye, Robins, Mohr, & Wilson, 2011; Hawkey & Cacioppo, 2010; Tomiyama, 2014). Further, social factors (e.g., loneliness, social ties) are important contributors to health and well-being as well. Despite this plausible connection, there is currently limited literature about how overweight and obesity interact with social processes, and if this is rooted in weight stigma. Therefore, social stigma and stigmatizing perceptions may be a major contributor to overweight and obesity.

There is a growing body of evidence that weight stigma results in poor psychological, behavioral, and physical health consequences (e.g., increased susceptibility to depression and low-esteem, negative cardiovascular consequences; Puhl & Heuer, 2009). Weight stigma may indirectly influence health by de-motivating higher weight individuals to engage in healthy behaviors (e.g., exercise, nutritious eating habits). Additionally, it also might negatively impact interactions with their healthcare providers, potentially leading to sub-optimal health care experiences. More specifically, overweight and obese patients may feel that they experience bias from their healthcare provider due to their weight status. This, in turn, impacts healthcare usage by the overweight and obese community and decreases the potential adoption of healthy behaviors and weight reduction methods (Fruh et al., 2016). Weight stigma may also directly influence physical health because it is considered a stressor, which results in the release of cortisol. Stressful weight stigmatizing experiences may enhance cortisol secretion (Tomiyama, 2014). Weight stigma is common for individuals to experience in daily life (Vartanian, Pinkus, &

Smyth, 2018). Over time, this continual cortisol secretion may lead to poor somatic health outcomes such as insulin resistance, high blood pressure, and worsened immune function (Vartanian & Smyth, 2013).

Overweight and obesity are increasingly common health issues, although they are still highly stigmatized, despite their growing affected population size. It becomes progressively important to ensure the sound mental and physical health of increasingly affected proportions of the population. Ensuring the health of this population is multifaceted, important, and made increasingly complicated with the increasing number of people in this population. Thus, that growing number of overweight and obese individuals presents a need for understanding the ways in which they interact with each other, form relationships, and later develop healthy behaviors. There is a gap in the literature regarding the extent to which stigmatization due to overweight and obesity permeates social ties and friendship selection among higher-weight individuals.

### **Social Ties and Health**

Social ties are individual relationships between people intending to connect or engage in similar activities with individuals who share characteristics, behaviors, or values (Winship, 2017). A large body of literature suggests that social ties are beneficial for multiple health outcomes (Seeman, 1996). Positive social relationships have been shown to significantly impact risk for death and other health implications, with increasingly strong research support for a causal relationship between positive social ties and fewer negative health outcomes. Further, these are consistent across age and gender (Holt-Lunstad & Smith, 2012).

Social ties have been found to not only lower the risk for early mortality, they also have significant implications for disease onset and progression. This has been illustrated in various

studies where people with fewer social ties or with lower quality social ties are susceptible, on average, to have chronic disease (Umberson & Karas Montez, 2010). The relationship between social ties and health may be due to their influence on health behaviors (e.g., more exercise, less smoking), psychosocial well-being (e.g., social support, mental health), and physiology (e.g., supportive relationships foster immune and endocrine benefits; Umberson & Karas Montez, 2010). Taken together, this suggests it may be important to nourish social connections to not only foster positive healthy behaviors, but also to reap the health benefits of having strong friendships. These immune and endocrine benefits, more specifically “immune-mediated inflammatory processes,” may thus be relevant for decreasing already-present inflammatory-related risk among the high-adipose tissue overweight and obese populations (Holt-Lunstad & Smith, 2012; Kiecolt-Glaser et al., 2005). In addition to additional focus on physiological processes (although not the goal of this work) is greater attention to social processes themselves and how they might be related to weight. However, little is known about the dynamics of social network ties in individuals with overweight and obesity.

### **Self-Segregation and In-Group Bias**

Many marginalized populations exhibit self-segregation (i.e., the tendency to associate with similar others) and in-group bias (i.e., a “traditional behavior” of individuals holding a preference for those in their “in-group;” Currarini, Jackson, & Pin, 2009; Grossarth-Maticsek, Eysenck, & Vetter, 1988; Rudman, Feinberg, & Fairchild, 2002; Wang, Brownell, & Wadden, 2004). This has been demonstrated in minority populations such as racial and ethnic minorities, and even the marginalized smoker population. In-group preference may be a positive, protective factor for health due to the formation of social ties; however, it may also be harmful to the health

of individuals if surrounded by people who do not foster healthy behaviors (Centola, 2011; De La Haye et al., 2011).

Given that obesity is a growing epidemic, yet members of this population continue to be stigmatized, it is important to understand the societal attitudes toward individuals with overweight and obesity. As of 2016, 39.8% of the United States population aged 20 or older was classified as obese, with 71.6% of this age 20 and older population being classified as either overweight or obese ("Selected Health Conditions and Risk Factors..." 2018). This is a number far greater than half of the adult American population. As such, it is reasonable to hypothesize that their in-group preferences may be similar to minority populations who similarly may exhibit "in-group" preferences. In other words, it is important to understand if their stigma still mimics that of a traditional minority group, even though they are trending to the majority (Wang et al., 2004).

However, there are limited studies of whether individuals who are marginalized due to their weight status exhibit this behavior. One study suggests that they do not, and that this may be due to internalized weight bias (Wang et al., 2004). This particular study examined implicit weight bias and negative overweight and obese stereotypes among two groups of higher-weight individuals. Findings demonstrated that this group did possess negative internal attitudes regarding overweight and obese individuals and also endorsed specific attitudes of fat phobia (Bacon, Scheltema, & Robinson, 2001; Wang et al., 2004). The results of this study run counter to the principles of in-group bias, particularly in the context of a marginalized social group, such that this group of higher-weight individuals did not favor their in-group, and actually exhibited attitudes of in-group devaluation (Wang et al., 2004). Based on this crucial article exploring social network attitudes among the overweight and obese population, it is evident that further

research needs to be done to examine the external and internal attitudes among higher-weight individuals that may or may not influence them to favor or devalue their own social group.

Given that social ties are important, and self-segregation is a social behavior enacted in multiple marginalized groups, it is valuable to deepen our understanding of how these two concepts interact with health behaviors and outcomes. It is essential to take a methodical and empirical approach to understanding social behaviors among this group through the examination of intrapersonal factors that may influence social behaviors and in-group preferences (e.g., anti-fat attitudes, internalized weight bias). This approach should analyze foundational and individualistic aspects that may be leading to stigmatizing attitudes.

### **Homophily and Social Network Research**

Homophily refers to the principle that people of similar characteristics tend to form social ties with one another, and it is thought to reflect a form of self-segregation. Homophily is a construct that underscores nearly all network ties (Currarini et al., 2009). “Baseline homophily” describes network ties formed based on the demographics of an individual’s surrounding community (Mcpherson, Smith-Lovin, & Cook, 2001). This is a relationship formed out of convenience, or chance, as an outcome of one’s immediate environment. “Inbreeding homophily,” however, posits that friendships tend to be deliberately formed and maintained between people of similar type (i.e., based on age, racial/ethnic, religion, etc.) regardless of building ties in the surrounding population due to convenience (Mcpherson et al., 2001).

Homophily has been examined across several different populations with direct attention to weight status. For example, two studies on friendship selection in adolescents demonstrated that social network ties were partially based on BMI, such that adolescents often selected friends

with a similar BMI to their own. In addition, they also chose *not* to initiate certain friendships due to the BMI of another potential social network tie (De La Haye et al., 2011; D. R. Schaefer & Simpkins, 2014). Another work found that BMI had an impact on an individual's perception of their own body weight, how they perceive the body image of their social network ties, and their internalized weight bias (Ramirez & Milan, 2016). More specifically, the adolescent female sample from this study exhibited significant positive correlations between their own perceived body size and the body sizes of their social network ties, with overweight females in the sample being influenced to rate themselves as being of higher body weight when surrounded by social network ties who were also of increased body weight (Ramirez & Milan, 2016). These studies serve to show that weight status impacts and is impacted by friendship selection in adolescent populations, such that overweight and obese individuals do experience significantly different friendship selection experiences when compared to their normal-weight counterparts (De La Haye et al., 2011; Ramirez & Milan, 2016; D. R. Schaefer & Simpkins, 2014).

Similarly, several studies of elderly African Americans living in a low-income housing facility found that African Americans were less likely to form friendships with their overweight counterparts than white individuals were. In other words, elderly white individuals were more likely than African American elders to form and sustain relationships with other members of the overweight and obese community (Flatt, Agimi, & Albert, 2012).

Homophily has also been linked to the adoption of health behaviors such as daily exercise and medication adherence (Centola, 2011). Research suggests that the higher the culturally ascribed social status of a homophilous group, the more likely that the network and its constituents are to adopt healthy behaviors. In contrast, research also suggests that homophily may be associated with lower adoption of positive health behaviors in certain groups (e.g.,

smokers, racial and ethnic minorities). In this case, homophily actually may be harmful to one's physical health and may exacerbate health disparities among high- and low- status homophilous groups (Centola, 2011). The construct of homophily, especially inbreeding homophily, may help elucidate social network ties, friendship biases, and health outcomes in the overweight and obese community.

### **Homophily and Weight Status: Potential Explanatory Mechanisms**

Schaefer and Simpkins (2014) assert that to understand network and health behaviors of social networks, the structure of the network, and, ideally, mechanisms of network creation should be examined explicitly and together. Further, the existing literature is fairly dated, with many studies having been conducted in the late 1900s to early 2000s (Marsden, 1987; Rudman et al., 2002; Wang et al., 2004). It appears that overweight and obese individuals are a distinct population when it comes to friendship selection and stigma, and that homophily in this group may be made more difficult due to overarching negative societal attitudes that may have been internalized by this population. There is a lack of consensus on whether individuals who are overweight or obese choose social networks of individuals with similar BMI, consciously or subconsciously, or instead blatantly avoid group members who look similar to them with regard to weight.

Normal weight individuals are less likely to choose an overweight or obese individual as a social network tie, but less is known about how overweight and obese individuals choose their social networks. Overweight and obese youth are far less likely to be chosen for a social network tie by a peer who is perceived to be of normal weight status. However, these overweight and obese youths have shown minimal preference in regard to the body type of their social network



ties (D. R. Schaefer & Simpkins, 2014). While homophily has been shown in individuals of normal weight status, this behavior is inconsistent among overweight and obese individuals, particularly adolescents of higher weight. Schaefer and Simpkins attribute this lack of homophily within overweight and obese individuals, and profound homophily among normal-weight individuals, to be rooted in blatant avoidance of those who are of higher-weight (D. R. Schaefer & Simpkins, 2014).

Although it may be reasonable to hypothesize that overweight and obese individuals would display in-group bias similarly to other marginalized groups, the limited available evidence suggests otherwise (Wang et al., 2004). Potential mechanisms to explain why overweight and obese individuals may not display high levels of homophily are needed. Thus, there is a need for understanding whether overweight and obese individuals with high external (e.g., anti-fat attitudes) and internal (e.g., internalized weight bias) stigmatizing attitudes exhibit different levels of homophily than higher-weight individuals with fewer stigmatizing attitudes. It is additionally necessary to understand if there are certain individual characteristics (e.g., personality traits) that may lead a higher-weight individual to exhibit higher levels of homophily. These stigmatizing attitudes and personal characteristics may be potential mechanisms to explain social network behaviors among overweight and obese individuals. However, current research in this domain is limited and rarely connects these attitudes and perceptions with social network creation, specifically.

