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# Implicit Weight Bias Among Men in Allied Health Career Fields

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This is to certify that the doctoral dissertation by

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Walden University
2025

Abstract

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## Abstract

This quantitative study observed if there was a difference in the presence of implicit weight bias in men who work in allied health fields versus men not in allied health fields. Age and ethnicity (Hispanic/Non-Hispanic) were also observed in these groups as moderating factors to see if they also had differences in the effects between groups. The purpose of this study was to utilize an electronic weight-implicit association test (W-IAT) to identify any significant differences in the presence of weight bias between the two groups. Implicit weight bias in this population is problematic in that implicit bias, particularly implicit weight attitudes, can influence the way professionals treat their patients. Essentially, how a person treats others is based on their implicit attitudes. As such, if the professionals have a high presence of weight bias, it could lead to poor treatment outcomes. Utilizing implicit bias theory, this study aimed to address the limited research on weight bias among men in allied health fields. Results indicated that implicit weight bias was present across participants but showed no statistically significant differences between occupational groups, nor were significant moderating effects found for age or ethnicity. Findings suggested that implicit weight attitudes are widespread and not confined to specific professions or demographic subgroups. The implications of this research highlight the importance of continued awareness and intervention efforts to reduce weight bias and promote unbiased treatment practices across healthcare and fitness professions. By fostering self-reflection and reducing unconscious bias, these efforts may contribute to positive social change and enhance inclusive care for individuals of all body types.

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# Chapter 1: Introduction to the Study

The topic of this study involved implicit weight bias, which was defined as unconscious and automatic negative attitudes or stereotypes directed toward individuals based on body weight (Greenwald et al., 2003; Phelan et al., 2014). These biases can influence interactions between individuals, particularly in healthcare settings (Greenwald et al., 2003; Lawrence et al., 2021; Phelan et al., 2014; Sabin et al., 2012). Implicit bias, driven by automatic assessments and predispositions, has been a persistent challenge throughout human history (Greenwald & Banaji, 1995). Humans rely on implicit cognitive mechanisms to quickly evaluate trustworthiness and identify potential threats, which helps conserve mental resources (Bar-Anan & Nosek, 2014; Fiske & Taylor, 2017; Pohl, 2017). However, this instinct is not always necessary in every social exchange and can become problematic, particularly when biases become ingrained in cognitive processes. In healthcare, implicit weight bias may manifest unintentionally, affecting treatment decisions, communication, and patient outcomes, thereby contributing to healthcare disparities (Phelan et al., 2014; Sabin et al., 2012). For allied health professions, where motivation and behavioral change are central to patient success, implicit weight bias can undermine trust and impede positive health outcomes.

This study aimed to explore implicit weight bias specifically in men employed in allied health and fitness careers, an area that has received limited empirical attention. While implicit weight bias has been well-documented across various domains, including healthcare (Lawrence et al., 2021; Phelan et al., 2015; Sabin et al., 2012), most research has focused on general healthcare professionals or mixed-gender populations, leaving a

gap in understanding how this bias manifests among men in allied health professions. This was an important population to study, as allied health professionals often engage with clients in supportive and motivational roles, significantly influencing patient experiences. Furthermore, implicit weight bias is harmful, contributing to poorer treatment outcomes, decreased patient satisfaction, and worsened mental health outcomes for individuals with higher body weight (Phelan et al., 2015). Given the growing evidence of the detrimental effects of weight bias, particularly in healthcare, understanding and addressing implicit weight bias is essential to improving treatment practices and fostering more inclusive care environments in other fields, including allied health fields.

The results of this study could positively affect social change though prompting general improvement of healthcare. The hope is that these findings can open a discussion surrounding promoting self-reflection of individuals in these allied health fields to promote weight-inclusive practices and mindsets. Such a discussion may reduce stigma in this field surrounding those who are bigger bodied and address how this might influence the treatment of these individuals. Finally, addressing implicit bias may improve client motivation, adherence to health plans, and overall well-being, ultimately reducing healthcare disparities related to weight stigma.

Chapter 1 addresses implicit weight bias among men in fitness and allied health careers, introducing the study's parameters. The background section emphasizes the impact of implicit weight attitudes in healthcare, where bias can influence patient outcomes (Alberga et al., 2019; Phelan et al., 2015). The problem statement identifies the

gap in research on how these biases manifest among men in health-related roles. The study's purpose and research questions focused on comparing implicit weight bias in men across career types and exploring moderating effects of age and ethnicity (Garcia et al., 2016; Sabin et al., 2012). The chapter also outlines the theoretical framework, implicit bias theory (Greenwald & Banaji, 1995), and addresses key assumptions, scope, delimitations, limitations, and potential contributions to social change. Understanding implicit attitudes in this population can guide bias-reduction efforts and promote more equitable care environments.

## Background

While implicit research has been studied in different disciplines (e.g., medical fields) and different areas of interest (e.g., race, age, and gender bias), weight bias is one area of implicit research that has been less studied but still has a significant impact regarding implicit associations (Puhl & Heuer, 2009). Phelan et al. (201) also found that implicit weight bias was more prevalent than race bias for many of their participants. This suggested that weight bias may influence how individuals are treated based on their weight more significantly than previously recognized.

Previous research further established the widespread existence of implicit weight bias among healthcare providers, highlighting negative impacts on patient interactions, treatment recommendations, and overall healthcare quality (Alberga et al., 2019; Garcia et al., 2016; Phelan et al., 2014). Despite this, a significant gap remained concerning the specific presence and impact of implicit weight bias among men employed in allied health and fitness careers, as existing literature primarily focuses on broader medical

fields or gender-inclusive samples without clear differentiation by occupation or gender (Alberga et al., 2019; Garcia et al., 2016). This study addressed this critical gap by specifically investigating implicit weight bias within a targeted occupational and gender-specific context. Understanding implicit weight bias in men working in allied health and fitness professions was crucial for developing targeted interventions aimed at reducing biases, improving patient care, and fostering inclusive professional practices within these influential occupational fields.

Specifically, this study was needed because it sought to aid in supplying critical information regarding whether there is a presence of implicit weight bias in men who work in allied health. Allied health professionals play a key role in health improvement, but weight bias from providers "can negatively influence patient-provider interactions, healthcare decisions, and patient outcomes, ultimately exacerbating health disparities" (Phelan et al., 2014, p. 320). Therefore, identifying implicit weight biases among professionals "is a crucial initial step toward developing effective strategies to improve care and patient-provider relationships" (Sabin et al., 2012, p. 539). Finding the presence of weight bias would be the first step in changing the trajectory of health and success for these patients.

## Problem Statement

The research problem studied in this dissertation was that implicit weight bias can lead to poor treatment of patients and impacts mental health (Alberga et al., 2019; Phelan et al., 2014; Sabin et al., 2012).

This is problematic because implicit bias, particularly implicit weight attitudes, can influence the way professionals in the medical field treat their patients (Moreira et al., 2021; Sabin et al., 2012). In fitness and allied health fields, the presence of weight bias, and ultimately judgment, can be problematic in how professionals treat clients, as the population being served is likely to need to improve their health and well-being (Souza & Ebbeck, 2018). Essentially, how one person treats another is based on their implicit attitudes. As such, if the professionals providing the service have a high presence of weight bias, it could lead to poor treatment of their clients. There is limited information on the presence or absence of implicit weight attitudes in men in careers related to health/fitness, and I sought to address this gap by seeing if there is a presence of implicit weight bias. Other factors that need more exploration include differences in providers' ethnicity and age, and how this can affect differences in weight bias. Weight bias differences in ethnicity have been observed with providers who treat obese patients (Garcia et al., 2016). However, more exploration is needed to see if there is a similar trend in other career fields involved in patient care.

This problem is lacking in sufficient research, as this issue has not been explored in relation to identifying if there is a weight bias in men in allied health. With implicit weight attitudes being problematic in the treatment of clients in the medical field and with the possibility of the presence of weight stigma in the fitness community, there is a need to explore implicit weight bias in allied health and fitness careers (Sabin et al., 2012; Souza & Ebbeck, 2018). Specifically, is there generally a presence of implicit weight associations in men working in allied health fields versus men who do not work in

allied health career fields? This study addressed whether there is implicit weight stigma present in this population and whether it is significantly different from how men perceive weight in general, or whether men in these careers have a higher presence of implicit weight bias. Age and race were factors used to differentiate and determine if there are clinically significant differences in the presence or absence of weight bias. In the medical field, age and race are considered significant differentials in regard to the presence or absence of implicit weight bias (Garcia et al., 2016; Sabin et al., 2015).

The specific research problem was explored through understanding whether men who work in allied health or fitness careers have more implicit weight associations than men in non-allied health or fitness-related careers, and if so, whether age or ethnicity are moderating factors.

## Purpose of the Study

The purpose of this quantitative study was to utilize an electronic weight-implicit association test (W-IAT) to identify any significant differences in the presence of weight bias between two groups (men in allied health positions and men not in allied health positions). Age and ethnicity were also evaluated as moderating factors for the population of interest.

## Research Questions and Hypotheses

The research questions for the study were as follows:

RQ1: Is there a statistically significant between-group difference between (a) men employed in allied health or fitness-related careers and (b) men employed in non-allied health or fitness-related careers, in terms of

implicit weight bias with the addition of age and ethnicity (Hispanic/Non-Hispanic) as moderating variables?

$H_{o1}$: No statistically significant between-group difference exists.

$H_{a1}$: A statistically significant between-group difference exists.

RQ2: Is there a statistically significant between-group difference regarding age and ethnicity (Hispanic/Non-Hispanic), in terms of implicit weight bias among men employed in allied health or fitness-related careers?

$H_{o2}$: No statistically significant between-group difference exists.

$H_{a2}$: A statistically significant between-group difference exists.

## Theoretical Framework

The theoretical foundation for this study was implicit bias theory (Greenwald & Banaji, 1995). Unlike explicit attitudes, which are consciously endorsed and easily reported, implicit attitudes operate automatically and often outside of conscious awareness. This distinction is critical because individuals may express egalitarian beliefs explicitly while still holding negative implicit associations that influence their behavior (Greenwald et al., 2003). Studying implicit attitudes is particularly important in healthcare contexts, where professionals may unknowingly allow unconscious biases to shape their clinical decisions and interpersonal interactions (Phelan et al., 2014). The present study focused on identifying implicit weight bias among men in allied health professions because implicit attitudes, unlike explicit ones, can reveal underlying beliefs that may not be captured through self-report. This deeper understanding is essential for developing targeted interventions to reduce bias and improve equitable care delivery.

## The Nature of the Study

A quantitative, correlational research design is appropriate when attempting to identify if any between-group differences exist. Additionally, this design was based on the prior work of Smith et al. (2018) and Charles and Banaji (2022). Both used an implicit association test (IAT) to assess implicit weight attitudes. Charles and Banaji also utilized the data from Project Implicit in order to assess changes of implicit and explicit attitudes in the last 5 years in a variety of populations and in multiple parts of the United States. In following this model, utilizing an IAT digitally can be beneficial in getting a variety of responses over a larger area of the country.

For my research design, I needed ordinal-level data for demographic and screening questions, including race and ratio scale data for age. Occupations were also collected as ordinal-level data. The data collected from the W-IAT were at the interval level. The data collection instrument included a computer-generated W-IAT from Millisecond (Millisecond, n.d.). The data were analyzed by utilizing a multivariate regression to compare the group's (men in health/fitness careers vs. men not in health/fitness careers) results from the implicit data collected from the W-IAT. The independent variable was occupations of the participants. The dependent variable was the results for the W-IAT D-score, which measures the strength and direction of implicit weight associations (Greenwald et al., 2003). Ethnicity and age were the moderator variables.

## Definitions

*Allied health professionals:* Dietitians, physical therapists, personal trainers, speech therapists, occupational therapists, and psychologists (Gomez, 2009).

*Antifat bias:* The prejudice and discrimination against people who are overweight or obese (Elran-Barak & Bar-Anan, 2018).

*Bias:* Deviation from formal logic, preference, tendency, systematic error, and unfair prejudice (Greenwood, 2023).

*Implicit:* Unconscious beliefs or biases that exist in memory but are often distinct from conscious values and beliefs (Sabin et al., 2012).

*Implicit bias:* Holding ideas and conceptualizations in the mind that are based on assumptions of others and how this assumption then affects the behaviors (Gawronski et al., 2022). More specifically, Gawronski et al. (2022) defined it as an unconscious effect of social category cues on behavioral responses, and they argue that the widespread equation of implicit bias and bias on implicit measures is problematic on conceptual and empirical grounds.

*Implicit weight bias:* A negative attitude towards people with obesity or overweight that is unconscious and covert (Abbott et al., 2022).

*Implicit association test (IAT):* An IAT is a measure used to assert implicit cognitive constructs and the strength of how these cognitions pair concepts (Sabin et al., 2012).

*Men/man:* For this study, men/man was defined by sex, meaning male at birth and not men as a gender preference (Pleck, 1976).

*Weight-implicit association test (W-IAT):* Assesses weight as a social cognition for which the IAT focuses connecting implicit categorization and attention versus how the individual explicitly considers a weight bias (Sabin et al., 2012).

## Assumptions

The assumptions made in this study were essential to establish a clear methodological foundation and to ensure meaningful interpretations of the findings. Firstly, the assumption that implicit weight bias exists without individuals' conscious awareness aligns with implicit bias theory (Greenwald & Banaji, 1995). This assumption justifies the use of implicit measurement tools like the W-IAT, as implicit biases are often inaccessible through direct self-report methods (Greenwald et al., 2003). Additionally, the assumption that men working in allied health fields may exhibit implicit biases enabled the study to specifically examine how such biases could impact patient care within this professional population, reflecting findings from previous healthcare research (Alberga et al., 2019; Garcia et al., 2016). Another key assumption was that participants would respond honestly and accurately on the demographic questionnaire, as complete verification of self-reported demographic data was not feasible within the study's parameters (Podsakoff et al., 2003). Additionally, it was assumed that participants fully understood the instructions and genuinely engaged with the content of the W-IAT, despite the inability to directly verify their cognitive engagement or sincerity (Greenwald et al., 2003). It was also assumed that implicit biases measured by the W-IAT would meaningfully reflect real-world attitudes or behaviors, though direct empirical confirmation of this relationship was beyond the scope of this study (Epifania et al.,

2022). Transparently recognizing these design-related assumptions clarifies the limitations and boundaries of the research, facilitating accurate interpretation and application of its results. Furthermore, the assumption regarding participant honesty and accuracy in self-reported demographic data was necessary to ensure the validity of correlations drawn from demographic variables such as age and ethnicity (Podsakoff et al., 2003). Recognizing these assumptions transparently clarifies study boundaries and reinforces the reliability and applicability of the research outcomes.

Several aspects of this study are believed to be true but cannot be empirically demonstrated within the current design. For instance, it is presumed that participants responded honestly and accurately on demographic questionnaires, though complete verification of these self-reported details was not feasible (Podsakoff et al., 2003). Additionally, the assumption that participants fully understood and sincerely engaged with the instructions and content of the Weight-Implicit Association Test (W-IAT) is inherent to the study, despite the inability to directly validate their cognitive engagement and interpretation (Greenwald et al., 2003). Another belief underpinning the study is that implicit weight biases detected via the W-IAT meaningfully correspond to actual behaviors or attitudes in real-world professional settings; however, this direct translation from implicit measures to explicit behaviors remains an inference rather than a guaranteed outcome (Epifania et al., 2022). Acknowledging these inherent limitations transparently underscores important considerations for interpreting and generalizing the study's findings.

