Bias in Clinical Decision-making Among Nursing Students

By

Lacey A. Alexander

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This dissertation is approved by the following members of the Final Oral Committee:

Dr. Diane Lauver, Professor, Nursing

Dr. Mel Freitag, Associate Clinical Professor, Nursing

Dr. Jenny Higgins, Associate Professor, Gender & Women's Studies, Obstetrics & Gynecology

Dr. Linda D. Oakley, Professor, Nursing

Dr. Tonya Roberts, Assistant Professor, Nursing

DEDICATIONS

This dissertation is dedicated to my supportive family. Many thanks to my mother, Angie Alexander, who I am very proud to say is the best nurse I have ever worked with and the best nursing leader I have ever worked for. Thank you to my father, Mike Alexander, who raised me to be hard-working and dedicated. Thank you to my siblings— Logan, Robert, Devon, and Lance—who provided me with endless encouraging words and childcare while I completed my undergraduate and graduate coursework. Thank you to one of my best friends, Frank Sprecher, for teaching me how to reach goals and think outside the box. Thank you to my partner, Gary Bettencourt, for supporting me through this professional endeavor, and for allowing me to build our relationship around my doctoral studies and night shift schedule. Finally, thank you to my son, Jenner Logan Alexander. Jenner's exceptional maturity and laid-back demeanor are the only reasons I was able to complete nursing school and my doctoral studies while being a single and working mother.

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ABSTRACT

This dissertation is made up of three papers. The first paper (Chapter 2) is a systematic review of literature about bias in decision-making. We used the PRISMA statement to guide our reporting. The objectives were: (1) to appraise evidence of studies in which authors used vignettes to detect bias in decision-making, and (2) to assess the characteristics of vignettes that have detected bias in decision-making among clinicians. We identified gaps in our reviewed studies, including that no researchers had used vignettes to test the effects of patients' sexual orientation on decision-making, and scholars from only three of 30 studies examined nurses.

In the second paper (Chapter 3), we discussed how we wrote and tailored vignettes to detect weight bias and sexual identity bias among nursing students. The aims of this study were: (1) to evaluate the content validity of original vignettes designed for use with students, and (2) to seek expert advice on which of the new vignettes were likely to detect differences in decision-making when researchers manipulate the hypothetical patient's weight status and sexual identity. The content validity indices for the vignettes varied from 0.88-1.00. The content validity indices of items varied from 0.63-1.00. Experts mostly agreed on which vignettes were likely to detect bias among students.

In the third paper (Chapter 4), we tested whether the effects of patients' weight and sexual identity statuses in written vignettes influenced nursing students' hypothetical decision-making. Our sub-aims of this study were: (1) to test the simultaneous effects of patient weight status and sexual identity on students' decision-making, (2) to assess whether students reported explicit and implicit biases, as demonstrated by scores on existing measures, influenced their decision-making responses to vignettes that varied patients' weight status and sexual identity, and (3) to examine whether students' self-reported weight or sexual identity moderated their decision-making responses to vignettes. In the results, we described several examples in which patients' weight status and/or sexual identity influenced students' decision-making. Students' explicit and implicit bias scores did not correlate with

scores on decision-making. Students' weight and sexual identity did not moderate their decision-making responses, with very few exceptions.

CHAPTER 1:

INTRODUCTION

I applied for the University of Wisconsin-Madison School of Nursing's Early Entry Option (EEO) in the summer of 2010. This program allows undergraduate nursing students the opportunity to gain early training in research while gaining clinical skills, and to seamlessly transition from being a baccalaureate nursing student to doctoral studies. I chose this unique program because I had early interests in women's health and I thought that developing a program of research could provide me with a meaningful career as an advocate for vulnerable women.

My early interests in women's health was the result of my undergraduate studies in nursing, gender and women's studies, and LGBTQ studies. I was certain that feminist and queer theory improved my skills in patient advocacy, and I found myself intrigued by clinician scholars who had conducted research informed by feminist theory and reproductive justice. By taking courses in multiple disciplines, I was exposed to research by clinicians who conducted research that was informed by feminist theory on topics such as mental health, gender-based violence, nutrition, childbirth, and cancer.

As I transitioned to graduate school, I still did not know the research question that I wanted to answer for my dissertation. I knew that I wanted to research how sexual identity influenced health, but I struggled to identify a context for my research—an issue that persisted throughout the first three years of my program. Upon completing my coursework, attending several LGBTQ health conferences, and networking with faculty and students in gender and women's studies, I had started to focus on health differences regarding sexual minority women and weight.

For my preliminary exams, I had proposed the purpose of my dissertation would be to describe the weight, exercise, and chronic diseases between women on concordance of sexual orientation. I sought to compare women with concordant sexual identity to women with heterosexual discordant identities. I had identified a large and publicly available dataset that I could use to answer this question. However, while I was in the process familiarizing myself with this dataset, I was introduced to a group of researchers who study race and gender bias regarding patients' health care experiences. They were

excited about my interest in weight and sexual identity. They invited me to collaborate on a project about multiple types of bias and patient care by internal medicine residents. Shortly after meeting this group in August of 2016, I transitioned my research away from what I wrote about for my preliminary exams, and I started to learn about education interventions to weight bias and sexual identity bias among clinicians.

Instead of focusing on how sexual minority status influences an individual's health, I transitioned to focusing on the appropriateness of healthcare provided to sexual minorities. Even though this was a substantial change in topic, I saw significant overlap between the two topics, and the literature that I knew from my initial topic was still highly relevant to weight bias and sexual identity bias. I also knew that my new topic was important because bias, prejudice and stigma influence health inequity (Hatzenbuehler, Phelan, & Link, 2013; Meyer, 2003). For example, clinicians' weight bias and sexual identity bias may influence their clinical decision-making and communication with patients (Chapman, Kaatz, & Carnes, 2013). If patients feel that clinicians prefer to work with patients with a different weight or sexual identity than they have, then they may be less likely to enter the healthcare system in the future (Eliason & Fogel, 2015; Nicholls, Pilsbury, & Davenport, 2015; Pearl & Puhl, 2018; Puhl & Heuer, 2009). Additionally, weight and sexual identity occur simultaneously in all people, which makes it important to consider how different interactions of weight and sexual identity could influence clinicians' bias (Fogel, 2014). To transition to a new dissertation topic, I worked with a team of bias researchers to conduct a systematic review to guide us in creating written clinical vignettes about race and gender.

This first paper of my dissertation features this systematic review guided by the PRISMA Statement (Mehon, Liberati, Tetzlaff, & Altman, 2009). The purpose of my systematic review is to describe the characteristics of the clinical vignettes that have been used in randomized studies to identify several types of implicit bias, including race, gender, age, socioeconomic status, weight, and sexual identity. We entered the systematic review wondering if vignettes with corresponding decision-

making items could detect bias in clinical decision-making in a meaningful way, and if clinical decisions would correlate with other implicit and explicit bias, such as implicit association tests (IATs). The act of carrying out this systematic review was the catalyst for my second and third dissertation papers, because it allowed me to identify a meaningful gap in existing bias research that used clinical vignettes.

Two meaningful gaps that I identified in my systematic review were that few scholars had conducted experimental studies to assess bias in clinical decision-making among nurses or nursing students, and few scholars had used clinical vignettes to assess weight bias and sexual identity bias. I decided that it would be meaningful for my dissertation to conduct an experimental study using clinical vignettes with corresponding decision-making items to assess weight bias and sexual identity bias among prelicensure nursing students. However, given that this type of study was novel with these types of bias and for this population, I first needed to develop and validate clinical vignettes that featured weight and sexual identity, and were consistent with prelicensure nursing student knowledge.

The second paper of my dissertation describes the content validity of newly developed written clinical vignettes and corresponding ordinal questions. I created these new vignettes with guidance from my systematic review in Chapter 2 of this dissertation. I used Polit & Beck's (2006; 2017) method of content analysis to assess the content validity of these new vignettes and their corresponding items. Ultimately, I generated three new clinical vignettes with content validity. Two of the vignettes vary both weight status (i.e., underweight, normal weight, overweight, obese) and sexual identity (i.e., heterosexual, bisexual, queer).

The third paper of my dissertation is an experimental study that examined whether randomly varying patients' weight and sexual identity statuses on a written clinical vignette would influence nursing students' hypothetical clinical decision-making. The sub-aims of this study included: (1) to test the combined influences of patient weight status and sexual identity on nursing students' hypothetical clinical decision-making, (2) to assess whether nursing students reported explicit and implicit biases, as

demonstrated by scores on existing measures, influence their decision-making responses to vignettes that vary hypothetical patients' weight status and patient sexual identity, and (3) to examine whether students' self-reported weight or sexual identity moderates their decision-making responses to vignettes. I recruited 417 prelicensure nursing students to respond to my survey study.

The following measures from my study are included in the analyses for this paper: (1) a clinical vignette with corresponding decision-making items about hypertension, (2) a clinical vignette with corresponding decision-making items about urinary frequency, a weight IAT for bodies, the Fat Phobia Scale, The Modern Homonegativity Scale, and several demographic factors, including participant weight and sexual identity. I used one-way Analysis of Variance (ANOVA) to analyze responses about clinical decision making to address my first and third aims. I used Pearson's correlations to address my second aim. A summary of these findings as well as my interpretations can be found in Chapter 4 of this dissertation.

The three papers that I described are in the form of manuscripts that I tailored to the required specifications of the journals for which the papers are targeted. Each of these papers is in a forthcoming chapter. Supplementary material related to my third paper about weight and sexual identity bias among prelicensure nursing students can be found after the Chapter 4 References. These figures are not likely to be published in journals but are hopefully useful for my committee to appreciate the complexity of my approach and analyses. Ideally, the journals for which these papers are targeted would make these figures available online to complement the analyses featured in my article.

In Chapter 5, I will summarize my results from Chapter 2 through Chapter 4. I will discuss further analyses that I would like to execute prior to publishing the data that I used in the third paper. I will also propose new and innovative questions that I can answer using the data I collected for the third paper. Finally, I will to discuss the implications of this dissertation and future directions for a program of research.

References

Chapman, E.N., Kaatz, A., & Carnes, M. (2013). Physicians and implicit bias: How doctors may unwittingly perpetuate health care disparities. Journal of General Internal Medicine. 28(11), 1504-1510. https://doi.org/10.1007/s11606-013-2441-1

Eliason, M.J. & Fogel, S.C. (2015). An ecological framework for sexual minority women's health: Factors associated with greater body mass. *Journal of Homosexuality*. 62(7). https://doi.org/10.1080/00918369.2014.1003007

Fogel, S. C. (2014). But I have big bones! Obesity in the lesbian community. In s. L. Dibble & P. A. Robertson (Eds.). *Lesbian Health 101: A Clinician's Guide* (pp.165-181). UCSF Nursing Press: San Francisco, CA.

Hatzenbuehler, M. L., Phelan, J. C., & Link, B. G. (2013) Stigma as a fundamental cause of population health inequalities. *American Journal of Public Health*. *103*(5), 813-821.Hays, R. D., Spritzer, K. L., Thompson, W. W., & Cella, D. (2015). US general population estimate for "excellent" to "poor" self-rated health item. *Journal of general internal medicine*, 1-6.

Meyer, I. H. (2003). Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: Conceptual issues and research evidence. *Psychological bulletin*, *129*(5), 674.

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G, The PRISMA Group. (2009). *Preferred reporting items for systematic reviews and meta-analyses: The* PRISMA statement. *J Clin Epidemiol, 6.* http://doi.org/10.1016/j.jclinepi.2009.06.005

Nicholls, W., Pilsbury, L. & Devonport, T.J. (2015). The attitudes of student nurses towards obese patient: A Questionnaire study exploring the association between perceived causal factors and advice giving. *Nurse Education Today*. http://dx.doi.org/10.1016/j.nedt.2015.11.009

Pearl, R.L. & Puhl, R.M. (2018). Weight bias internalization and health: A systematic Review. *Obesity Reviews*. Advance online publication. https://doi.org/10.1111/obr.12701

Polit, D. F., & Beck, C. T. (2006). The content validity index: Are you sure you know what's being reported? Critique and recommendations. *Research in Nursing & Health*, 29(5), 489–497. http://dx.doi.org/10.1002/nur.20147.

Polit, D. F., & Beck, C. T. (2017). Nursing research: Generating and assessing Evidence for Nursing Practice (10th edition). South Holland, Netherlands: Wolters Kluwer.

Puhl, R.M & Heuer, C.A. (2009). The stigma of obesity: A review and Update. *Obesity.* 17(5), 941-964. http://doi.org/10.1038/oby.2008.636

CHAPTER 2:

A Systematic Review of Clinical Vignettes to Detect Bias in Clinical Decision-making

Background

Clinicians, educators and bias researchers are currently engaged in rich dialogue about how unconscious bias might influence clinical decision-making. Many scholars have documented implicit and explicit bias among clinicians based on non-observational methods, such as implicit association tests or standardized patients (Alberga et al., 2016; Chapman, Kaatz, & Carnes, 2013; FitzGerald & Hurst, 2017; Hall et al., 2015; Sabin, Riskind, & Nosek, 2015). However, clinicians and scholars are not sure if evidence of bias translates to making biased clinical decisions with real-life patients.

One of the most common ways that researchers assess bias in clinical decision-making is with clinical vignettes. Scholars frequently use clinical vignettes to elicit information about clinical interactions in research studies. Clinical vignettes are short stories or scenarios about patient situations. Typically, bias researchers administer these brief clinical vignettes to clinicians and then have a set of follow-up items or questions that ask clinicians to make decisions about how they would respond to patient situations. Bias researchers use clinical vignettes in other ways to discover different types of information, such as whether a clinician's demographic factors or clinical experience might influence how they respond to a clinical vignette.

One major limitation of clinical vignettes compared to observational methods is that researchers do not know if decisions about hypothetical patients are the same or comparable with decisions about real-world patients (Converse, Barrett, Rich, & Reschovsky, 2015). Specifically, some scholars are concerned that clinicians may give socially desirable responses when making decisions associated with hypothetical clinical vignettes and then make different decisions in their actual clinical practice (Peabody et al, 2000; Veloski, Tai, Evans, & Nash, 2005). From this perspective, scholars who interpret results from clinical vignettes may unintentionally overestimate real-life clinical performance (Samuels, Boatright, Sanchez, Heron, & Liferidge, 2018). The decisions that clinicians make in actual practice are ingrained patterns of behaviors that might be influenced by our subconscious bias. However, when reading a

clinical vignette and the responding to a corresponding item about decision-making, clinicians have time to consider how they might respond optimally, thus bypassing their gut-level, implicit decisions.

Teams of researchers have conducted systematic reviews about implicit bias in healthcare. In these reviews, researchers described how they used clinical vignettes to measure race bias in clinical decision-making (Dehon et al., 2017; Paradies et al., 2013). These scholars documented nonexistent or minimal evidence of race bias when responding to decision-making items that corresponded with clinical vignettes. This contradicts the research of many scholars that have documented significant implicit race bias among clinicians (FitzGeral & Hurst, 2017). Scholars may have observed this discrepancy in this body of research because some researchers measured explicit bias scores and others measured decision-making scores, and peoples' responses to hypothetical clinical vignettes do not mirror actual clinical behaviors. Conversely, some scholars have documented significant race bias in clinical decision-making when they used clinical vignettes and corresponding decision-making items (Sabin & Greenwald, 2012). This introduces the possibility that researchers are not optimally designing and delivering clinical vignettes.

Several researchers had previously provided recommendations for considerations on how to design and deliver clinical vignettes (Evans et al., 2015; Gould, 1995; Hughes & Hube, 2002; Veloski et al., 2005). Evans and colleagues (2015) and Hughes & Hube (2002) discussed the importance of considering internal and external validity when designing clinical vignettes and decision-making items. Converse and colleagues (2015) reviewed many considerations for constructing a clinical vignette, including question type (i.e., open-ended or closed ended), response format (e.g., dichotomous, fill in the blank, etc.), mode of administration (e.g., computer, hard copy), how to decide which clinical issue to study (e.g., if decisions can be evidence-based), among others. We found this team's suggestions to be useful, but our team also wanted evidence that these strategies have been effective.