***External Weight Bias.*** Negative attitudes against higher-weight individuals may have serious behavioral implications regarding the treatment and inclusion of overweight and obese individuals. Anti-Fat Attitudes, or the rejection of members of the overweight and obese community, are a motivation projected outward, from the self, onto another person or group of

people (Crandall, 1994). Crandall draws comparison between anti-fat attitudes and symbolic racism, proposing that these ideals held by individuals are related to their own self-identity, belief systems, and are believed to impact behaviors and motivations. Thus, anti-fat attitudes may be a useful construct to help understand social behaviors towards and by members of the overweight and obese community (Crandall, 1994). Fat phobia, which also falls in the category of an external weight bias, is defined as an outwardly negative attitude toward overweight and obese individuals that specifically addresses the stereotypes associated with people of higher-weight (e.g., lazy, overeats; Bacon, Scheltema, & Robinson, 2001). Fat phobia might predict one's actions and beliefs to either stigmatize or include individuals who are overweight and obese, in a similar regard to anti-fat attitudes. These stereotypes may serve as a predictor for the treatment of overweight and obese individuals, particularly in the concept of weight status homophily (Bacon et al., 2001).

***Internal Weight Bias.*** Weight bias that is internalized describes the weight stigma that one imposes on him- or herself (i.e., self-stigma), and this implicit bias against the self may predict social behaviors (Durso & Latner, 2008). It is important to understand how overweight and obese individuals think about *themselves* before, and in order to, understand how this population conceptualizes and treats others who are also overweight and obese. Further, much weight stigma research has previously assumed that explicit negative attitudes held by overweight and obese individuals regarding the higher-weight population were also reflective of how these individuals thought about themselves (Durso & Latner, 2008). Thus, the development of a unique measure for self-stigmatizing attitudes has been crucial, as distinguishing between how one feels about and treats overweight others may be exceedingly different from how they internally feel about themselves being overweight (Durso & Latner, 2008). The outward

repercussions of this essential construct difference may become evident when social network behaviors with explicit and implicit weight attitudes are compared, side-by-side.

***Concern for Physical Appearance.*** The concern for outward physical appearance is a potential contributor to bias when it comes to social network creation with overweight and obese individuals. Social comparison theory proposes that a person's perception of their own abilities, and physical appearance plays a role in the way overweight and obese individuals think about themselves and form relationships (Festinger, 1954). Two forms of appearance comparisons may be relevant to the current research: outward physical appearance and sociocultural attitudes toward appearance. The emphasis that one puts on his or her outward physical appearance is a proposed mechanism of weight bias in individuals and may impact the formation of social networks. It is important to understand the social comparison processes that interplay with beliefs regarding one's own appearance in relation to the appearance of a social network tie (L. M. Schaefer & Thompson, 2014). Sociocultural attitudes toward appearance target an additional mechanism of self-perception, such that this type of attitude focuses on conceptualizing societal beliefs of ideal physical appearance. Further, they direct attention to societal pressures on the individuals regarding their appearance and seeks to understand the source of these factors in one's life or social network (L. M. Schaefer, Harriger, Heinberg, Soderberg, & Kevin Thompson, 2015). Prior research has shown that increased evaluation of physical appearances may predict obesity discrimination (O'Brien, Latner, Ebner, & Hunter, 2013). Understanding the degree to which one cares about how they are outwardly perceived by the public, or how heavily they weight the physical appearance of others, may aid in understanding how he or she chooses people (i.e., social network ties) to be seen with.

***Appreciation for Self.*** Body appreciation is a measure of an individual's acceptance, respect, and overall favor toward their own body (Tylka & Wood-Barcalow, 2015). The literature suggests that individuals high in body appreciation are less susceptible to negative social expectations regarding weight status and protected against deleterious mental effects related to the thin ideal (Halliwell, 2013). Thus, it is reasonable to propose that individuals high in body appreciation may choose social network ties independently of their weight status and thus may not discriminate based on weight status in the selection of their social network ties.

Self-esteem may serve as an additional measure of appreciation for self that impacts social network creation and stigmatizing attitudes. An adolescent study regarding bullies and bully victims found that children who either were bullied, acted as the bully, or a combination thereof, showed lower self-esteem levels than children who never experienced being a bully nor were a recipient of bullying (O'Moore & Kirkham, 2001). Being bullied may parallel experiences of weight stigma or discrimination, and the bully role may parallel being the perpetrator of weight stigmatization. In this case, weight stigmatization may perhaps be manifested through overweight or obese individuals with low self-esteem purposely *not* choosing similar-looking individuals as their social network ties (O'Moore & Kirkham, 2001). Thus, the research on self-esteem and negative social behaviors may be worth examining further to establish a stronger connection and determine a potential directionality to this proposed self-esteem – behavioral action association.

***Other Individual Factors.*** It has additionally been proposed that certain displays of personality traits may contribute to weight statuses, stigmatizing attitudes, and actions that may be relevant to the current research. For example, it has been shown that individuals high in trait “Extraversion” may be increasingly susceptible to obesity, and, more specifically, 2-year weight

gain, due to the potential for more engagement in social activities that are associated with poor health behaviors that lead to weight gain (e.g., binge drinking; Magee & Heaven, 2011). Traits “Agreeableness” and “Extraversion” may serve as predictors for the degree of acceptance one may exhibit when interacting with stigmatized individual (Canu, Newman, Morrow, & Pope, 2008). Thus, it may be important to analyze personality traits to develop more fully the evidence surrounding individual characteristics and social network behaviors.

The present research seeks to expand these existing concepts, some discovered primarily amongst adolescents, to the lives of overweight and obese adults. Further, some cases of homophily previously described, with overweight adolescents and African American elders, are centered on two marginalized groups (Flatt et al., 2012; Ramirez & Milan, 2016). A realm for potential research lies in the generalizability of homophily findings to the greater United States population and beyond. A crucial step towards understanding the reasoning underlying homophilous behaviors, and whether they are enacted in social groups, lies within understanding the potential mechanisms when a social tie is decided upon and formed.

## **The Present Study: Research Questions and Hypotheses**

### ***The Present Study***

Although there is a well-established link between social connections and positive health benefits, how social connections form and function is not as well-understood or agreed upon in the context of the overweight and obese community. In addition, homophily is a relevant construct for social networks and focusing on its presence, or absence, among particular populations of individuals may inform future health interventions. Although homophily is

assumed to be largely driven by motivational factors (e.g., desiring to be around similar others to reduce stigma), there is little research on this topic and almost none in the context of weight status. As such, there is a growing need for understanding the underlying mechanisms that drive these processes as an interconnected unit.

There is a gap in the literature regarding the dynamics between social ties and homophily in individuals who are overweight and obese. This is important to expand upon due to the growing, yet increasingly stigmatized, overweight and obese population. With greater understanding of social network formation among these higher-weight individuals, future interventions regarding weight stigma reduction and health behavior change may decrease poor health outcomes in this population and also may decrease negative societal attitudes regarding being overweight or obese.

The present research attempted to determine if overweight/obese individuals may exhibit self-segregation or positive social supporting behaviors. This research aimed to elucidate the potential mechanisms underlying the potential marginalization of individuals with overweight and obesity by other higher-weight individuals and to understand how such mechanisms may be related to the development of their social ties. Further, this research sought to understand the role that weight stigma and other underlying mechanisms may play in self-segregation, as well as began to examine how perceptions (e.g., anti-fat attitudes, fat phobia, internalized weight bias, etc.) and behaviors may have implications for health outcomes (e.g., adoption of health behaviors, reduction of chronic disease, etc.).

### ***Research Questions and Hypotheses***

The primary endpoint of this research was to understand factors (e.g., anti-fat attitudes, internalized weight bias, etc.) that may influence people with overweight or obesity to stigmatize

other higher-weight individuals, and to determine whether these factors may be involved in the formation of social ties among this population. Hypotheses 2-4 were examined across 3 different types of social networks to examine if there are differences in the mechanisms at play in one's spouse/partner relationship, versus one's four closest network ties that are *not* their spouse or partner, versus the network comprised of the spouse/partner and the four general, closest network ties. The breakdown of these three social networks was important to the present research due to the crucial differences in the way that the spouse/partner relationship may have been formed, when compared to a simple social relationship, not bound by confines of marriage or an intimate relationship. Divergence on the variables across these three social networks may suggest that homophily is impacted differently depending on the nature of the relationship, whether it be romantic/intimate/legal such as a marriage or romantic partnership, or a relationship formed otherwise.

***Hypothesis 1.*** It was hypothesized that weight status is positively associated with the weight status of one's social network ties, as measured by the relative homophily score (De La Haye et al., 2011; D. R. Schaefer & Simpkins, 2014).

***Hypothesis 2.*** Increased explicit weight biases (i.e., anti-fat attitudes, fat phobia), implicit weight biases (i.e., internalized weight bias), and physical appearance comparisons (i.e., outward physical appearance, sociocultural attitudes toward appearance) may predict a lower weight status of one's close social ties and low homophily, or a large difference, in the weight statuses of the social network.

***Hypothesis 3.*** Increased appreciation for self (i.e., body appreciation, self-esteem) may predict a higher weight status of the social network ties and a greater degree of homophily, or a smaller difference, in the weight status of the social network.

*Hypothesis 4.* Increased weight status of self was predicted to be positively associated with “Extraversion,” such that individuals higher in this personality trait may thus also be of higher weight themselves. Increased homophily was predicted to be associated with “Openness to Experience” and “Agreeableness.”

## **Chapter 2**

### **Methods**

#### **Overview**

#### **Amazon Mechanical Turk**

This research utilized Amazon’s Mechanical Turk (MTurk) platform for participant recruitment and data collection. Amazon Mechanical Turk is an online crowdsourcing platform, the purpose of which is to help people find paid research study opportunities via a web-based survey. MTurk is hosted by the Amazon.com Web Services platform. MTurk enables researchers to recruit participants to complete study tasks such as filling out surveys, de-coding data, completing cognitive psychosocial studies, and many others. Participants from around the world have dedicated MTurk profiles that contain their demographic information such as age, gender, income, and other personal measures. Researchers can indicate specific inclusion and exclusion criteria for their MTurk study, advertise the study on MTurk, and participants are able to choose to participate in studies that interest them. However, participants can only access studies for which they meet verified inclusion/exclusion criteria. These tasks are displayed to MTurkers as “Human Intelligence Tasks,” or HITs. In MTurk, researchers can also indicate their desired sample size for the study and provide Amazon directly with a payment for all



participants' compensations. Once the desired sample size is reached on the MTurk platform, the study will automatically disappear from the dashboards of eligible users. Once participants have completed the tasks within each HIT, they are compensated; payment is securely transferred directly to the participants' preferred/indicated financial account immediately after the completion of a study via Amazon.

Recently, the MTurk platform and its crowdsourcing capabilities have been utilized to collect high-quality data for behavioral and social science research. MTurk's collectively large participant base of over one hundred thousand participants in total and as many as two thousand workers engaged at one time, allows for extremely rapid data collection of high quality (Casler, Bickel, & Hackett, 2013; Difallah, Filatova, & Ipeirotis, 2018). This quality can be ensured via internal attention checks embedded in the survey or MTurk task (e.g., careless responder questions). Further, this substantive participant base, composed of workers worldwide, provides significant diversity that can be used for representative data collection (albeit at the "cost" of some selection biases as to who elects to become an MTurk worker). Lastly, collecting behavioral social science data, which typically is a time-intensive task that requires in-person, human effort, can be swiftly and reliably gathered electronically via MTurk without sacrificing data quality (Casler et al., 2013).