## Scope and Delimitations

Implicit weight attitudes in men in allied health fields was addressed in this study in response to research gaps, which found a lack of literature regarding research on those in allied health fields, along with a lack of implicit research regarding weight bias for men (Alberga et a., 2019; Flint et al., 2016; Garcia et al., 2016; Phelan et al., 2015; Smith et al., 2018). As the independent variable included the implicit bias of men, many possible conflicting internal validity questions are present. These include the validity of the instruments collecting the data and the sample effectively representing the desired population. As a comparative measure, men in allied health fields will also be compared with the results of men who do not work in allied health fields. The age group of the participants will include men between the ages of 18 and 65 years old. These men should not also have a history of an eating disorder.

When including boundaries for the study in relation to the scope, the ability for generalization and having a wide enough sample size were vital. In addressing differences culturally, collecting data related to ethnicity and age within the population. In excluding other populations, the question of external validity would involve if results can be applied to other populations not being addressed. Implicit bias theory has been explored across a range of populations to examine the presence of bias in various contexts (Elran-Barak & Bar-Anan, 2018; Foster et al., 2003; Garcia et al., 2016; Sabia et al., 2015; Shah & Bohlen, 2023). However, the majority of prior research has predominantly utilized female participants. Given that the current study specifically focused on male participants employed in allied health and fitness fields, the applicability

of previous findings may be limited. It remains unclear whether women in allied health professions would exhibit similar patterns of implicit weight bias, underscoring the importance of the current study's gender-specific focus.

To enhance generalizability, men were recruited from the target population in several regions of the United States, enabling the capture of regional differences in their internalized concepts of weight. Generalizability implies the ability for the concept being studied to be applicable to the population as a whole (Kukull & Ganguli, 2012). As the theory of implicit bias has been shown to be reciprocal to other populations, keeping the boundary of the desired population to men who are involved with allied health groups and do not have a diagnosed mental health condition related to eating or body image disorders will enable the generalizability to be maintained to the desired population. Although, as there may be outliers or other complications in the data, it was important that the statistical analysis of the data be unbiased and representative of what the desired outcomes are trying to measure.

## Limitations

This study is subject to several limitations related to its design and methodology. First, the correlational design restricts the ability to infer causation, meaning that while relationships among variables can be identified, direct cause-and-effect conclusions cannot be drawn (Field, 2022). Additionally, this study will pull participants using a snowball sampling method. The use of snowball sampling via social media platforms may introduce selection bias by attracting individuals who are more interested or engaged with the research topic, or those who are not engaging with social media, potentially

limiting the generalizability of findings (Leighton et al., 2021). Although efforts were made to recruit from multiple geographic regions within the United States, the results may not generalize to populations beyond this context (Shadish et al., 2002).

Recruiting enough male participants may also present a challenge, as prior studies have noted limited male participation in implicit association research (Smith et al., 2018). However, because this study targets male-dominated allied health and fitness careers, this limitation may be reduced. Another limitation involved the method of survey distribution. Without a centralized lab or office, participants must have reliable internet and email access to complete the W-IAT and demographic survey. To address this, participants were screened to ensure they have access to the necessary technology prior to inclusion.

Construct validity is another concern, as the study relies solely on the Weight-Implicit Association Test (W-IAT). While the W-IAT demonstrates strong reliability and validity (Greenwald et al., 2003; Nosek et al., 2007), using a single implicit measure may not fully capture the complexity of implicit weight bias. Alternative tools, such as semantic priming tasks or the Implicit Relational Assessment Procedure (IRAP), may offer additional insights in future studies (Epifania et al., 2022; Moreira et al., 2021). Moreover, confounding variables such as prior exposure to weight bias training, personal experiences with stigma, or socially desirable responses in demographic reporting could impact the outcomes, complicating interpretation of results (Podsakoff et al., 2003).

Potential researcher bias is also acknowledged. As a woman conducting research on weight bias in men, there was a risk of interpretative bias that may influence the lens

through which results are viewed. To address this, a control group and randomization was used to help reduce bias and strengthen objectivity.

Several measures were implemented to mitigate these limitations and enhance study validity. Recruitment from diverse platforms such as LinkedIn, Facebook, and Instagram aimed to increase demographic variation and reduce selection bias (Leighton et al., 2021). Attrition bias was addressed by ensuring the survey was concise, user-friendly, and accessible, thereby encouraging full participation (Field, 2022). Anonymity was emphasized to minimize social desirability bias and promote honest responses (Podsakoff et al., 2003). Though the W-IAT is the primary measure, the study acknowledged the future need for convergent validity through the use of additional tools (Epifania et al., 2022; Moreira et al., 2021). External validity was further supported through nationwide recruitment, while inclusion and exclusion criteria were designed to control potential confounding factors (Faul et al., 2009). Lastly, IBM SPSS was used to manage data cleaning, screen for outliers, and verify statistical assumptions to ensure the accuracy and integrity of the analysis (Field, 2022).

## Significance

Understanding and addressing implicit weight bias in allied health professionals—particularly men—has the potential to improve the quality of patient care, reduce health disparities, and advance equity in treatment outcomes. While weight bias in healthcare has been documented, little is known about how this manifests specifically in male providers working in allied health and fitness roles. By focusing on this underexplored population, the current study fills a critical gap and supports the

development of interventions that can shift unconscious attitudes and ultimately improve client experiences and health outcomes (Abbott et al., 2022; Phelan et al., 2015; Rudman & Phelan, 2010).

In addition to the well-documented physical health disparities associated with weight bias in healthcare, the psychological toll of marginalization, such as anxiety, depression, and lowered self-esteem, warrants equal scholarly attention. Similar to other forms of social "isms," weight-based discrimination contributes to internalized stigma and adverse mental health outcomes (Phelan et al., 2015; Sherf-Dagan et al., 2024). Weight stigma has been linked to increased risk of psychological distress, including disordered eating, body dissatisfaction, and avoidance of health-promoting behaviors (Puhl & Suh, 2015). Moreover, stigma has been identified as a fundamental cause of population-level health inequalities, with enduring effects on both physical and mental health, regardless of individual-level interventions (Hatzenbuehler et al., 2013). This study aims not only to identify the presence of implicit weight bias among allied health professionals but also to contribute to broader efforts aimed at reducing bias-related harm. By illuminating where such bias may exist, this research supports the development of bias-reduction strategies to foster more supportive, stigma-free care environments—ultimately benefiting both psychological well-being and equitable health outcomes (Abbott et al., 2022; Rudman & Phelan, 2010).

Weight bias in the medical field has been demonstrated with how doctors treat patients differently depending on the bias they hold (Phelan et al., 2015; Sabin et al., 2012). Research across other fields have also demonstrated the harmful effects of implicit

bias on patient outcomes. For instance, Bhat et al. (2021) identified how implicit bias contributes to disparities in stroke diagnosis and management, particularly in younger populations. This highlights that implicit biases can influence care decisions across diverse medical specialties. Bias discrimination in the medical field is dangerous, and patient care can be compromised. An example being Harrop (2019), when the patient was being treated at an eating disorder clinic, the therapist was not convinced they had anorexia due to the patient's larger size and ignored many other presenting diagnostic symptoms. While we are seeing this in the medical field, the study sought to explore weight bias in other fields. The relationship between implicit associations and men working in allied health fields is a new area to explore regarding the success of the clients they have contact with. here change can be made regarding implicit associations include the implicit bias awareness which then can improve how patient perceive and receive care from their providers, making change for that patient's health better able to occur fast forward to more recent views of the treatment of obesity, and we can see that Even in older studies, the importance if this area of research was able to be presented and is still relevant in today's terms. Rudman and Phelan's (2010) study showed the social change importance of assessing implicit associations affect many different aspects of the human experience. More attention and interest in implicit associations can help in the treatment of disorders as well as how underserved or underrepresented populations are treated in everyday settings. Rudman and Phelan (2010) also found that when targeted, implicit bias can be evolved and shifted. Furthermore, if there is a presence of implicit for health care and allied health professionals, creating more awareness and providing training can assist

in minimizing this bias and improving the care given to patients (Abbott et al., 2022).

A means for how this can positively impact social change can occur when viewing how practitioners are affecting their patients' treatment can lead to better outcomes. Studies have found that the presence of an implicit weight bias significantly impacted the ability for that individual to get better or complete treatment (Carels et al., 2014). Specifically, practitioners with weight bias at one bulimia treatment center found that when the clinician had less weight bias present, their treatment of patients different from others with more prominent weight bias and the patients were more receptive to treatment. Treatment interventions that focus on implicit bias can have a profound impact on how others are treated and how social situations can be impacted in a more positive and helpful manner (Alberga et al., 2023).

## Summary

Chapter 1 introduced the issue of implicit weight bias among men in allied health and fitness-related careers, and its potential impact on patient care and professional interactions. The research problem emphasized the limited exploration of this bias within gender-specific and occupation-focused contexts. The purpose of the study was to examine whether men in health-related careers have more implicit weight bias compared to those in unrelated professions, and whether age and ethnicity moderate these associations. The theoretical foundation (implicit bias theory) provides the conceptual lens for understanding how unconscious attitudes may influence behavior in health settings (Greenwald & Banaji, 1995). The key assumptions, limitations, scope, and the study's significance in promoting equitable healthcare practices were also discussed.

In the next chapter, the purpose was to build on this foundation by reviewing the existing literature on implicit weight bias, with a particular emphasis on research related to healthcare, psychology, and fitness professions. It also explored how implicit attitudes are formed and measured, the role of demographic variables such as age and ethnicity, and how these biases may impact the delivery of care. This literature review contextualized the current study and demonstrated the need for focused inquiry on implicit weight attitudes among men in allied health fields.

# Chapter 2: Literature Review

## Introduction

The specific research question that was addressed through this study is whether men who work in allied health or fitness careers have more implicit weight associations than men in non-allied health or fitness-related careers, and if so, are age or ethnicity moderating factors? In alignment with the research question for this study, understanding where a person's implicit bias affects the behaviors of persons in specific careers was of interest, especially for individuals in careers that focus on service and helping others as the affected population of the served individuals are more at risk for a person's implicit bias creating more harm than good in these industries (Alberga et al., 2019). This study utilized a quantitative approach using an electronic weight-implicit association test (W-IAT) to compare the presence of implicit weight bias in men in allied health and fitness career fields versus men who are not in allied health careers. Age and ethnicity were also evaluated as moderating factors for the population of interest.

The research question addressed in this study focused on the presence of implicit weight bias among men in different career fields (allied health and non-allied health), and it considers age and ethnicity as potential factors influencing this bias. The literature is lacking in representing both implicit research and observing this in men. As such, men were the targeted population of interest for this study, as well as noting if age and ethnicity influence the present of implicit weight bias. The main factor lacking in the research is where implicit weight bias most affects the patient care in a specific field and utilizing the presence of weight bis in men specifically. The literature supports that there

is implicit weight bias in the medical field but other career paths who have significant impact on the success of others and harm reduction can negatively impact those individuals based on the presence of implicit weight bias.

This section specified the research strategies, the foundation and information regarding the theoretical framework used guide the study, and past and present research regarding implicit weight bias.

## Literature Review Search Strategy

The key terms used to search the topic include as follows: Implicit Weight Associations, Weight attitudes, implicit, IAT, Implicit weight bias, weight bias in medical field, effects of weight bias, effects of implicit bias, weight bias and psychologists, eating disorder and weight bias, implicit bias theory, and Implicit social cognition. Search terms in parallel fields include doctors and nurses in order to see the presence of weight bias in other career specialties which are affecting patient care. Additional search terms used included career or job or work or occupation or profession or employment.

The data searched were between 1960 and 2024 in order to get a full understanding of both the background and current research in progress focusing on implicit weight attitudes. During the literature review search, the databases used were Academic Search Complete, ERIC, Directory of Open Access Journals, Social Sciences Citation Index, SAGE Journals, CINAHL Plus with Full Text, and PubMed. Countries the research was found in was the United States, Germany, Italy, Canada, New Zealand, Australia, Isreal, and Brazil.

## Theoretical Framework in the Literature Review

The theory that grounded this study is Greenwald and Banaji's (1995) implicit bias theory. Implicit bias theory linked how social cognition affects attitudes, self-esteem, and other internal constructs. Implicit bias theory framed the current research by addressing the underlying core of the nature of implicit attitudes and bias for which individuals make behavioral and cognitive associations from.

### Implicit Bias Theory

Implicit bias theory (Greenwald & Banaji,1995), suggested that bias exists without the conscious knowledge of the individual. In allied health fields, the presence of an implicit weight bias would create room for stereotypes to influence how the professional would treat the clients or what level of effort is placed upon their treatment, as seen in other medical professionals (Alberga et al., 2019; Garcia et al., 2016). Using the implicit bias theory to frame the research helped to find ways the unconscious processes are present for the men in allied health fields.

The concept of implicit cognitions stemmed from research in the early years of psychology with the notion of social psychology theory and the introduction of attitudes, stereotypical cognitions (Brown, 1929). These stereotypes and unconscious associations were typically founded in research involving race, gender, and age. Goffman (1963) noted later studies recognized there were other types of bias that effect how others are treated even when the effector has no conscious idea the bias is present. Kurt Lewin, founding father of social psychology, began the movement of understanding how society influences people on an individual level (Lewin, 1936). In improving the general

consensus for how social interactions affect society, it then moved the field of psychology from a microscopic or individualized level to a macroscopic or widening the viewpoint for research. The addition of behavioral considerations incorporated with social influences that drive behavior, it became more widely understood that people do not simply behave based on genetic predisposition, but also there is a link between behavior and socially accepted or learned distinctions (Fiske & Taylor, 2017). Society generally determines how others react to determine what is appropriate or what others should think about certain subjects (Ajzen, 1991; Asch, 1956; Morris et al., 2023).

Social concepts then expanded in the 1960s to include social stereotypes and conditions being further explored with Goffman's stigma theory (Goffman, 1963). Goffman observed stereotypes and the treatment of others differently based on external stimuli. Stigma theory marked a pivotal moment in psychological and social research when pinpointing how to best explain why people act differently than their conscious minds. Goffman (1963) explained stigma theory to explain how society uses categories to divide systems, and people, depending on what attributes that items or person possessed and how it compared with current societal norms. Stereotyping and racial discrimination continued to grow in the literature, and researchers wanted to find better ways to identify where these concepts were formulated and how it then influenced behavior (Fiske & Taylor, 2017).

**Components of the Implicit Bias Theory**

The main component of the implicit bias theory included differentiating between the conscious and unconscious mind (Greenwald & Banaji,1995). A common

representation of the unconscious has been seen in Freudian followings, in that how a person can have a seen and known representation of how they might think of conceptualizing things, verses an underlining presentation of thoughts that also affect behaviors (unconscious verse conscious). While Sigmund Freud and other psychoanalytic individuals in psychology significantly introduced conscious and unconscious thought processes into the mainstream, the underlying concepts have remained present in research and popular media (Westen, 1998). For implicit theories, one must understand that subconscious and unconscious thoughts influence behaviors and thought processes. There has been great debate and controversy since these fundamental theories were introduced; however, what holds weight for all forces is that people will act without thinking about it first (Greenwald & Banaji, 1995; Kahneman, 2011). People are influenced by their thoughts even when they have other constructed thoughts and restrictions. Implicit bias theory framed the current research by addressing the underlying core of the nature of implicit attitudes and bias from which individuals make behavioral and cognitive associations (Greenwald & Banaji, 1995). Implicit bias theory is associated with the unconscious need to understand how implicit attitudes influence cognitive patterns and connections to the outside world.