A gap in bias literature is that scholars do not have evidence of which characteristics of clinical vignettes have been effective at detecting bias in clinical decision-making. If scholars knew more about the characteristics of clinical vignettes that researchers have used to detect bias and understand bias in clinical decision-making, then scholars could incorporate these characteristics into designing and implementing new clinical vignettes. Most authors of systematic reviews have drawn conclusions about using clinical vignettes to detect bias in clinical decision-making have only examined race bias among physicians (Dehon et al., 2017; FitzGerald & Hurst, 2017; Paradies et al., 2013). If scholars had guidance about designing clinical vignettes to detect other types of bias, such as gender bias and weight bias, this knowledge would be useful to research and practice. Further, if scholars had a better understanding about designing clinical vignettes along with decision-making items for clinicians who are not physicians, such as nurses and dieticians, then this understanding could inform scholars who conduct educational research and apply findings to future research about decision-making among these types of clinicians.

Objectives

Our objectives were to systematically review and appraise evidence of studies in which authors used clinical vignettes to detect bias in clinical decision-making and assess the characteristics of clinical vignettes that have detected bias in clinical decision-making among clinicians. We used the PRISMA statement to guide our reporting of this systematic review (Moher, Liberati, Tetzlaff, & Altman, 2009).

Methods

Data Sources

We searched the following databases for studies published between January 1995 and December 2017: Web of Science, CINAHL, Women's Studies International, SocINDEX, Social Work Abstracts, MEDLINE, LGBT Life, and PsychINFO.

See Table 1 for an example of our search strategy.

Study Selection

***Types of Studies*.** We included studies from 1995-2017 because we knew that scholars started publishing studies about biased clinical decision-making in the mid-nineties. We included peer-reviewed experimental studies in which authors randomized characteristics of hypothetical patients within clinical vignettes and examined how such patient characteristics influenced participants' clinical decision-making. We defined "clinical vignette" broadly as a case or scenario that illustrated key components about a patient, including experimental, controlled, and contextual factors. We were open to including articles about many types and contexts of hypothetical clinical decision-making. The patient characteristics that researchers randomized in their vignettes could be about race, ethnicity, socioeconomic status, sexual orientation, gender, age, or weight. We were also interested in any study that examined the interactions of any of these types of bias.

For an article to be included in our review, the authors' clinical vignette(s) had to include corresponding items about decision-making that would prompt the participants to decide how they would assess, educate, diagnose, manage, or treat the patient. We included in our review clinical vignettes that were presented in different formats, including: video-recorded, virtual reality, written, or included photographs. Authors could have delivered the clinical vignettes to their participants on paper, in an interview, over the phone, or online. We only included articles that authors published in English because we were only interested in US-based articles that had not been translated. It is likely that bias differs by country and region, so we wanted to control for this in study selection. We did not include dissertations or theses because we believed we would have a higher quality body of articles if we only included peer-reviewed articles. For each dissertation or thesis that could potentially meet our inclusion criteria, we searched to see if the author ever published their thesis or dissertation. Articles in which researchers had tested the effect of provider characteristics on decision-making were beyond the scope of this review.

***Types of Participants*.** In our review, participants could be any type of clinician who provided direct patient care; we were interested in many types of biased decision-making rather than just bias in decision about prescribing and treating (e.g., surgical interventions). We were open to including most credentialed clinicians, regardless of their prescriptive authority, including physicians, physician assistants, nurse practitioners, nurses, pharmacists, therapists, social workers, and mental health professionals. We did not include health students or clinician samples from outside the United States.

We screened titles and abstracts of all identified studies for inclusion. The first author independently screened all articles. Other authors acted as second reviewers to screen articles for inclusion. When reviewers disagreed about the inclusion of an article, all authors would review the title and abstract and make a decision to include or exclude the article.

Data Extraction

The first author extracted data from each eligible study. Each co-author assessed a subset of extracted data for accuracy. We made sure each study met our inclusion and exclusion criteria. We extracted the following data:

- Study aims about clinical vignettes;
- Setting, sample, and response rate (e.g., type of clinician, sample size);
- Type of bias studied (e.g., race, gender, weight, sexual orientation, socioeconomic status, age);
- Format of clinical vignette (e.g., video vignette, virtual reality, written, with a photo);
- Type of measurement of clinical decision-making items, in response to clinical vignettes (e.g., open-ended response, ordinal scale, multiple choice, etc.);
- Results about decision-making in response to the clinical vignettes

Quality Assessment

To assure that we performed a reliable quality assessment, two authors assessed the quality of each article considered for this review using the Health Evidence Bulletin Wales critical appraisal tool. We selected this appraisal tool because it can facilitate scholars' rigorous assessment of the domains of study quality that are most important to experimental studies (e.g., clarity of aims, rigor of study design and analysis, risk of bias, and relevance). The first author assessed the quality of all eligible studies and a

co-author served as a second reviewer for a subset of articles. For each article, the reviewer would rate the quality as low, low-moderate, moderate, high-moderate, or high. When two authors disagreed on the quality rating of an article, the authors would review the article, apply a critical appraisal tool, and conclude on how to rate the quality of the article (e.g., low, moderate, high; see Table 2).

Results

We identified 111 total records that were applicable and eligible by searching databases, additional records (e.g., systematic reviews), and reference lists. Thirty articles met our inclusion and exclusion criteria. See Figure 1 for more details about how we identified, screened, and assessed eligibility for each identified study.

Types of Clinicians Studied

Most of the 30 studies we reviewed had physician-only samples (n=24). In six studies, researchers included other types of clinicians, including rehabilitation professionals (e.g., physical therapists; Rybarczyki, Haut, Lacey, Fogg, & Nicholas, 2001), advanced practice providers (e.g., nurse practitioners; Criste, 2003; Puumala et al., 2016; Edmonds et al., 2016; Griffin, Polit, & Byrne, 2007), and nurses (Rybarczyki et al., 2001; Haider et al., 2015; Griffin et al., 2007). Even though Edmonds and colleagues (2016) had recruited advanced practice providers, only one participated in their study.

Types of Bias Studied

In most of our studies, the authors examined race bias (i.e., and sometimes ethnicity or "race/ethnicity" bias) in clinical decision-making (n=23). Most researchers studied race and at least one other type of bias (n=17). In total, the authors of 15 studies examined the combined influences of at least two types of bias in clinical decision-making (e.g., Haider et al. [2015] studied race and class bias). Authors of 15 studies examined gender bias in clinical decision-making. The authors of studies were less likely to examine other types of bias, such as age (n=7), SES (n=4), and weight (n=3) compared to race

and gender bias. We did not identify any studies in which researchers tested the effects of sexual orientation in a clinical vignette.

Types and Delivery of Clinical Vignettes

The mode of delivery was online for fourteen studies (i.e., clinicians participated via an online survey). The authors of these online studies administered their clinical vignettes via online video vignettes (n=2), online written vignettes (n=7), and online written vignettes with photos (n=5).

Researchers delivered clinical vignettes in-person in seven studies, two of which were delivered as video vignettes (Kales et al., 2005a; Kales et al., 2005b). Researchers conducted two studies by administering vignettes and decision-making items over the phone (Lutfey, Link, Grant, Marceau, & McKinlay, 2009; Maserejian, Link, Lutfey, Marceau, & McKinlay, 2009). Researchers administered vignettes via mail in six studies, three of which included photos.

Measurement Approach for Decision-making

Many authors used more than one type of measure or scale to assess bias in clinical decision-making. Most authors measured decision-making in response to clinical vignettes using ordinal scales (n=11). These ordinal scales frequently referred to the likelihood of taking a clinical action (n=5) or to the extent of agreement with a clinical action (n=5). Similarly, other scholars used visual analog scales (n=3; Edmonds et al., 2016; Griffin et al., 2007; Hirsch et al., 2015). One group of researchers had asked about the 'likelihood' of performing a certain task by using a 3-option, categorical response of low, intermediate, or high (Daugherty et al., 2017).

Several authors used structured or semi-structured interviews to ask about participants' decision-making responses and rationale (n=7). For example, in one study the authors asked participants, "What do you think is going on with this patient?" They then asked participants to follow-up their explanation with their level of certainty on a 0-100 scale (Lutfey et al., 2009). Other authors used 100-point scales without providing an explanation for them (Griffin et al., 2007; Hirsch et al., 2015).

Authors of at least three studies had predetermined a "correct" diagnosis for a clinical vignette patient and then scored the clinician's diagnosis as correct or incorrect (Oliver et al., 2014; Thamer et al., 2001). Other researchers assessed clinical decision-making using a similar approach as those who had predetermined diagnoses, such as Kales and teams (2005a; 2005b); in these studies, researchers asked providers to list what they thought was a best diagnosis and to provide their level of certainty about the diagnosis. One similar approach to Kales and teams (2005a; 2005b) included dichotomous response options for decision-making (e.g., yes/no to thrombolysis recommendation; Green et al., 2007; Rathore et al., 2009).

Degree of Bias

Authors of only seven of 30 studies detected consistently high levels of bias on several decision-making scores. Notably, although we included few studies about age and weight bias, four of the seven articles that detected high levels of bias had tested age bias (Rybarczyki et al., 2001; Uncapher et al., 2000) or weight bias (Davis-Coelho; Hebl & Xu, 2000). The other three examined race biases (Edmonds et al., 2006), gender bias (Daugherty et al., 2017), and multiple types of bias (e.g., age, SES, gender, and race; Maserejian et al., 2009). The characteristics of these articles are summarized in Table 2. The seven studies in which bias was detected did not have the same mode of delivery or refer to the same type of clinician as one another. One noteworthy finding was that the authors of most of these articles utilized ordinal scales or asked the clinician to write short responses about the patient's diagnosis.

We found that about one third of researchers reported little or nonexistent differences in decision-making among clinician participants. Most of these researchers varied race (n=8) and/or gender (n=6). About half of the reviewed studies contained vignettes that yielded moderate levels of bias in clinical decision making among clinicians. Thus, a minority of vignettes and decision-making items yielded significant findings.

Study Quality

Of our thirty studies, we scored zero as “high” or “low” quality using the Health Evidence Bulletin Wales Critical Appraisal Tool. We scored most of the studies “moderate” quality (n=18). We scored five studies as “low-moderate” quality. We scored seven studies as “high-moderate quality.”

Discussion

We systematically reviewed and appraised evidence from studies in which researchers had used clinical vignettes to detect bias in clinical decision-making. We also described the characteristics of clinical vignettes that researchers had used and detected significant findings regarding bias in clinical decision-making among clinicians. By conducting this review, we addressed two gaps in the scientific literature about the effect of hypothetical patients’ demographic characteristics on unconscious bias in clinicians’ decision making. First, we reviewed studies in which researchers provided participants with (a) clinical vignettes that varied by gender, race, age, SES, and weight bias and (b) decision-making items based on vignettes. We did not find a study in which researchers had varied sexual orientation in clinical vignettes.

Whereas prior researchers had focused on physicians as their clinicians of interest, we focused our review on studies in which participants were not physicians, but rather other health professionals such as nurses and dieticians. We found 30 such studies. We had hoped to identify more studies in which authors included non-physician samples. The fact that we identified so few non-physician samples is a limitation of the existing literature about bias in clinical decision-making. To build research about bias in decision-making using clinical vignettes, future researchers could include other types of clinicians in their assessments about bias in clinical decision-making. They could design their vignettes to be appropriate for all clinicians in a setting, as Puumala and colleagues (2016) did for the emergency department. Also, they can tailor their clinical decision-making items to the knowledge and scope of practice relevant to different types of clinicians.

We had difficulty summarizing the extent of bias observed in some studies because some authors had not described their clinical vignettes adequately. Ultimately, we concluded that the authors who studied age bias and weight bias were more likely to detect bias in clinical decision-making than authors who studied other types of bias, such as race bias. There could be logical explanations for why age and weight bias were easier to detect than other types of bias. We questioned whether scholars might have unintentionally selected clinical contexts that are expected to have weight and age differences; scholars need to be certain they are measuring bias instead of differences based on evidence-based practice. For each of our 30 articles, we considered whether the findings could be a function of clinical context rather than subconscious bias. Basically, we considered whether there could be logical or evidence-based explanation to explain away differences in clinicians' decision-making according to their patients'' age or weight.

we concluded that the authors who had reported high levels of age or weight bias also had selected perfect examples of clinical contexts to assess age or weight. For example, Uncapher (2000) randomly assigned a hypothetical patient to physicians who was either aged 38 or 78 and had depression and suicidal ideation. One would not expect clinicians to provide different quantities of treatment to this patient based on their age, if clinicians were practicing based on evidence. Thus, participants would be likely to report similar decision-making responses for the patient, regardless of age, if they were practicing based on evidence. This type of clinical context makes it an appropriate one for a clinical vignette.

Our conclusions are a function of the type of decision-making measures (i.e., outcome measures) that researchers applied with their clinical vignettes. A few scholars had intentionally designed their clinical vignettes to suggest a diagnosis because they wanted to test whether the clinician-participants would choose the "correct" answer. This approach may have been problematic. Authors may have unintentionally tested the effect of clinical knowledge instead of bias in clinical

decision-making. When scholars intentionally introduced ambiguity into their clinical vignettes (Al-Khatib et al., 2011; Hirsch et al., 2015), such as varying the clinical contexts to include medical noncompliance versus compliance, then we found more reports of bias in decision making.

Future scholars can consider how to elicit valid responses from clinicians about what they do in actual practice rather than in response to hypothetical patients. One of our findings was that the type of measure that scholars used was associated detection of bias; measures such as ordinal scales and open-ended questions were more likely to be associated with bias detection than multiple choice. Ordinal scales designed to measure clinician's likely behavior were more likely to be associated with bias detection than were measures that asked for a "correct" answer. This makes sense because multiple choice, "select all that apply", and dichotomized response options often read like test questions rather than realistic options to consider when making clinical decisions. Our concern is that participants would search for the "right answer" rather than identifying the clinical behaviors that they would be most likely to take.

A few authors used unique approaches to promote authenticity in the hypothetical patient or clinical situation. For an example of promoting authenticity in their hypothetical patients, Weisse and teams (2001; 2003) used racially stereotyped names for hypothetical patients and then altered race (i.e., black or White) and gender (i.e., man or women) of their patients. For an example of promoting authenticity in the clinical situation, Burgess and colleagues (2014) attempted to recreate the rushed nature of clinical decision-making by putting their participants under time pressure. These authors concluded that another factor, time pressure, influenced clinicians differently by gender; men were more likely to deviate from evidence-based practice when faced with time pressure than women. Future scholars should consider different and innovative ways in which to promote authenticity in the design of their vignettes and devise appropriate strategies to make clinicians feel as though they are treating real-world patients, as opposed to hypothetical patients.

This review helped us identify next steps to advance understanding in using clinical vignettes to detect bias in clinical decision-making. Regarding studies in which researchers used vignettes that varied race and ethnicity, most dichotomized race as black and white. Few researchers assessed other races or ethnicities. One group of researchers each assessed bias against Asians (Thamer et al., 2001) and against American Indian children (Puumala et al., 2016). If future researchers were to include more levels of race and ethnicity, then they could examine whether clinicians' make biased decisions about the care for sub-populations of patients that have been understudied.

The conclusions that scholars can draw with systematic reviews are limited by the quality of the articles that they review (Samuels et al., 2018). One limitation of our review is that most studies were of moderate quality. Additionally, because the clinical decisions in the studies that we reviewed were hypothetical, we cannot be sure that clinicians would make the same or similar decisions in actual practice.

Conclusion

In this systematic review, we addressed gaps in the bias literature by appraising evidence regarding the effect of clinical vignettes on types of bias in clinical decision-making. We also assessed and summarized the characteristics of clinical vignettes and corresponding decision-making items that have been associated with biases in clinical decision-making among clinicians. Future researchers can improve their approach to: the type of clinical contexts (e.g., degree of ambiguity) in their clinical vignettes and how they measure clinical decision-making (e.g., with an interval scale rather than a dichotomy). In addition to this review, there are quality resources to aid in creating and distributing clinical vignettes and corresponding decision-making items in research (Converse et al., 2015; Evans et al., 2015; Gould, 1995; Hughes & Hube, 2002; Veloski et al., 2005).