Historically, much behavioral, psychological, and social research has been conducted among populations of undergraduate students, whose attentiveness and quality of data can sometimes be of questionable quality (Hauser & Schwarz, 2016). Many currently have the same notion for research conducted by MTurk workers, as researchers are unable to ensure quality in-person. However, substantive experimental research has been conducted to elucidate reliability of MTurk data and ensure that MTurk workers are completing tasks as effectively as in-person

participants would, if not more effectively. Psychology researchers Hauser and Schwarz (2016) specifically compared MTurk workers with undergraduate survey-takers through a web-based survey that evaluated the two groups' specific focus to the surveys' instructions. Results showed that MTurk workers showed superior attention to instructions, better response times when instructions were manipulated, and quicker survey responses as a whole, while still maintaining answer accuracy (Hauser & Schwarz, 2016). Thus, Amazon's MTurk survey platform presents an opportunity for high-quality, diverse behavioral and social science research, with promise for rapid data collection and attentive, representative data.

Of the MTurk worker pool, this research only recruited individuals who qualify as "MTurk Masters." A Masters qualification on MTurk signifies that a worker is at the top of the participant pool for high-quality data given and tasks accomplished. Masters are given this distinction from their employer, the Amazon platform, as a result of the aggregate data gathered from their previous completed HITs and approval rates given to them from those previous HIT administrators. To gain this distinction, and to keep it, MTurkers must reliably produce data of superb quality. Also, workers with Masters Qualifications have typically been MTurk employers for a longer time and have completed a wide range of electronic tasks on the platform, making them more skilled and more reliable sources of data for researchers (MTurk "FAQs," 2018). Thus, although the present MTurk study utilizes cross-sectional, online self-report data collection, the MTurk Masters qualification for all of the study participants enhances confidence regarding data quality.

## **The Present MTurk Study**

Data were collected through the administration of a questionnaire via Qualtrics administered through the Amazon MTurk platform. On MTurk, eligible participants were able to locate and engage with the HIT specific to this survey. When participants chose our HIT entitled “The Self-Perception, Friendship, and Weight Status Study,” on their dashboard, Amazon redirected them to the study survey that was hosted in Penn State Qualtrics. Within this Penn State Qualtrics survey, participants were screened for additional eligibility criteria, presented with the informed consent, and (once consented) directed to complete the questionnaire, which included both demographics and psychosocial measures. The entire survey (109-items in total) took about 12-15 minutes to complete.

After completion, Qualtrics provided a one-time completion code that participants copied and inserted back into the MTurk platform in their web browser to document their completion in the study and to cue their compensation. No participant identifiers were retained for the purpose of this research. To ensure that participants were carefully and thoughtfully completing the survey, a single careless responder question was embedded in the questionnaire content (e.g., “Which of the following words is in the same category as “apple”?”; see Appendix K).

## **Participants**

### **Sample Size and Compensation**

The sample size for this research was determined based on prior studies on social network and weight stigma. Although some (e.g., epidemiological) social network research has been completed with census-level data with populations in the thousands, the current research,

and most research investigating specific social network ties, has used smaller sample sizes but more closely analyzed relationships within particular communities (Centola, 2011; Marsden, 1987; D. R. Schaefer & Simpkins, 2014). Social network research has typically been done in close-knit settings among small communities (i.e. schools, workplaces), with relatively small sample sizes. As this research is based in the theories of social network research and was done in the context of weight stigma among a specific population, the sample size sought to mimic that of similar previous social network-specific research but to expand slightly to facilitate statistical power and perhaps enhance generalizability to the larger overweight and obese population in the United States. Therefore, the current study recruited 150 participants to complete a short, ~15-minute web-based survey on the Amazon MTurk platform. Participants who were eligible for and willing to fully complete the survey on MTurk were compensated \$3.00 for their time after completing the online questionnaire and submitting a completion code for proof.

### **Participants and Eligibility Criteria**

In order to be eligible to participate in the study, participants had to be 18 years of age, be fluent in the English language, have a body mass index (BMI; based on reported height/weight) greater than or equal to 25, and must have reported not having been previously diagnosed with a mental illness for which they have been hospitalized within the last 3 months prior to completing the survey. Additionally, individuals were required to be confirmed and registered as an “MTurk Worker,” qualify as an “MTurk Master,” and be in good standing with Amazon’s Mechanical Turk survey recruitment service.

BMI inclusion criteria calculations took place within the Qualtrics survey platform after participants clicked on the HIT in MTurk and were redirected to Penn State Qualtrics. Before the

informed consent, participants were asked initial screening questions about their height and weight, and embedded code in Qualtrics calculated their BMI based on those reported data at that point. Participants with  $BMI < 25$  were redirected out of the survey and did not receive a completion code. Participants with  $BMI \geq 25$  were allowed to proceed to the next step of the study. Participants were required to agree to the informed consent after being screened for BMI and before proceeding to the demographics and other study questions. Any participants who were no longer interested in participating in the study after reading the informed consent were given the opportunity to indicate that and were redirected out of the survey platform.

## **Measures**

### **Demographics**

Demographic variables collected from the web-based survey included biological sex, age, race, Hispanic or Latino origin, education level, current household income, and eating disorder history (See Appendix A). All survey questions were answered using either Likert-scales, multiple choice, or free-response text-entry.

The BMI calculated by embedded Qualtrics code for screening purposes was utilized to interpret the results and remove outliers.

Individuals indicated their race by choosing from one of the following categories: White; Black or African American; American Indian or Alaska Native; Asian; and Native Hawaiian or Pacific Islander. Due to insufficient distribution, these values were recoded into white, and non-white individuals; white individuals served as the reference group for all others, as there was

unfortunately not a sufficient distribution of other races for meaningful data analysis by each racial/ethnic subgroup.

The Household Income variable, originally coded into 6 increments, was re-coded into 5 different categories to ensure sufficient representation of each category for the purpose of data analysis. Options indicating \$20,000/year or less were re-coded into the same variable (e.g., “Less than \$10,000”; “\$10,000 to \$20,000”) to provide adequate cell size. The option indicating between \$20,000 and \$40,000 was kept as one unique value (e.g., “\$20,000 to \$40,000”). The option indicating between \$40,000 and \$60,000 was kept as one unique value (e.g., “\$40,000 to \$60,000”). The option indicating between \$60,000 and \$100,000 was kept as one unique value (e.g., “\$60,000 to \$100,000”), and the option indicating greater than \$100,000/year was also kept as its own value (e.g., “\$100,000 and above”). Individuals who preferred not to disclose the Household Income measure were removed from the data for the income variable, leaving a sample of 147 individuals for this measure.

Individuals indicated their highest level of education by choosing one of the following categories: Some high school, no diploma; High school graduate or equivalent; Trade/technical/vocational school; Some college, no degree; Associate’s degree; Bachelor’s degree; Master’s or Professional degree; or Doctorate degree. The education variable was also recoded into three distinct categories for the purpose of interpreting results and obtaining adequate cell sizes for analysis. Options indicating a high school education level or less were transformed into the same variable (i.e., “Some high school, no diploma”; “High school graduate or equivalent” were combined to completed high school or less). Options indicating more education than high school, but less than a Bachelor’s degree were transformed into the same variable (i.e., “Trade/technical/vocational school”; “Some college, no degree”; “Associate’s

degree” were combined to some college). Lastly, all options indicating a Bachelor’s degree or greater were transformed into the same variable (i.e., “Bachelor’s degree”; Master’s or Professional degree”; “Doctorate degree” were combined to indicate 4-year college degree or above).

### **Homophily, Self-Body Image Perception, and the Perception of Social Network Ties’ Body Image**

*Self-Perceived Body Image.* Participants were presented an image showing range of body types and were asked to indicate which body they believe most closely represented their own. The BMI-Based Body Size Guide for Women and Men was used to assess body image (Harris et al., 2008). Participants were shown ten bodies on a continuum of weights and body types ranging from A (underweight) to J (Class III obese). These responses were coded such that the minimum BMI of Self value was 1, and the maximum BMI of Self value was 10 (See Appendix B).

*Body Image Perception of Social Network Ties.* Marsden’s (1987) General Social Survey was used to gather information about individuals’ social network ties. This survey first gathered information about the respondent’s closest social network ties and then asked about the overall positive/negative nature of the relationship, as well as the role of that social tie in the life of the respondent (e.g., best friend, pastor, etc.).

Participants were asked to think about their current or most recent spouse or partner. After prompted to mentally identify this person, the participant was asked to indicate their sex and to choose a body image that was most representative of that person, from a range of body types in the BMI-Based Body Size Guide for Women and Men (Harris et al., 2008).

Next, the participant was asked to identify the four most important people in their lives, aside from their spouse or partner, which they voluntarily have chosen to have a relationship with. These may be people with whom the participant has discussed important matters, has a close connection, etc. After prompted to mentally identify these four people, the participant was asked to indicate the sex of each person (denoted Person 1, Person 2, Person 3, and Person 4) and choose a body image that was most representative of each person, from a range of body types in the BMI-Based Body Size Guide for Women and Men (Harris et al., 2008).

***Degree of Homophily.*** The degree of homophily in each social network tie and in the social network as a whole was measured by comparing the self-perceived body image value to the reported body image values of the social network ties. The weight status of one's social ties (i.e. the tie with similar others) when compared to the weight status of the self was used as the measure of the degree of homophily within that social network. Three social network groupings were used and analyzed for the homophily scores, and two homophily scores were created for each of the networks described: Mean of the Raw Differences Score (Homophily Score 1) and a Mean of the Absolute Value of the Differences Score (Homophily Score 2;  $r = -.816$ ,  $p < .001$ ).

Two homophily scores were calculated for the purpose of this research so that the directional difference (i.e., Homophily Score 1; relative homophily) in the weight statuses of the individual and the members of their social networks could be distinguished from the general degree of difference (Homophily Score 2; absolute homophily) in weight status of the social network as a whole. Homophily Score 1 describes the relative weight status difference in the social network. In other words, the relative homophily score (Homophily Score 1) relays information regarding whether an individual's social network ties are of higher or lower weight status than themselves, on average. Homophily Score 2 describes the absolute, or general, weight



status difference in the social network as a whole. In other words, the absolute homophily score (Homophily Score 2) is a value that simply describes the degree of difference in the weight statuses of the social network members, and it does not have directionality.

**Homophily Score 1.** This score was calculated by individually subtracting the Self-Perceived Body Image Value from the body image value of each social network tie and taking the mean of those differences. The minimum possible value was -9, and the maximum possible value was 9. A calculated score of 0 for this measure indicated the greatest degree of homophily in the network, as there was no overall difference between BMIs of the social network. Homophily Score 1 provided directionality to the differences in BMI perception among a social network, with higher values indicating that the social network had, on average, a higher BMI than the participant, and lower values indicating that the social network had, on average, a lower BMI than the participant. Homophily Score 1 will also be referred to as “relative homophily”.