**Early Use of Implicit Bias Theory**

The implicit bias theory was formulated from the research of Greenwald and Banaji (1995). When Greenwald and Banaji (1995) conceptualized implicit bias theory, it solidified that internal conditions influence the formulation of bias and how these unconscious biases influence how people act or conceptualize their world and those

around them. Greenwald and Banji recognized that when individuals began to behave and act in social situations, it might be due to an internal response rather than an external response to those stimuli. A person's internalized view of the world can be based on that person's implicit stereotypes, schemas, relationships to their self-esteem, and unconscious cognitions. Their behaviors are then a reflection of how that person has internalized or remembered external stimuli and situations. This internalized schema also influences how they treat others based on internalized associations and attitudes. As this is an unconscious process, consciousness or rationalization does not always stop behaviors and thoughts. The implicit attitudes, or biases, then create an automatic response and are remembered by the individual to formulate quicker decisions in the future.

**Implicit Bias Theory and Other Studies**

Researchers at Harvard University sought to investigate the implicit motivations and bias in a variety of different populations and situations (Project Implicit, n.d.; Nosek et al., 2007). As such, in 1998 they utilized implicit bias theory and created Project Implicit (Project Implicit, n.d.) after the concept of implicit bias came to popularity and the desire to understand where implicit bias affects different areas of culture was more widely recognized (Nelson & Zippel, 2021). Project Implicit allowed for an Implicit Association Tests (IAT) to be used to explore different populations that might have an implicit bias related to specific societal topics. In no fault of their own, individuals with implicit bias can have behaviors and actions which lead to unwanted treatments or stereotypes of specific populations, including races, disabilities, and, of interest to this research, weight bias.

An example in current research of the impact of implicit bias comes from Gawronski et al. (2022), who discussed how implicit bias can affect behavior even if the affected person does not know they have the bias. An implicit bias can be problematic in fields where the patient's care might be affected if bias is present. Implicit bias theory played a role in determining the mechanisms by which this process occurs and how to utilize interventions or tests that are best to determine the presence or absence of the bias in order to change or assist in understanding the root of the bias. This then can help patients and providers find better connections and maintain the best levels of care.

The logical connections between the framework presented and the nature of my study included the implicit bias theory. As the study used a weight-implicit association test (W-IAT) as the primary assessment tool to observe if there is a presence of implicit weight attitudes in men who work in allied health fields verse men who do not work in allied health fields, implicit bias theory was most appropriate. The implicit bias theory related to the current research on implicit attitudes in that individuals frame their unconscious world and memories around associations they learn and experience. Greenwald and Banaji (1995) introduced the theory of implicit attitudes and their relationship to self-esteem and stereotypes by connecting unconscious cognition to behaviors and ideals. The implicit cognitions become a part of memory, and individuals base their world around them on the formed implicit associations. Greenwald and Banaji (1995) defined implicit attitudes as “introspectively unidentified (or inaccurately identified) traces of experience that mediate favorable or unfavorable feeling, thought, or action toward social objects” (p. 5).

### Implicit Bias Theory and its Use in the Current Study

In relation to the current study, implicit bias theory is well suited for foundational presence for implicit theory research and is commonly referred to as the theory behind other implicit research. The research question for this study was whether implicit weight bias differs in men in allied health versus non-allied health, and whether age and ethnicity influence this bias. When comparing the research question to implicit bias theory, the theory aligned well with the theory's assumption that there is a subconscious bias that will influence a person's behaviors and choices that are not easy to identify with the permit that it is not known to the said person, they have a bias (Greenwald & Banaji, 1995). Finding bias is done using tools and assessments, which have shown to be a good representation of the presence or absence of the bias being assessed.

## Literature Review Related to Variables and Concepts

### Problematic Implicit Weight Bias

Previous research has identified implicit weight bias as a significant issue, particularly in healthcare (Alberga et al., 2019Phelan et al., 2014). The terminology and language used by health care providers to describe patients play a crucial role in shaping biases, which can, in turn, influence treatment decisions (Romano, 2018). Despite changes in media and public discussions regarding individuals in larger bodies or those classified as obese, the prevailing discourse and terminology surrounding body weight remain largely unchanged (Sherf-Dagan et al., 2024). The bias held by these professionals has been found to significantly affect treatment for patients and patient outcomes (Sherf-Dagan et al., 2024). Specifically, in the medical field, many

professionals hold implicit biases against individuals in larger bodies, which can negatively impact patient care and lead to disparities in treatment outcomes (Abbott et al., 2022; Alberga et al., 2019; Sherf-Dagan et al., 2024). Recognizing the presence of weight bias is the first step in addressing it, allowing for a shift in perspective that can lead to improved patient care. More research is needed to examine the extent of weight bias and its effects on treatment outcomes.

Persistent biases exist regarding how individuals of certain body weights perform and behave in daily life (Puhl & Heuer, 2009). Professionals in healthcare and related fields who focus on weight management often develop biases based on limited population samples or ingrained assumptions about how individuals arrive at their current weight (Tomiyama et al., 2018). Additionally, the notion that a specific body weight is ideal for health and success reinforces weight bias. This belief contributes to the assumption that only those within a "standard" weight range can achieve good health and success.

Allied health professionals, including nutritionists, psychologists, physical therapists, and personal trainers, play a crucial role in patient health (Allied Health Professions Australia [AHPA], 2020). They are often the first point of contact for individuals seeking care, especially related to health and weight, and their biases, whether implicit or explicit, can shape a patient’s experience (Chapman et al., 2013). If patients or clients perceive that a professional is disengaged or treating them differently due to weight bias, they may avoid seeking necessary care (Puhl & Heuer, 2009). Additionally, men represent a significant portion of professionals in these fields (U.S. Bureau of Labor Statistics, 2023), yet research on their implicit weight attitudes is limited (Flint et al.,

2016). The current study sought to aid in the research on the effect of implicit weight bias by taking that first step and seeking to identify if there is a significant presence of weight bias in the field of allied health, as there is a need to address the gender gap and provide deeper insights into weight bias in men who work in allied health settings (Phelan et al., 2015).

**Evidence of Implicit Weight Bias in the Medical Field**

Research has shown how weight bias and stigmas are known to be negative and have been problematic in the treatment of individuals who are obese (Abbott et al., 2022; Alberga et al.,2019; Sherf-Dagan et al., 2024). Someone who is bigger-bodied is often given poorer treatment or is not given more effort in treatment compared to those considered smaller or not obese. Many doctors will emphasize that symptoms the person is experiencing are related to their excess weight and will minimize other symptoms that could cause more harm. Abbott et al. (2022) also provided evidence of implicit weight bias in healthcare providers working with individuals who have obesity and found they did not know their bias could affect patient outcomes. This is also not limited to the doctors as new students also present with weight bias, which can affect patient treatment and outcomes (Sherf-Dagan et al., 2024).

For Alberga et al. (2019), in viewing 732 articles, ten themes were identified, which included contemptuous, patronizing, disrespectful treatment, lack of training in the topic, ambivalence, attribution of all health issues to excess weight, assumptions about weight gain, barriers to health care utilization, expectation of differential health care treatment, low trust and poor communication, avoidance or delay of health services, and

"doctor shopping." What is concerning is that these patients are being overlooked or treated differently and possibly given less care by trusted healthcare professionals, purely based on a lack of education or self-awareness from doctors and nurses.

For this study, it was learned that the challenges patients face when health care professionals give poor treatment based on perceived weight bias and how to solidify that weight bias and stigma are adverse outcomes for that patient care. That care differential can significantly impact the treatment of that patient and how the general public can develop a stigma or an implicit association. In particular, individuals seeking guidance and service from those in allied health fields (i.e., trainers, dietitians, physical therapists) could lose faith in the population they are designed to assist.

Sabin et al. (2012) discussed an example of healthcare professionals who treat patients differently based on personal implicit weight attitudes in a group of medical doctors and nurses. Specifically, they discussed how implicit weight bias can influence the treatment of patients by professionals who hold negative associations with certain factors. Particularly when looking at weight, race, and gender. Interestingly, Sabin et al. (2012) discussed that health professionals might even feel uncomfortable treating patients who are obese due to their own weight bias. However, this is reported from self-reported bias, but implicit bias cannot be addressed quickly. Therefore, individuals who do not consciously associate with having a weight bias might still be treating patients differently. Sabin et al. (2012) utilized the online Project Implicit platform to gather Weight-IAT data regarding the physician's implicit weight associations.

Further, Sabin et al. (2012) found that medical doctors had implicit weight attitudes that aligned with antifat beliefs. Medical doctors with strong explicit weight attitudes also aligned with the societal ideal that expressing their opinions regarding antifat attitudes is acceptable as it will align with the general public's attitudes regarding the topic. A limitation presented in the study was that the participants were not random or from the public and could not be used in the generalized opinion of all medical doctors or healthcare professionals. Future studies should consider whether patients feel these implicit and explicit weight biases and how this might affect how a patient would report discrimination based on weight from medical doctors.

The addition of weight attitudes and its impact on medical professionals on different age groups and when race is considered a factor can also be problematic (Sabin et al., 2015). Childhood obesity continues to be problematic in the US health system, and while public health is important and the consequences can be devastating, how professionals treat their patients should consist of the same respect and level of care between patients of small bodies and larger bodies. Sabin et al. (2015) noted there is a higher tendency for minority group children to experience obesity; current statistics from the Center for Disease Control and Prevention (CDC) (Centers for Disease Control and Prevention, 2022) suggest that from 2020, overall, 19.7% of all adolescents' experience obesity. Of minority groups, 26.2% of Hispanic children and 24.8% of non-Hispanic Black children had the highest rates of obesity. The prevalence of obesity and bigger-bodied individuals remains high, so the treatment of the general public should be considerate and fair. Sabin et al. (2015) noted that for the medical professionals they

observed, only 56% of these professionals felt qualified to treat children with obesity. They explicitly either have a deficit in their knowledge base, their bias has made them insecure, or they do not desire to handle these patients' care. Sabin et al. (2015) explored further and found that these individuals held strong antifit attitudes, which can influence the quality of care given to these populations.

Similar patterns of implicit weight attitudes are present in medical providers. One of these is Foster et al. (2003), who questioned 620 primary care physicians' treatment of obese patients. They found that more than 50% of the physicians noted the patients who were obese; the physicians thought they were awkward, unattractive, ugly, and noncompliant. They also found the treatment of obesity to be less effective when the physicians held negative beliefs about their patients. While it was not a component of that study, it would have been interesting to observe if the physician had a more optimistic and encouraging attitude. Would the treatment of their patients be more effective? This concept would not only apply to physicians but also to supportive staff, including nurses. How nurses view and treat patients has just as much significance. If patient care is affected by implicit bias, care will inevitably be affected, and the outcomes of that patient will continue to be poor (Garcia et al., 2016). It can be particularly distressing for patients experiencing weight bias when receiving medical care. Regardless of the staff's own race, gender, or age, the presence of weight bias can still impact the quality of care being provided in the medical field.

### Other Professionals: Evidence of Weight Bias for Psychologists

While weight bias has been seen in medical fields, psychologists have also been

found to have a presence of weight bias (Lawrence et al., 2021; Romano, 2018). Even as ethical principles are in place to try and mediate biases from affecting treatment, if the professional is not aware they have a bias in this aspect, they would not be able to identify the bias and then recognize how it is affecting the treatment of patients (Romano, 2018). Similarly to the medical field, the presence of weight bias for psychologists will affect the effort given to patients they treat. If there is a presence of weight bias in the medical field and psychology, there is a presence of weight bias in other fields that are tied to the importance of effective patient care. Exploring another field in latitude and the current study will help identify where this issue exists and how to address it for optimal patient success.

**Implicit Weight Bias in the Fitness Industry**

As society has certain expectations for which people should look/weigh in terms of beauty standards, these biased ideals are particularly impactful in the weight industry (Speirs et al., 2022). Previous research has looked at the implication of weight bias in the treatment of patients for individuals who are trying to better their health; the providers in those industries might still be impacting the success of their clients if weight bias is impacting their patient care. Speirs et al. (2022) observed that fitness practitioners with weight and obesity stigmas affected the treatment and beliefs about their client's abilities. They also found that placing a desire component on obesity did not shift the obesity stigmas present. Future studies should consider the specific career field (Physical Education teacher versus Personal Trainers) and the influence the clients seen by the professionals might have.

**Implicit Attitudes Related to Careers and Discouragement**

When discussing the concept of implicit attitudes, understanding the influences of implicit bias and attitudes on conscious choice is important to discuss. The comparison between what is at the forefront of consciousness (explicit attitudes) and what is a subconscious influence (implicit) can show important differences that the person is unaware of. Things that can influence both implicit and explicit choices are important factors in understanding how others also treat people. Arendt et al. (2019) discussed implicit attitudes as an influence on choice versus explicit attitudes. Their study observed whether implicit and explicit factors contributed to news choices. Arendt et al. (2019) utilized an affect misattribution procedure (AMP) in order to assess for implicit measures and a seven-point scale to assess explicit attitudes regarding the programs and desires to watch. They found a parallel between news choice and implicit/explicit affiliations. Individuals were more likely to choose news that aligned with their beliefs. A significant limitation identified was that only two stations were chosen, and the targeted population did not watch the news regularly. It was noted that the social influences present in the news can be implicitly influential and should be considered in how individuals make everyday choices.

Implicit attitudes can influence others to develop problematic implicit attitudes (Dunlap & Barth, 2019). An example of this can be seen in the encouragement or discouragement of individuals choosing different life paths. In career choice, women and men experience societal and parental pressures based on gender alone. Their ability to perform their career or tasks is not based on skill, as much as the stereotype associated

with a career or job. While many people seek careers based on predictable reasoning (i.e., monetary reasons, general interest), outward factors can seep into the implicit mind and influence how that person treats others or what that person is capable of. A Dunlap and Barth (2019) study examined any implicit beliefs regarding women working in science, technology, engineering, and math (STEM) careers. It mainly looked at women in college who are studying STEM fields. They wanted to see the implicit nature of the attitudes as, at present, individuals might say they do not hold gender-specific beliefs about women in STEM careers yet act differently or have internal intrinsic motivations to see differently. These implicit negative beliefs regarding women's success in STEM careers can significantly impact both applicability for women to be in STEM and for women to apply for STEM careers. An Implicit Association test (IAT) was used to identify the implicit associations for comparison.

Dunlap and Barth (2019) found that for women, STEM associations were predictive of their attitudes regarding women in STEM. Women in STEM held less implicit associations towards other women in STEM careers than men and women in non-STEM careers. There was still a high correlation of help from both women and men that women mostly prefer person-oriented and non-STEM careers. Limitations indicated by Dunlap and Barth (2019) reported that future IATs should consider that regardless of the implicit attitude, many women in STEM still understand that despite being in a STEM career, they think most women would prefer to be in a caregiving or person-oriented career. A suggestion for future research would be to look at age differences and whether men married to women in STEM differ in implicit associations.

For my study, gender was a gap in the implicit associations that are underrepresented or not studied as frequently (Lawrence et al., 2021). While Dunlap and Barth (2019) looked at differences in STEM and non-STEM careers, there was no mention of other implicit associations to address in other fields of interest. Previous research with implicit associations has determined that implicit bias can determine a presence in career choice; in addressing the need to identify implicit bias, those drawn to allied healthcare careers might have a more elevated presence for weight bias than others, particularly in men.