References

*Adams, A. & et al. (2014). Investigating the influence of African American and African Caribbean race on primary care doctors' decision making about depression. *Social Science & Medicine*, *116*, 161-168. https://doi.org/10.1016/j.socscimed.2014.07.004

Alberga, A. S., Pickering, B. J., Hayden, K. A., Ball, G. D. C., Jelinski, S., Nutter, S., … Russell-Mayhew, S. (2016). Weight bias reduction in health professionals: A systematic review. *Clinical Obesity*, *6*(3), 175-188. https://doi.org/10.1111/cob.12147

*Al-Khatib, S. M., Sanders, G. D., O'brien, S. M., Matlock, D., Zimmer, L. O., Masoudi, F. A., Peterson, E. (2011). Do physicians' attitudes toward implantable cardioverter defibrillator therapy vary by patient age, gender, or race? *Annals of Noninvasive Electrocardiology, 16*(1), 77-84. https://doi.org/10.1111/j.1542-474X.2010.00412.x

*Barnhart, J. M. & Wassertheil-Smoller, S. (2006). The effect of race/ethnicity, sex, and social circumstances on coronary revascularization preferences: A vignette comparison. *Cardiology in Review, 14*(5), 215-222. https://doi.org/10.1097/01.crd.0000214180.24372.d5

*Burgess, D. J. & et al. (2008a). Patient race and physicians' decisions to prescribe opioids for chronic low back pain. *Social Science & Medicine, 67*(11), 1852-1860. https://doi.org/10.1016/j.socscimed.2008.09.009

*Burgess, D. J. & et al. (2014b). The effect of cognitive load and patient race on physicians' decisions to prescribe opioids for chronic low back pain: A randomized trial. *Pain Medicine, 15*(6), 965-974. https://doi.org/10.1111/pme.12378

Chapman, E. N., Kaatz, A., & Carnes, M. (2013). Physicians and implicit bias: How doctors may unwittingly perpetuate health care disparities. *Journal of General Internal Medicine*, *28*(11), 1504-1510. https://doi.org/10.1007/s11606-013-2441-1

Converse, L., Barrett, K., Rich, E., & Reschovsky, J. (2015). Methods of observing variations in physician's decisions: The opportunities of clinical vignettes. *Journal of General Internal Medicine, 30*(3), 586-594. https://doi.org/10.1007/s11606-015-3365-8

Criste, A. (2003). Do nurse anesthetists demonstrate gender bias in treating pain? A national survey using a standardized pain mode. *AANA Journal, 71(3)*, 206-209.

*Daugherty, S. L., Blair, I. V., Havranek, E. P., Furniss, A., Dickinson, L. M., Karimkhani, E., … Masoudi, F. A. (2017). Implicit gender bias and the use of cardiovascular tests among cardiologists. *Journal of the American Heart Association, 6*(12). https://doi.org/10.1161/JAHA.117.006872

*Davis-Coelho, K., Waltz, J., & Davis-Coelho, B. (2000). Awareness and prevention of bias against fat clients in psychotherapy. *Professional Psychology: Research and Practice, 31*(6), 682. http://dx.doi.org/10.1037/0735-7028.31.6.682

Dehon, E., Weiss, N., Jones, J., Faulconer, W., Hinton, E., & Sterling, S. (2017). A systematic review on the impact of physician implicit racial bias on clinical decision-making. *Academic Emergency Medicine, 24*(8), 895-904. https://doi.org/10.1111/acem.13214

*Edmonds, B. T., Mckenzie, F., Austgen, M. B., Ashburn-Nardo, L., Matthias, M. S., & Hirsh, A. T. (2016). Obstetrical providers' management of chronic pain in pregnancy: A vignette study. *Pain Medicine, 18*(5), 832-841. https://doi.org/10.1093/pm/pnw195

Evans, S. C., Roberts, M. C., Keeley, J. W., Blossom, J. B., Amaro, C. M., Garcia, A. M., … Reed, G. M. (2015). Vignette methodologies for studying clinicians' decision-making: Validity, utility, and application in ICD-11 field studies. *International Journal of Clinical and Health Psychology, 15*(2), 160-170. https://doi.org/10.1016/j.ijchp.2014.12.001

FitzGerald, C. & Hurst, S. (2017). Implicit bias in healthcare professionals: A systematic review. *BMC Medical Ethics, 18*(19), 1-18. https://doi.org/10.1186/s12910-017-0179-8

*Griffin, R. A., Polit, D. F., & Byrne, M. W. (2007). Stereotyping and nurses' recommendations for treating pain in hospitalized children. *Research in nursing & health, 30*(6), 655-666. https://doi.org/10.1002/nur.20209

*Haider, A. H. & et al. (2015a). Unconscious race and class biases among registered nurses: Vignette-based study using implicit association testing. *Journal of the American College of Surgeons, 220*(6), 1077-1086. e3. https://doi.org/10.1016/j.jamcollsurg.2015.01.065

*Haider, A. H. & et al. (2014b). Unconscious race and class bias: Its association with decision-making by trauma and acute care surgeons. *Journal of Trauma and Acute Care Surgery, 77*(3), 409-416. https://doi.org/10.1097/TA.0000000000000392

Hall, W. J., Chapman, M. V., Lee, K. M., Merino, Y. M., Thomas, T. W., Payne, B. K., … Coyne-Beasley, T. (2015). Implicit racial/ethnic bias among health care professionals and its influence on health care outcomes: A systematic review. *American Journal of Public Health*, *105*(12), e60–e76. https://doi.org/10.2105/AJPH.2015.302903

*Hebl, M. R. & Xu, J. (2001). Weighing the care: Physicians' reactions to the size of a patient. *International Journal of Obesity, 25*, 1246. https://doi.org./10.1038/sj.ijo.0801681

*Hirsh, A.T. & et al. (2015). The interaction of patient race, provider bias, and clinical ambiguity on pain management decisions. *The Journal of Pain, 16*(6), 558-568. https://doi.org/10.1016/j.jpain.2015.03.003

Hughes, R. & Hube, M. (2002). The application of vignettes in social and nursing research. *Journal of Advanced Nursing, 37*(4), 382-386. https://doi.org/10.1046/j.1365-2648.2002.02100.x

*Kales, H. C. & et al. (2005a). Effect of race and sex on primary care physicians' diagnosis and treatment of late-life depression. *Journal of the American Geriatrics Society, 53*(5), 777-784. https://doi.org/10.1111/j.1532-5415.2005.53255.x

*Kales, H. C & et al. (2005b). Race, gender, and psychiatrists' diagnosis and treatment of major depression among elderly patients. *Psychiatric Services, 56*(6), 721-728. https://doi.org/10.1176/appi.ps.56.6.721

*Lutfey, K. E. & et al. (2009). Is certainty more important than diagnosis for understanding race and gender disparities?: An experiment using coronary heart disease and depression case vignettes. *Health policy, 89*(3), 279-287. https://doi.org/10.1016/j.healthpol.2008.06.007

Maserejian, N. N. & et al. (2009). Disparities in physicians' interpretations of heart disease symptoms by patient gender: Results of a video vignette factorial experiment. *Journal of Women's Health, 18*(10), 1661-1667. https://doi.org/10.1089/jwh.2008.1007

McKinlay, J. B. & et al. (2007a). Patient, physician and presentational influences on clinical decision making for breast cancer: Results from a factorial experiment. *Journal of Evaluation in Clinical Practice, 3*(1), 23-57. https://doi.org/10.1111/j.1365-2753.1997.tb00067.x

*McKinlay, J., Piccolo, R., & Marceau, L. (2013). An additional cause of health care disparities: The variable clinical decisions of primary care doctors. *Journal of Evaluation in Clinical Practice, 19*(4), 664-673. https://doi.org/10.1111/jep.12015

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & The PRISMA Group. (2009). *Preferred reporting items for systematic reviews and meta-analyses:* The PRISMA statement. *PLoS Med*, *6*(7), e1000097. https://doi.org/10.7326/0003-4819-151-4-200908180-00135

*Oliver, M. N. & et al. (2014). Do physicians' implicit views of African Americans affect clinical decision-making? *The Journal of the American Board of Family Medicine, 27*(2), 177-188. https://doi.org./10.3122/jabfm.2014.02.120314

Paradies, Y., Truong, M., & Priest, N. (2013). A systematic review of the extent and measurement of healthcare provider racism. *Journal of General Internal Medicine, 29*(2), 364-387. https://dx.doi.org/10.1007/s11606-013-2621-z

*Puumala, S. E., Burgess, K. M., Kharbanda, A. B., Zook, H. G., Castille, D. M., Pickner, W. J., & Payne, N. R. (2016). The role of bias by emergency department providers in care for American Indian children. *Medical Care, 54*(6), 562–569. https://doi.org/10.1097/MLR.0000000000000533

*Rathore, S. S., Ketcham, J. D., Alexander, G. C., & Epstein, A. J. (2009). Influence of patient race on physician prescribing decisions: A randomized on-line experiment. *Journal of General Internal Medicine, 24*(11), 1183–1191. https://doi.org/10.1007/s11606-009-1077-7

*Rybarczyk, B. & et al. (2001). A multifactorial study of age bias among rehabilitation professionals. *Archives of Physical Medicine and Rehabilitation, 82*(5), 625-632. https://doi.org/10.1053/apmr.2001.20834

Sabin, J. A., Riskind, R. G., & Nosek, B. A. (2015). Health care providers' implicit and explicit attitudes toward lesbian women and gay men. *American Journal of Public Health, 105*(9), 1831–1841. https://doi.org/10.2105/AJPH.2015.302631

*Sabin, J.A. & Greenwald, A. G. (2012). The influence of implicit bias on treatment recommendations for 4 common pediatric conditions: pain, urinary tract infection, attention deficit hyperactivity disorder, and asthma. *American Journal of Public Health, 2012. 102*(5): p. 988-995. https://doi.org/10.2105/AJPH.2011.300621

*Sabin, J. A., Rivara, F. P., & Greenwald, A. G. (2008). Physician implicit attitudes and stereotypes about race and quality of medical care. *Medical care*, *46*(7), 678-685. Retrieved from http://www.jstor.org/stable/40221722

Samuels, E. A., Boatright, D., Sanchez, L. D., Heron, S. L., Liferidge, A. T., Wilson, T. , … Burton, J. H. (2017). Clinical vignettes Inadequate to assess impact of implicit bias: Concerning limitations of a systematic review. *Academic Emergency Medicine, 24*, 1531-1532. https://doi.org/10.1111/acem.13317

*Tamayo-Sarver, J. H. & et al. (2003). The effect of race/ethnicity and desirable social characteristics on physicians' decisions to prescribe opioid analgesics. *Academic Emergency Medicine, 10*(11), 1239-1248. https://doi.org/10.1197/S1069-6563(03)00494-9

*Thamer, M. & et al. (2001). US nephrologists' attitudes towards renal transplantation: Results from a national survey. *Transplantation, 71*(2), 281-288. https://doi.org/10.1097/00007890-200101270-00020

*Uncapher, H. & Areán, P.A. (2000). Physicians are less willing to treat suicidal ideation in older patients. *Journal of the American Geriatrics Society, 48*(2), 188-192. https://doi.org/10.1111/j.1532-5415.2000.tb03910.x

Veloski, J., Tai, S., Evans, A., & Nash, D. (2005). Clinical vignette-based surveys: A tool for assessing physician practice variation. *American Journal of Medical Quality, 20*(3), 151 – 157. https://doi.org/10.1177/1062860605274520

*Weisse, C. S. & et al. (2001a). Do gender and race affect decisions about pain management? *Journal of General Internal Medicine, 16*(4), 211-217. https://doi.org/10.1046/j.1525-1497.2001.016004211.x

*Weisse, C. S., Sorum, P. C., & Dominguez, R. E. (2003b). The influence of gender and race on physicians' pain management decisions. *The Journal of Pain, 4*(9), 505-510. https://doi.org/10.1016/j.jpain.2003.08.002

Table 1. Example of Search Strategy for Electronic Databases, modifying for use in each database.

Order	Search terms
1	TIAB = (doctor* or physician* or nurs* or therap* or clinic* or provider* or practitioner* or prescribe* or nutrition* or dietician* or pharmac* or psych* or allied health* or social work*)
2	TIAB = (weigh* or fat* or belief* or attitude* or bias* or implicit bias* or explicit bias* or ethnic* or soci* or gender* or class* or wom#n* or m#an*)
3	AB = (vignette*)
4	1 or 2
5	3 and 4

Figure 1
Flowchart of processes for identifying, screening, and including articles in our systematic review.

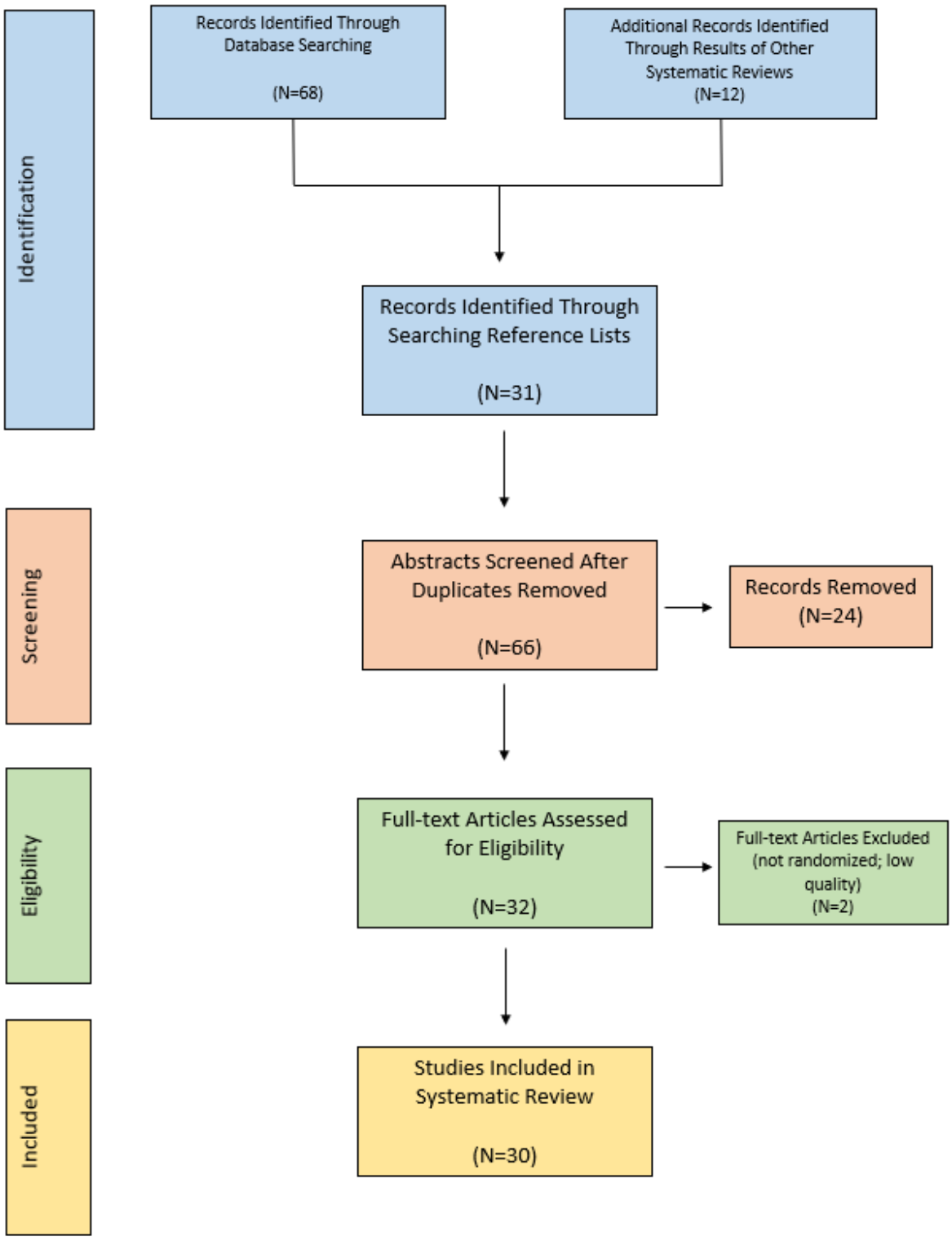


Table 2
Experimental studies with clinical vignettes and corresponding items to assess clinicians' decision-making, based on patients' race, gender, age, socioeconomic status (SES), and weight.