**Homophily Score 2.** This score was calculated by individually subtracting the BMI of Self Value from the BMI of each social network tie and taking the average of the absolute value of those differences. Homophily Score 2, which used the absolute value of BMI differences, was a non-directional measure of homophily. Values simply indicated the degree of difference in the social network. The minimum possible value was 0, and the maximum possible value was 9. A higher score here indicated a larger degree of heterogeneity in regard to weight status in the social network. Smaller values for this score indicated a greater degree of homogeneity, or homophily, in the social network. Homophily Score 2 will also be referred to as “absolute homophily”.

**Social Networks.** Social Network A was defined as the social network comprised of the individual participant and their current or most recent spouse or partner. Social Network B was defined as the social network comprised of the individual's four closest social ties, not including the spouse/partner. Social Network C was defined as the social network comprised of every network tie that the participant reported, including spouse/partner and the four most important social network ties. Statistical analyses were conducted across each of these three social networks and incorporated into the study's hypotheses to understand if there were differences in homophilous behaviors across different types of network connections.

## **Mechanisms of Weight Bias**

### *Explicit Stigmatizing Attitudes*

**Anti-Fat Attitudes.** The 13-item Anti-Fat Attitudes Questionnaire (AFAQ) was a measure of participants' external weight biases (Crandall, 1994). Items on the scale ranged from Very strongly disagree (1) to Very strongly agree (9), with a higher scale rating corresponding to greater anti-fat attitudes (e.g., "If I were an employer looking to higher, I might avoid hiring a fat person"). An Anti-Fat Attitudes score was calculated by adding the values from each of the 13 items (scores thus ranging from 13 to 117). (See Appendix C.)

**Fat Phobia.** The 14-item Fat Phobia Scale – Short Form was utilized as an additional measure of participants' external weight bias (Bacon et al., 2001). Items on this scale ranged from 1 to 5 with higher values indicating more feelings of fat phobia. This measure was anchored by opposing pairs of adjectives sometimes used to describe people with overweight or obesity (e.g., Lazy [1] to Industrious [5]). Items 1, 2, 8, 9, 11, 13, and 14 were reverse-scored, to

continue with the principle of higher values indicating more fat phobia. A total Fat Phobia score was calculated by adding responses from each of the 14 items in the questionnaire and dividing by 14. The possible range for the Fat Phobia Score was 1 to 5 (Bacon et al., 2001). (See Appendix D.)

### *Attitudes toward Outward Physical Appearance*

**Physical Appearance Comparison.** The Physical Appearance Comparison Scale – Revised (PACS-R) was used to measure the degree to which individuals care about their external physical appearance in the context of other individuals (L. M. Schaefer & Thompson, 2014). The PACS-R is a 5-item measure of the degree to which one compares their physical appearance to individuals around himself/herself (e.g., “When I’m out in public, I compare my physical appearance to the appearance of others”). Items in the PACS-R ranged from Never (0) to Always (4), with higher values indicating more physical appearance comparisons. An overall Physical Appearance Comparison score was calculated by averaging responses to each of the 5 items (scores thus ranging from 0 to 4; L. M. Schaefer & Thompson, 2014). (See Appendix E.)

**Sociocultural Attitudes toward Appearance.** This research used a modified version of the SATAQ-4 (SATAQ-4-M) to specifically gather attitudes on “thin,” “better,” or “little fat” appearances that individuals may desire (L. M. Schaefer et al., 2015). Thus, only items that explicitly mentioned those three terms were chosen (e.g., “I think a lot about looking thin”). This modified measure was a 10-item scale with answer choices ranging from Definitely Disagree (1) to Definitely Agree (5). Higher values indicated more individual importance of appearance in a societal context. A Sociocultural Attitudes Toward Appearance score was

calculated by adding the values for each of the ten items, with a possible range from 10 to 50 (L. M. Schaefer et al., 2015). (See Appendix F.)

### *Implicit Stigmatizing Attitudes*

**Internalized Weight Bias.** A modified 11-item Weight Bias Internalization Scale (WBIS-M) was utilized to measure of participants' internal anti-fat beliefs and implicit biases (Durso & Latner, 2008; Pearl & Puhl, 2014). Items on this scale ranged from Strongly Disagree (1) to Strongly Agree (7), with higher values indicating greater internalized weight bias (e.g., "I am less attractive than most other people because of my weight"). A total Internalized Weight Bias score was calculated by summing responses from each of the 11 items in the questionnaire, with a possible range of 11 to 77 (Durso & Latner, 2008; Pearl & Puhl, 2014). (See Appendix G.)

### *Appreciation of Self*

**Self-Esteem.** The Rosenberg Self-Esteem Scale was utilized as a measure of participants' appreciation for self that may buffer stigmatizing attitudes (Rosenberg, 1965). This was a 10-item scale with answer choices ranging from Strongly Agree (4) to Strongly Disagree (1); however items 2, 5, 6, 8, and 9 were reverse scored, such that higher values were always indicative of greater self-esteem (e.g., "I feel that I have a number of good qualities"). A Self-Esteem score was calculated by adding the scores from each of the ten recoded answer choices (scores thus potentially ranging from 10 to 40; Rosenberg, 1965). (See Appendix H.)

**Body Appreciation.** Body Appreciation was used to assess acceptance, respect, and overall favor towards one's own body (Tylka & Wood-Barcalow, 2015). It was a 10-item

questionnaire with answer choices ranging from Never (1) to Always (5), with higher values indicating greater body appreciation (e.g., “I respect my body”). The Body Appreciation score was calculated by averaging participants’ responses for each of the ten items, thus the potential range was 1 to 5 (Tylka & Wood-Barcalow, 2015). (See Appendix I.)

### *Individual Characteristics*

**Assessment of Personality Traits.** The Big Five Personality Inventory-10 (BFI-10) was used to collect and measure personality traits of individuals (Rammstedt & John, 2007). It is a 10-item questionnaire with answers ranging from Disagree strongly (1) to Agree strongly (5). Items 1, 3, 4, 5, and 7 are reverse-scored. Higher scores for each item indicated more presence of that personality trait in an individual. Items 1 and 6 were indicative of the personality trait “Extraversion” (e.g., “I see myself as someone who is reserved”). Thus, an Extraversion score was calculated by summing items 1 and 5. Items 2 and 7 were indicative of the personality trait “Agreeableness” (e.g., I see myself as someone who is generally trusting”). Thus, an Agreeableness score was calculated by summing items 2 and 7. Items 3 and 8 indicated “Conscientiousness” (e.g., “I see myself as someone who does a thorough job”). Thus, a Conscientiousness score was calculated by summing items 3 and 8. Items 4 and 9 indicated “Neuroticism” (e.g., “I see myself as someone who gets nervous easily”). Thus, a Neuroticism score was calculated by summing items 4 and 9. Lastly, items 5 and 10 indicated “Openness to Experience” (e.g., “I see myself as someone who has an active imagination”). Thus, an Openness to Experience score was calculated by summing items 5 and 10. Each personality domain thus had a possible range from 2 to 10 (Rammstedt & John, 2007). (See Appendix J.)

## Data Analysis

### Statistical Analysis

Descriptive statistics were used to calculate the means and standard deviations for age, BMI of Self, the average BMI of social network ties, Homophily score 1, Homophily score 2, anti-fat attitudes, fat phobia, physical appearance comparisons, sociocultural attitudes toward appearance, internalized weight bias, self-esteem, body appreciation, and individual personality traits. Frequencies were calculated for sex at birth, race, ethnicity, education level, household income, and eating disorder history. Hypotheses 1-4 were tested using correlation tests. A p-value less than or equal to 0.05 is used for a threshold for statistical significance.

## Chapter 3

### Results

#### Demographic Information

The final sample (n=149) was 61.1% male, with a mean age of 40.64 years (SD = 10.034; Table 1). 8 individuals identified as being of Hispanic, Latino, or Spanish origin. Before the Race variable recode, the descriptive statistics showed that out of the 144 individuals who disclosed their race, 90.3% of participants were White, 4.9 % were Black or African American, 0.7% were American Indian or Alaska Native, and 4.2% were Native Hawaiian or Pacific Islander. 72% of the sample had received a Bachelor's degree or greater, 55% of the sample had graduated high school but not received a Bachelor's degree, and 22% of the sample had a high school education or less. Of the 147 individuals who disclosed their annual household income, 11.6% of the sample had an income less than \$20,000, 32% of the sample had an income

between \$20,000 and \$40,000, 24.5% of the sample had an income between \$40,000 and \$60,000, 21.1% of the sample had an income between \$60,000 and \$100,000, and 10.9% of the sample had an income greater than \$100,000. The average BMI of the individuals was 31.34 (SD = 6.39). Of 148 individuals who chose to disclose eating disorder history, or lack thereof, 1.35% of the sample reported having been diagnosed with an eating disorder in their lifetime.

**Table 1. Sample Characteristics**

	<b>Frequency or Mean</b>	<b>Percent or Standard Deviation</b>
<b>Sex</b>		
Male	91	61.1
Female	58	38.9
<b>Ethnicity</b>		
Hispanic or Latino	8	5.3
Not Hispanic or Latino	141	94.6
<b>Race</b>		
White	130	87.2
Black or African American	7	4.7
American Indian or Alaskan Native	1	0.7
Native Hawaiian or Pacific Islander	6	4.0
Asian	0	0
Other	0	0
Missing	5	3.3
<b>Education</b>		
High school or less	22	14.8
Graduated high school, but no Bachelor's degree	55	36.9
Bachelor's degree or greater	72	48.3
<b>Annual Household Income</b>		
Less than \$20,000	17	11.4
\$20,000-\$40,000	47	31.5
\$40,000-\$60,000	36	24.2
\$60,000-\$100,000	31	20.8
\$100,000 and above	16	10.7
Missing	2	1.3
<b>Eating Disorder History</b>		
No	146	97.9
Yes	2	1.3
Missing	1	0.67
<b>Age</b>	40.64	10.03
<b>BMI</b>	31.34	6.39



## Data Screening

Preliminary analyses of the data were intended to detect outliers, defined as values 3 or more standard deviations from the mean. The only outlier found in the present data was an outlier of the BMI data at 70 (i.e., about 6 standard deviations above the mean), which was thus eliminated, under the assumption that their results in other areas may be skewed as well. Therefore, all data analyses were completed using a sample of 149 individuals, unless specified otherwise.

## Bivariate Correlations and Descriptive Statistics

**Table 2.** *Potential Mechanisms of Weight Bias Descriptive Statistics*

<b>Variable</b>	<b>Mean</b>	<b>Standard Deviation</b>
Anti-Fat Attitudes (AFA)	53.48	18.28
Fat Phobia	3.39	.810
Internalized Weight Bias (WBIS)	41.45	16.25
Sociocultural Attitudes toward Appearance (SATAQ)	26.83	9.06
Physical Appearance Comparison (PACS)	1.74	1.16
Self-Esteem	28.88	8.07
Body Appreciation	3.06	.963
Extraversion	4.97	2.45
Agreeableness	6.95	2.22
Conscientiousness	8.04	1.96
Neuroticism	5.29	2.67
Openness to Experience	7.69	2.12

*Note: N=149*

**Hypothesis 1.** It was hypothesized that an individual's own perceived weight status would be positively associated with the weight status of their social network ties, such that individuals of higher weight would be more likely to have social network ties that were also of higher weight. This directionality of weight status difference is measured using Homophily Score 1, the relative homophily score. Table 3 displays the descriptive statistics and bivariate

correlations for the relationship between BMI of Self and the relative weight status homophily (Homophily Score 1) of each social network.