## Gender and Implicit Bias

As with other research focused on weight and body image, gender differences in research have become apparent and a focus for the current study. Most research that focused on weight attitude or bias uses women as the primary focus group due to the link to other weight stereotypes in culture (Lawrence et al., 2021; Moreira et al., 2021; Nolan et al. 2013). Recognizing there is a distinguished lack of research regarding men and any topic of weight bias in the literature emphasized the importance of investigating if other genders, particularly males, have a presence of weight bias and what the next steps for future research to focus on for that population. When implicit weight bias was observed with women of different-sized bodies, both average-sized and overweight women had the same preferences, implicitly for thin or average-sized persons (Baur et al., 2022). In turn, this can affect how they view themselves and others and possibly have implications for how they treat themselves or others. Baur et al. (2022) also discussed the lack of research on implicit weight bias as it relates to a person's own attitudes towards others who are

overweight/obese while considering themselves with similar traits. Their study focused on women who are classified as being overweight or obese and if they hold a negative implicit weight attitude towards others who are also overweight or obese. Nolan et al/ (2013) also found a significance difference in the presence of wight bias for men verse women and noted a need for men to be separated and a focus of implicit research.

When examining gender as a factor in research, it is important to consider the effectiveness of the Implicit Association Test (IAT) as a measure of weight bias in men. Research suggested that the IAT may be more effective for this population compared to other implicit measures (Rudman & Phelan, 2010; Smith et al., 2018). Since eating disorders and disordered eating patterns often present differently in men, weight bias may also manifest in distinct ways. Identifying the presence of weight bias in men could provide a deeper understanding of this issue. Although research on weight bias has historically focused on women, exploring its impact on men could expand treatment options and spark cultural conversations about how men may be suffering in silence.

Research on gender/sex bias and IATs shows significant differences between men and women in certainty when making choices related to implicit affiliations and their implications. There is still a significant gender bias in modern society regarding women working in STEM-related fields (Moreira et al., 2021). One particular study out of Brazil saw the importance of observing implicit bias in matters related to gender differences as it forces the individual to think quickly and honestly, even if the individual is unaware of the implicit attitudes and influences. An interesting observation observed by Moreira et al. (2021) was that in previous studies that observed similar topics and findings, the IAT

was conducted by a woman and yielded different results than the present study, which was conducted with men. For this research study, understanding that there are significant differences in how men might report results in IAT research will bring more important focus and attention to the presence of implicit associations and bias in other career fields, which still affect patient care.

## Ethnicity/Race and Implicit Weight Bias

Ethnicity and race bias have also been observed as a fundamental concern in treating patients (Garcia et al., 2016; Morehouse & Banaji, 2024). Thus far in implicit bias research, race/ethnicity have shown to be contributing factors in general, since the start of implicit research and continues to be a popular topic in implicit research (Morehouse & Banaji, 2024).While studies have seen that implicit bias about race can have profound effect on patient treatments, depending on that patent's race/ethnic background, the providers who hold the bias might also be different in the presence of bias and how this might be affecting treatment. Many research studies have focused on the effect racial bias has had on the systemic treatment of others, including that of implicit research. In the upcoming study, ethnicity was used as a moderating factor to see if there is a connection between ethnicity and the presence of weight bias in men who work in allied health fields. When observing race/ethnicity as a factor in contributing to implicit weight bias, in the medical field, nurses were found to have more weight bias if the persons were of black or Hispanic race (Garcia et al., 2016; Hall et al., 2015). While research on implicit race bias has been considerable, there is a lack of research seeing it as a discernable variable. Nonetheless, continuing to see if individuals of different

ethnicities and ethnic backgrounds also hold differences in the presence or absence of weight bias. Providing more evidence of ethnicity/race differences when observing implicit weight bias is an important contribution to the topic of weight bias.

## Age and Weight Bias

Age was a variable used in the current study to see if there are implicit differences in the presence of weight bias. Generally, thus far in the literature, there is an emphasis in implicit research that implicit bias is formed at a young age and over time, experiences shift the perceptions held (Chopik & Giasson, 2017; Lawrence et al., 2021)). In relation to implicit weight attitudes, it could be likely that younger individuals maintain mainstream attitudes whereas older individuals might have challenged these ideals and formulated new bias or impressions on wight. A difference in age and how weigh is preserved, whether that is explicitly or implicitly, has been shown to have some influence in relation to the presence of wight bias. Studies have found that younger individuals held more bias than older individuals (Lawrence et al., 2021; Phelan et al.,2014). Other studies have depicted age related differences in implicit attitudes in general (Chopik & Giasson, 2017). Individuals generally prefer adults the same age when viewing implicit stimuli. Specifically, the younger adults preferred stimuli which included younger adults and the same was true for older adults. While studies are generally divided regarding whether age is a significant factor and provides enough evidence for differences in implicit research, other studies would argue that there is enough evidence to support the continued assessment of differences between age groups for implicit research. This study hoped to

see if the age of the participate might be a contributing factor to the presence of weight bias in the desired population.

## The Use of Weight-IAT in Implicit Weight Bias Research

The Implicit Association Test (IAT) is one of the gold standards in testing implicit bias and attitudes (Greenwald et al., 2003; Shah & Bohlen, 2023). IATs have been used to assess a multitude of different cultural factors, including race, mental illness, socioeconomic status, age, and gender. Greenwald et al. (1998) introduced the IAT into implicit research as a tool to assess the presence of racism, which has since led the IAT to be used in a multitude of different topics related to implicit bias and behavioral outcomes. The incorporation of weight IATs served in response to the presence of implicit weight associations, which contributed to why individuals of a particular established weight were experiencing differences in treatment or job selection. When concerning the current study, while there are many other implicit assessment tools now compared to the beginning of implicit research, as the IAT and weight IAT are still considered the gold standard in research, this tool was used to assess men in allied health-related fields. Weight and body image have become an emerging topic of interest in implicit research, and the use of an IAT streamlines how other research observes implicit bias and associations.

## Summary

As the themes in the literature have suggested, the presence of implicit weight bias can significantly impact how patients receive care (Abbott et al., 2022; Alberga et al., 2019; Sherf-Dagan et al., 2024). The current study investigated the presence of

implicit weight bias among men working in allied health and fitness careers compared to those in non-allied health fields. It aims to determine whether these professionals exhibit stronger implicit biases and whether age and ethnicity serve as moderating factors. The research was grounded in Implicit Bias Theory (Greenwald & Banaji, 1995), which posits that individuals unconsciously develop biases that influence their attitudes, behaviors, and decision-making (Greenwald & Banaji, 1995). Understanding how implicit bias affects professionals in health and service-oriented careers is particularly important, as bias in these industries can lead to disparities in patient care and treatment outcomes (Alberga et al., 2019).

Implicit weight bias has been well-documented in the medical field, where healthcare professionals often hold negative attitudes toward individuals with higher body weight (Lawrence et al., 2021; Puhl & Heuer, 2009). Research indicates that such biases can negatively impact healthcare interactions, leading to lower quality of care, misdiagnoses, and reduced treatment adherence among patients with obesity (Abbott et al., 2022). However, studies have yet to fully explore whether weight bias differs across specific career fields, particularly among male professionals in allied health and fitness industries (Jayawickrama et al., 2023). Additionally, most previous research has centered on women's experiences of weight stigma, leaving a gap in understanding how implicit weight attitudes manifest among men (Alberga et al., 2023).

This study employed a quantitative approach, utilizing the Weight-Implicit Association Test (W-IAT) to measure implicit weight attitudes (Greenwald, McGhee, & Schwartz, 1998). The Implicit Bias Theory framework is used to examine unconscious

attitudes and behaviors, emphasizing how these biases can form without individuals being aware of them (Brownstein, 2019). Prior research suggested that healthcare professionals, including physicians and fitness trainers, frequently demonstrated both implicit and explicit weight biases, which can influence their treatment recommendations and overall perception of patient health (Lawrence et al., 2021; Sabin, Marini, & Nosek, 2012). The study also considered age and ethnicity as potential influencing factors, recognizing that implicit attitudes can evolve based on personal experiences, cultural exposure, and generational perspectives (Chopik & Giasson, 2017).

The study's findings could have important implications for healthcare, psychology, and fitness industries, as implicit biases among professionals in these fields may affect client experiences, trust in medical care, and treatment outcomes (Hall et al., 2015). Research suggested that bias-awareness training and antistigma interventions can be effective in reducing both explicit and implicit weight bias in professional settings (Sherf-Dagan et al., 2024). By identifying whether weight bias is more pronounced in allied health careers, this research may contribute to developing bias-reduction training and promoting more equitable treatment practices (Alberga et al., 2023). Ultimately, this study sought to advance the conversation around implicit bias in professional settings and highlight the need for continued research on bias in male populations. Chapter 3 will expand upon the methods of collecting the data and the use of a W-IAT to extract if there is implicit bias present in the mentioned targeted population.

# Chapter 3: Research Method

## Introduction

The purpose of this quantitative study was to utilize an electronic weight-implicit association test (W-IAT) to identify any significant differences in the presence of weight bias between two groups (men in allied health position and men who are not in allied health positions). Age and ethnicity were also evaluated as moderating factors for the population of interest.

Chapter 3 outlined the quantitative research methodology used to examine implicit weight bias among men in allied health versus non-allied health professions. This chapter details the study's design, including the use of a computerized Weight-Implicit Association Test (W-IAT) and a demographic survey administered through Millisecond's Inquisit platform (Millisecond, n.d.). Recruitment procedures, participant eligibility criteria, data collection methods, and the statistical approach (i.e. multiple linear regression) are described, as this method is well-suited for evaluating the predictive relationship between occupation type and implicit attitudes while accounting for continuous and categorical variables (Field, 2022). The chapter also addressed ethical considerations, data screening processes, and how potential limitations and validity concerns were managed in accordance with best practices in quantitative research design (Shadish et al., 2002).

## Research Design and Rationale

The research design was a quantitative, correlational study using a multiple regression analysis. The independent variable was the occupation of the participants. The

dependent variable was the results for the W-IAT D-score. Ethnicity and age were the moderate variables. An additional survey was presented to participants to collect background and qualification data through Inquisit by Millisecond (Millisecond, n.d.). A comparative study best sought to assess if there is a presence of weight bias existing in men who work in allied health fields and if this presentation of bias is significantly different than the general population (Field, 2022; Shadish et al., 2002)

The design choice for this study included a multivariate regression analysis to fully compare and assess the variables. A Multiple regression is well-suited for this study as it permits the analysis of the predictive relationship between the independent variable (occupation type) and the dependent variable (W-IAT D-score), while simultaneously evaluating the influence of moderating variables such as age and ethnicity on this relationship (Field, 2022). While other simpler research designs were considered (i.e., *t*-test and correlations), the current study design better represents the variables and the research questions appropriately.

The research design consisted of a qualitative study, involving ordinal level data for demographic and screening questions, including their race and age. Occupations were collected as ordinal-level data. The data collected from the W-IAT was at the interval level. The data was analyzed by utilizing a multivariate regression was used to compare the group's (men in allied careers versus men not in health/fitness careers) results from the implicit data collected from the W-IAT.

The research method that was used is a quantitative method utilizing surveys and W-IAT data. When gathering background on other W-IAT and IAT studies, a quantitative research method allowed for the results to best be observed and assessed, Correlational research comparing the differences between how men who work in allied health to men who do not and if there is a presence of weight bias more in men who work in allied health.

This studies design was following the work of Charleswith and Banaji (2022) and Smith et al. (2018). Both used an IAT to assess implicit weight attitudes. Charleswith and Banaji (2022) utilized the data from Project Implicit in order to assess changes of implicit and explicit attitudes in the last five years in a variety of different populations and in multiple parts of the United States. As this study was focused on the weight attitudes of the male participants, the use of a W-IAT is a better fit then a general IAT. Other studies that used a W-IAT in a quantitative research methodology include Abbott et al. (2022), Baur et al. (2022), Carels et al. (2014), Elran-Barak and Bar-Anan (2018), Jayawickrama et al. (2023), Phelan et al. (2014), Sabin et al. (2012), Sabin et al. (2015), and Sherf-Dagan et al. (2024).

## Methodology

### Population

The targets population aimed to include men between the ages of 18 and 65 who are currently working, with at least half the targeted population coming from those in allied health fields.

**Sampling and Sampling Procedure**

Sampling was conducted using social media, specifically LinkedIn, Facebook, and Instagram, through snowball sampling methods. A flyer was presented on this examiner's social media and those also on the social medial platform were asked if they are willing to share the flyer or link of the study to their own pages in the hopes to broaden the exposure to the study. This sample collection procedure was selected as a method to gain access to a multitude of men in the desired population through modern practices (Leighton et al., 2021). Snowballing sampling occurs when the researcher initiates the participation of one individual with the intention and hope that this individual will then ask others, they know in a similar field of field of interest to also participate in the research and spread the information regarding how to engage in the research. On social media platforms, this can be easily achieved and creates a fast yield of product for the researcher, as long as the person who is initiating the snowball is an effective source for obtaining the desired population.

In this study, the sample was drawn from social media platforms including LinkedIn, Facebook, and Instagram. This researcher presented on their social medial profile, a link and description asking for participants and others to forward the desired information to people they know who fit the desired description of the population being studied. The material on the post received approval from the IRB and any other material being sent to participants was also approved by the IRB. Once the post has been approved and posted to the appropriate forms, the individuals who were interested in participating clicked on the desired linked which took them to a website which linked the study

information, informed consent forms, and can prompt the participants to take the weight-IAT and other assessments.

Inclusion criteria included men, between the ages of 18 and 65 years old, who worked full-time or part-time in the last year. Men in allied health or fitness careers (e.g., physical therapists, personal trainers, dietitians). Men in non-allied health careers, with no formal training or work experience in allied health or fitness fields. Exclusion criteria included individuals who were born female at birth or those who identify as women. Men who do not have internet access (required for survey completion). Also, men who do not consent to participate were excluded.

The targets population size was calculated using the G*power 3.1 software (Faul et al., 2009). Overall, the targeted sample for this study was 109 participants, with 55 participants in the allied health occupation group and 55 men in the non-allied health group. In order to achieve this number, the goal for recruitment was to obtain 130-180 people of interest to accommodate for exclusionary factors (i.e. age and occupation). The population target considered for the 95% confidence level with 5% margin of error that the study is able to adequately connect the presence of implicit weight attitudes in the populations of comparison. Age and race played a medicating role in the relationship.

## Procedures for Recruitment, Participation, and Data Collection

Participants accessed the study via a unique link directing them to the online survey hosted by Millisecond's Inquisit Web version 7 platform (Millisecond, n.d.). The survey and task required the downloading of the Inquisit application, which can be deleted upon completion and did not change any settings in the participants

phone/computer. Upon clicking the link, participants first encountered an informed consent page detailing the purpose of the study, participation procedures, potential risks, and participants' rights. Consent was indicated by selecting "yes" before continuing. Participants who do not consent were unable to proceed further. This examiners email address was also provided on the consent form in order to provide a platform for the participant to ask questions or reach out if needing assistance or resources.

After consenting, participants will complete the demographic questionnaire followed directly by the Weight Implicit Association Test (W-IAT). Participants completed a demographic survey hosted on Millisecond's Inquisit Web version 7 platform app (Millisecond, n.d.). The survey gathered demographic data, including gender/sex, age, and career, which align with the specified inclusion and exclusion criteria. Due to the nature of the program, ethnicity was only gathered as Hispanic, Non-Hispanic, and other. Race was also collected in order to determine other differential data.

To ensure accurate matching and continuity of participant data across survey components, a unique identifier (subject ID) was automatically embedded within the URL query parameters. This identifier is automatically logged by Inquisit, which reduces data entry errors and facilitates the seamless integration of datasets across multiple platforms, thus enhancing the efficiency of multi-platform experimental designs (Millisecond, n.d.).