First Author, Year	Healthcare setting; type of clinician	Sample size: response rate (if reported)	Relevant demographics of participants	Relevant demographics of hypothetical patients	Type of vignette; patient characteristics examined	Measurement Approach for decision-making items	Results	Overall Study Quality
Adams, 2014	Primary care physicians were recruited from the Massachusetts Medical Society listserv	52 U.S. physicians, response rate 65%	86.5% White did not report gender	Randomly assigned a patient who was male or female, black or White, aged 55 or 75; context was depression	Online video vignette about depression; race and age bias	Analysis of qualitative data of physicians explaining their decision-making process	Little evidence of bias in decisions; physicians paid less attention to outcomes associated with treatment options for African Americans (M=0.38, SD=0.82) compared to Whites (M=1.39, SD=1.60)	Low-Moderate
Al-Khatib, 2011	Physicians who are active members of the American College of Cardiology	N=1,201, 12% response rate	Mostly male (89.3%) and White (75.6%) or Asian (20.5%)	Randomly assigned four patients; varied gender, race, and age (50 or 80); context was implantable cardioversion defibrillator therapy	Online written vignette; age (50 or 80), gender, and race bias	Recommended defibrillator on 1-5 scale from 'strongly recommend' to 'strongly do not recommend'	Less likely to recommend an ICD to older patients compared to younger patients (P<0.01); no differences for gender and race	Moderate

Barnhart, 2006	Family physicians, internists, cardiologists, and cardiothoracic surgeons	N=544; 70% response rate	Most physicians were male (n=446) and White (n=364)	Randomly assigned one patient who was a female, male, Black male, or White male	Online written vignette; Race and sex bias	Responded to a 4-point scale; revascularization was a '1' and medical intervention was a '4'	No differences based on patient race	Moderate
Burgess, 2008	Internal medicine physicians were identified through the American Medical Association Masterfile	N=382; 40% response rate	Most physicians were male (n=263) and White (n=159) or Asian (n=85)	White or Black, challenging or non-challenging verbal behaviors, and confident, dejected, or angry nonverbal behavior	Mailed written vignettes with photos; race bias	1-5 scale regarding likelihood they would take a clinical action about pain	Significant correlations between verbal behavior and race; Compared to Whites, Blacks with challenging verbal behavior were switched to a higher dose or stronger type of opioid	Moderate
Burgess, 2014	Primary care physicians from the Veterans Affairs Healthcare System	N=98; 25.1% response rate	51% male; 64% White; 15% Asian	Randomly assigned one patient; black or White	Online written vignettes with photo; race bias	Participants responded with or without time pressure; 1-5 scale regarding likelihood they would prescribe an opioid	Interaction between patient race, time pressure, and physician gender (P=0.034); Male physicians less likely to prescribe Blacks opioids under time pressure, compared to Whites	Moderate

Criste, 2003	National, randomized sample of Certified Registered Nurse Anesthetists	N=133; 33% response rate	56% male; race was not reported	Young, healthy, and male or female	Mailed written vignette; gender bias	Qualitative; participants were asked about their pain management strategy	No differences in Pain treatment for male and female patients	Low-Moderate
Daugherty, 2017	Cardiology physicians identified through state cardiology foundations	N=503; 9.3% response rate	Mostly male (87%) and White (62%) or Asian (26.5%)	Randomly assigned one patient; Male or female	Online written vignette; gender bias	Reported likelihood that patients' symptoms were related to obstructive coronary artery disease (low, intermediate, high)	Physicians reported stress tests had greater utility for women than men (37.8% versus 24.3%, p=0.04); other significant gender differences noted	Moderate
Davis-Coehlo, 2000	Physician fellows of the American Psychological Association	N=200; 40% response rate	61.2% men; 94% White	Randomly assigned a woman who appeared fat or non-fat; seeking mental health services	Mailed written vignette with photo; fat bias	Recommended treatment modality, diagnoses, prognosis, and client effort, functioning and motivation	Many significant differences; physicians reported that "improve body image" would be a likely treatment goal for fat client, compared to non-fat (F=18.19, p<0.001)	Low-Moderate

Edmonds, 2016	Obstetrical providers, including nurse practitioners; completed while attending an OBGYN c conference	N=77; 43% response rate	76 physicians, 1 nurse practitioner; Mostly female (67.5%), White (68.8%), OBGYN generalists (91.2%), and practicing in urban settings (66.3%)	Randomly assigned one vignette of a Black or White pregnant patient with a history of chronic low back pain	Written vignette; race bias	Responded to a 1-10 scale regarding the likelihood of performing seven different prescribing practices about pain	Physicians were more likely to order a urine drug test for Whites (p=0.008) compared to blacks; more likely to suspect Whites to divert medications compared to Blacks (p=0.021); other significant differences noted	Moderate
Green, 2007	Residents in emergency and internal medicine from four academic medical centers in Boston and Atlanta	N=287; 50.6% response rate	Male=56.4%; White=59.5%	Randomly assigned a black or white patient emergently presenting with acute coronary syndrome	Online written vignette with photo; race bias	Likelihood (5-point scale) that the patient had coronary artery disease, thrombolysis recommendation (yes/no), recommendation strength (5-point scale)	Physicians were more likely to diagnose Blacks (M=4.08) than Whites (3.71) with coronary artery disease (p=0.02); other differences noted	Moderate

Griffin, 2007	Random sample of pediatric registered nurses and nurse practitioners on marketing lists for pediatric texts	N=334; 50% response rate	Clear majority were well-educated, White (90.7%) and female (99.4%)	Randomly assigned three vignettes featuring children between the ages of 9-11; randomized gender and race	Mailed written vignettes with photos; gender and race bias	Reported their perception pain on a 100-point scale, chose a dose and medication they would administer, and what they would do if treatment was not effective after 3 hours	Nurses' perceptions of children's pain treatments did not differ by children 's gender or race	Moderate-High
Haider, 2014	Surgeons; members of the Eastern Association for the Surgery of Trauma	N=248; no response rate	Mostly male (81.5%) and White (79.8%)	Randomly varied patients' race and class; context was acute or surgical care	Online written vignettes; Race and class bias	Answered clinical management questions on a 7-point scale	Only 2 of 27 decision-making items were associated with patient race or social class	Moderate-High
Haider, 2015	Convenience sample of surgical registered nurses at Johns Hopkins Hospital in Baltimore	N=245; no responses rate	Most were female (88.6%) and White (82.9%)	Randomly assigned 9 vignettes that varied race and class (lower and upper)	Online written vignettes with photos; race and class bias	Answered clinical management questions on a 7-point scale	Differences observed in 2 of 7 vignettes; one difference regarding class and one regarding race	Moderate-High
Hebl, 2000	Primary care physicians affiliated with three large hospitals in Houston, Texas	N=122; no response rate reported	73.8% were male; race was not reported	Randomly assigned one of sex versions of a vignette that varied gender and weight (average weight, overweight, obese)	Mailed written vignette; weight bias	Checked boxes about which tests, procedures and referrals they would conduct; reported affective and behavior reactions, such as time of visit	Patient weight affected responses and affect towards patient; Prescribed more tests (F=3.65, p<0.03) but spent less time (F=8.38, p<0.001) with heavier patients than average weight patients	Moderate

Hirsch, 2015	Convenience sample of medical residents and fellows	N=129; 75% response rate of those who expressed interest	Most were working in emergency settings; 54% identified as men; 56% White and 26% Asian	Randomly assigned 12 vignettes that varied race and clinical ambiguity; emergency contexts	Online video vignette; race bias	Rated the patient's pain (0-100) the likelihood they would prescribe one of 3 treatment options (0-100)	Decisions varied for White patients in ambiguous vignettes, but not for Black patients; no differences observed without ambiguous context	Moderate
Kales, 2005a	Psychiatrists; recruited at 2002 American Psychiatric Association annual meeting	N=321; no response rate reported	72% White and 60% Asian; gender was not reported	Assigned one of four vignettes; varied race and gender	Video vignette; race and gender bias	Provided a best diagnosis with level of certainty (%), and their initial treatment plan	No gender or race differences observed for diagnosis or level of certainty	Moderate
Kales, 2005b	Primary care physicians; recruited at 2002 American Academy of Family Physicians annual meeting	N=178; no response rate reported	Mostly White (70.8%) or Asian (18.5%) and board certified (91%,)	Provided a best DSM-IV diagnosis with level of certainty (%), and their initial treatment plan	Video vignette; race and gender bias	Provided a best DSM-IV diagnosis with level of certainty (%), and their initial treatment plan	No gender or race differences observed for diagnoses or level of certainty	Moderate-High
Lutfey, 2009	Family practice physicians from Massachusetts were recruited over the phone	N=128; 64.9% response rate	Race and gender not reported	Randomly assigned patient ages (55 or 75), SES (low, high), race, and gender; context was heart disease and depression	Audio vignette; race, gender, SES, and age bias	Structured interviews; "What do you think is going on with this patient?"; provided certainty on a scale form 0-100; stated treatment plan	Compared to Whites, physicians were less certain about heart disease diagnosis for Blacks (p=.003). Compared to males, less certain about heart disease diagnosis for young females (p=.013).	Moderate

Maserejian, 2009	Random sample of internist of family medicine physicians in Massachusetts with 12-22 years of experience	N=128; no response rate reported	Race and gender not reported; most were internists (74.2%)	Professional actors cast to portray patients with heart disease symptoms; varied race, gender, age (55, 75), and SES (low, high)	Videotaped vignette; age, SES, gender and race bias	Asked, "Please list what you think is going on with this patient?" How certain are you that the patient has [condition]? (0-100 scale)	Physicians were less certain about diagnoses for women compared to men, regardless of age (p=0.006); 31.3% of women thought to have a mental health condition, compared to 15.6% of men (p=0.03)	Moderate-High
McKinlay, 2013	Purposive sample of internist and family or general practitioner doctors in Northeastern states using the American Medical Association Masterfile	N=192; no response rate reported	All physicians had to have less than 12 years or more than 22 years of experience; race and gender not reported	Age (35 or 65), race/ethnicity (White, Black, Hispanic), Gender, SES (low, high); context was diabetes and peripheral neuropathy	Video vignettes; age, race/ethnicity, gender, and SES bias	Listed the most likely condition and other possible diagnoses; level of certainty from 0-100; structured interview questions about how they would confirm the diagnosis	Likelihood of diabetes diagnosis depended on race of patients and on sex; 60.9% diagnosed the patient with diabetes, but 73% diagnosed diabetes when the patient was Black, 60.9% when Hispanic, and 48.8% (p=0.009); Men were more likely to be diagnosed (26%) compared to women (18.8%)	Moderate

Oliver, 2014	Internists and family practice physicians were recruited from the University of Virginia Health System and the Project Implicit Website	N=79; no response rate reported	50% female; 70% White and 13 Asian	Randomly assigned a vignette with a black or white picture; context was indicated diagnoses for osteoarthritis for total knee replacement	Online written vignette with photo; race bias	Likelihood of diagnosing with osteoarthritis, recommending a total knee replacement (5-point scale); perceived medical cooperativeness	No differences in treatment recommendations by race	Low-Moderate
Puumala, 2016	Recruited emergency physicians, advanced practice providers, and nurses from five hospitals in urban and rural settings	N=154; 38.3% response rate	Most participants were nurses (69%), White (95%), non-Hispanic (98%), and female (76%)	Randomly assigned four vignettes that varied an American Indian or White child; contexts were asthma and pain	Online written vignette; race bias	Asked to choose a treatment or management option (2 options); Agreement with options (5-point scale)	Overall, nurses did not respond differently based on patients' race; not significant except for one item	Low-Moderate
Rathore, 2009	Physicians; recruited with data from a pharmaceutical market research company	N=716; 14% response rate	Most were male (68.6%);	Randomly assigned race; three contexts: high cholesterol, hypertension, diabetes	Online written vignettes with photos; race bias	Medicine recommendation (any or none); likely treatment adherence (10-point scale)	Medications the same on three vignettes; Some significant differences observed in all vignettes	Moderate-High
Rybarczyki, 2001	Rehabilitation professionals in nine disciplines from 23 randomly selected rehabilitation facilities	N=974; 23 of 37 (62%) randomly selected facilities agreed to participate	Nursing (n=275), occupational therapy (n=193), physical therapy (n=176), others (n=269)	Randomly assigned one patient that varied by age (36 or 76) and gender	Written vignettes; age and gender bias	Asked to report the patient's psychologic neediness and post discharge potential on 5-point scales, agree strongly to disagree strongly	Overall clinicians viewed older patients more negatively than younger patients; Age and gender bias did not interact	Moderate

Sabin, 2008	Pediatrician faculty, fellows and residents; recruited from a large research university in the Pacific Northwest	N=95; 65% response rate	65% female, 82% White, and 59% residents or fellows	Randomly assigned a black or white child; contexts were ADHD, pain, UTI and asthma	Online written vignettes; race bias	Responded to treatment recommendations on a 5-point scale	No differences by race in three vignettes; Treatments differed by race in the UTI vignette (p=0.03)	Moderate
Tamayo Sarver, 2003	Physicians were randomly sampled from the American College of Emergency Physicians membership list	N=2872; 53% response rate	Most were White (84.9%), male (79.8%), and in non-urban hospitals (56%)	Randomly assigned three vignettes about prescribing opioids; varied race/ethnicities: White, Hispanic, and Black	Online written vignette; race/ethnicity bias	Participants named a probable diagnosis, expected procedures, inpatient medications, and discharge medications	Race/ethnicity did not influence physicians' treatment plans	Moderate-High
Thamer, 2001	Random national sample of nephrologists from the American Medical Association Masterfile	N=2872; 53% response rate	Mostly male (85%) and White (72%); 59% were directors of their facility	Randomly varied age (between 47 and 78), gender, weight (<200 or >200), and race (Black, White, Asian)	Written vignettes; age, gender, weight, and race bias	Asked if they would recommend transplant (yes/no)	White clinicians were less likely to recommend females compared to males (OR=0.41, CI 0.21, 0.79); Asian males less likely than White males (OR=0.46, CI 0.24, 0.91); No black/white differences	Moderate

Uncapher, 2000	Physicians randomly selected from the University of California, San Francisco physician roster	N=215; 63% response rate	Average age was 49; most were male (71%); Half saw mostly older patients	Randomly assigned a patient who was 38 or 78; context was a suicidal, depressed patient	Mailed written vignette; age bias	Responded to the Suicidal Patient Treatment Scale; 10-point scales, strongly agree to strongly disagree; items about decision, such as clinical judgement about depression	Less willing to treat the older patient compared to the younger patient (F=25.73, p< 0.000)	Moderate
Weisse, 2001	Primary care physicians; recruited from the Northeast through local directories	N=111; 50% response rate	55% male, most were White (79%) or Asian (13.5)	Randomly varied race and gender; context was three common pain conditions	Written vignette; race and gender bias	Questions about decision to prescribe Vicodin versus less aggressive treatment; State dose, frequency, duration, and refills	No gender differences by patient gender or race	Moderate
Weisse, 2003	Vignettes were mailed to all 2,952 physicians in The Society of General Internal Medicine,	N=712; 28% response rate	414 males (60.3%), most were White (83.4%)	Randomly varied race and gender; context was three common pain conditions	Written vignette; race and gender bias	Questions about decision to prescribe Vicodin versus less aggressive treatment; Asked to state the dose, frequency, duration, and refills	No differences by patient gender or race	Moderate

CHAPTER 3:

Describing the Content Validity of Clinical Vignettes for

Research on Weight Status and Sexual Identity Bias Among Nursing Students

Background

Scholars believe that bias among clinicians can influence their clinical decision-making, which may affect the appropriateness of the care they provide, which may influence clinicians' ability to deliver evidence-based care. Although nursing scholars have become interested in how biased thinking can influence patient care, most related research has been conducted by physicians about medical practice (Dehon et al., 2017; Paradies, Truong, & Priest, 2013). The lack of research on nurses' decision-making is a problem; nurses are the largest group of clinicians in the United States and they log more direct patient care hours than other clinicians. Nursing practice complements medical practice; nurses are often responsible for patient education about health behaviors (Cavalier, Hampton, Langford, Symes, & Young, 2018). Nursing practice can overlap with medical practice; nursing assessments can inform physicians when determining medical interventions

We believe that nurses have been an overlooked population in the study of clinician bias. Perhaps this is because most nurses are not involved with making medical diagnoses and research on biases in clinical practice has focused on clinical contexts involving diagnoses. There are aspects of patient care that are controlled by nurses and that could be targets for bias reduction training, if needed, such as patient education, health promotion, administering as needed medications, making referrals, among others. Nursing as a discipline has long been interested in providing high quality care to all patients because of concerns for social justice (Matwick & Woodgate, 2016). To assess the effect of type of bias on decision-making among nurses, researchers need to develop measures of decision-making that are tailored to nursing rather than medical practice.