**Social Network A.** Social Network A includes the individual participant and their current/most recent partner or spouse. Self-Perceived BMI was negatively associated with Homophily Score 1 ( $r=-.506, p<.001$ ).

**Social Network B.** Social Network B includes the individual participant and their four closest social network ties, excluding their current spouse or partner. Self-Perceived BMI was negatively associated with Homophily Score 1 ( $r=-.813, p<.001$ ).

**Social Network C.** Social Network C includes the individual participant, their four closest social network ties, and their current or most recent spouse or partner. Self-Perceived BMI was negatively associated with Homophily Score 1 ( $r=-.814, p<.001$ ).

**Table 3.** *Hypothesis 1 - Bivariate Correlations Among Self-Perceived BMI and Relative Homophily*

	1	2	3	4
1. Self-Perceived BMI	-			
2. Social Network A (Homophily Score 1)	-.506*	-		
3. Social Network B (Homophily Score 1)	-.813*	.532*	-	
4. Social Network C (Homophily Score 1)	-.814*	.693*	.979*	-

*Note: N= 149; \*p<.001*

**Hypothesis 2.** It was hypothesized that increased explicit weight biases (i.e., anti-fat attitudes, fat phobia), implicit weight biases (i.e., internalized weight bias), and measures of physical appearance comparisons (i.e., outward physical appearance, sociocultural attitudes toward appearance) would predict a lower weight status of one's closest social ties and a low degree of homophily in the social network, and that these findings may differ across Social

Networks A, B, and C. Tables 4-6 display the bivariate correlations between the implicit and explicit weight bias measures as well as physical appearance comparison measures versus Homophily Score 1 (relative homophily) and Homophily Score 2 (absolute homophily) for each social network.

**Social Network A.** There was a statistically significant negative relationship between Anti-Fat Attitudes (AFA) and the Homophily Score 2 (absolute homophily score) in Social Network A ( $r=.194, p=.018$ ). There was a statistically significant negative relationship between Internalized Weight Bias (WBIS) and relative homophily in the Social Network A relationship ( $r=-.300, p<.001$ ). There was a statistically significant positive relationship between WBIS and Homophily Score 2 (absolute homophily) in the Social Network A relationship ( $r=.323, p<.001$ ) (Table 4). There was a statistically significant negative relationship between Sociocultural Attitudes toward Appearance (SATAQ) and relative homophily in the Social Network A relationship ( $r=-.230, p=.005$ ). There was a statistically significant positive relationship between SATAQ and the absolute homophily score ( $r=.197, p=.016$ ).

**Table 4.** *Hypothesis 2 - Bivariate Correlations of Social Network A*

	Homophily Score 1	Homophily Score 2
AFA	-.133	.194*
Fat Phobia	-.060	.126
WBIS	-.300***	.323**
SATAQ	-.230**	.197*
PACS	-.133	.104

*Note:*  $N=149$ ; \* $p<.05$ ; \*\* $p<.01$ ; \*\*\* $p<.001$

**Social Network B.** There was a statistically significant negative relationship between Anti-Fat Attitudes (AFA) and the relative homophily score ( $r=-.203, p=.013$ ) (Table 5). There was a statistically significant negative relationship between Fat Phobia and the relative

homophily score ( $r=-.215, p=.008$ ). There was a statistically significant positive relationship between Fat Phobia and the absolute homophily score ( $r=.244, p=.003$ ). There were statistically significant relationships between WBIS and both the relative and absolute homophily scores. Individuals with higher WBIS were more likely, on average, to report lower BMIs of their social network ties ( $r=-.533, p<.001$ ) and have a greater absolute difference in the overall weight status of themselves in comparison to their social network ties ( $r=.478, p<.001$ ). SATAQ were also significantly associated with both relative and absolute homophily scores, such that higher SATAQ indicated a lower weight status of the social network ties ( $r=-.325, p<.001$ ) and a greater difference in the social network weight statuses as a whole ( $r=.356, p<.001$ ). Physical Appearance Comparisons (PACS) were significantly associated with both relative and absolute homophily scores, such that higher PACS indicated a lower weight status of the social network ties ( $r=-.206, p=.012$ ) and a greater difference, or smaller degree of homophily, between the weight statuses of the social network ties and the reference individual ( $r=.282, p<.001$ ).

**Table 5.** Hypothesis 2 - Bivariate Correlations of Social Network B

	Homophily Score 1	Homophily Score 2
AFA	-.203*	.126
Fat Phobia	-.215**	.244**
WBIS	-.533***	.478***
SATAQ	-.325***	.356***
PACS	-.206*	.282***

Note:  $N=149$ ; \* $p<.05$ ; \*\* $p<.01$ ; \*\*\* $p<.001$

**Social Network C.** Every measure of explicit weight bias, implicit weight bias, and physical appearance comparison in the social network comprised of each social network tie as well as spouse/partner was significantly associated with either relative homophily, absolute homophily, or both. AFA were negatively associated with relative homophily ( $r= -.205, p=.012$ )

(Table 6). Fat Phobia was significantly negatively associated with the relative homophily score ( $r=-.197, p=.016$ ) and positively associated with the absolute homophily score of the entire social network ( $r=.220, p=.007$ ). WBIS was significantly negatively associated with the relative homophily score of the social network as a whole ( $r=-.526, p<.001$ ) and positively associated with the network's absolute homophily score ( $r=.448, p<.001$ ). SATAQ was significantly negatively associated with the relative homophily score of the social network as a whole ( $r=-.332, p<.001$ ) and positively associated with the network's absolute homophily score ( $r=.330, p<.001$ ). PACS was significantly negatively associated with the relative homophily score of the social network as a whole ( $r=-.207, p=.011$ ) and positively associated with the network's absolute homophily score ( $r=.258, p=.001$ ).

**Table 6.** Hypothesis 2 - Bivariate Correlations of Social Network C

	Homophily Score 1	Homophily Score 2
AFA	-.205*	.145
Fat Phobia	-.197*	.220**
WBIS	-.526***	.448***
SATAQ	-.332***	.330***
PACS	-.207*	.258**

Note:  $N=149$ ; \* $p<.05$ ; \*\* $p<.01$ ; \*\*\* $p<.001$

**Hypothesis 3.** It was hypothesized that increased appreciation for self (i.e., body appreciation, self-esteem) would predict a higher weight status of the social network ties and a greater degree of homophily in the social network. Tables 7-9 display the descriptive statistics and bivariate correlations for the measures regarding the appreciation of the self.

**Social Network A.** There was a statistically significant negative relationship between Self-Esteem and the absolute homophily score in the Social Network A relationship ( $r=-.272, p=.001$ ) (Table 7). There was a statistically significant positive relationship between Body

Appreciation and the relative homophily score in the Social Network A relationship, ( $r=.272$ ,  $p=.001$ ). There was a statistically significant negative relationship between Body Appreciation and absolute homophily ( $r=-.339$ ,  $p<.001$ ).

**Table 7.** Hypothesis 3 - Bivariate Correlations of Social Network A

	Homophily Score 1	Homophily Score 2
Self-Esteem	.152	-.272***
Body Appreciation	.272**	-.339***

Note:  $N=149$ ; \* $p<.05$ ; \*\* $p<.01$ ; \*\*\* $p<.001$

**Social Network B.** Both Self-Esteem and Body Appreciation were significantly associated with both relative and absolute homophily (Table 8). Self-Esteem was positively associated with the relative homophily score ( $r=.348$ ,  $p<.001$ ). Self-Esteem was negatively associated with the absolute homophily score ( $r=-.321$ ,  $p<.001$ ). Body Appreciation was significantly positively associated with the relative homophily score ( $r=.499$ ,  $p<.001$ ). Additionally, Body Appreciation was significantly negatively associated with the absolute homophily score ( $r=-.420$ ,  $p<.001$ ).

**Table 8.** Hypothesis 3 - Bivariate Correlations of Social Network B

	Homophily Score 1	Homophily Score 2
Self-Esteem	.348***	-.321***
Body Appreciation	.499***	-.420***

Note:  $N=149$ ; \* $p<.05$ ; \*\* $p<.01$ ; \*\*\* $p<.001$

**Social Network C.** Both Self-Esteem and Body Appreciation were significantly associated with both relative and absolute homophily (Table 9). Self-Esteem was positively related to the relative homophily score ( $r=.333$ ,  $p<.001$ ) and negatively associated with the

absolute homophily score of the network ( $r=-.292, p<.001$ ). Body Appreciation was positively related to the relative homophily score ( $r=.490, p<.001$ ) and negatively associated with the absolute homophily score of the network ( $r=-.398, p<.001$ ).

**Table 9.** *Hypothesis 3 - Bivariate Correlations of Social Network C*

	Homophily Score 1	Homophily Score 2
Self-Esteem	.333***	-.292***
Body Appreciation	.490***	-.398***

*Note: N=149; \* $p<.05$ ; \*\* $p<.01$ ; \*\*\* $p<.001$*

**Hypothesis 4.** It was hypothesized that increased weight status of self would be positively associated with “Extraversion.” Increased homophily was predicted to be associated with “Openness to Experience” and “Agreeableness.”

**Self-Perceived Weight Status.** There was a statistically significant positive association between an individual’s perceived weight status (i.e., BMI of Self) and the Big Five Personality trait “Neuroticism” ( $r=.229, p=.005$ ) (Table 10).

**Table 10.** *Hypothesis 4 - Bivariate Correlations of BMI of Self*

	Self-Perceived BMI
Extraversion	-.142
Agreeableness	-.019
Conscientiousness	-.011
Neuroticism	.229**
Openness	-.088

*Note: N=149; \* $p<.05$ ; \*\* $p<.01$ ; \*\*\* $p<.001$*

**Social Network A.** There were no statistically significant associations between either of the homophily scores and the Big Five Personality Traits (Table 11).

**Table 11.** *Hypothesis 4 - Bivariate Correlations of Social Network A*

	Homophily Score 1	Homophily Score 2
Extraversion	.242	-.034
Agreeableness	.041	-.101
Conscientiousness	-.053	.025
Neuroticism	.007	.083
Openness	-.015	.054

Note:  $N=149$ ; \* $p<.05$ ; \*\* $p<.01$ ; \*\*\* $p<.001$

**Social Network B.** The personality trait “Neuroticism” was significantly associated with both the relative and absolute homophily scores. Individuals high in “Neuroticism” were more likely, on average, to perceive their social network ties as being of a lower BMI than themselves ( $r=-.219$ ,  $p=.007$ ), as well as to have a greater degree of weight status difference in the social network as a whole ( $r=.216$ ,  $p=.008$ ).

**Table 12.** *Hypothesis 4 - Bivariate Correlations of Social Network B*

	Homophily Score 1	Homophily Score 2
Extraversion	.069	-.142
Agreeableness	.012	.012
Conscientiousness	.053	-.011
Neuroticism	-.219**	.216**
Openness	.058	-.088

Note:  $N=149$ ; \* $p<.05$ ; \*\* $p<.01$ ; \*\*\* $p<.001$

**Social Network C.** The personality trait “Neuroticism” was significantly associated with both the relative and absolute homophily scores. Individuals high in “Neuroticism” were more likely, on average, to perceive their social network ties as being of a lower BMI than themselves ( $r=-.185$ ,  $p=.024$ ), as well as to have a greater degree of weight status difference in the social network as a whole ( $r=.187$ ,  $p=.023$ ).