Implicit bias data was collected through the paid laboratory access provided by Millisecond's Inquisit software, with all data securely transmitted to a protected storage

folder. Millisecond is a reputable public resource widely utilized in psychological and behavioral research (Greenwald et al, 2003; Nosek, et al, 2014).

Upon completion of the W-IAT and demographic surveys, participants proceed to the study's exit process. During this phase, participants were promoted with the option to delete the application. If participants have further inquiries, they may utilize the contact information provided in the informed consent form to seek assistance via email.

No follow-up activities, interviews, or treatment interventions will occur post-survey completion.

## Instrumentation and Operationalization of Constructs

### Weight-Implicit Association Test

The main assessment tool utilized in this study was the Weight-Implicit Association Test (W-IAT). The developers of the W-IAT was associated with Project Implicit, Dr. Tony Greenwald, Dr. Mahzarin Banaji, and Dr. Brian Nosek (Greenwald et al., 1998; Project Implicit, n.d.). They developed the measure in 1998, and the measure can be manipulated to include a multitude of different bias related topics. Other publications and companies have also released versions for research use which can be rented and used for specific amounts of time. The IAT measures the strength of automatic (implicit) associations between the target categories (Thin People vs. Fat People) and attribute categories (Good/Bad) (Greenwald et al., 1998). The main Dependent Variable is the D-Score ('Difference Score'). A positive score supports a stronger association between 'Thin People-Good' and 'Fat People-Bad' than for the opposite pairings. A negative d-scores supports a stronger association between 'Fat People-Good' and 'Thin

People-Bad' than for the opposite pairings. For this study, the Weight-Implicit Attitude Test (Weight-IAT) was provided through Inquisit by Millisecond (Millisecond, n.d.). Millisecond is a public resource providing assessments for research and professional development purposes. The rights to utilize the program for the instrument were purchased for a 6-month of access including the lab feature, to run the test and process the data collected through the instrument. The Internal consistency reliability of the W-IAT has been found to range from 0.70 to 0.90, depending on the sample and testing conditions (Nosek et al., 2007). The test-retest reliability of the W-IAT is considered moderate (0.40 to 0.60) (Nosek et al., 2007; Teachman et al., 2003). The construct validity of the W-IAT has shown good construct validity, as it correlates with explicit measures of weight bias (albeit modestly) and behavioral indicators of discrimination against individuals with obesity (Schwartz et al., 2006). Regarding Convergent Validity, the W-IAT has been shown to correlate with other implicit bias measures but remains distinct from explicit weight bias self-reports, indicating that it captures unique, automatic biases (Agerström & Rooth, 2011). The population the W-IAT was previously used for was within the general population, healthcare workers, employment and hiring staff, and clinical research. Within the general population, the W-IAT was used in studies assessing weight bias among the public, demonstrating widespread implicit anti-fat attitudes (Schwartz et al., 2006). Studies looking at healthcare populations found implicit weight bias among physicians, nurses, dietitians, and medical students, which can influence treatment decisions and patient interactions (Phelan et al., 2014). Regarding employment and Hiring Studies, the W-IAT was applied in organizational psychology to

examine hiring biases against job applicants with obesity (Agerström & Rooth, 2011). Additionally, clinical research has used the W-IAT to assess implicit weight bias among individuals with eating disorders, showing variations in bias compared to non-clinical populations (Teachman et al., 2003). Reliability and validity have been established in various study samples through replication across diverse demographics, including different cultural and professional backgrounds.

An online implicit association test (IAT) provided in a website format can be reliable and used in different settings. If the scores were similar to what is being produced in person, they were just as reliable and valid. Greenwald et al. (2003) used the Yale IAT website, which was easily accessible to many of the population, making it a tremendous possible option for researchers and other professionals interested in implicit data. The studies were conducted to assess multiple angles and use for the IATs. Greenwald et al. (2003) also found that for all studies, the algorithm for all the IATs needed to be adjusted in order to represent better what is the desired result for the magnitude of the implicit and explicit correlation, the resistance to speed response contamination and contamination from being previously exposed to other IATs, and the latent implicit and explicit path in the confirmatory factor analysis (CFA). Construct validity was high despite the need to change the effect algorithm. Upon replacing the IAT scoring algorithm, the new online version is an excellent method for conducting the IAT.

While other tools are continuing to emerge in implicit research, the IAT is still one of the standard tools for measuring implicit bias and associations. For this study, an IAT was an appropriate and prominent study assessment tool that has been computerized

and is widely used in weight association research. Compared to other assessment tools, the IAT in an online format was just as effective as in more traditional formats. As I planned to use the online version of the weight IAT, this can validate that my data results will not be less valid due to the nature of the collection.

While other implicit measures have been used in implicit research, the IAT is still considered the standard for most studies. Researchers have noted that there are limitations to the use of the IAT for implicit bias research. Moreira et al. (2021) reported not using a traditional Implicit Association Test (IAT) and instead decided to use an Implicit Rational Assessment Procedure (IRAP). The reason for an alternative implicit test to be used was the need for more refined differentiation between the gentrification, which the IRAP has been found to have the ability to achieve, over a traditional IAT. Moreover, Epifania et al. (2022) found that introducing a linear mixed effect to the research analysis portion of the IAT can significantly improve linking implicit bias and behavioral connectivity, ultimately leading to better implications of IAT data and behavioral modifications or identification in linking implicit attitudes and behaviors.

**Operationalization**

The variables being utilized by the W-IAT include the independent variable as occupations of the participants, the dependent variable as the results for the W-IAT D-score, which measures the strength and direction of implicit weight associations (Greenwald et ak., 2003), with ethnicity and age were the moderator variables. The W-IAT is calculated utilizing reaction time and the decisions made by the participants in relation to a set of stimuli (photos of individuals) regarding choice between objects (i.e.

thin or fat) (Greenwald et al., 2003). The positive D-score records an implicit preference for thin individuals over fat individuals. A negative D-score indicated an implicit preferred for fat individuals over tin individuals. A near-zero D-score implies no implicit bias. The instrument itself will not manipulate or compare other variables, and the variables were compared within SPSS to statistically compare the results and find the equivalence in the hypothesis from there.

## Data Analysis Plan

Data was evaluated using multivariate regression analysis to assess the relationships between the variables (i.e. occupation of the participants, weight-IAT scores, age, and ethnicity) and determine the corresponding hypothesis related to the presence of implicit wight bias for men working in allied health. Specifically, the independent variable was occupations of the participants. The dependent variable was the results of the W-IAT D-score, which measures the strength and direction of implicit weight associations (Greenwald et al., 2003). Ethnicity and age were the moderator variables. A multiple regression was used to assess the relationship between variables. It assesses whether observed differences in sample means are likely due to true population differences or merely random variation (Tabachnick & Fidell, 2019). Epifania et al. (2022) and Moreira et al. (2021) suggested that the incorporation of a multiple regression into future studies would assist in better understanding the relationship between the variables related to W-IAT data and other variables (i.e. age and ethnicity). Carels et al. (2014) and Elran-Barak and Bar-Anan (2018) both utilized a multiple regression in their analysis of weight bias to assess relationships between variables.

Ultimately, due to the limitation within the data collection program, ethnicity was self-reported with broad categories (Hispanic/Latino vs. non-Hispanic) that do not capture cultural heterogeneity. Race was also captured in an attempt to determine differentials in data presentation.

The software used for this data analysis was the Statistical Package for the Social Sciences (SPSS) program provided for students through Walden University. SPSS is a widely used statistical software application designed for data management, analysis, and visualization in social science research and other disciplines. Developed by IBM, SPSS provides tools for descriptive statistics, inferential analysis, regression models, and data manipulation, enabling researchers to efficiently process large datasets (Field, 2022). Its user-friendly interface and ability to handle complex statistical procedures make it a preferred choice among academics and professionals in various fields.

**Data Cleaning and Screening Procedures**

Data cleaning and screening was implemented through the use of the IBM SPSS statistical software. SPSS provides a comprehensive set of tools for handling missing data, detecting outliers, and verifying statistical assumptions, which are crucial for maintaining data integrity and reducing biases (Field, 2022). Through SPSS, missing data can be identified thought the following SPSS procedures: Frequent analysis, Missing Value Patterns, and imputation methods. Other methods in SPSS to use to address distortion in the analysis process include the use of Boxplots, z-scores, and Winsorization or Transformations. To ensure the parameters and test are appropriate, SPSS also can utilize normality tests, linearity checks, and homoscedasticity to ensure the proper use of

data analysis over other statistical methods (i.e. one-way ANOVA verses multivariate regression).

The procedures that were used to account for the need for multiple statistical tests include a Bonferroni Correction test (adjust and control for type 1 errors), holm-Bonferroni method testing (reduce risk for false negatives) (Field, 2022). For this dissertation, the multiple regression, along with multiple comparison corrections like Bonferroni and Holm-Bonferroni**,** allows for a comprehensive examination of implicit weight bias across career fields, accounting for age and ethnicity as influencing factors.

The main dependent variable was the W-IAT D-score, which measures the strength and direction of implicit weight associations (Greenwald et al., 2003). The moderating variables included in this study (e.g. age and race/ethnicity) were chosen based on previous research showing inconsistencies in how these demographic factors influence implicit weight bias. For example, Sabin et al. (2015) and Garcia et al. (2016) both found that providers' age and ethnicity played a role in the presence of anti-fat bias, but the direction and strength of these associations varied across studies. Similarly, Phelan et al. (2014) and Chopik and Giasson (2017) reported that younger individuals exhibited stronger weight bias, yet the interaction with racial/ethnic identity complicates the interpretation of such findings. These complexities underscore the need to examine age and race as potential moderating variables in understanding implicit weight bias.

**Interpretation of Results**

Results were interpretated using SPSS version 29, and all statistical assumptions (normality, linearity, homoscedasticity, absence of multicollinearity) were tested and

reported. Data screening will include checking missing data, outliers, and ensuring eligibility criteria are met.

The key parameter estimates (B coefficients), p-values, and 95% confidence intervals (CIs) were reported for each predictor variable. A p-value of $< .05$ was considered statistically significant, in accordance with APA 7 guidelines (American Psychological Association [APA], 2020). Confidence intervals that do not include zero was interpreted as supporting the presence of an effect.

Effect sizes were reported using $R^2$ for multiple regression analyses to evaluate the proportion of variance in the outcome variable explained by the predictors (Field, 2018).

If categorical versions of the W-IAT scores are created (e.g., high vs. low bias), logistic regression may be employed, and odds ratios (OR) with 95% CIs were interpreted, with $OR > 1$ indicating increased odds of high implicit bias.

**Reinstatement of the Research Questions and Hypotheses**

RQ1: Is there a statistically significant between-group difference between (a) men employed in allied health or fitness-related careers and (b) men employed in non-allied health or fitness-related careers, in terms of implicit weight bias with the addition of age and ethnicity (Hispanic/non-Hispanic) as moderating variables?

$H_{o1}$: No statistically significant between-group difference exists.

$H_{a1}$: A statistically significant between-group difference exists.

RQ2: Is there a statistically significant between-group difference regarding age and ethnicity, in terms of implicit weight bias among men employed in allied health or fitness-related careers?

$H_{o2}$: No statistically significant between-group difference exists.

$H_{a2}$: A statistically significant between-group difference exists.

## Threats to Validity

### External Validity

External validity concerns the generalizability of the study findings beyond the sampled population (Shadish et al., 2002). While this study focused on implicit weight bias in men in allied health and fitness careers, generalizing these results to other demographic groups, particularly women or non-health-related professions, remains a limitation (Alberga et al., 2019). Previous research indicates that weight bias has primarily been studied among women and expanding future research to include both genders would enhance applicability (Puhl & Heuer, 2009).

To mitigate external validity threats, participants were recruited from multiple regions within the United States to capture a diverse range of perspectives. Additionally, replicating this study in cross-cultural contexts would help determine whether implicit weight bias manifests differently based on societal norms regarding weight and health (Jayawickrama et al., 2023). Furthermore, since implicit attitudes may shift over time due to exposure to weight-inclusive training or societal changes, a longitudinal approach could improve the assessment of how implicit weight bias develops across a professional career span (Greenwald et al., 2003).

## Internal Validity

Internal validity ensures that the study accurately measures the relationship between the independent and dependent variables without interference from confounding factors (Shadish et al., 2002). This study acknowledges potential threats such as selection bias, instrumentation validity, and attrition bias.

### Selection Bias

Since recruitment is conducted via social media and professional networks, self-selection bias may occur, as individuals interested in weight bias research may be more inclined to participate (Leighton et al., 2021). This could lead to a non-representative sample, affecting the validity of the findings. To address this, participants were recruited from both professional organizations (e.g., fitness associations, medical boards) and general social networks to ensure broader representation. Additionally, efforts were made to match participants across groups based on years of experience, educational background, and workplace setting to reduce variability (Podsakoff et al., 2003).

### Instrumentation Validity

The study utilized the Weight-Implicit Association Test (W-IAT), a widely used tool in implicit bias research (Greenwald et al., 2003). However, some researchers argue that alternative implicit measures, such as semantic priming tasks or the Stroop test, may provide additional insights into implicit weight bias (Shah & Bohlen, 2023). While the W-IAT remains the primary instrument, future research should consider using multiple implicit measures to establish convergent validity.

**Attrition Bias**

A potential limitation is participant dropout, particularly if the study sample becomes disproportionately skewed toward one occupational group. To address attrition bias, participation was streamlined through an easily accessible online format, ensuring that surveys and assessments are brief and clear to reduce dropout rates (Leighton et al., 2021). Participants also received reminders and support to encourage study completion.

**Construct Validity**

Construct validity determines whether the study accurately measures implicit weight bias. The use of self-reported demographic surveys presents a risk of social desirability bias, where participants may provide responses, they perceive as more socially acceptable rather than truthful reflections of their biases (Paulhus, 1991). To address this, this examiner ensured participant anonymity and emphasize the importance of honesty in responses. Additionally, indirect questioning techniques may be incorporated to mitigate response biases (Podsakoff et al., 2003).

Another consideration is the reliance on a single implicit bias measurement tool. While the W-IAT is validated for assessing weight bias, alternative measures such as the Implicit Relational Assessment Procedure (IRAP) have been found to offer finer differentiation between implicit attitudes (Epifania et al., 2022). Future research should explore integrating multiple measures to strengthen construct validity.

## Ethical Procedures

The treatment of human participants documentation included training and IRB approval of the study process, was provided to IRB before conducting study procedures. IRB approval number was 08-19-25-1008588.

Informed consent was obtained electronically before participation. Additionally, participants were able to withdraw at any time, and the research involved minimal risk, using the W-IAT. The possible risk for participants could have been expressed as the men feeling embarrassed, emotionally charged, or overwhelmed from taking the W-IAT. How this potential distress was mediated was using clear and concise verbiage used in the informed consent and verifying the individual understand what is being researched prior to completing any study material. Finally, assuring the participants that the results are anonymous and no one was able to link their responses to them will aid in any other distress regarding general research practices. If participants refused to complete the study or would like to withdraw, they were free to do so, and their data was excluded from the study. If needed, a referral list to community resources could be provided to participants who might need additional support or become distressed from participating.

The ethical concerns related to the recruitment process and materials regarding snowballing include the possibility of perceived obligation. As social media outlets were the main target for this study recruitment campaign, it was made clear that participation is voluntary and no signs of forced participation or required participation were noted. As this researcher does not work with others in the targeted field, no forced participation was encouraged by the workplace either by coworker or management. Additionally,

unintentional exclusion bias might be present as the study is intended for a specific population. This is mediated through the use of sending the material to multiple platforms and social media sites. Finally, there could be a misunderstanding of the intent of the study as many might expect there to be a sport or fitness aspect to participate. This was to be mediated by including in the flyer the intent and direct aspects of the study (i.e. implicit weight bias).