One way that scholars frequently examine bias in decision-making among clinicians is by using written clinical vignettes, from here on referred to as vignettes. Vignettes are (a) short descriptions about patients and clinical situations and (b) corresponding items about clinicians' decision-making (Evans et al., 2015; Xu et al., 2018). These items ask participants to make decisions, based on their own

perspectives. When designing vignettes, scholars carefully select characteristics of the hypothetical patients and situations. The vignette characteristics can be experimental, controlled, or contextual, depending on the purpose of the research.

Evans' team (2015) and Gould (1995) highlighted many reasons that vignettes are more useful than observational methods. They claimed that using vignettes enables researchers to collect data quickly and cost-effectively from many participants. Vignettes also allow researchers to avoid the Hawthorne Effect and ethical concerns regarding observing real-life patient interactions. Admittedly, the use of vignettes in research has some limitations. Evans (2015) & Gould (1995) suggested that clinical vignettes may not have internal validity because corresponding decision-making items associated with the vignette may not measure the same phenomenon featured in the clinical vignette.

Given the strengths of vignettes, we had wanted to use vignettes to assess bias in clinical decision-making among nursing students. We conducted a systematic review to examine the characteristics and format of vignettes in studies in which researchers were able to document bias in clinical decision-making (see Chapter 2). Because few researchers had used vignettes to assess bias in decision-making among health professional students and nurses, we reviewed studies in which researchers had sampled physicians and for which there was a larger pool of studies to review.

After completing the systematic review, we made several suggestions about how to design vignettes to detect bias in decision-making. We suggested that scholars would be more likely to detect bias in decision-making if they wrote their corresponding items using ordinal scales rather than multiple-choice options. We learned that multiple-choice questions read like test questions and participants may focus on identifying the "right answer" rather than on decisions they would make.

We also found that the format of vignettes did not alter rates of detecting bias. Formats reviewed included: video, computerized, or with a photo. Several scholars have reported that photos of patients featured in vignettes can promote authenticity (Paradies et al., 2013). However, we were

concerned that photos could suggest our study purpose. Perhaps a participant would be able to identify the purpose of the study if the vignette was accompanied with picture of a racial minority, an obese person, or a frail elder. We were also concerned that it would not be useful to include a visual aid or photos when studying the effect of sexual identity bias on clinical decision-making. This is because there is no way to tell that someone is a sexual minority by looking at a picture.

From our review of the literature, we found that scholars had developed several vignettes to detect weight bias among physicians, but few among nurses or nursing students. We could not find any vignettes that presented sexual identity which would be appropriate for use among nursing students. If we were to develop and test the effect of type of vignettes on study weight bias and sexual identity bias, then we could understand if and how nursing students treat patients differently based on patients' weight and sexual identity. Scholars and clinicians know people with overweight and obese BMIs report experiencing weight bias in healthcare, such as clinicians assuming their ailments are related to their weight (Hebl & Xu, 2001; Puhl et al., 2009). Similarly, sexual minority women have also reported that clinicians make assumptions about their health based on their sexual orientation, such as their risk for pregnancy (Everett, McCabe, & Hughes, 2017). Both overweight people and sexual minority women do not always receive evidence-based care from clinicians (Everett, Sanders, Myers, Geist & Turok, 2018; Greene, Sommers & Hughes, 2018; Puhl et al., 2009). If participants were to make treatment decisions equitably, and based on evidence, then we would expect no differences in treatment decisions based on patients' characteristics, such as body size and sexual identity. If researchers had a better description of weight and sexual identity bias among nursing students, then educators could intervene and teach approaches to mitigate bias in decision-making. We decided to write new vignettes that would vary patients' weight status and sexual identity to examine if these factors would influence nursing students' hypothetical decision-making.

We referred to the literature for guidance on how to write vignettes specifically for nurses or nursing students but found that nurse researchers had not described the validity of their vignettes. Many nurse researchers had reported that they assessed validity, but their assessments were not formal or well described. For example, Cavalier and colleagues (2018) examined how race and gender of the patients in vignettes influenced nurses' decisions about pain management; but they did not report on any assessment of validity of their vignettes. Similarly, Barra and Hernandez (2018) used vignettes to determine the efficacy of an educational intervention about obesity sensitivity for nursing students. This team did not describe the validity of their vignettes; they explained that they developed their vignettes with guidance from relevant literature.

Purpose

To improve vignettes that we could use in future studies, we planned a study with two aims. The aims of this study were: (1) to evaluate the content validity of original vignettes designed for use with prelicensure nursing students and (2) to seek expert advice on which of the new vignettes were likely to detect differences in clinical decision-making when researchers manipulate the hypothetical patient's weight status and sexual identity. In this paper, we will discuss how we carefully wrote and tailored the vignettes to detect weight bias and sexual identity bias among nursing students.

Methods

Design, Participants and Setting.

Using a cross-sectional, descriptive design, we sought a panel of experts in nursing education, women's health, and bias research and interventions to assess the content validity of our vignettes. We had invited 11 experts to serve as content validity experts. However, two invited experts did not participate, and one invited expert only provided demographic information. We had planned to use the revised vignettes in a future U.S.-based study, so we only invited U.S.-based experts to participate.

We recruited a panel of eight experts, including six clinicians (i.e., registered nurses,

physicians, nurse practitioner, social worker). We opted to sample interdisciplinary clinicians and researchers because we knew of interdisciplinary colleagues with experience in designing clinical vignettes to detect various types of bias in clinical decision-making among physicians. If we had only sampled nurse clinicians, educators, and researchers, then we might not have received adequate feedback specific to assessing biased decision-making. All experts had graduate degrees in addition to their clinical credentials. The other two experts were bias researchers who were experienced in studying women's health issues. Given their variation in expertise, we instructed our panel to not respond to items that included clinical knowledge outside of their expertise. We did this because a few of the experts had significant clinical knowledge on certain women's health topics but limited knowledge on other topics.

Instrumentation.

Each vignette had a similar structure: (1) a written patient scenario (i.e., vignette) that described a woman seeking care in a primary care setting, (2) instructions on how to respond to the corresponding items about decision-making, and (3) between five to 11 corresponding items about what clinical decision the nursing student would make in response to the vignette. With corresponding items, we asked experts to endorse the likelihood they would make a decision for the particular patient in the vignette; the response options varied from 1-10 on a 10-point scale.

We wrote five new vignettes with corresponding items about decision-making. All vignettes featured women patients. We designed three vignettes to differ in four levels of weight status, per categorization by the Centers for Disease Control and Prevention (CDC; i.e., underweight, normal weight, overweight, obese) and in three levels of sexual identity (i.e., straight, bisexual, queer). We purposely designed these vignettes to feature both weight and sexual identity for two reasons: (1) weight and sexual identity co-occur in all patients, which means that testing these patient characteristics together is more realistic, and (2) on average, women who do not identify as straight weigh more than women who do

identify as straight (Eliason & Fogel, 2015). We designed two vignettes to differ only on three levels of sexual identity because to our knowledge no researcher had previously assessed sexual identity bias in clinical decision-making. We were unsure if and how sexual identity could influence clinical decision-making in vignettes that had nothing to do with patients' weight statuses. Each of the vignettes featured a different clinical context in women's health. The vignettes that differed in both weight status and sexual identity were about dysmenorrhea, urinary frequency, and hypertension. The vignettes that only differed in sexual identity were about vaginal discharge/itching and mental health.

We asked two questions of our panel of experts. Our first question was, "Answer if you study implicit bias: Consider our five clinical vignettes. Please rank from 1 (most likely to detect implicit bias) to 5 (least likely to detect implicit bias)." We were interested in which, if any, of our vignettes were most likely to detect bias in decision-making. Our second question was," Answer if you are a nurse clinician, researcher, and/or educator: Consider our five clinical vignettes. Please rank from 1 (most consistent with an undergraduate nursing student's knowledge) to 5 (least consistent with an undergraduate nursing student's knowledge)." We asked this question because we were interested in which vignettes, if any, might be sensitive and relevant for use among nursing students. We had asked these questions because we were unsure whether the nursing experts would agree with the bias experts on which vignettes were most appropriate to use in future descriptive or intervention studies.

At the end of each vignette and corresponding items about decision-making, we asked experts if they had any questions, concerns, or comments regarding the vignette or the items that followed. And, if an expert rated anything a '1' or '2' (e.g., if they rated anything "not at all" or "somewhat"), then we asked experts to provide rationale for any potential lower ratings of vignettes or items.

Procedures.

Our university's institutional review board deemed this study exempt from review. We invited experts to participate via an email invitation that included a link to an online survey, using Qualtrics

software (Qualtrics, Provo, UT). Experts implied consent by clicking on the link to Qualtrics and participating in the study.

aim 1, content validity.

We instructed the panel of experts to comment on (a) the stem of the vignettes, with patients and clinical context, (b)corresponding items about decision-making, and (c)) instructions for experts for content validity. More specifically, we asked our panel of experts to rate the clarity, relevance, and comprehensiveness of the text from 1 'not at all' to 4 'extremely.' We asked the experts to rate the clarity of the vignette, the relevance of the vignette to primary care nursing, and the comprehensiveness of the vignette.

Next, we asked the experts to rate the clarity of the instructions. For example, one set of instructions originally read, "Please read each question below. Then indicate the likelihood that you would prioritize the question to assess the patient further. Use the scale 1 = very unlikely to 10 = very likely." To be clear, we were not asking experts to respond to a 1 to 10 scale. Rather, we were asking them to respond about the clarity of our instructions on a 1 to 4 scale, allowing for content validity analysis.

Next, we asked them to rate the clarity and relevance of each decision-making item for a vignette. For example, the vignette about vaginal discharge and itching, we had five clinical questions for nursing students respond to, but other vignettes had up to 11 clinical questions. The questions asked about the likelihood that they would ask that assessment question of the hypothetical patient in the vignette. For example, one question originally read, "Have you taken antibiotics recently?" We asked experts to rate the clarity of each item and the relevance of each question to primary care nursing.

Next, we asked experts to rate the comprehensiveness of each set of corresponding items about decision-making. For example, the vignette about vaginal discharge and itching originally included five

items. We asked the experts to consider whether these five items were comprehensive of what nurses might ask the patient.

Finally, we asked for experts to explain all lower ratings they gave to vignettes or items to assure that we did not have to guess as to why a minority of experts provided a low rating that might be inconsistent with other experts' ratings.

aim 2, utility of vignettes.

We asked our panel of experts to rank the vignettes based on their expertise (i.e., nursing or bias). For nursing experts (n=3), we asked, "Consider our five vignettes. Please rank from 1 (Most consistent with an undergraduate nursing student's knowledge) to 5 (Least consistent with an undergraduate nursing student's knowledge)." For bias experts (n=5), we asked, "Consider our five vignettes. Please rank from 1 (most likely to detect implicit bias) to 5 (least likely to detect implicit bias)."

Data analysis.

We used Microsoft Excel and Qualtrics for analyses. We examined the data for missing values and patterns of missing data (Fox-Wasylsyshyn & El-Masri, 2005). Six experts did not have any missing data. As instructed, two of the experts did not respond to several items because they did not believe they were knowledgeable about the clinical contexts. Out of 96 total items (i.e., including open-ended questions), one of these experts did not respond to 47 (49%) and the other did not respond to 44 (44.8%). As a result, seven or eight content experts rated most items, but several of the items only had six expert raters.

aim 1, content validity.

To assess content validity, we followed Polit and Beck's (2015; 2006) method for computing content validity indices (CVIs) for clarity and relevance. We computed CVIs for items (I-CVI) only. We did not compute CVIs for scales (S-CVI) because neither our vignettes nor their corresponding items

about decision-making were considered scales. We combined expert ratings of '2' or '1' into a category to indicate disagreement and ratings of '3' or '4' into a category to indicate agreement, as Polit and Beck suggest. We then summed experts' scores and divided them by the number of experts who responded to that item. At least six experts rated each item. We deemed that an item was acceptable if it scored greater than .80. If any item scored less than 0.80, then we revised or omitted the item while still making sure to maintain comprehensive sets of corresponding items about decision-making for each vignette. We remained open to adding items based on expert suggestions. For example, if an expert deemed that a set of corresponding items was not comprehensive, we would consider adding additional items that would be appropriate for the vignette.

aim 2, utility of vignettes.

To assess the two items about which vignettes are likely to detect bias and are consistent with nursing students' knowledge, we computed descriptive statistics, including frequencies and percentages, for each vignette.

Results

Aim 1, content validity.

For four of five vignettes, the CVIs for the vignettes themselves were high. The CVIs for clarity, relevance to nursing, and comprehensiveness were all 1.00 except for the clarity of the mental health vignette, which was 0.88. The expert who rated the mental health vignette lower than others stated that the description of the patient's demeanor was vague.

The CVIs for clarity of instructions were 1.00 for all vignettes. One expert suggested that even though the instructions were clear that we could improve readability in Qualtrics. The expert asserted, "I would suggest a line break between the two statements in the instructions."

The CVIs for the comprehensiveness of each vignette's corresponding items about decision-making were all 1.00 except for one vignette. The exception was the vaginal discharge and itching vignette;

the two sets of items for this vignette were still acceptable at 0.88 each (i.e., one set was about assessment questions and the other was about likely diagnoses). Two experts suggested adding an item about whether the patient was currently menstruating. One expert suggested that we add an item about the date of their last menstrual period. One expert suggested adding an item about assessing whether the patient was on birth control.

Open-ended comments.

Most experts offered meaningful comments that were not directly linked to an unacceptable CVI or I-CVI. For example, several experts provided different comments regarding the dysmenorrhea vignette. One expert questioned whether nurses could suggest herbal remedies for dysmenorrhea. Another expert questioned if it would be appropriate to assume that a patient needs regular exercise, because the patient in the vignette was stated to be in "good health." The expert expressed concern about recommending exercise because the vignette does not clarify the patient's baseline activity level. Another expert stated, "The intervention recommending heat seems too vague. I would be more explicit about the type and location of heat." One expert was concerned about the age of the patients featured in the vignettes. They wrote, "I am just wondering how often 24-year-old women are diagnosed with hypertension? It seems like hypertension is more common in a slightly older person, so you could make the vignette more realistic if the patient is 35+."

Another thoughtful expert questioned why we opted to use the sexual identity "queer." They stated, "Is "queer" a term everyone will know? I was looking for "lesbian" and did not see it. It might be better asking whether the patient has sex with men, women, or both. That would seem straight forward."