**Table 13.** *Hypothesis 4 - Bivariate Correlations of Social Network C*

	Homophily Score 1	Homophily Score 2
Extraversion	.035	.032
Agreeableness	.020	.009
Conscientiousness	.033	.012
Neuroticism	-.185*	.187*
Openness	.046	.000

Note:  $N=149$ ; \* $p<.05$ ; \*\* $p<.01$ ; \*\*\* $p<.001$

## Chapter 4

### Discussion

The purpose of the present study was to examine the structure of social networks in individuals of higher weight (e.g., BMI>25), with the goal of understanding how such social relationships may form and be sustained – including explored mechanisms underlying friendship selection in overweight and obese individuals. Individual differences in explicit and implicit weight biases, attitudes toward outward physical appearance, appreciation for self, personality traits, and demographics were examined in the context of their various social networks to understand constructs that may be implicated in the formation of social network ties, including explicit and implicit weight biases, measures of physical appearance comparisons, self-protective measures, personality traits, and demographic characteristics.

**Hypothesis 1.** In all three social networks, it was found that the BMI of the individual was a predictor of the weight status of the social network ties. It was consistently shown that the higher the BMI of the individual, the more likely they were to report a lower perceived BMI of the social network ties, contributing to a greater difference in the social network weight status comparison as a whole. This finding was unexpected because the principle of homophily warrants that “similarity breeds connection” (Mcpherson et al., 2001). Prior research suggests that those of comparable demographics, geography, behaviors, appearances, etc. should generally gravitate together to form social networks, and that this should hold true across all types of networks, including those specifically delineated in the present research (e.g., romantic/spousal, other network ties) (Mcpherson et al., 2001).

One possible explanation of this finding is that, in the Qualtrics questionnaire, individuals were asked to share their perceptions of their social network ties prior to being prompted to disclose their own personal body perception. Research by Ramirez and Milan on adolescent females posits that the way in which an individual perceives the body of a social network tie thus impacts the way in which they perceive their own body, and that these things were positively correlated and potentially moderated by internalized weight bias (Ramirez & Milan, 2016). Perhaps for adults who are overweight and obese, the relationship found in the present research may change when accounting for internalized weight bias, as WBIS was significantly associated with homophily for Social Networks A, B and C. Future research may seek to expand upon this finding.

Although this finding showed that individuals in the sample were, on average, more likely to report lower weight status of their social network ties at higher weight status, this association differed in strength depending on the social network in which it was explored.

Interestingly, this relationship was similar between Social Networks B and C ( $r=-.813$ ;  $r=-.814$ ), but weaker for Social Network A, the partner/spouse relationship ( $r=-.506$ ). This finding raises the question – is homophily more likely in the singular partner/spouse relationship? Does love or intimacy or legality of a relationship transcend weight stigma and thus allow individuals to be more accepting of a higher weight status spouse or partner? Interestingly, research has shown that men with higher stigmatizing attitudes were both of higher BMI and less likely to be married, when compared to their counterparts with fewer attitudes of weight stigma (Himmelstein, Puhl, & Quinn, 2018). When related to the context of the present research's finding, it may be possible that those of increased BMI who *do* choose to be married or be in a close intimate relationship with a partner have fewer stigmatizing attitudes and may be less likely

to deliberately choose a partner of lower weight status than themselves. Thus, this finding may indicate that the spouse/partner relationship characterized by Social Network A does not experience weight stigma the same as a larger, less intimate social network, and may exhibit homophily in a stronger or different regard than the relationships in Social Networks B and C. This is to be explored further in the subsequent hypotheses.

**Hypothesis 2.** Many underlying stigmatizing attitudes were significantly associated with both relative and absolute homophily scores in the social networks.

**Explicit Weight Bias.** Anti-Fat Attitudes were significantly associated with the relative homophily score for both Social Network B and Social Network C, and only significantly associated with the absolute homophily score for Social Network A. Social Network A is unique in many senses because it consists of a spousal or partner relationship that may be the closest, most intimate and vulnerable relationship that an individual has. AFA are potentially the strongest indicator of explicit weight bias, and individuals may put these negative beliefs aside when it comes to the ones they love or desire most in their life. In another sense, research has shown that weight stigma may be higher in relationships where the two individuals are of similar, or “matched,” weight statuses (Collisson & Rusbasan, 2016). As it has been shown that the weight stigma between individuals of similar weight in a romantic relationship is significantly higher than the weight stigma of individuals of different weights in a romantic relationship, it makes sense that this study’s findings did not find as strong a correlation between anti-fat attitudes and weight status similarity in an individual’s spouse or partner relationship.

For Social Networks B and C, individuals of higher weight not only perceived their social network ties to be smaller in body size than themselves, but they also did not think of themselves as associating with individuals who were of similar weight status. This is in line with the

projected hypothesis but does not follow principles of homophily. Thus, AFA play a significant role in friendship selection, above and beyond the expected psychological and behavioral expectations of homophilous friendship selection. With regard to the absolute homophily score and AFA, the reasoning behind their inverse relationship may be rooted in avoidance or refusal to acknowledge one's own weight status. Thus, it is important to consider whether the reports on an individual's own weight status and the weight status of their social network ties are fully accurate, or instead if some of those reports might be an altered perception influenced by the weight of their social network ties or negative internal perceptions; this idea will be explored more fully in the context of internalized weight bias.

Perhaps individuals who are overweight or obese and also incorporate AFA into their belief systems do not want others in their external environment to think that they associate with members of the stigmatized higher-weight population. Thus, in choosing to associate with people who are *not* overweight or obese, or are simply thinner than themselves, these individuals may believe that they are reducing the perceived stigma on themselves.

Fat Phobia was significantly associated with both the relative and absolute homophily scores for Social Networks B and C, but not significantly associated with either homophily measure for Social Network A. This trend is identical to the AFA results, such that it is directly in line with the hypotheses of the study but is inconsistent with the principles of homophily. It is again important to consider the unique implications of the spousal relationship, and as such future weight stigma interventions may be tailored differently to different types of social networks and relationships (Himmelstein et al., 2018). General homophilous principles may be overridden by one's outward disapproval of members of the overweight and obese community, even if they themselves are overweight or obese. This outward disapproval, demonstrated by low

homophily, high AFA and high fat phobia, is a form of in-group devaluation and an important phenomena to understand when tailoring health promotion and behavior change implementations specific to overweight and obese individuals (Wang et al., 2004).

**Implicit Weight Bias.** Weight Bias Internalization was significantly associated with both the relative and absolute homophily scores for Social Networks B and C, and significantly associated with the relative homophily score for Social Network A. Thus, in both Social Networks B and C, individuals with high internalized weight bias were more likely, on average, to perceive their social network ties as being of a lower weight status than themselves and had a larger difference in the comparative weight statuses of the social network overall. These findings are in line with the expectations for Hypothesis 2. It is plausible to attribute this finding to the notion that one who deeply holds negative beliefs about those of higher weight status, even if they themselves are included in this group, may consciously or subconsciously choose individual social network ties who do not fulfill those negative weight status beliefs. This makes sense, insofar as these individuals may then be choosing ties who are not of higher weight status and potentially are thinner than themselves; they will consequently have low homophily in their social networks. Additional manipulation of the present data may provide insight regarding the true average weight status of an individual's social network ties. Further, it may be interesting to understand if, although these individuals are choosing those who are of a lower weight status than themselves, those social network ties are thin enough to no longer be considered overweight or obese, or if they are still considered overweight or obese, just not necessarily as overweight or obese as the given individual. Although this seems probabilistically unlikely due to population levels of overweight and obesity, future homophily research may benefit from a deeper, more finite understanding of whether these social network ties are actual

members of the normal or underweight categories, or if they are simply a lower BMI number in the overweight or obese category.

Lastly, it has been shown that individuals with a high perceived BMI exhibited increased WBIS scores when they had friends that they viewed as being of lower weight status than themselves, or that they viewed as “relatively thin” (Ramirez & Milan, 2016). It is possible that participants reported higher WBIS in the questionnaire after being prompted to think about the weight status of their social network ties, which activated their negative internal weight status feelings. The data is consistent with this, in that these individuals reported their ties as having a lower weight status of themselves. Internalized weight bias may be an individual factor that causes deviation from traditional principles of homophily.

**Outward Physical Appearance.** Sociocultural Attitudes toward Appearance were significantly associated with both the relative and absolute homophily scores of all three social networks. Thus, individuals with high societal appearance comparison ideals were, on average, more likely to report their social network ties as being thinner than themselves and had greater degrees of weight status difference in their social networks. Physical Appearance Comparisons were significantly associated with both the relative and absolute homophily scores of Social Networks B and C.

As SATAQ focuses on an individual’s comparative perceptions in regard to societal influences as a whole, and PACS aims to capture attitudes regarding more specific interpersonal contact, it makes sense that PACS may not be significant in the specific participant-spousal/partner relationship, as they may be more accepting of the weight of their spouse or partner, the one they are most vulnerable with and attached to regardless of their appearance. Prior research supports the notion that individuals of different weights in a relationship receive

more outward stigma from the world around them in regard to their relationship (Collisson, Howell, Rusbasan, & Rosenfeld, 2017). Further, as SATAQ is one of the only measures in this research that is significant for both relative and absolute homophily in Social Network A, these individuals who have low homophily in their relationships may be accepting these societal attitudes formed against themselves, and in turn may believe more strongly in the overwhelming negative attitudes of their society.

Relatedly, the Revised Physical Appearance Comparison Scale (PACS-R) used in this research has been shown to predict obesity discrimination across various realms (O'Brien et al., 2013). Simply put, individuals with high negative physical appearance comparison attitudes may feel discriminatory against members of the overweight and obese community, even if they themselves are a member of that group. Thus, those comparisons may lead to deliberate choosing of individuals who are of a lower weight status, contributing to the low levels of relative and absolute homophily seen in the present research. These results are important in the context of societal and personal ideals that may impact weight stigma and weight-based discrimination. Understanding beliefs of PACS and SATAQ and how they impact social network formation may be useful for societal-level health promotion strategies, particularly related to the “thin ideal” and negative stereotypes regarding overweight and obese individuals (Klaczynski et al., 2004).

**Hypothesis 3.** Both Self-Esteem and Body Appreciation were significantly associated with measures of homophily for each of the three social networks. Self-Esteem was significantly related to the relative homophily score for Social Network A and significantly related to both the relative and absolute homophily scores for Social Networks B and C. Body Appreciation was significantly associated with both the relative and absolute homophily scores for all three social networks.



**Self-Esteem.** For all three social networks, higher Self-Esteem scores predicted greater absolute homophily. In other words, individuals with greater Self-Esteem were more likely to have surrounded themselves with social network ties who were of similar weight status to themselves. Self-Esteem has previously been positively associated with increased self-love or self-acceptance and a refusal to hide one's body (Myers A. & Rosen J.C., 1999). As prior research supports the notion that individuals with more Self-Esteem are more likely to feel positively toward their body, this information can be extrapolated to potentially understand that these high Self-Esteem individuals are also less discriminatory of the bodies of those around them. This makes sense in the context of the present data, such that people with high self-esteem are potentially more confident in the body that they have. They perhaps choose to foster relationships with others who are similar. One step further, perhaps continuing to surround oneself with a network of similar-looking individuals may help to maintain that level of self-esteem.