Regarding the treatment of data, all data was stored in a secure hard drive and kept separate from other data. Any data collected from survey and test data was collected via secure, encrypted platforms (Millisecond Software). Once collected, the data was downloaded to a password-protected, encrypted drive stored on the researcher's private, access-controlled computer. A back-up copy was stored on a secure cloud drive (e.g., OneDrive or Google Drive) with two-factor authentication enabled. Access to all stored data was restricted solely to the principal investigator (Jessica Jensen). Personal information was not shared with third parties, and only aggregated, de-identified results were presented in the final dissertation and any future publications. All findings were reported in aggregate form (e.g., group comparisons, means, and standard deviations). No raw data or individual results were disclosed in any publication or presentation. Participant responses were not traceable in any report, presentation, or article. Additionally, all digital data will be stored securely for five (5) years following the completion of the study. After five years, all digital data are set to be permanently deleted using secure data erasure software (e.g., DBAN or Eraser) and no hard copies of data were created.

All data was collected anonymously, and the informed consent generated a random assortment number once assigned. That number was the only link to the data filled out form the participants. Participant responses on the demographic questionnaire and Weight-Implicit Association Test (W-IAT) were anonymous. No names, email addresses, IP addresses, or employment identifiers were recorded in association with the study data.

## Summary

The study was conducted via a quantitative correlational research methodology to explore implicit weight bias among men employed in allied health and fitness careers compared to those in non-allied health careers. The study utilized a computerized Weight-Implicit Association Test (W-IAT; Greenwald et al., 2003) alongside a demographic questionnaire hosted via Millisecond's Inquisit Web version 7 platform (Millisecond, n.d.). This study aimed to quantify the implicit weight bias among the targeted male population. Participants were recruited through various social media platforms, employing snowball sampling methods to effectively reach a diverse range of respondents (Leighton et al., 2021). The desired sample size was 109 male participants. A sample size of 109 participants was established based on G*Power analysis to ensure adequate statistical power, with recruitment efforts accommodating potential attrition through broader initial targeting (Faul et al., 2009).

Data collection procedures prioritized ethical standards, anonymity, and data security, incorporating informed consent and unique participant identifiers to ensure accuracy and confidentiality. Statistical analyses were thoroughly outlined, including

multivariate regression analyses, one-way ANOVA, and MANOVA, specifically targeting the evaluation of occupational differences in implicit weight bias and the moderating effects of age and ethnicity (Field, 2022; Tabachnick & Fidell, 2019). Additionally, clear procedures for data cleaning, screening, and addressing statistical assumptions were articulated to maintain the rigor and validity of the study findings.

Finally, the chapter addressed potential threats to internal and external validity, along with comprehensive ethical considerations to reinforce methodological soundness. This methodological framework sets the stage for Chapter 4, where the empirical findings derived from these rigorous analyses were presented and discussed, providing direct insights into the stated research questions and hypotheses.

# Chapter 4: Results

## Introduction

The purpose of this quantitative study was to utilize an electronic weight-implicit association test (W-IAT) to identify any significant differences in the presence of weight bias between two groups (men in allied health position and men who are not in allied health positions). Age and ethnicity were also evaluated as moderating factors for the population of interest.

## Reinstatement of the Research Questions and Hypotheses

RQ1: Is there a statistically significant between-group difference between (a) men employed in allied health or fitness-related careers and (b) men employed in non-allied health or fitness-related careers, in terms of implicit weight bias with the addition of age and ethnicity (Hispanic/Non-Hispanic) as moderating variables?

$H_{o1}$: No statistically significant between-group difference exists.

$H_{a1}$: A statistically significant between-group difference exists.

RQ2: Is there a statistically significant between-group difference regarding age and ethnicity (Hispanic/Non-Hispanic), in terms of implicit weight bias among men employed in allied health or fitness-related careers?

$H_{o2}$: No statistically significant between-group difference exists.

$H_{a2}$: A statistically significant between-group difference exists.

Chapter 4 reviews the data collection process and challenges that presented itself to collect said data. This chapter started by noting data collection procedures, including the time frame, recruitment and response rates, and noted any deviations from the plan

outlined in Chapter 3. Baseline demographic characteristics of the sample are reported, along with an evaluation of how representative the sample is of the target population. Where applicable, results of univariate analyses were provided to justify inclusion of covariates. To note, a multiple regression was planned in chapter 3 as the main data analysis. After analysis, a ANCOVA was decided as the final analysis method in order to best incorporate the covariates and assess any relationships present in the data.

The results section then summarized descriptive statistics, evaluated statistical assumptions, and reported findings for each research question and hypothesis. Exact statistics, probability values, confidence intervals, and effect sizes were included, along with post-hoc or additional analyses when appropriate. Tables and figures illustrated the outcomes in accordance with APA guidelines.

## Data Collection

The time frame data was collected from August 19th to September 9th, 2025. Recruitment was performed via social media and snowballing through word of mouth. The biggest barriers to recruitment were that in order to complete the study, an app needed to be downloaded. Also, some participants were not able to complete the W-IAT on their phone. Additionally, recruiting virtually was also a barrier as the population could not trouble shoot on the spot if they had difficulty with the app or W-IAT and some participants did not complete the tasks due to this issue. Specifically, 19 participants attempted to take the assessment but failed to finish due to their phones not working with the W-IAT. These individuals' results were not included in the final data analysis.

In Chapter 3, the main plan was to utilize social media as the sole recruitment for the study participants. The data collection for this study was conducted after receiving Institutional Review Board (IRB) approval and remained open until the target sample size was reached. Recruitment occurred exclusively through social media platforms, as described in Chapter 3, using a snowball sampling method to increase reach and participant diversity. Participants were directed to an electronic link where they completed a demographic questionnaire followed by the Weight Implicit Association Test (W-IAT) via Millisecond's Inquisit Web platform. All data was collected anonymously and securely stored as directed in Chapter 3. Overall, there was one discrepancy between the proposed data collection procedures outlined in Chapter 3 and the methods carried out in practice. As for ethnicity being collected, due to constraints from the program used, ethnicity was collected as Hispanic or Latino, Non-Hispanic or Latino, and Unknown. Race was also collected to see if there was a presence of difference in the overall comparison.

In relation to representation and external validity, race was also collected along with ethnicity in order to identify other possible differences, and it was identified that the participants gathered through snowballing had some limitations as a majority (58.5%) of the population stated being White. The region in which the participants completed the study was not collected.

# Results

## Descriptive Statistics

The sample size included 118 men with the mean age being 40-year-old (SD = 10.83). Of the sample participants, 58.5% (n = 69) were employed in allied health or fitness-related careers, and 41.5% (n = 49) represented non–allied health or fitness-related careers. The majority of participants identified as White (58.5%), with Hispanic or Latino participants representing 13.6% of the sample. Black or African American participants represented 11.0% (n = 13) of the sample, while 9.3% (n = 11) reported being of more than one race (Black/White). Native Hawaiian or Other Pacific Islander participants comprised 8.5% (n = 10). Smaller proportions of the sample identified as South Asian (3.4%, n = 4), East Asian (1.7%, n = 2), or American Indian/Alaska Native (1.7%, n = 2). An additional 5.9% (n = 7) selected “Other” as their racial category. These distributions indicate that while White participants constituted the largest proportion, the sample reflected representation across multiple racial groups. The remainder of the population specified their race as the following: Black or African American (11.0%, n = 13), Native Hawaiian or Other Pacific Islander (8.5%, n = 10), South Asian (3.4%, n = 4), East Asian (1.7%, n = 2), or American Indian/Alaska Native (1.7%, n = 2). An additional 5.9% (n = 7) selected “Other” as their racial category.

**Table 1**

*Distribution of Occupational Groups (N = 118)*

| Occupation group | Frequency | Valid % |
|---|---|---|
| Non–allied health or fitness-related | 49 | 41.5 |
| Allied health or fitness-related | 69 | 58.5 |
| Ethnicity (Hispanic/Non-Hispanic) | | |
| Hispanic or Latino | 16 | 13.6 |
| Not Hispanic | 88 | 74.6 |
| Unknown | 14 | 11.9 |
| **Total** | **118** | **100** |

**Table 2**

*Distribution of Participants by Race (N = 118)*

| Race | Frequency | Valid % |
|---|---|---|
| White | 69 | 58.5 |
| South Asian | 4 | 3.4 |
| Native Hawaiian or Other Pacific Islander | 10 | 8.5 |
| More than one race – Black/White | 11 | 9.3 |
| East Asian | 2 | 1.7 |
| Black or African American | 13 | 11.0 |
| American Indian/Alaska Native | 2 | 1.7 |
| Other | 7 | 5.9 |
| **Total** | **118** | **100.0** |

In Chapter 3, a simple multiple regression was identified as the planned statistical approach for examining the relationship between occupation, implicit weight bias, and the moderating variables of age and ethnicity. However, during the analysis phase, an ANCOVA was performed instead. This adjustment was made because occupation was a categorical independent variable with two groups (allied health versus non–allied health), while the W-IAT score was a continuous dependent variable. ANCOVA provided a more

appropriate test of between-group differences while controlling for age and ethnicity as covariates. Although the specific analytic technique differed from the initial plan, the research questions and hypotheses were addressed as proposed.

Regarding the statistical assumptions required for the ANCOVA, the assumption of homogeneity of variance was met, as Levene's tests (Table 3) were nonsignificant across all models, F (1,116) = 0.064, p = .800; F(1,116) = 0.011, p = .917; and F (1,116) = 0.044, p = .835. The assumption of homogeneity of regression slopes was also satisfied, with all interaction terms between occupation and age, and occupation and ethnicity, nonsignificant (all *p*-values > .05). Finally, correlation analyses showed no evidence of problematic multicollinearity among the covariates. Collectively, these results confirmed that the assumptions for ANCOVA were satisfied, supporting the validity of the analyses and subsequent interpretation of findings.

**Table 3**

*Levene's Test (N = 118)*

| *F* | *p* |
|---|---|
| .064 | .800 |

**Table 4**

*Descriptive Statistics and Correlation Between Variables (N = 118)*

| | *M* | *SD* | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|
| 1. Occupation | 0.585 | 0.495 | -- | | | | |
| 2. W-IAT | 0.283 | 0.416 | -0.171 | -- | | | |
| 3. Age | 40.653 | 10.833 | 0.045 | 0.077 | -- | | |
| 4. Hispanic or Latino | 0.136 | 0.344 | -0.018 | -0.041 | -0.065 | -- | |
| 5. Not Hispanic or Latino | 0.746 | 0.437 | -0.097 | 0.149 | -0.001 | -.678** | -- |
| 6. Unknown | 0.119 | 0.325 | 0.150 | -0.157 | 0.070 | -0.145 | -.628** |

*Note. M* = average; *SD* = standard deviation.

***p* < .01; **p* < .05.

**Results From W-IAT**

Table 5 noted all the participants separated into Allied health and Non-Allied health occupations. The results from the W-IAT for all participants are presented in Table 6. The table presents the distribution of weight bias preferences as measured by the W-IAT. The categorization was based on D-score ranges. The results show that 16.9% of participants reported little to no preference, while the remaining participants demonstrated varying degrees of implicit bias. Specifically, 2.5% expressed a strong nonconforming preference, 7.6% a moderate nonconforming preference, and 5.1% a slight nonconforming preference. Conversely, 20.3% of results showed a slight conforming preference, 30.5% a moderate conforming preference, and 16.9% a strong conforming preference. These findings indicate that the majority of participants leaned toward conforming weight bias preferences, with moderate conforming bias being the most frequently observed category.

**Table 5**

*Test Between-Groups for Occupation (N = 118)*

| Occupation | *p* | 95% Cl | |
|---|---|---|---|
| | | Lower | Upper |
| 1. Allied health or fitness-related careers | 0.061 | -0.007 | 0.301 |
| 2. Non-allied health or fitness-related careers | 0.061 | -0.301 | 0.007 |

*Note.* Dependent variable = W-IAT; adjustment for multiple comparisons: Sidak.

**Table 6**

*Distribution of Weight Bias Preferences (N = 118)*

| Preference category | Frequency |
|---|---|
| Strong preference (nonconforming) | 3 |
| Moderate preference (nonconforming) | 9 |
| Slight preference (nonconforming) | 6 |
| Little to no preference | 20 |
| Slight preference (conforming) | 24 |
| Moderate preference (conforming) | 36 |
| Strong preference (conforming) | 20 |
| **Total** | **118** |

*Note.* Preferences are based on W-IAT D-score categorizations.

**Results From Research Question 1**

Research question 1 sought to explore if there is a statistically significant between-group difference between men employed in allied health or fitness-related careers and men employed in non-allied health or fitness-related careers, in terms of implicit weight bias with the addition of age and ethnicity (Hispanic verse non-Hispanic) as moderating variables. Table 7 presents the results of the ANCOVA examining implicit weight bias (W-IAT) scores while controlling for age and ethnicity (Hispanic verse non-

Hispanic). Neither age ($F(1, 112) = 0.673$, $p = .414$, ETA = .006), nor ethnicity ($F(1, 112) = 0.157$, $p = .693$, ETA = .001), were statistically significant predictors of W-IAT scores. Similarly, the main effect of occupation was not significant, $F(1, 112) = 0.553$, $p = .459$, ETA = .005. Interaction effects were also non-significant as age with occupation ($F(1, 112) = 0.083$, $p = .774$, ETA = .001) and ethnicity with occupation ($F(1, 112) = 0.016$, $p = .899$, ETA < .001). The overall model accounted for only 3.9% of the variance in W-IAT scores ($R^2 = .039$, Adjusted $R^2 = -.004$), indicating negligible explanatory power. In summary, these results suggest that implicit weight bias did not differ significantly by occupation when controlling for age and ethnicity, and no moderation effects were observed.

Additionally, as noted for Table 5, repeated again, expressed the results of the between-group comparison of occupation for implicit weight bias (W-IAT). Participants in allied health or fitness-related careers were compared with those in non-allied health or fitness-related careers. The group difference approached but did not reach statistical significance, $p = .061$. The 95% confidence intervals for both groups included zero (Allied health group: CI [−0.007, 0.301]; Non-allied health group: CI [−0.301, 0.007]), indicating that the observed differences were not statistically reliable.

Overall, these findings suggest that while allied health participants showed slightly higher W-IAT scores on average, occupation was not a statistically significant predictor of implicit weight bias when using Sidak-adjusted comparisons.

**Table 7**

*ANCOVA Test for W-IAT With Age and Hispanic or Latino (N = 118)*

| | Type III sum of squares | Mean square | *F* | *p* | Partial ETA squared |
|---|---|---|---|---|---|
| Age | 0.117 | 0.117 | 0.673 | 0.414 | 0.006 |
| Hispanic or Latino | 0.027 | 0.027 | 0.157 | 0.693 | 0.001 |
| Occupation | 0.096 | 0.096 | 0.553 | 0.459 | 0.005 |
| Age * Occupation | 0.014 | 0.014 | 0.083 | 0.774 | 0.001 |
| Hispanic or Latino * Occupation | 0.003 | 0.003 | 0.016 | 0.899 | 0.000 |
| Error | 19.418 | 0.173 | | | |
| Total | 29.674 | | | | |
| Corrected total | 20.206 | | | | |

*Note.* Dependent variable = W-IAT; *R* squared = .039 (adjusted *R* squared = -.004).