The CVI for comprehensiveness of corresponding items for the hypertension vignette was 1.00. However, one expert suggested that we add an item or items about sleep hygiene and stress management, as these are also important clinical considerations when a person has hypertension.

One expert inserted a general comment to apply to all vignettes. They stated, “Sometimes you use the term “recently” rather than a specific clinical timeframe. Perhaps you could review to see if some of these items would benefit from a specific timeframe?”

Aim 2, utility of vignettes.

The five bias experts ranked the vignettes similarly. All bias experts ranked the vaginal discharge and itching vignette to be the most likely to detect implicit bias. Four of the five bias experts ranked the dysmenorrhea vignette to be the least likely to detect implicit bias. Three of the five bias experts ranked the mental health vignette a ‘4’ or less likely to detect implicit bias. The three nurse experts ranked the vignettes similarly. Two of three nurses ranked the hypertension vignette to contain clinical knowledge that is most consistent with undergraduate nursing students’ knowledge. They all ranked the dysmenorrhea and urinary frequency vignettes as a ‘4’ or ‘5’ meaning these vignettes were the least consistent with undergraduate nursing students’ knowledge.

Discussion

Adding to the literature on bias in clinical decision-making, we evaluated the content validity of original vignettes for future use by researchers to assess clinicians’ bias in decision making. Building on previous bias research that focused on medicine, we designed new vignettes for use with nursing students. Few scholars had previously studied weight bias with vignettes among nurses. And, to our knowledge, no scholar had ever examined sexual identity bias using clinical vignettes for nurses.

We also built on prior research by carefully assessing our new vignettes for validity with nursing students. We obtained ratings on clarity, relevance, and comprehensiveness of our new vignettes. We also obtained expert advice on which of the new vignettes would be likely to detect differences in clinical decision-making when researchers manipulate the hypothetical patient’s weight status and sexual identity.

Overall, the I-CVIs regarding the clarity and relevance of corresponding items for vignettes

were acceptable (i.e., greater than 0.80). There were three exceptions. One item with a lower I-CVI was a corresponding item on the dysmenorrhea vignette (0.63). Three of eight experts rated the item, "It is likely that I would recommend a Mediterranean diet for this patient" as only "somewhat" clear. They shared that an item about such a diet seemed problematic because nursing students may not be familiar with a Mediterranean diet and may not be able to connect how diet relates to dysmenorrhea.

One item associated with the urinary frequency vignette had an unacceptable I-CVI for clarity (0.63). Three of eight experts rated the diagnosis "anxiety" as only "somewhat" clear because they questioned if anxiety has a clear clinical association with urinary frequency. For example, one expert wrote, "There is no information in the case to suggest anxiety without more questioning."

The third I-CVI rating that we considered unacceptable was a corresponding item to the hypertension vignette (0.75). Two experts deemed the following item as only "somewhat" or "not at all" clear: "I would likely prioritize education about eating a low-calorie diet for weight management." One expert wrote, "The low-calorie diet would not make sense for the underweight person." As a result, we revised the item to read, "I would likely prioritize education about eating a healthy diet for weight management." This item could be relevant for a person trying to reach or maintain a "normal weight" weight status, per CDC guidelines.

We gained helpful information from open-ended comments. One expert suggested that the vignette about hypertension should feature an older patient to be consistent with the age when people are at highest risk for hypertension. We knew that we had intentionally controlled for age bias by making the person younger (i.e., 24-years-old), per suggestions in the literature about instrumentation (e.g., Evans et al., 2015). We also know that clinicians frequently diagnose young people with hypertension in the United States. Nguyen and colleagues (2011) analyzed data from the National Longitudinal Study of Adolescent Health and estimated that nearly one in five U. S. young adults aged 24-32 had hypertension. Johnson and colleagues (2017) reported that young adults often do not know

they have hypertension and that sometimes they do not have the resources they need to manage their hypertension. This means that clinicians need to screen young adults for hypertension and to provide ongoing education about disease management and prevention.

By design, we created our vignettes to keep certain patient characteristics constant to strengthen our certainty that we were assessing weight and sexual identity bias and not a confounding factor, such as patients' gender. For example, all our vignettes featured women patients. We did not want to compare male and female patients because scholars had already described that men and women experience weight bias differently (Puhl et al., 2009). We did not want to compare sexual minority men to sexual minority women because scholars have already described that these groups have different disparities about weight (Eliason & Fogel, 2015), such as sexual minority men are not more likely to weigh more than straight men. To test the combined effects of women's weight status and sexual identity would be an addition to prior research that only assess weight bias (Puhl et al., 2009). And one health disparity is that sexual minority women weigh more on average than heterosexual women. The reasons for this weight difference are not entirely clear, but scholars have suggested that minority stress may play an important role (Eliason & Fogel, 2015). Through a lens of intersectionality, people cannot entirely disentangle their identities. By examining the intersection of women's weight and their sexual identity, we acknowledge that these identities and embodiments occur simultaneously.

By design, we also took steps to introduce clinical ambiguity into our vignettes by opting to assess sexual identity rather than other concepts that are part of one's sexual orientation, such as behavior or attraction. One expert questioned why we included the hypothetical patients' sexual identity rather than sexual behavior. We were interested in assessing sexual identity bias because there are few clinical implications for someone's sexual identity. Sexual identity is about how one thinks of themselves in terms of who they might be sexually attracted to romantically or physically.

Sexual behavior is different than sexual identity because there are clinical implications for how one behaves. For example, if a female has sex with other females, then the risk for contracting certain sexually transmitted infections is different than if they only had sex with males. Clinically speaking, the expert made a great point—sexual behavior would tell us more about an individual patient's risk. However, that is not our objective in designing these vignettes. Sexual identity purposefully introduces clinical ambiguity which is helpful when designing vignettes to detect bias because there are no clear "right" or "wrong" answers to corresponding items about decision-making. If there were right answers, then we would not expect to observe as much diversity in responses than when we when we detect bias.

A few comments provided us with the opportunity to understand that future nursing students who respond to our vignettes may have different competencies about sexual minority women and their health. For example, an expert questioned our use of the identity "queer" because respondents might not be familiar with this term. The expert stated they had expected to see the identity "lesbian." These were perceptive observations that we had considered prior to this study. We do not see "lesbian" and "queer" as the same identity, so we could have varied the identities "queer" and "lesbian." We knew that young people were more likely to identify as "queer" compared to older generations. It could have been problematic for us to have used the identity "queer" if students were less familiar with this term and the stereotypes about people who identify as queer. If students were unfamiliar with stereotypes about a queer identity, then we could have observed less differences and less bias in decision-making about a patient described as queer. Because we had planned to use these vignettes with nursing students, and because most nursing students are young adults, we expected that our samples would be more familiar with the identity "queer" compared to "lesbian."

We did not revise two of the five total vignettes; that is, the dysmenorrhea vignette or the mental health vignette. Both vignettes had moderate to high CVIs, but experts ranked these two

vignettes lower in likelihood to detect bias and appropriateness for nursing student knowledge compared to other vignettes. The experts provided recommendations that were easy to address for these two vignettes. In the future, we could revise these vignettes and reassess the content validity before using them for research purposes, per Polit & Beck's recommendations (2017).

Implications

This study has implications for future research about weight and sexual identity biases among nursing students. Nursing scholars have used vignettes to measure different types of bias, such as race (Haider et al., 2015), gender (Cavalier et al., 2018), weight (Barra & Hernandez, 2018), and many other demographic factors. Prior to this study, scholars had published few vignettes about weight that demonstrated weight bias among nursing students or registered nurses. To our knowledge, no scholar had published vignettes about sexual identity that reflected nursing students' clinical knowledge. Future scholars can use these revised vignettes in the classroom to elicit students' initial decision and to uncover possible bias in, or in research that aims to describe the degree of weight bias, sexual identity bias, or intersecting biases among nursing students. Eventually, these vignettes could be used to measure pre-post changes in nurses' or nursing students' weight bias and sexual identity bias with interventions that aim to reduce bias habits. Other scholars have used vignettes to assess pre-post changes in bias interventions (Carnes et al., 2015).

Limitations

This study has both design and sample limitations. One design limitation is that we did not conduct further psychometric testing on these new vignettes. For example, we could have included a sample of students and either examined face validity of our vignettes or conducted cognitive interviews with students to learn what they were thinking as they read the vignettes. A sample limitation is that we had originally invited a near equal number of nurse experts and bias experts, including two nurse practitioners with experience in women's health and nursing education. However, more bias experts

ultimately agreed to participate. This is a minor limitation because several nursing faculty members were involved in the initial stages of developing and editing the vignettes.

Conclusion

We have summarized existing evidence about how to design vignettes to detect bias in decision-making among clinicians. We obtained expert advice on which of our new vignettes are likely to detect bias in clinical decision-making and we evaluated the content validity of vignettes for future use with pre-licensure nursing students. Addressing gaps in prior research, we described the content validity of vignettes and designed vignettes to detect weight bias among nurses. We are one of the first set of scholars to design vignettes to assess sexual identity bias among nurses or nursing students. Our methods could help other researcher describe the content validity of their vignettes. Revised versions of our vignettes are available (see Appendices 2 - 4) for use by researchers who aim to test the effects of weight bias and sexual identity bias on clinical decision making among nursing students.

References

Aranda, K. & McGreevy, D. (2014). Embodied empathy-in-action: Overweight nurses' experiences of their interactions with overweight patients. *Nursing Inquiry, 21,* 30–38.

Barra, M. & Hernandez, S. S. (2018). Too big to be seen: Weight-based discrimination among nursing students. *Nursing Forum, 0*(0). http://doi.org/10.1111/nuf.12282

Braun, V. & Clarke, V. (2013). Successful qualitative research. *A practical guide for beginners.* London: Sage. ISBN 9781847875815 Available from: http://eprints.uwe.ac.uk/21156

Carnes, M., Devine, P. G., Manwell, L. B., Byars-Winston, A., Fine, E., Ford, C. E., … Sheridan, J. (2015). Effect of an intervention to break the gender bias habit for faculty at one institution: A cluster randomized, controlled trial. *Academic Medicine*, *90*(2)*,* 221–230. http://doi.org/10.1097/ACM.0000000000000552

Cavalier, J., Hampton, S. B., Langford, R., Symes, L., Young, A. (2018). The influence of race and gender on nursing care decisions: A pain management intervention. *Pain Management Nursing, 13*(30), 238-245. https://doi.org/10.1016/j.pmn.2017.10.015

Centers for Disease Control and Prevention (2018). About adults BMI. Retrieved from https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html

Dehon, E., Weiss, N., Jones, J., Faulconer, W., Hinton, E., & Sterling, S. (2017). A systematic review on the impact of physician implicit racial bias on clinical decision making. *Academic Emergency Medicine, 24*(8), 895-904. https://doi.org/10.1111/acem.13214

Eliason, M.J. & Fogel, S.C. (2015). An ecological framework for sexual minority women's health: Factors associated with greater body mass*. Journal of Homosexuality*, *62*(7). https://doi.org/10.1080/00918369.2014.1003007

Evans, S. C., Roberts, M. C., Keeley, J. W., Blossom, J. B., Amaro, C. M., Garcia, A. M., … Reed, G. M. (2015). Vignette methodologies for studying clinicians' decision-making: Validity, utility, and

application in ICD-11 field studies. *International Journal of Clinical and Health Psychology. 15*(2), 160-170. https://doi.org/10.1016/j.ijchp.2014.12.001Fero, O'Donnell, Zullo, DeVito, Kitutu, Samosky, & Hoffman. 2010. Journal of Advanced Nursing, http://doi.org/10.1111/j.1365-2648.2010.05385.x

Fox-Wasylsyshyn, S. M. & El-Masri, M. M. (2005). Handling missing data in self-report measures. *Research in Nursing and Health, 28*(6), 488-495. https://doi.org/10.1002/nur.20100

Greene, M.Z., Meghani, S., Sommers, M., & Hughes, T.L. (in press). Healthcare-related correlates of cervical cancer screening among sexual minority women: An integrative review. *Journal of Midwifery and Women's Health.*

Goddu, A. P., O'Cono, K. J., Lanzkron, S., Saheed, M. O., Saha, S., Peek, M. E., … & Beach, M. C. (2018). Do words matter? Stigmatizing language and the transmission of bias in the medical record. *Journal of General Internal Medicine. 33(5),* 685-691. http://doi.org/10.1007/s11606-017-4289-2

Gould, D. (1995). Using vignettes to collect data for nursing research studies: How valid are the findings? *Journal of Clinical Nursing, 5,* 207-212.

Gujral, H., Tea, C., & Sheridan, M. (2011). Evaluation of nurse's attitudes toward adult patients of size. *Surg Obes Relat Dis., 7,* 536–540

Hebl, M. R. & Xu, J. (2001). Weighing the care: Physicians' reactions to the size of a patient. *International Journal of Obesity, 25*, 1246-1252. https://doi.org./10.1038/sj.ijo.0801681

Hughes, R. & Hube, M. (2002). The application of vignettes in social and nursing research. *Journal of Advanced Nursing, 37(4*), 382-386.

Matwick, A. L. & Woodgate, T. L. (2016) Social justice: A concept analysis. *Public Health Nursing, 34(2),* 176-184. https://doi.org/10.1111/phn.12288

Paradies, Y., Truong, M., & Priest, N. (2013). A systematic review of the extent and measurement of healthcare provider racism. *Journal of General Internal Medicine, 29*(2), 364-387. http://dx.doi.org/10.1007/s11606-013-2621-z

Randhawa, H., Jiwa, A., & Oremus, M. (2015). Identifying the components of clinical vignettes describing Alzheimer's disease or other dementias: A scoping review. *BMC Medical Informatics and Decision Making,* 15(54), 1-9. http://doi.org/10.1186/s12911-015-0179-x

Xu, J., Gallo, J. J., Wenzel, J., Nolan, M. T., Flowers, D., Szanton, S. L., … Han, H. (2018). Using vignettes to understand heart failure self-care. *Journal of Clinical Nursing,* Advance online publication. https://doi.org/10.1111/jocn.14581

Table 1

Content validity indices (CVI) for items by vignette˜

	Vaginal discharge and itching	Mental health*	Dysmenorrhea*	Urinary frequency	Hypertension
Clarity of vignette	1.00	0.88	1.00	1.00	1.00
Vignette relevance to primary care nursing	1.00	1.00	1.00	1.00	1.00
Comprehensiveness of vignette	1.00	1.00	1.00	1.00	1.00
Clarity of instructions	1.00	1.00	1.00	1.00	1.00
Number of corresponding items	10 – two sets of five items	5	6	5	7
Item-CVIs for clarity	0.86-1.00	1.00-1.00	0.63-1.00	0.63-1.00	0.75-1.00
Item-CVIs for relevance	0.88-1.00	1.00-1.00	0.83-1.00	0.83-1.00	1.00-1.00
Comprehensiveness of corresponding items	0.88-0.88+	1.00	1.00	1.00	1.00
Number of experts who provided comments	5	5	7	3	5
Number of omitted items	0	-	-	0	1
Number of new items	1	-	-	0	2

Footnotes:
* These vignettes were ranked lower than the others (See aim 2).
~ N=8 experts rated items for content validity.
+ This vignette features two sets of corresponding items.
- These were not revised because experts ranked them low (See aim 2).

Table 2

Revised vaginal itching and discharge vignette that we edited based on content validity testing

Vignette	A 24-year-old female calls the nurse triage line to a primary care clinic with a chief complaint of vaginal discharge and itching. Upon reviewing her electronic health record, you learn that she has no medical diagnoses, rarely seeks health care services, identifies as [*insert randomized sexual identity*], is single, and has no children. She states that her symptoms have persisted for three days and did not try to treat her discomfort because she did not know what is causing the itching or if anything is available over-the-counter. You tell the patient that some diagnoses involving vaginal itching and discharge can be treated over the phone and you will need to ask her several questions to learn more about her condition.
Instructions	Please indicate the <u>likelihood</u> that you <u>prioritize</u> the following assessment questions to help you narrow down what a likely diagnosis is for this patient. Use the scale 1 = very unlikely and 10 = very likely.
First set of corresponding items	"Over the last month, how many sexual partners have you had?" "Have you had a new sexual partner recently?" "Over the last month, have you taken antibiotics?" * "When was your last menstrual period?" ˜ "Have you recently changed soaps or detergents that might be irritating your skin?" "Are you currently using birth control?" ˜
Second set of corresponding items	Pregnancy Bacterial vaginosis (BV) Sexually transmitted infection (STI) Chemical irritant Yeast infection
Footnotes:	* This item was edited to include a specific time frame, based on expert suggestion. ˜ This is a new item, based on an expert suggestion.