**Body Appreciation.** Body Appreciation, in every social network, predicted the individuals, on average, to have social network ties of higher weight status than themselves and to have overall higher degrees of homophily in those social networks overall. In this sense, it is important to note the difference between the relative and absolute homophily scores. The relative homophily score shows that these individuals did not discriminate against weight statuses similar to their own, and even endorsed friendships with individuals who had increasingly high weight statuses. The absolute homophily score shows that these individuals, overall, surrounded themselves with network ties who were similarly overweight or obese, as opposed to wide variations in weight status of their friendships.

Body appreciation, by definition, evaluates individuals for their acceptance of, positivity directed at, and overall respect for their own body and body image (Tylka & Wood-Barcalow, 2015). Thus, similarly to self-esteem and the current homophily findings related to these two variables, an individual who appreciates their own body perhaps appreciates the bodies of those who look similar to them. Whereas some people possess negative attitudes about those who are overweight or obese, someone of this category and with a high body appreciation might increasingly favor those who are of that same body type that they appreciate. These findings regarding self-positivity both make sense and are important. Perhaps all people, regardless of their own weight status, are less discriminatory when they themselves have greater self-esteem and body appreciation. Perhaps self-esteem and body appreciation are the avenues through which weight stigma may be reduced and social acceptance may prevail, thus encouraging positivity in the overweight and obese population, which may in turn encourage healthy behaviors (e.g., exercise, healthy eating).

**Hypothesis 4.** Broadly inconsistent with expectations, the Big Five Personality traits were only weakly associated with the individuals' self-perceived BMI and homophily scores. A notable exception to this pattern was for "Neuroticism." Each of these are discussed below.

**Self-Perceived BMI.** It was anticipated that individuals high in the trait "Extraversion" may be of increased weight status, compared to individuals low in the trait "Extraversion," due to the potential increased likelihood of extraverted individuals to engage in social behaviors that may be of poor health consequences (Magee & Heaven, 2011). Instead, it was found that "Neuroticism" was significantly associated with one's perceived BMI. An initial proposed explanation for this finding was that neuroticism is associated with more negative self-appraisals, so individuals high in this trait may report themselves with more negative

characteristics in general (i.e., more overweight or obese). However, although this explanation was considered, neuroticism was not seen to significantly impact other variables, and thus the relationship between neuroticism and self-perceived BMI may not be understood through this explanation. This relationship instead may be explained by prior research, which indicates that negative or maladaptive eating behaviors (e.g., cued eating, food and body preoccupation) contributing to weight gain may be predicted by “Neuroticism” (Ellickson-Larew, Naragon-Gainey, & Watson, 2013).

**Homophily.** It was anticipated that traits “Openness to Experience” and “Agreeableness” may be predictive of increased homophily. This was expected due to the notion that perhaps individuals high in these traits may be more tolerant of those with increased weight status, and as such their social networks may contain high weight status individuals, which happen to be similar to themselves.

For Social Network A, there were no Big Five Personality traits significantly associated with the measures of homophily. For Social Networks B and C, the trait “Neuroticism” was weakly associated with both relative and absolute homophily scores. Personality has been shown to influence social appraisals, and this may impact friendship selection in the overweight and obese community (Canu et al., 2008). Neuroticism is consistently associated with anxiety and potential negative or worried emotional states. Perhaps individuals high in trait “Neuroticism” are more likely to be high in internalized weight bias, and/or low in self-esteem, and these two or three self-attributes may interact to contribute to non-homophilous social network behaviors. Future research may benefit from further examining the relationship between “Neuroticism,” internalized weight bias, and Self-Esteem to help elucidate this concept.

## Conclusion

The present research identified biopsychosocial correlates that are significantly associated with both weight status and partner/friendship selection among the population of overweight and obese individuals. In general, the principle of homophily does not seem to necessarily apply to individuals who possess increased external or internalized stigmatizing attitudes, and these individuals may be more likely to choose social network ties who of a thinner weight status than themselves. Avoidance may play a part in this relationship, which has further health implications related to decreased feelings of personal responsibility of one's weight status and thus the potential for exacerbation or continuation of weight gain in an individual – a biologically and socially relevant dilemma.

Increased appreciation and acknowledgement of the self contributed to greater homophily in this population and greater social inclusion of overweight and obese individuals. This gives hope to future health promotions that may target self-esteem and body appreciation as mechanisms to both reduce weight status of the self, promote social connection in this higher-weight group, and reduce generalized societal weight stigma. Only one personality trait (i.e., Neuroticism) was significantly associated with homophily and the weight status of the self. This is a positive finding with promising health implications, since the truly significant measures included in this research were malleable social constructs that play into stigmatizing attitudes and weight gain, not static personal attributes that are not necessarily subject to change.

Across nearly all analyses, the spouse/partner relationship of Social Network A differed from findings in Social Networks B and C. This information indicates something unique about weight stigma and deliberate selection of one's social network members. When informing future health interventions, it will be important to consider the intimate nature of the spouse/partner

relationship, as individuals may exhibit fewer discriminatory attitudes and actions when it comes to their spouse or partner.

## **Limitations**

There are several noteworthy limitations in this study. Social network research traditionally analyzes intricate relationships within a closely-connected social group (e.g., classrooms, workplaces, etc.) (Marsden, 1987). However, utilizing the MTurk method, although it allowed for rapid and diverse data collection, did not permit this research to collect detailed social network data. The method used to collect the homophily measure was not standardized, nor tested against previous social network research. Instead, the integrity of Marsden's (1987) General Social Survey social network methods were maintained as closely as possible so that this measure would be both reliable suitable for this specific study.

Additionally, this research utilized online survey methods as the means for data collection. Although the MTurk participant population is both large and diverse, there was not random selection or stratification in the present data collection, and the sample is rather homogenous in regard to the demographics of the participant population. Further, it is important to acknowledge the inherent risk in remote, online data collection, such that it is difficult to truly ensure the quality of the data provided by participants. Methods were put in place to maximize the data quality and to minimize fraudulent or hasty responses by MTurkers, for example, the "Careless Responder" question embedded in the study survey. Each participant answered this attention-checker question correctly, only MTurk Masters were invited to participate in the

survey, and individuals were only permitted to take the survey one time. Given these facets of the study design, we are more confident in the quality of the data collected.

Generally speaking, it is difficult to distinguish between a potential reporting bias and actual effects of weight status and stigmatizing attitudes on social network formation. It is possible that individuals under- or over-reported their own weight status, and that a distorted perception here may have additionally altered their perception of their social network ties. Although we are confident that the data here is both realistic and reflective of the overweight and obese population's perceptions, future research may seek to better ensure that individuals' scientifically-calculated BMI is similar to the body image that they associate with themselves, and that this is able to correlate well with their perception of the weight status of their social network ties.

### **Future Research**

The present research yielded a plethora of significant correlates of partner and friendship selection in overweight and obese individuals. It is crucial for future research to expand upon this current undergraduate thesis to gain a deeper understanding of potential factors that may interact and differentially impact both relative and absolute homophily, above and beyond the basic correlations that were found here.

Further, there were significant contrasts between measures that were significant for Social Networks B and C, but not significant for Social Network A, the spouse/partner relationship. Future research may benefit from examining this specific network tie individually

to better understand why the biopsychosocial correlates that were significant when analyses were expanded to larger social networks were no longer as relevant for the spouse/partner relationship.

Additionally, the present research contributed to the increasing evidence of the validity and merit attributed to the Amazon Mechanical Turk platform as a method of data collection. Future research may be able to increase the sample size in order to better diversify the present research utilizing the MTurk platform. This will allow more generalizable insight on the concept of homophily in social networks of overweight and obese individuals.

It is also important to acknowledge a potential meaning of non-significant findings in this research. Although they may be due to a small sample size, an inability of the proposed measures to fulfill the particular aim of the study, or lack of statistical power, non-significant findings in regard to weight stigma research may instead be an indicator of fairness, kindness, and equality. Perhaps individuals are experiencing fewer stigmatizing attitudes and thus are not consciously forming social network ties based on weight status. This phenomenon may have resulted in a wider/more variable range of homophily scores, as people may or may not care about the weight status of their social network ties and form random friendships with people of all shapes and sizes. Future research should seek to not only expand the present sample size, but also to develop a more precise, defined method of measuring the difference between homophilous or non-homophilous friendship selection and network selection that does not consider weight status as a factor at all.

The findings presented here set a precedent for a new wave of social network research on higher-weight individuals. Future research may benefit from increasing the present sample size and exploring interactional aspects of measures examined here. The current research identified initial associations between implicit and explicit weight biases, individual characteristics, and the

formation of social network ties among overweight and obese individuals. Future research may seek to tease apart these associations and consider how they interact with one another, as well consider demographic factors that may change the present relationships. A foundation has been set regarding relevant mechanistic constructs (e.g., implicit and explicit weight biases) that alter the expected homophilous behaviors of this group. In the future it will be interesting to expand upon these findings with the ultimate goal of tailoring health promotions and societal behavior change theories that reduce weight stigma and increase health outcomes in the overweight and obese populations across the United States and worldwide.



**Appendix A**  
**Demographic Questionnaire**

Please answer the following questions about yourself:

1. What is your biological sex? (SEX)
  - a. Male (0)
  - b. Female (1)
  - c. Prefer not to answer (2)
  
2. What is your age in years? *Please enter a number (e.g., 35)* (AGE\_YR)
  - a. Enter Number
  
3. What is your race? (*Select all that apply*) (RACE)
  - a. White (1)
  - b. Black (2)
  - c. American Indian or Alaskan Native (3)
  - d. Asian (4)
  - e. Native Hawaiian or Other Pacific Islander (5)
  - f. Prefer not to answer (0)
  
4. Are you of Hispanic, Latino, or Spanish origin? (HISPANIC\_LATINO)
  - a. Yes (1)
  - b. No (0)
  - c. Prefer not to answer (2)
  
5. What is your highest level of education? (EDUCATION)
  - a. Some high school, no diploma (1)
  - b. High school graduate or equivalent (e.g., G.E.D.) (2)
  - c. Trade/technical/vocational school (3)
  - d. Some college, no degree (4)
  - e. Associate's degree (5)
  - f. Bachelor's degree (6)
  - g. Master's or Professional degree (7)
  - h. Doctorate degree (8)
  - i. Prefer not to answer (0)
  
6. What is your current household income? (HOUSEHOLD\_INCOME)
  - a. Less than \$10,000 (1)

- b. \$10,000 to \$20,000 (2)
  - c. \$20,000 to \$40,000 (3)
  - d. \$40,000 to \$60,000 (4)
  - e. \$60,000 to \$100,000 (5)
  - f. More than \$100,000 (6)
  - g. Prefer not to answer (7)
7. Have you ever been diagnosed with an eating disorder? (e.g., Bulimia, Binge Eating Disorder)
- a. Yes (1)
  - b. No (2)
  - c. Prefer not to answer (0)

## Appendix B

### BMI-Based Body Size Guides

Please choose an image that best represents your body image: (BMI\_SELF)

When thinking about Person \_ (#), choose an image that best describes your perception of their body type: (P#\_BODY\_SCORE)

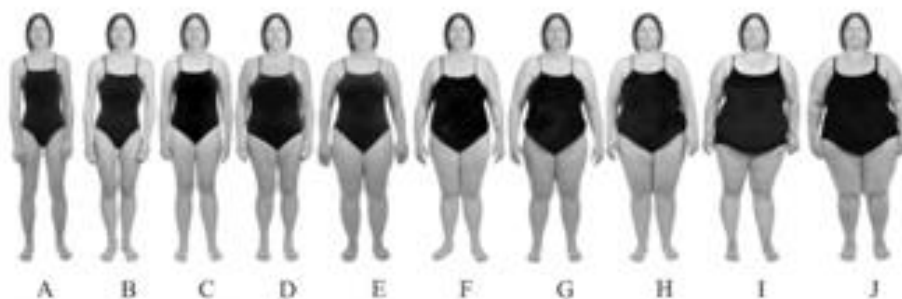
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*[If participate previously self-identified as male]:*



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*[If participate previously self-identified as female]:*



---

A. (1) B. (2) C. (3) D.(4) E. (5) F. (6) G. (7) H. (8) I. (9) J. (10)

(Harris, Bradlyn, Coffman, Gunel, & Cottrell, 2008)

## Appendix C

### Anti-Fat Attitudes

Below is a list of statements that may or may not apply to you. Please rate the extent to which you agree or disagree with each of the statements below.