**Table 8**

*Test Between-Groups for Occupation (N = 118)*

| | | 95%Cl | |
|---|---|---|---|
| Occupation | *P* | Lower | Upper |
| 3. Allied health or fitness-related careers | 0.061 | -0.007 | 0.301 |
| 4. Non-allied health or fitness-related careers | 0.061 | -0.301 | 0.007 |

*Note*. Dependent variable = W-IAT; adjustment for multiple comparisons: Sidak.

**Moderation Models**

When assessing the moderation variables further, Table 9 presented the moderation analysis examining whether age and Hispanic or Latino moderated the relationship between occupation and implicit weight bias (W-IAT). The main effect of occupation was not statistically significant ($b = -0.143$, SE = 0.084, $t(112) = -1.708$, p =

.090, 95% CI [−0.309, 0.023]). Similarly, age (b = 0.002, p = .730) and Hispanic or Latino (b = −0.031, p = .858) were not significant predictors of W-IAT.

The interaction terms were also nonsignificant. The occupation and age interaction was not significant, (b = 0.002, SE = 0.007, t(112) = 0.288, p = .774, 95% CI [−0.012, 0.016]). Likewise, the occupation and Hispanic or Latino interaction was nonsignificant, (b = −0.029, SE = 0.226, t(112) = −0.127, p = .899, 95% CI [−0.477, 0.420]).

Taken together, these results indicate that neither age nor Hispanic or Latino moderated (i.e. ethnicity) had a relationship between occupation and implicit weight bias. All predictors and interactions were nonsignificant, and the confidence intervals included zero, reinforcing the absence of reliable effects.

**Table 9**

*Moderation Analysis of Occupation Moderated by Age and Hispanic or Latino (N = 118)*

| Variable | Estímate | *SE* | *t* | *p* | 95% CI | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| Occupation | -.143 | .084 | -1.708 | .090 | -.309 | .023 |
| Age | .002 | .006 | .346 | .730 | -.009 | .013 |
| Occupation * Age | .002 | .007 | .288 | .774 | -.012 | .016 |
| Hispanic or Latino | -.031 | .170 | -.179 | .858 | -.368 | .307 |
| Occupation * Hispanic or Latino | -.029 | .226 | -.127 | .899 | -.477 | .420 |

*Note.* Dependent variable = W-IAT; *SE* = standard error.

In assessing ethnicity related to non-Hispanic/Latino individuals, Table 9 presents the moderation analysis testing whether age and Non-Hispanic or Latino moderated the relationship between occupation and implicit weight bias (W-IAT). The main effect of occupation was not statistically significant, (*b* = −0.274, *SE* = 0.160, *t*(112) = −1.716, *p* =

.089, 95% CI [−0.590, 0.042]). Age (*b* = 0.002, *p* = .725) and Non-Hispanic or Latino (*b* = 0.012, *p* = .932) were also not significant predictors of W-IAT scores.

The interaction terms were nonsignificant. The occupation and age interaction was not significant, (*b* = 0.002, *SE* = 0.007, *t*(112) = 0.348, *p* = .729, 95% CI [−0.012, 0.017]). Similarly, the occupation and Non-Hispanic or Latino interaction did not reach significance (*b* = 0.180, *SE* = 0.182, *t*(112) = 0.990, *p* = .324, 95% CI [−0.181, 0.542]).

Overall, these results suggest that neither age nor ethnicity significantly moderated the relationship between occupation and implicit weight bias. All predictors and interaction terms were nonsignificant, and confidence intervals included zero, reinforcing the lack of reliable effects.

**Table 10**

*Moderation Analysis of Occupation Moderated by Age and Non-Hispanic or Latino (N = 118)*

| Variable | Estimate | *SE* | *t* | *p* | 95% CI | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| Occupation | -.274 | .160 | -1.716 | .089 | -.590 | .042 |
| Age | .002 | .005 | .353 | .725 | -.009 | .013 |
| Occupation * Age | .002 | .007 | .348 | .729 | -.012 | .017 |
| Not Hispanic or Latino | .012 | .146 | .085 | .932 | -.277 | .302 |
| Occupation * Not Hispanic or Latino | .180 | .182 | .990 | .324 | -.181 | .542 |

*Note.* Dependent variable = W-IAT; *SE* = standard error.

When assessing individuals who noted having an unknown ethnicity, Table 10 presented the moderation analysis testing whether age and Unknown moderated the relationship between occupation and implicit weight bias (W-IAT). The main effect of occupation was not statistically significant (b = −0.105, SE = 0.081, t(112) = −1.300, p =

.196, 95% CI [−0.266, 0.055]). Age (b = 0.002, p = .717) and Unknown (b = 0.030, p = .903) also did not significantly predict W-IAT scores.

The interaction terms were likewise nonsignificant. The occupation and age interaction was not significant (b = 0.003, SE = 0.007, t(112) = 0.438, p = .662, 95% CI [−0.011, 0.017]). Similarly, the occupation and Unknown interaction was nonsignificant, (b = −0.279, SE = 0.280, t(112) = −0.998, p = .320, 95% CI [−0.834, 0.275]).

Overall, these findings suggest that neither age nor Unknown moderated the relationship between occupation and implicit weight bias. All predictors and interactions were nonsignificant, and their confidence intervals included zero.

**Table 11**

*Moderation Analysis of Occupation Moderated by Age and Unknown (N = 118)*

| | | | | | 95% CI | |
|---|---|---|---|---|---|---|
| Variable | Estímate | *SE* | *t* | *p* | Lower | Upper |
| Occupation | -.105 | .081 | -1.300 | .196 | -.266 | .055 |
| Age | .002 | .005 | .364 | .717 | -.009 | .013 |
| Occupation * Age | .003 | .007 | .438 | .662 | -.011 | .017 |
| Unknown | .030 | .245 | .122 | .903 | -.455 | .515 |
| Occupation * Unknown | -.279 | .280 | -.998 | .320 | -.834 | .275 |

*Note.* Dependent variable = W-IAT; *SE* = standard error.

## Results From Research Question 2

### *Model 1: Age*

Research question 2 sought to detect if there is a significant between-group difference regarding age and ethnicity, in terms of implicit weight bias among men employed in allied health or fitness-related careers. Participants employed in non–allied health or fitness-related careers had a mean age of M = 40.08 years (SD = 10.807, n =

49), whereas those in allied health or fitness-related careers had a mean age of M = 41.06 years (SD = 10.913, n = 69). The Levene's test of homogeneity of variance noted no significance (F(1, 116) = 0.144, p = .705), indicating that the assumption of equal variances was satisfied and supporting the use of parametric procedures in the following analyses. After completing the test of homogeneity, Table 11 presents the test of homogeneity of regression slopes for implicit weight bias (W-IAT). The interaction between Occupation and W-IAT was not significant (F(1, 116) = 0.550, p = .578, ETA = .009). These findings indicate that the assumption of homogeneity of regression slopes was satisfied, as no significant interaction was observed (p > .05). This supports the validity of the subsequent ANCOVA analyses. Overall, there was no evidence that age varied systematically as a function of W-IAT or occupation in this sample and the null hypothesis is accepted in relation to age. To note, Table 12 presents the ANCOVA results examining age with W-IAT and occupation entered as predictors. Neither W-IAT, F (1, 112) = 0.865, p = .354, ETA = .007, nor occupation, F (1, 112) = 0.400, p = .528, ETA = .003, were significant predictors. The model explained a negligible proportion of variance ($R^2$ = .009; Adjusted $R^2$ = −.008).

**Table 12**

*Test of Homogeneity of Regression Slopes (N = 118)*

| | Type III sum of squares | Mean square | *F* | *p* | Partial ETA squared |
|---|---|---|---|---|---|
| Occupation * W-IAT | 130.184 | 65.092 | 0.550 | 0.578 | 0.009 |
| Error | 13600.570 | 118.266 | | | |
| Total | 208741.000 | | | | |
| Corrected total | 13730.754 | | | | |

*Note.* Dependent variable = age; *R* squared = .009 (adjusted *R* squared = -.008).

**Table 13**

*ANCOVA Test for Age With W-IAT (N = 118)*

| | Type III sum of squares | Mean square | *F* | *p* | Partial ETA squared |
|---|---|---|---|---|---|
| W-IAT | 102.265 | 102.265 | 0.865 | 0.354 | 0.007 |
| Occupation | 47.352 | 47.352 | 0.400 | 0.528 | 0.003 |
| Error | 13601.177 | 118.271 | | | |
| Total | 208741.000 | | | | |
| Corrected total | 13730.754 | | | | |

*Note.* Dependent variable = age; *R* squared = .009 (adjusted *R* squared = -.008).

***Model 2: Ethnicity/Race***

Ethnicity was measured between Hispanic, Non-Hispanic, and other due to the limitations of the survey collection method. Regarding ethnicity, Table 13 presented the test of homogeneity of regression slopes for implicit weight bias (W-IAT). The interaction Occupation and W-IAT was not significant (F(1, 116) = 1.396, p = .252, ETA = .024). These findings indicate that the assumption of homogeneity of regression slopes was satisfied, as no significant interaction was observed (p > .05). This supports the validity of the subsequent ANCOVA analyses using Not Hispanic or Latino as the dependent variable.

**Table 14**

*Test of Homogeneity of Regression Slopes (N = 118)*

| | Type III sum of squares | Mean square | *F* | *p* | Partial ETA squared |
|---|---|---|---|---|---|
| Occupation * W-IAT | 0.530 | 0.265 | 1.396 | 0.252 | 0.024 |
| Error | 21.842 | 0.190 | | | |
| Total | 88.000 | | | | |
| Corrected total | 22.373 | | | | |

*Note.* Dependent variable = Not Hispanic or Latino; *R* squared = .024 (adjusted *R* squared = .007).

Additionally, Table 14 displayed the descriptive statistics of W-IAT by occupational group for Not Hispanic or Latino. Participants in non–allied health or fitness-related careers had M = 0.800 (SD = 0.407, n = 49), whereas those in allied health or fitness-related careers had M = 0.710 (SD = 0.457, n = 69). Table 3 noted Levene's test of homogeneity of variance. The test was not significant (F(1, 116) = 3.494, p = .064), indicating that the assumption of equal variances was satisfied and supporting the use of parametric procedures in the subsequent analyses.

**Table 15**

*Descriptive Statistics by Not Hispanic or Latino for the W-IAT (N = 118)*

| Occupation | *M* | *SD* | *N* |
|---|---|---|---|
| 1. Non–allied health or fitness-related careers | 0.800 | 0.407 | 49 |
| 2. Allied health or fitness-related careers | 0.710 | 0.457 | 69 |

*Note. M* = average; *SD* = standard deviation.

**Table 16**

*Levene's Test (N = 118)*

| *F* | *p* |
|---|---|
| 3.494 | 0.064 |

When accounting for the W-IAT and occupational scores, Table 15 presents the ANCOVA results examining Not Hispanic or Latino with W-IAT and occupation entered as predictors. W-IAT was not a significant predictor ( F(1, 116) = 2.136, p = .147, ETA = .018), and occupation was also nonsignificant (F(1, 116) = 0.623, p = .431, ETA = .005). The model explained a small proportion of variance ($R^2$ = .027; Adjusted $R^2$ = .011). In summary, Non-Hispanic or Latino participants did not vary systematically as a function of W-IAT or occupation in this sample.

**Table 17**

*ANCOVA Test for Not Hispanic or Latino With W-IAT (N = 118)*

| | Type III sum of squares | Mean square | *F* | *p* | Partial ETA squared |
|---|---|---|---|---|---|
| W-IAT | 0.404 | 0.404 | 2.136 | 0.147 | 0.018 |
| Occupation | 0.118 | 0.118 | 0.623 | 0.431 | 0.005 |
| Error | 21.758 | 0.189 | | | |
| Total | 88.000 | | | | |
| Corrected total | 22.373 | | | | |

*Note.* Dependent variable = Not Hispanic or Latino *R*; squared = .027 (adjusted *R* squared = .011).

In looking at between group adjustments, Table 16 presented the between-groups comparison for Not Hispanic or Latino across occupational groups. The group difference was not statistically significant (p = .431). The 95% confidence intervals included zero

for both groups (Non-allied: CI [−0.098, 0.228]; Allied: CI [−0.228, 0.098]), indicating that the observed difference was not reliable after Sidak adjustment for multiple comparisons. In summary, occupation was not associated with differences in Not Hispanic or Latino.

**Table 18**

*Test Between-Groups for Occupation (N = 118)*

| | | | 95% CI | |
|---|---|---|---|---|
| | Occupation | *p* | Lower | Upper |
| 1. | Non–allied health or fitness-related careers | 0.431 | -0.098 | 0.228 |
| 2. | Allied health or fitness-related careers | 0.431 | -0.228 | 0.098 |

*Note.* Dependent variable = Not Hispanic or Latino; adjustment for multiple comparisons: Sidak.

As some subjects reported their ethnicity as unknown, a separate assessment was run to see if these individuals would have a difference in the presence of weight bias. Table 17 presented the test of homogeneity of regression slopes for implicit weight bias (W-IAT). The interaction Occupation and W-IAT was not significant ($F(1, 116) = 1.486$, $p = .231$, ETA = .025). These findings indicate that the assumption of homogeneity of regression slopes was satisfied, as no significant interaction was observed ($p > .05$). This supports the validity of the subsequent ANCOVA analyses using Unknown as the dependent variable. Table 18 displayed the descriptive statistics of W-IAT by occupational group for Unknown. Participants in non–allied health or fitness-related careers had $M = 0.060$ ($SD = 0.242$, $n = 49$), whereas those in allied health or fitness-

related careers had M = 0.160 (SD = 0.369, n = 69). Table 19 presented the Levene's test of homogeneity of variance. The test was significant, F(1, 116) = 10.805, p = .001, indicating that the assumption of equal variances was not satisfied. This violation suggests caution in interpreting group comparisons; robust or adjusted procedures are recommended where available.

**Table 19**

*Test of Homogeneity of Regression Slopes (N = 118)*

| | Type III sum of squares | Mean square | *F* | *p* | Partial ETA squared |
|---|---|---|---|---|---|
| Occupation * W-IAT | 0.311 | 0.155 | 1.486 | 0.231 | 0.025 |
| Error | 12.028 | 0.105 | | | |
| Total | 14.000 | | | | |
| Corrected total | 12.339 | | | | |

*Note.* Dependent variable = Unknown; *R* squared = .025 (adjusted *R* squared = .008).

**Table 20**

*Descriptive Statistics by Unknown for the W-IAT (N = 118)*

| Occupation | *M* | *SD* | *N* |
|---|---|---|---|
| 1. Non–allied health or fitness-related careers | 0.060 | 0.242 | 49 |
| 2. Allied health or fitness-related careers | 0.160 | 0.369 | 69 |

*Note. M* = average; *SD* = standard deviation.

**Table 21**

*Levene's Test (N = 118)*

| *F* | *p* |
|---|---|
| 10.805 | 0.001 |

When completing the ANCOVA for ethnicity related to those who identified as unknown, Table 20 presented the ANCOVA results examining Unknown with W-IAT and occupation entered as predictors. W-IAT was not a significant predictor ($F(1, 116) = 2.125$, $p = .148$, $\eta^2 = .018$), and occupation was also nonsignificant, $F(1, 116) = 1.860$, $p = .175$, ETA = .016. The model explained a small proportion of variance ($R^2 = .040$; Adjusted $R^2 = .023$). In summary, those who identified as Unknown did not vary systematically as a function of W-IAT or occupation in this sample. Additionally, when comparing groups related to occupation, Table 21 presented the between-groups comparison for Unknown across occupational groups. The group difference was not statistically significant ($p = .175$). The 95% confidence intervals included zero for both groups (Non-allied: CI [−0.204, 0.038]; Allied: CI [−0.038, 0.204]), indicating that the observed difference was not reliable after Sidak adjustment for multiple comparisons. In summary, occupation was not associated with differences in Unknown.