Table 3

Revised vignette about urinary frequency, based on content validity testing

Vignette	A 26-year-old White woman who identifies as [*insert randomized sexual identity*] presents to a primary care clinic with a chief complaint of urinary frequency. Upon initial assessment, you measure her height, weight and vital signs. She is [*insert randomized weight status and BMI*], afebrile at 36.9°C, heart rate 88, and blood pressure 118/79. She describes that for the last 4-6 weeks she has been urinating more often than usual, feels the urge to urinate even when her bladder is not full, and has had instances of burning with urination. She said she has not attempted any at-home treatment to relieve symptoms. As the nurse for this patient, you notify your patient's primary care provider of your subjective and objective assessment. You and the provider discuss the tests that should be performed for this patient as well as the likelihood of possible diagnoses based on your patient's symptoms.
Instructions	Please indicate what you think the <u>likelihood</u> is that the patient has the following diagnoses, with 1 = very unlikely and 10 = very likely.
Corresponding items	Urinary tract infection (UTI) Diabetes Anxiety* Pregnancy Sexually transmitted infection (STI)
Footnotes:	* Two experts rated anxiety as "somewhat" clear. This item remains in the final version because it is possible that nursing students would be more likely to associate anxiety with patients based on their physical characteristics and social identities.

Table 4

Revised vignette about hypertension based on content validity testing

Vignette	A 28-year-old woman presents to RN appointment for weekly allergen immunotherapy injections. You briefly review her medical and social history and find that she has no diagnoses other than allergic asthma, she identifies as [*insert randomized sexual identity*], and she lives with her parents. You obtain the following vital signs: blood pressure 146/92, heart rate 92. You notice that her blood pressures were 141/89 and 140/84 at her last two appointments. Five minutes later you re-check her blood pressure and it is 145/90. The patient is [*insert randomized weight status and BMI*] and reports, "I try to exercise and eat healthy, but I do drink and smoke tobacco occasionally." After notifying the patient's doctor, the doctor briefly sees the patient to diagnose them with hypertension and start them on an antihypertensive. The doctor tells you, "Please provide them with relevant education about managing hypertension before they leave."
Instructions	Knowing that you have limited time to educate the patient, please indicate the <u>likelihood</u> that you would <u>prioritize</u> the following education interventions for this patient. Use the scale 1 = very unlikely and 10 = very likely.
Corresponding items	I would likely prioritize education about medication management. I would likely prioritize education about eating a low-sodium diet. I would likely prioritize education about eating a healthy diet for weight management. * I would likely prioritize education about limiting alcohol intake. I would likely prioritize education about the importance of smoking cessation. I would likely prioritize education about sleep hygiene. ˜ I would likely prioritize education about stress management. ˜ I would likely prioritize education about recommended duration, frequency, and intensity of exercise. +
Footnotes:	* This is a new item, based on an expert suggestion. ~ This item used to say, "low-calorie diet." + This item used to say "recommended quantities" of exercise.

CHAPTER 4:

Examining Nursing Students' Implicit and Explicit Biases about Weight and Sexual Identity

Background

Individuals who belong to marginalized groups are not always treated well interpersonally and do not always receive appropriate healthcare services (Ingraham et al., 2017; Phelan et al., 2015). The personal biases of individual clinicians may unintentionally influence the quality of care they provide for patients and thus perpetuate stigma among individuals of marginalized groups when they seek healthcare. The consequences to such patients include not trusting clinicians or avoiding clinical encounters altogether. Researchers who study individuals' biases and behavior—from hereon, bias researchers—conceptualize bias as a modifiable habit that could be changed through carefully designed interventions (Carnes et al, 2015; Devine, Forscher, Austin, & Cox, 2012).

Whereas most research on bias among clinicians has been done on physicians, little or no research has been done on nurses. However, Nurses are the largest group of clinicians in the United States (U. S. Bureau of Labor Statistics, 2018). Most nurses spend considerable time with patients and are often tasked with providing tailored patient education and health promotion interventions. Nursing students would be at a critical point in their professional development to receive educational interventions that promote appropriate, tailored care for individuals to prevent biased care. Compared to experienced nurses, nursing students do not have years of reinforced biases in favor of or against certain groups of people. Given most nursing students enter healthcare training programs and are less likely to have been exposed to this type of socialization, and perhaps they could more easily modify their biases and stigmatizing behaviors than seasoned clinicians.

There are two types of biases relevant to patient care. An explicit bias is one that is conscious, endorsed, and reflects a person's beliefs. For example, a negative, explicit attitude about sexual identity would be if a nurse consciously preferred to care for heterosexual women instead of sexual minority women (SMW). Implicit attitudes are more complicated to recognize and acknowledge; they are the ideas people carry and the automatic responses that people may not explicitly endorse, but they lay

outside the realm of our consciousness. For example, even if a nurse does not explicitly endorse that overweight people lack willpower and are lazy, the nurse might still have unconscious negative attitudes about this stigmatized group (Nicholls, Pilsbury, & Devonport, 2015; Puhl et al., 2009). These two types of bias can influence patient care differently and require different interventions to reduce bias (Chapman, Kaatz, Carnes, 2013; Sabin, Marini, & Nosek, 2012).

Two types of explicit and implicit bias that could be meaningful to study among nursing students are weight bias and sexual identity bias. Both types of bias have been understudied in nursing and health student populations even though scholars have identified that many types of clinicians hold significant weight and sexual identity biases that may influence care delivery. Clinicians have explicit and implicit preferences for thin patients (Nicholls, Pilsbury, Blake, & Devonport, 2015; Pantenburg et al., 2012; Pascal & Kurpius, 2012; Phelan et al., 2014; Puhl et al., 2009). Pantenberg and colleagues (2012) found that medical students (N=671) often endorsed that patients are overweight due to a positive energy balance rather than social, environmental or biomedical reasons. If so, this might explain why so many scholars focus their health education programs and obesity prevention initiatives on physical activity and eating behaviors, rather than on combatting social, environmental, and biomedical variables that can influence weight, such as poverty or safety.

Regarding sexual identity biases, clinicians often assume heterosexual identities for their patients, use non-inclusive language, and lack basic knowledge about issues affecting SMW (Ingraham et al., 2017; Sabin, Riskin, & Nosek, 2015; Steele, Tinmouth, & lu, 2006). Sabin and colleagues (2015) reported that nurses (n=5,379) demonstrated explicit and implicit preferences to care for heterosexual patients over people who identify as lesbian or gay. Perhaps unsurprisingly, SMW often report poor satisfaction with how they are treated in healthcare settings, including negative experiences with clinician weight bias that may decrease the likelihood that they seek care in the future (Eliason et al., 2015; Garbers et al., 2015).

Studying the simultaneous influences of multiple identities has a theoretical basis within feminist thought. Intersectionality was originally discussed in terms of race and gender in the context of violence against women (Crenshaw, 1989). Crenshaw introduced intersectionality by explaining that race and gender interact and often reinforce one another. Since Crenshaw's introduction of intersectionality to feminist theory, many other public health scholars have used intersectionality to explain how other identities interact to create distinct lived experiences (Bauer, 2014). Understanding how the simultaneous influences of patients' sexual identity and weight status affect a nursing student's clinical decision-making is clinically meaningful because SMW are more likely than heterosexual women to be overweight and obese (Bowen et al., 2008; Eliason et al., 2015; Ward et al., 2014). Researchers have created interventions to reduce clinician weight bias and stigma when treating SMW (Ingraham et al., 2017), even though scholars do not fully understand the simultaneous influence of patient sexual identity and weight on clinician bias.

The Social Ecological Model (SEM) promises to be useful when understanding and studying bias among nursing students. Briefly, the SEM is a conceptual model that helps explain the multifaceted and interactive effects of many levels of society. Scholars have used the SEM widely in health and clinical contexts, including in community health promotion, communicating public health policy, promoting personal disease prevention, communicating health risk with patients, among many other applications. The SEM could be used to explain the relationships among marginalized groups seeking care, and interpersonal interactions with clinicians (e.g., clinician bias), organizations in the community (e.g., education and research institutions), and policy-level influences (e.g., Healthy People 2020 goals; Baral, Logie, Grosso, Wirtz, & Beyrer, 2013; Bronfenbrenner, 1994).

For example, marginalized groups may have biological and behavioral characteristics that lead to health vulnerabilities. These individuals have an interpersonal network, including clinicians, and that network influences their social experience, such as their experience within organizations, such as clinical

environments. When individuals from a marginalized group enter a healthcare environment with biased clinicians, the clinical environment puts them at risk of being stigma. As a result, people may avoid care if they expect to feel stigmatized. Members of Marginalized groups, health professionals, and healthcare organization are all influenced by social community norms. For example, social norms about "ideal body weight" are often reinforced by research and education. Researchers and educators may struggle to question social norms, especially if the norms are ingrained in multiple levels of policy, such as national health goals regarding ideal body weight. By prioritizing "ideal" body weight, researchers and educators might be assuming they know the needs of marginalized groups, rather than letting these groups state their needs. For example, scholars might make assumptions that patients' weight might need to be prioritized for physiologic needs, but patients' health priorities might be psychological in nature and not be related to weight.

We used the SEM to guide this research by identifying measures that reflected biases relevant to interpersonal-, organizational-, and policy-levels. In addition, we chose to measure variables relevant to educational settings of health professionals and to interpersonal interactions, that is, weight and sexual identity biases. We considered whether using clinical vignettes could help us meet this purpose.

Several researchers have used vignettes about hypothetical clinical situations to study how patients' weight could influence biases in decision-making by clinicians. A clinical vignette is a brief, written description of a patient in a clinical scenario; researchers carefully select features of the patient or situation that can be experimental, controlled, or contextual (Evans et al., 2015). Thus, researchers can design vignettes to manipulate independent variables that could influence clinical decision-making, such as race, gender, sexual orientation of patients. After participants read such a vignette, they then respond to questions about appropriate treatment, prescription, or referral (McKinlay, Marceau, and Piccolo, 2011; Norcini, 2004; Peabody, et al., 2004; Veloski, Tai, Evans, and Nash, 2005). Scholars have documented that clinicians' responses to vignettes can reveal clinicians' implicit biases in clinical decision-making.

However, an important consideration when interpreting responses to vignettes is that they may not reflect actual clinical behaviors (Dehon et al., 2017). If participants' responses to vignettes were not to reveal implicit biases in each sample, then it does not necessarily mean that they treat people equally (Samuels, Boatright, Sanchez, Heron, & Liferidge, 2018). Participants in a sample could possess subconscious beliefs about minority groups. Aside from clinical vignettes, we do not know of any existing measures that allow researchers to assess weight and sexual identity biases simultaneously. However, both characteristics co-occur in individuals.

If researchers could use vignettes to measure biases among nurses, then they could describe the degree to which bias is present, if at all, and then create and evaluate bias reduction interventions in healthcare contexts that are tailored for use with nurses. If these interventions were successful, then patients could find healthcare interactions to be less stigmatizing and more welcoming, and thus support patients to seek care when needed. If nursing faculty could equip nursing students with evidence-based strategies to recognize and mitigate their implicit weight bias, then they might be more likely to examine external factors on weight, rather than solely internal factors.

Some researchers have studied implicit and explicit bias about sexual identity bias. However, none of these researchers included vignettes or targeted clinician decision-making. The main ways to assess biases in clinician decision-making are observational studies in real situations or hypothetical situations via vignettes. To our knowledge, there are no such studies of clinical decision making prompted by vignettes with samples of nursing students. Scholars currently have only descriptive results of nurses' sexual identity explicit and implicit biases (Sabin, Riskind, & Nosek, 2015). Conducting a study that examines nursing students' decision-making plans in response to vignettes could help us better understand how weight and sexual identity biases influence behaviors and thought processes. No known researcher has assessed the effects of weight and sexual identity or the interactional effects of patients' weight and sexual identity on nursing student decision-making on vignettes simultaneously.

Furthermore, few researchers (Nicholls et al., 2015; Sabin et al., 2015) have conducted studies about implicit and explicit weight bias only with nursing students or nurses.

Purpose

The purpose of our study is to test whether the effects of patients' weight and sexual identity statuses in written clinical vignettes influenced nursing students' hypothetical clinical decision-making. Our sub-aims are: (1) to test the simultaneous effects of patient weight status and sexual identity on nursing students' hypothetical clinical decision-making, (2) to assess whether nursing students reported explicit and implicit biases, as demonstrated by scores on existing measures, influenced their decision-making responses to vignettes that varied hypothetical patients' weight status and patient sexual identity, and (3) to examine whether students' self-reported weight or sexual identity moderated their decision-making responses to vignettes.

Methods

Design

Using an experimental design with randomization, we recruited a convenience sample of prelicensure, undergraduate nursing students. We collected data an online survey in Qualtrics (2018) and Inquisit 5 by Millisecond (2018). The factors were weight and sexual identity statuses as operationalized in written clinical vignettes. The outcome variables were nursing students' clinical decision-making scores. We also examined whether implicit and explicit bias scores about weight and sexual identity correlated with decision-making scores.

Sample and Setting

We recruited prelicensure nursing students from U.S. states and territories. Inclusion criteria included self-reported fluency in English and acceptance into a prelicensure, undergraduate registered nursing program. We attempted to oversample men and nurses of color because these groups are underrepresented among nursing students in the United States and we wanted to use race and gender

as covariates. We conducted a power analysis (Polit & Beck, 2015) and estimated that we needed a sample size of at least 150 participants, assuming an alpha of 0.05, a power of 0.80, and a medium effect size (f=0.25), based on moderate effect sizes observed in similar studies that used student samples (Paradies, Truong, & Priest, 2013).

Measures

vignettes.

We used clinical vignettes to manipulate weight status and sexual identity, which are the independent variables in this study. We designed two written clinical vignettes based on the results of a systematic review. The review provided guidance on designing clinical vignettes with relevant measures of decision-making to detect bias by respondents (see Chapter 3).

independent variables.

The clinical contexts of these vignettes included hypertension and urinary frequency. We chose to use these two vignettes because either one or both of our vignettes might not detect bias, based on others' research (Dehon et al., 2017). Our vignettes presented hypothetical women patients being seen for common, primary care issues (Evans et al., 2015). In these vignettes, we manipulated weight status to have four levels, that is, underweight, normal weight, overweight, obese; and sexual identity status to have three levels that is, heterosexual, bisexual, queer; clinical scenarios with experimental factors that is, BMI and sexual identity; controlled factors that is, age and gender, and contextual features (e.g., past medical history). The levels of weight status are consistent with the categorizations of weight by the Centers for Disease Control and Prevention (CDC; 2018). We had 12 versions of each vignette (i.e., 3x4 design).

dependent variables.

After each vignette, there were several items for which participants were to make clinical decisions; these were our outcome variables. For example, in the hypertension vignette, we describe a

patient who was newly diagnosed with hypertension and the nurse needs to prioritize education for this patient. These decision-making items reflect the degree to which participants would prioritize education. One item read, “I would likely prioritize education about recommended duration, frequency, and intensity of exercise.” The response options were from ‘1’ to ’10.’

content validity.

We had used Polit & Beck’s (2006; 2015) method to assess the content validity of our new vignettes and their corresponding items (Alexander & Lauver, 2018). The content validity indices for the clinical vignettes varied from 0.88 to 1.00. The indices of the corresponding response items varied from 0.63 to 1.00. We then revised vignettes and corresponding items based on expert feedback. Scholars can review the full version of these two vignettes elsewhere (Alexander & Lauver, 2018). We did not establish other types of validity or reliability for these clinical vignettes.

implicit bias.