---

1	2	3	4	5	6	7	8	9
Very strongly disagree	Strongly disagree	Disagree	Disagree Somewhat	Unsure	Agree somewhat	Agree	Strongly agree	Very strongly agree
1. I really don't like fat people much (ANTI_FAT_1).								
2. People who weigh too much could lose at least some part of their weight through a little exercise (ANTI_FAT_2).								
3. If I were an employer looking to hire, I might avoid hiring a fat person (ANTI_FAT_3).								
4. I don't have many friends that are fat (ANTI_FAT_4).								
5. Although some fat people are surely smart, in general, I think they tend not to be quite as bright as normal weight people (ANTI_FAT_5).								
6. I worry about becoming fat (ANTI_FAT_6).								
7. Fat people make me feel somewhat uncomfortable (ANTI_FAT_7).								
8. Some people are fat because they have no willpower (ANTI_FAT_8).								
9. I tend to think that people who are overweight are a little untrustworthy (ANTI_FAT_9).								
10. I feel disgusted with myself when I gain weight (ANTI_FAT_10).								
11. I have a hard time taking fat people too seriously (ANTI_FAT_11).								
12. One of the worst things that could happen to me would be if I gained 25 pounds (ANTI_FAT_12).								
13. Fat people tend to be fat pretty much through their own fault (ANTI_FAT_13).								

---

(Crandall, 1994)

## Appendix D

### Fat Phobia

Listed below are 14 pairs of adjectives sometimes used to describe obese or fat people. For each adjective pair, please click relative to the adjective that you feel best describes your feelings and beliefs.

---

1 2 3 4 5

---

- |                      |                                    |
|----------------------|------------------------------------|
| 1. Lazy              | Industrious (FAT_PHOBIA_1)         |
| 2. No will power     | Has will power (FAT_PHOBIA_2)      |
| 3. Attractive        | Unattractive (FAT_PHOBIA_3)        |
| 4. Good self-control | Poor self-control (FAT_PHOBIA_4)   |
| 5. Fast              | Slow (FAT_PHOBIA_5)                |
| 6. Having endurance  | Having no endurance (FAT_PHOBIA_6) |
| 7. Active            | Inactive (FAT_PHOBIA_7)            |
| 8. Weak              | Strong (FAT_PHOBIA_8)              |
| 9. Self-indulgent    | Self-sacrificing (FAT_PHOBIA_9)    |
| 10. Dislike food     | Likes food (FAT_PHOBIA_10)         |
| 11. Shapeless        | Shapely (FAT_PHOBIA_11)            |
| 12. Undereats        | Overeats (FAT_PHOBIA_12)           |
| 13. Insecure         | Secure (FAT_PHOBIA_13)             |
| 14. Low self-esteem  | High self-esteem (FAT_PHOBIA_14)   |
- 

(Bacon et al., 2001)

## Appendix E

### Physical Appearance Comparison

Please indicate the frequency with which you find yourself experiencing what is being described in each statement below.

---

0	1	2	3	4
Never				Always

---

1. When I'm out in public, I compare my physical appearance to the appearance of others. (PACS\_1)
  2. When I meet a new person (same sex), I compare my body size to his/her body size. (PACS\_2)
  3. When I'm shopping for clothes, I compare my weight to the weight of others. (PACS\_3)
  4. When I'm with a group of friends, I compare my body size to the body size of others. (PACS\_4)
  5. When I'm eating at a restaurant, I compare my body fat to the body fat of others. (PACS\_5)
- 

(L. M. Schaefer & Thompson, 2014)

## Appendix F

### Sociocultural Attitudes toward Appearance

Below is a list of statements that may or may not apply to you. Please rate the extent to which you agree or disagree with each of the statements below.

---

1	2	3	4	5
Definitely Disagree				Definitely Agree

---

1. I want my body to look very thin. (SATAQ\_1)
  2. I want my body to look like it has little fat. (SATAQ\_2)
  3. I think a lot about looking thin. (SATAQ\_3)
  4. Family members encourage me to get in better shape. (SATAQ\_4)
  5. I think a lot about having very little body fat. (SATAQ\_5)
  6. I feel pressure from family members to look thinner. (SATAQ\_6)
  7. I feel pressure from family members to improve my appearance. (SATAQ\_7)
  8. I feel pressure from the media to improve my appearance. (SATAQ\_8)
  9. I feel pressure from my peers to look in better shape. (SATAQ\_9)
  10. I feel pressure from the media to look thinner. (SATAQ\_10)
- 

(L. M. Schaefer et al., 2015)

## Appendix G

### Internalized Weight Bias

Below is a list of statements that may or may not apply to you. Please rate the extent to which you agree or disagree with each of the statements below.

---

1	2	3	4	5	6	7
Strongly						Strongly
Disagree						Agree

---

1. Because of my weight, I am just as competent as anyone. (WBIS\_1)
  2. I am less attractive than most other people because of my weight. (WBIS\_2)
  3. I feel anxious about being overweight because of what people might think of me. (WBIS\_3)
  4. I wish I could drastically change my weight. (WBIS\_4)
  5. Whenever I think a lot about being overweight, I feel depressed. (WBIS\_5)
  6. I hate myself for being overweight. (WBIS\_6)
  7. My weight is a major way that I judge my value as a person. (WBIS\_7)
  8. Because I am overweight, I don't feel like my true self. (WBIS\_8)
  9. I don't feel that I deserve to have a really fulfilling social life, as long as I'm overweight. (WBIS\_9)
  10. Because of my weight, I don't understand how anyone attractive would want to date me. (WBIS\_10)
  11. If only I had more willpower, I wouldn't be the weight that I am. (WBIS\_11)
- 

(Durso & Latner, 2008; Pearl & Puhl, 2014)



## Appendix H

### Body Appreciation

Please indicate the frequency with which you believe or experience the feelings described in the items below.

---

1	2	3	4	5
Never	Seldom	Sometimes	Often	Always
<hr/>				
1. I respect my body. (BAS_1)				
2. I feel good about my body. (BAS_2)				
3. I feel that my body has at least some good qualities. (BAS_3)				
4. I take a positive attitude towards my body. (BAS_4)				
5. I am attentive to my body's needs. (BAS_5)				
6. I feel love for my body. (BAS_6)				
7. I appreciate the different and unique characteristics of my body. (BAS_7)				
8. My behavior reveals my positive attitude for my body; for example, I hold my head high and smile. (BAS_8)				
9. I am comfortable in my body. (BAS_9)				
10. I feel like I am beautiful even if I am different from media images of attractive people (e.g., models, actresses/actors) (BAS_10)				

---

(Tylka & Wood-Barcalow, 2015)

## Appendix I

### Self-Esteem

Below is a list of statements regarding general feelings that you hold about yourself. Please rate the extent to which you agree or disagree with each of the statements below.

1	2	3	4
Strongly Agree	Agree	Disagree	Strongly Disagree
1. On the whole, I am satisfied with myself. (SE_1)			
2. At times I think I am not good at all. (SE_2)			
3. I feel that I have a number of good qualities. (SE_3)			
4. I am able to do things as well as most other people. (SE_4)			
5. I feel I do not have much to be proud of. (SE_5)			
6. I certainly feel useless at times. (SE_6)			
7. I feel that I am a person of worth, at least on an equal plane with others. (SE_7)			
8. I wish I could have more respect for myself. (SE_8)			
9. All in all, I am inclined to feel that I am a failure. (SE_9)			
10. I take a positive attitude toward myself. (SE_10)			

(Rosenberg, 1965)

## Appendix J

### Big Five Personality Inventory

Please indicate the frequency with which you believe or experience the feelings described in the items below.

---

1	2	3	4	5
Disagree	Disagree a little	Neither Agree nor Disagree	Agree a little	Agree strongly
strongly				

---

1. I see myself as someone who is reserved. (BFI\_1)
  2. I see myself as someone who is generally trusting. (BFI\_2)
  3. I see myself as someone who tends to be lazy. (BFI\_3)
  4. I see myself as someone who is relaxed, handles stress well. (BFI\_4)
  5. I see myself as someone who has few artistic interests. (BFI\_5)
  6. I see myself as someone who is outgoing, sociable. (BFI\_6)
  7. I see myself as someone who tends to find fault with others. (BFI\_7)
  8. I see myself as someone who does a thorough job. (BFI\_8)
  9. I see myself as someone who gets nervous easily. (BFI\_9)
  10. I see myself as someone who has an active imagination. (BFI\_10)
- 

(Rammstedt & John, 2007)

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#### EDUCATION

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##### **The Pennsylvania State University, Schreyer Honors College**

College of Health and Human Development | Biobehavioral Health

Graduation Date: May 2020

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#### EXPERIENCE

---

##### **Clinical**

##### **All About Women, LLC**

Newark, DE | Summer 2015, 2016, 2017, 2018

- Medical Assistant and Medical Records File Clerk
- Gathered patient history, assembled and aided medical procedures at the right hand of the provider, coordinated patient appointments
- Sorted and uploaded >500 patient charts into electronic health records system; communicated with insurance companies for explanations of patient benefits

##### **University of Notre Dame Haiti Program**

Leogane, Haiti | June 2018

- Traveled with a group of 30 students and healthcare providers to deliver medical care and education
- Assisted in the care of > 1,050 patients in a week through setting up mobile health clinics

##### **Work**

##### **Eberly College of Science, Department of Chemistry**

University Park, PA | Sept. 2017- May 2020

- Proctor, Grader, eBook Assistant, Learning Assistant
- Assisted >250 students in general chemistry course with in-class activities and weekly recitation
- Contributed to the design and editing of general chemistry exam question bank

##### **Research**

##### **Stress, Health, and Daily Experiences Lab**

University Park, PA | Sept. 2017- May 2020

- Undergraduate Research Assistant
- Dedicate 7 hrs/week completing in-lab tasks and facilitating participant visits to assist principal investigators on stress research in a public health context

#### LEADERSHIP

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##### **Omega Phi Alpha National Service Sorority**

Jan. 2017 – Dec. 2018

- Executive Vice President, Programming Chair

#### ACTIVITIES

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- LifeLink PSU Student Mentor
- College of Health and Human Development Student Ambassador Sept. 2018 – May 2020