**Table 22**

*ANCOVA Test for Unknown With W-IAT (N = 118)*

| | Type III sum of squares | Mean square | *F* | *p* | Partial ETA squared |
|---|---|---|---|---|---|
| W-IAT | 0.219 | 0.219 | 2.125 | 0.148 | 0.018 |
| Occupation | 0.192 | 0.192 | 1.860 | 0.175 | 0.016 |
| Error | 11.844 | 0.103 | | | |
| Total | 14.000 | | | | |
| Corrected total | 12.339 | | | | |

*Note*. Dependent variable = Unknown; *R* squared = .040 (adjusted *R* squared = .023).

**Table 23**

*Test Between-Groups for Occupation (N = 118)*

| Occupation | *p* | 95% CI Lower | 95% CI Upper |
|---|---|---|---|
| 1. Non–allied health or fitness-related careers | 0.175 | -0.204 | 0.038 |
| 2. Allied health or fitness-related careers | 0.175 | -0.038 | 0.204 |

*Note.* Dependent variable = Unknown; adjustment for multiple comparisons: Sidak.

**Results of Post-Hoc Analyses**

Post-hoc analyses were completed after consulting with a statistician, the use the Sidak-adjusted comparisons were also conducted to examine potential differences in implicit weight bias between occupational groups. Tables 24, 25, and 26 showed the findings from the three analyses. Results indicated that differences between allied health and non-allied health participants approached but did not sustain statistical significance (p-values ranged from .061 to .079). Although the result showed moderate significance, the 95% confidence intervals for all comparisons crossed zero, suggesting that the observed differences were not statistically reliable.

**Table 24**

*Test Between-Groups for Occupation (N = 118)*

| Occupation | *p* | 95% CI Lower | 95% CI Upper |
|---|---|---|---|
| 1. Allied health or fitness-related careers | 0.079 | -0.016 | 0.294 |
| 2. Non-allied health or fitness-related careers | 0.079 | -0.294 | 0.016 |

*Note.* Dependent variable = W-IAT; adjustment for multiple comparisons: Sidak.

**Table 25**

*Test of Homogeneity of Regression Slopes (N = 118)*

| Type III sum of squares | Mean square | *F* | *p* | Partial ETA squared |
|---|---|---|---|---|
| 0.430 | 0.215 | 1.268 | 0.285 | 0.022 |
| 0.413 | 0.206 | 1.217 | 0.300 | 0.021 |
| 19.144 | 0.169 | | | |
| 29.674 | | | | |
| 20.206 | | | | |

*Note.* Dependent variable = W-IAT; *R* squared = .053 (adjusted *R* squared = .019).

**Table 26**

*Test of Homogeneity of Regression Slopes (N = 118)*

| | Type III sum of squares | Mean Stablequare | *F* | *p* | Partial ETA squared |
|---|---|---|---|---|---|
| Occupation * Age | 0.415 | 0.208 | 1.236 | 0.294 | 0.021 |
| Occupation * Unknown | 0.574 | 0.287 | 1.708 | 0.186 | 0.029 |
| Error | 18.982 | 0.168 | | | |
| Total | 29.674 | | | | |
| Corrected total | 20.206 | | | | |

*Note.* Dependent variable = W-IAT; *R* squared = .061 (adjusted *R* squared = .027).

## Summary

This study examined implicit weight bias among men employed in allied health or fitness-related careers compared to men in non–allied health careers, with age and ethnicity included as potential moderators. A total of 118 men were recruited through social media using snowball sampling, and all completed the demographic survey and the Weight Implicit Association Test (W-IAT; Greenwald et al., 2003). Recruitment occurred as planned, and one discrepancy in data collection were identified (ethnicity being collected as Hispanic/Latino verses non-Hispanic/Latino). The mean age of participants was 40 years (SD = 10.83). Most were employed in allied health or fitness-related careers (58.5%, n = 69), with the remainder in non–allied health careers (41.5%, n = 49). The majority of participants identified as White (58.5%), while smaller proportions identified as Hispanic or Latino (13.6%), Black or African American (11.0%), more than one race (9.3%), Native Hawaiian or Other Pacific Islander (8.5%), South Asian (3.4%), East Asian (1.7%), American Indian/Alaska Native (1.7%), or “Other” (5.9%).

Assumption testing confirmed that the requirements for ANCOVA were met, including homogeneity of variance, homogeneity of regression slopes, and absence of multicollinearity (Field, 2022; Tabachnick & Fidell, 2019). Although multiple regression was originally proposed in Chapter 3, ANCOVA was conducted instead as the more appropriate method given the categorical nature of the independent variable. Results indicated no statistically significant differences in W-IAT scores between allied health and non–allied health participants. Effect sizes were small, and neither age nor ethnicity significantly predicted implicit weight bias or moderated occupational group differences.

Post-hoc comparisons suggested trends toward higher bias among non–allied health participants; however, these did not reach significance, and all confidence intervals crossed zero.

In summary, implicit weight bias was present in the sample but was not explained by occupation, age, or ethnicity. These results suggest that implicit weight bias may be broadly distributed across occupational and demographic groups rather than specific to men in health-related careers. Chapter 5 provides an interpretation of these results in relation to existing literature and implicit bias theory (Greenwald & Banaji, 1995), discusses study limitations, and offers recommendations for future research, practice, and social change.

# Chapter 5: Discussion, Conclusions, and Recommendations

## Introduction

The purpose of this quantitative study was to examine the presence of implicit weight bias among men in allied health and fitness careers compared to men in non-allied health careers, using the Weight-Implicit Association Test (W-IAT). The study also evaluated whether age and ethnicity served as moderating factors in these associations. Guided by Implicit Bias Theory (Greenwald & Banaji, 1995), the study sought to determine if unconscious weight attitudes influence professional practice in a population underrepresented in existing literature. This research was conducted to address the gap regarding implicit weight bias in male allied health professionals, an important population given their direct influence on patient and client outcomes

The key findings of this study indicated that implicit weight bias was present among participants, yet no statistically significant differences were observed between men employed in allied health or fitness-related careers and those in non–allied health careers. Similarly, age and ethnicity did not significantly predict or moderate implicit weight bias. Although post-hoc analyses suggested slight trends toward higher bias among non–allied health participants, these differences were not statistically reliable. Overall, the findings highlight that implicit weight bias may be broadly distributed across occupational and demographic groups rather than confined to specific subsets of men.

## Interpretation of the Findings

The findings of this study indicated that no statistically significant differences in implicit weight bias were observed between men employed in allied health or fitness-

related careers and men in non–allied health careers, even when accounting for age and ethnicity. However, there was a general presence of weight bias for the men, which aligned with prior research from Nolan et al. (2013). This outcome both confirms and extends existing knowledge. Prior research has shown that weight bias is pervasive across multiple settings and not confined to healthcare professionals (Alberga et al., 2019; Phelan et al., 2014). The lack of significant group differences in this study supports that conclusion, suggesting that implicit weight bias is a widespread phenomenon among men regardless of occupational background. At the same time, the finding disconfirms expectations based on earlier studies in which healthcare providers demonstrated higher levels of implicit weight bias relative to other groups (Agerström & Rooth, 2011; Sabin et al., 2012). This suggests that bias may not be as strongly tied to professional training or career field as previously thought, underscoring the need for further investigation.

The absence of moderating effects of age and ethnicity similarly extends knowledge in the field. Prior studies suggested that demographic characteristics could influence expressions of implicit bias (Garcia et al., 2016; Sabin et al., 2012), yet the present study found no such effects. This may indicate that implicit weight bias operates as a robust, automatic attitude that transcends demographic differences, aligning with Greenwald and Banaji's (1995) implicit bias theory. According to the theory, implicit associations are socially learned and widely shared, meaning they are less dependent on individual characteristics and more reflective of cultural norms. Thus, the consistency of bias across groups in this study reinforces the theory's claim that implicit attitudes are pervasive and not always predicted by explicit social categories.

Although results were not statistically significant, post-hoc comparisons suggested mild differences in bias, with non–allied health participants trending toward slightly higher scores than allied health participants ($p = .061$; allied health CI [−0.007, 0.301]; non–allied health CI [−0.301, 0.007]). These small effects may reflect subtle occupational differences that could emerge more strongly in larger or more diverse samples. This aligns with calls in the literature for continued research on implicit bias among underexamined populations (Abbott et al., 2022). Therefore, while the findings of this study do not provide evidence of clinically significant group differences, they extend the literature by highlighting the stability of implicit weight bias across occupational and demographic groups and by emphasizing the need for further studies to clarify small but potentially meaningful effects.

## Limitations of the Study

### Completion of the W-IAT

The first significant limitation to this study involved the data collection method. The W-IAT was not formulated well to be conducted on a cell phone. Many participants were discouraged from taking the W-IAT and did not complete the task due to not being able to complete it on their phones. Future studies should note this when using a W-IAT or similar data collection. Additionally, the W-IAT needed to be completed through the use of an application downloaded on the phone. Many potential participants did not want to complete this portion and found that to be a limitation to completing the task.

**Sample Size for ANCOVA Analyses**

As noted in Chapter 1, sample size was a limitation to this study. Although the overall sample included 118 participants, the subgroup sizes used in the ANCOVA models may have been insufficient for detecting small effects. With modest statistical power, especially once covariates were included, the ability to identify statistically significant associations was limited. This constraint reduces confidence in the results reported. Also noted in Chapter 1 was that recruitment of male participant would be more challenging than female patients, and this still held for the recruitment process. The men recruited had a difficult time passing on the information to other male potential participants, which caused the study to take longer than anticipated to recruit for.

**Uneven Distribution of Participants by Ethnicity**

The ethnicity variable was heavily skewed, with most participants identifying as non-Hispanic (74.6%), compared to 13.6% identifying as Hispanic or Latino and 11.9% unknown. This imbalance restricts the validity of group comparisons, as small subgroup sizes may mask meaningful differences and limit the generalizability of the findings. Additionally, snowballing gave way for limited variability overall as the sample were of similar backgrounds, giving way to limited variations.

**Limited Detail in the Ethnicity Variable**

Ethnicity was self-reported with broad categories (Hispanic/Latino vs. non-Hispanic) that do not capture cultural heterogeneity, or the nuances of participants lived experiences. As a result, meaningful distinctions in cultural background, acculturation, or identity could not be examined. For example, as Table 5 indicated, White racial identity

was predominant across all ethnic categories, which may help explain the absence of significant between-group differences. However, because the ethnicity variable did not adequately reflect cultural diversity, the explanatory value of this covariate was limited.

## Recommendations

The first recommendation for future research would be to collect samples with more purposeful and direct means. This would include directly targeting sites or individuals directly to observe data differences. As this study utilized snowballing, it was limited to the online and communities directly linked to others who were directly connected within a similar community. This also affected the ability to find significant differences in multiple areas.

Another recommendation for future research would be to increase the sample size. Although the sample size was found to be adequate in numbers, given the trend of the data, that is more participants were collected, there might have been a more prevalent and noticeable effect size or significance in more participants were collected. Also, future studies should include a larger variety in ages to see if there is a difference in age specifically. As with the sample collected were of similar range in age, their life events and bias might be similar as with their cohort, the learned bias is also similar.

Finally, adding another implicit association task to compare results would be affecting to verify the presence of weight bias in these populations. While men are still considered an understudied population, having multiple types of implicit tasks would be affecting in addressing construct validity.

# Implications

## Positive Social Change

The results of this study suggest that implicit weight bias is a pervasive issue that extends across occupational and demographic groups, indicating the need for broad societal awareness and intervention (Greenwald & Banaji, 1995; Phelan et al., 2014). By recognizing and addressing implicit weight bias, healthcare and fitness professionals, as well as the wider community, can work toward reducing stigma, improving equitable treatment, and fostering inclusive environments (Alberga et al., 2019). These efforts have the potential to enhance both physical and mental health outcomes and contribute to meaningful social change by promoting respect for body diversity and reducing the negative impact of weight-based discrimination (Abbott et al., 2022; Phelan et al., 2015).

## Implementation on an Individual Level

At the individual level, the findings highlight the importance of self-awareness regarding implicit weight bias. Because bias was present regardless of occupation, age, or ethnicity (Hispanic/non-Hispanic), these results suggest that men across diverse groups may benefit from opportunities to recognize and address their own unconscious attitudes. Prior research shows that implicit attitudes can influence behaviors even in the absence of explicit endorsement (Greenwald & Banaji, 1995; Greenwald et al., 2003). Increased awareness may therefore promote more respectful interactions, reduce stigmatizing behaviors, and improve mental health outcomes for individuals living in larger bodies (Phelan et al., 2014).

### Implementations on a Family Level

At the family level, reducing implicit weight bias can help create healthier dynamics by challenging stereotypes that may contribute to shame or stigma within households. Families who recognize the presence of weight bias may be better positioned to foster supportive environments that emphasize overall health and well-being rather than weight alone. Prior research has linked weight bias to negative psychological outcomes such as lowered self-esteem and depression (Alberga et al., 2019; Phelan et al., 2015), suggesting that family-level interventions to reduce stigma could improve both mental and physical health across generations.

### Implementations on a Societal/Policy Level

At the societal and policy level, these findings reinforce the need for broader interventions that address weight bias as a public health and equity issue. Weight-inclusive education in healthcare and allied health training programs, combined with organizational initiatives, can reduce disparities in patient care and foster more equitable health outcomes (Abbott et al., 2022; Alberga et al., 2019). Policies that discourage weight-based discrimination and promote body diversity can further strengthen systemic change, while public health campaigns that highlight inclusivity may help shift cultural norms away from stigmatizing weight-based stereotypes (Phelan et al., 2015).

## Conclusion

The key takeaway from this study is that implicit weight bias is a pervasive phenomenon among men, regardless of occupational group, age, or ethnicity (Hispanic/Non-Hispanic). Although no statistically significant differences were found

between allied health and non–allied health participants, the presence of bias across groups reinforces the notion that weight stigma is deeply embedded within broader social and cultural contexts (Greenwald & Banaji, 1995; Phelan et al., 2015). Importantly, the recognition of implicit bias provides an opportunity for meaningful positive change. By acknowledging the role of unconscious attitudes in shaping interactions and decisions, healthcare and fitness professionals—as well as society at large—can begin to address weight bias more directly and constructively (Alberga et al., 2019).

These findings underscore the importance of continued research and the development of training and educational interventions aimed at reducing stigma and promoting weight-inclusive practices. Identifying and addressing implicit weight bias can improve the quality of patient care, foster more equitable treatment across diverse populations, and reduce the psychological toll of discrimination (Abbott et al., 2022; Phelan et al., 2015). By promoting awareness and integrating strategies to mitigate bias into both clinical practice and community contexts, this study highlights the potential for systemic improvements in health outcomes and well-being.

Ultimately, while implicit weight bias remains a challenge, it also represents an opportunity. This research contributes to the growing body of evidence that greater awareness of unconscious attitudes can serve as a catalyst for social change. Through intentional reflection, training, and policy development, implicit weight bias can be confronted in ways that enhance care, reduce inequities, and promote dignity and respect for individuals of all body sizes. In doing so, this study affirms that recognition of bias is

the first step toward transformation, providing hope that change is possible both within healthcare systems and across society as a whole.

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