We used the weight implicit association test (IAT) for bodies to measure implicit weight biases. The weight IAT is a computer-based and timed test that researchers designed to detect the strength of participants’ automatic associations between two concepts. The weight IAT for bodies prompts participants to classify positive words (e.g., determined, motivated) and negative words (e.g., lazy, slow) with fat and thin body figures (Schwartz et al., 2003). The IAT software interprets participant responses as “matched” or “mismatched,” based on the speed and accuracy they can associate thin figures with the word thin, fat figures with word fat, positive adjectives (e.g., wonderful) with the word good, and negative adjectives (e.g., evil) with the word bad. The software interprets the accuracy of coordinating descriptors and categories. The software then generates scores based on a participant’s matches and mismatches of descriptors and categories. This IAT D-score indicates the strength of an individual’s implicit associations, and varies from -2 to +2, with break points for ‘slight’ (.15), ‘moderate’ (.35) and

'strong' (.65). A higher score indicates that the participant endorsed a stronger association between fat people and negative words, such as sluggish or lazy.

In some studies, responses to clinical vignettes have correlated with weight IAT scores, giving support for construct validity to implicit weight bias (Baker et al., 2016; Phelan et al., 2015). In addition, the weight IAT has shown to have modest predictive validity across almost 200 samples, including college students (Greenwald et al., 2009; average r = 0.27 across 122 studies; N = 14,900). IATs have had moderate to high (0.71-0.80) internal consistency reliability (Egloff & Schukle, 2002) among college student samples.

explicit bias.

modern homonegativity scale.

We used the Modern Homonegativity Scale (MHS) to measure explicit bias about sexual identity (Morrison & Morrison, 2002). For this 12-item, authors created two distinct scales—one for lesbian women and one for gay men. The MHS for lesbians demonstrated to have good psychometric properties (Morrison & Morrison, 2001), including high internal consistency reliability (0.91) and moderate construct validity (r = .57) among a sample of college students. We used the lesbian version of this scale, but we chose to use the identity "queer women" instead of "lesbian" because we wanted to refer to terms used for sexual identity that are commonly used among young people today (Garvey, 2017; Thomas, 2016). This could strengthen the validity of our use of this measure. Items ask participants to endorse their beliefs about queer women, such as, "Queer women still need to protest for equal rights." Participants respond on a 5-point scale, with a '1' representing "strongly disagree" and a 5 representing "strongly agree."

fat phobia scale short form.

We used the 14-item, five-point Fat Phobia Scale (Bacon et al., 2001) to measure explicit weight bias, which is a short- form of the original Fat Phobia Scale (FPS; Robinson, Bacon & O'Reilly, 1993). We

instructed participants to do the following: “Listed below are 14 pairs of adjectives sometimes used to describe obese or fat people. For each adjective pair, move your sliders on the line closest to the adjective that you feel best describes your feelings and beliefs about this group of people.” The participants selected ‘1’ through ‘5’, with opposing adjectives at each anchor of the scale. For example, one set of adjectives is active (5) and inactive (1). The short form has strong psychometric properties (Bacon et al., 2001), concurrent validity (pretest mean = 3.8, s. d. = 0.43; posttest mean = 2.8, s. d. = 0.46; t [39] = 10.79, P= 0.001) among a sample of mostly young, White women, and high internal consistency reliability (0.91).

demographic characteristics.

Prior to consenting participants, we screened all interested students by asking them to confirm that they were fluent in English and to identify what type of prelicensure, undergraduate nursing program they were enrolled in. Our institutional review board approved for us to retain pre-consent data for demographic purposes. This allowed us to better understand differences between those who completed the study and those who did not. We obtained demographic data at the end of the study, including gender, sexual identity, ethnicity, race, age, weight, and height. We asked weight and height with the intention of calculating their BMI because it would have been less reliable to ask them to self-report their BMI. We also asked if their school is public or private, and how they learned about this study. We asked for the first three digits of their zip code because it is useful to know where our sample resided.

Procedures

Our university institutional review board approved this study. Interested participants who were recruited through email or Facebook invitation entered our study through an online link to Qualtrics. Our primary approach to recruitment was to email leaders of undergraduate, prelicensure schools of nursing and request them to forward our study invitation to their students. Our secondary recruitment

method was to invite nursing students via Facebook by posting invitations to pages that were dedicated to undergraduate nursing students, such as the National Student Nurses Association. We promoted the visibility of our invitation via Facebook advertisements, purposefully targeting the populations we planned to oversample.

Interested students first responded to screening questions. Interested students who met the inclusion criteria were then presented with information about our study, including risks and benefits. We stated that we were interested in learning about how nursing students make clinical decisions, but we withheld information about our independent variables (i.e., weight and sexual identity), because complete exposure could have primed participants to think about weight and sexual identity. The subsequent awareness may have interfered with the way they read, analyzed and responded to our survey. Social desirability bias may have influenced the way participants responded. Interested students who agreed to the study terms provided consent by marking a box agreed to study terms. Because we used passive deception, we debriefed all participants on the true purpose of the study at the end of data collection. We then asked them if we could still use their data. If they did not give us permission to use their data after knowing the true purpose of our study, then we omitted all responses after their screening data.

Participants who provided consent to participate responded to vignettes. We programmed Qualtrics to randomly assign one of twelve versions of two vignettes to each participant. The versions of each vignette were identical regarding clinical situation, except for the weight statuses and sexual identities of the presenting patients. We programmed Qualtrics to assure that each vignette version was randomly distributed to a similar number of participants. Participants reported their decision-making scores on several relevant items for each vignette. We presented the clinical vignettes before other measures about bias to avoid participant priming and social desirability bias (Drakulich, 2015).

Next, we directed participants away from Qualtrics to a second website (Millisecond). The second website was needed because it is programmed to administer the weight IAT to participants and deliver IAT scores to researchers. We chose to administer the weight IAT after the vignettes but before the explicit bias measures. We proposed that participants could complete the vignettes without identifying our independent variables or the purpose of the study. Ideally, we wanted participants to start taking the weight IAT without being primed to think about their conscious feelings about weight status. We administered our weight IAT via the online software Inquisit 5 (2018). This software has limitations, such as incompatibility with Androids and difficulty downloading on public computers. We did not use an alternative platform because they are cost prohibitive.

Upon completing the weight IAT, we directed participants back to Qualtrics to respond to our remaining measures. Going between sites was needed to utilize the IAT in an optimal order and avoid priming our participants. When participants returned to Qualtrics they completed the Modern Homophobia Scale (MHS) and the Fat Phobia Scale (FFS). Lastly, we asked for consenting participants to provide us with their demographic factors. We gave participants the options to either remain anonymous or provide us with an email address to enter a drawing to win one of many $20 gift cards. We did not download or file email addresses to maintain participants' anonymity or de-identification.

Analysis

The first step in our analysis was to assess for missing data and patterns of missingness. We identified when participants dropped out of the study and analyzed for demographic differences between those who met study inclusion and exclusion criteria. We described our sample using descriptive statistics. We dichotomized some of our demographic factors, such as race as White and racial minority, and sexual identity as heterosexual and sexual minority. Although not ideal, due to insufficient numbers of participants in these minority categories, we had to collapse all racial minorities into one category and all sexual minorities into one category for analyses. Collapsing minority categories

is not ideal because it assumes that all minorities have a different lived experience about race and sexual identity than White and straight individuals. It also assumes that all minority categories are more like one another than they are different. Despite these known limitations, we decided that retaining and analyzing participants' minority status was important because we could compare the groups who possess the most social privileges (e.g., White, heterosexual) with those with less social privileges (e.g., sexual minorities, racial minorities). We calculated participants' BMIs and categorized them by BMI, according to CDC criteria (2018). We collapsed the underweight category with the normal weight category because only nine participants were classified as underweight, which was an insufficient number for one category in planned analyses. We chose to not eliminate these participants because most of these nine participants' BMIs were very close to a normal weight BMI. Additionally, even though underweight women may experience stigma based on their size (e.g., assumptions regarding their weakness or disordered eating), both the normal weight and underweight participants have the common lived experience of thin privilege.

We analyzed all data using Number Crunching Statistical Software 12 (NCSS; 2018). For all three aims, we analyzed the two vignettes separately, but used the same overall analysis plan.

aim 1.

To test the simultaneous influence of hypothetical patients' weight status and sexual identity statuses on nursing students' clinical decision-making scores, we used analysis of variance (ANOVA). We tested for differences between participants' mean responses about decisions for nursing care with (a) the reference vignette, with a heterosexual and normal weight patient and with (b) hypothetical patients whose weight and sexual identity had been varied by design. We chose this as our reference because normal weight patients are often assumed to be healthier than underweight, overweight and obese patients. Also, it is common for clinicians to assume that patients are heterosexual (Eliason et al., 2015), which is evidence that being heterosexual is often seen as a "baseline patient," whereas being a

sexual minority is an alteration from the "norm." We performed one ANOVA per vignette on the set of mean responses to decision-making items (i.e., 5 to 8 decisions per vignette), comparing the experimental means to the referent. If the overall F scores were statistically significant, then we performed post-hoc False Discovery Rate (FDR) tests to see which means differed from the referent and protected our alpha (.05).

In addition, we estimated Cohen's d to indicate the magnitude of difference between our experimental and referent means. For example, there are eight decision-making items for the hypertension vignette, which has 12 versions, one of which is the reference version. Thus, for each decision-making item associated with the hypertension vignette, we calculated 11 effect sizes.

aim 2.

We used Pearson's correlations to examine whether nursing students' implicit and explicit bias scores (i.e., IAT, FFS, MHS) were associated with decision-making scores. We also examined these correlations with six covariates: participant weight status, participant sexual identity, race, ethnicity, gender, and age. These covariates were chosen based on theory and prior research.

aim 3.

We used ANOVA for fixed factors and calculated F-ratios to test whether participants' weight and sexual identity statuses altered or moderated decision-making responses to vignettes.

Results

missing data.

We had no missing data from participants who completed the study due to forcing responses in Qualtrics. Eight hundred eighty-three participants started the study. Ninety interested students did not meet eligibility requirements and three people did not provide consent. See Table 1 for a comparison of participants who started the survey (N=883) and participants who completed the survey (N=417). Six hundred forty-seven people completed decision-making items for the vignettes. Of note, distributions of

decision-making scores were not normal on about one third of decision-making items. We had a high dropout rate before and after taking the weight IAT (n=224) when people changed software. During data collection, four participants emailed the first author that they experienced issues downloading the IAT software. Three participants had contacted the first author during data collection to express concern about associating stereotyped words with body silhouettes. Four hundred twenty-three participants started the explicit bias measures, but three dropped out before reaching the end of the study and three participants did not give us permission to use their data. Our final sample included 417 nursing students. For more details on participant responses to screening questions, see Table 1.

sample.

Our sample was mostly White (78.4%, n=327), non-Hispanic or Latin (89.9%, n=375), cisgender (100%, N=417) women (88.7%, n=370) who were mostly under the age of 25 (74.1%). Over half of our sample was underweight (2.2%, n=9) or normal weight (53.7%, n=224). Our participants were most likely to identify as "straight" (70.1%, n=334) or "mostly straight" (9.1%, n=38). Most of our sample attended public nursing schools (71.9%, n=300) and learned about the study from their university (97.6%, n=407).

aim 1, mean differences and effect sizes.

hypertension vignette.

For the hypertension vignette, the F ratios for three of eight decision-making scores were significant. See Table 3. When asked to prioritize patient education for a patient with a new diagnosis of hypertension, participants who received different versions of vignettes responded significantly differently on three different items. These three items included the likelihood to prioritize: education about a low sodium diet (F=2.24, p=0.01), weight management (F=5.26, p< 0.01), and exercise (F=3.76, p< 0.01).

Most Cohen's *d* effect sizes for the magnitude of differences between our experimental and referent decision-making means on the hypertension vignette were small to moderate. A few had large

effect sizes (see Tables 4 through 11). Most of the significant and moderate or large effect sizes were observed in participants' responses to the decision-making items about the likelihood they would prioritize patient education about weight management and exercise.

We saw a pattern in the responses to an item about prioritizing education about weight management. For all vignette versions featuring an underweight or a normal weight woman, the effect sizes of differences between experimental and referent decision-making were small and positive (i.e., effect sizes varied between 0.12 and 0.17). However, for all vignette versions featuring an overweight or obese woman, the effect sizes were negative (i.e., effect sizes varied between -0.29 and -0.78). Participants were most likely to prioritize education about weight management for heterosexual and obese women (ES= -0.78, $p< 0.01$) and queer and overweight women (ES= -0.73, $p< 0.01$), compared to the referent.

The responses to the decision-making item about the likelihood that participants would prioritize patient education about eating a low sodium diet were moderate to large and clinically relevant. Participants were less likely to prioritize education about eating a low sodium diet for an underweight woman than for patients of other weight statuses, the effect sizes were larger for the bisexual and underweight version (ES=0.37, p=0.12) and for the queer and underweight version (ES=0.65, p=0.11), compared to the reference vignette.

Participants reported prioritizing patient education about exercise for patients who were overweight or obese patients compared to the reference vignette. These effect sizes of differences between experimental and referent decision-making scores were large, and most were significant. The largest effect sizes for this item about exercise included the heterosexual and obese vignette version (ES= -0.78, p<0.01), the bisexual and overweight version (ES= -0.56, p=0.01), and the queer and overweight version (ES= -0.56, p=0.01).

urinary frequency vignette.

For the vignette about urinary frequency, the F ratios for two of our five clinical decision-making items were significant. When asked about the likelihood that the patient had a certain diagnosis based on their chief complaint of urinary frequency, participants who received different versions of vignettes, responded differently for two diagnoses. These two items were the likelihood that the patient's symptoms are due to diabetes (F=3.12, $p< 0.01$) or pregnancy (F=1.88, $p<0.04$).

Most Cohen's *d* effect sizes for the urinary frequency vignette were small to moderate; a few were large (see Table 12 through 16). Effect sizes were moderate for the decision-making items about diabetes and pregnancy. Regarding the likelihood of a diabetes diagnosis, participants were less likely to endorse that diabetes is a probable diagnosis for an underweight and queer woman (ES=0.58, $p<0.02$) compared to the referent. Although not statistically significant, compared to their responses to the reference vignette, participants were more likely to think that diabetes was a probable diagnosis for the vignette versions that featured a queer and overweight woman (ES= -0.35, $p=0.17$) and a queer and obese woman (ES= -0.41, $p=0.10$), compared to the referent.

Regarding a decision-making item about the likelihood of pregnancy, for most vignette versions, participants reported that they were less likely to suspect pregnancy when patients were not normal weight and/or heterosexual. Participants were less likely to consider pregnancy as a probable diagnosis for queer and underweight woman (ES=0.55, $p=0.3$), queer and overweight women (ES=0.52, $p=0.05$), and queer and obese women (ES=0.50, $p=0.50$), compared to the referent. Participants were less likely to consider pregnancy for bisexual and underweight women (ES=0.42, $p=0.12$) and bisexual and overweight women (ES=0.38, $p=0.33$), compared to the referent.

The diagnoses of UTI, anxiety, and STI as well as the weight status and sexual identity of the patient did not influence decision-making from a statistical or clinical standpoint. Several of these effect sizes decision-making scores were nearly nonexistent. For example, regarding the item about a UTI

diagnosis, bisexual and normal weight women had an effect size of 0.01 (p=0.98) and queer and normal weight women had an effect size of zero (p=0.99).

aim 2, correlations.

implicit association test.

Participants' weight IAT scores ('-2' strong anti-thin bias to '+2' strong anti-fat bias) had a low to no linear relationship with decision-making scores for the hypertension and urinary frequency vignettes. Adding the covariates of participants' weight status, sexual identity, race, ethnicity, age, and gender did not meaningfully change correlations. For the hypertension vignette, the unadjusted scores varied from r= -0.04 to r= 0.1, and adjusted scores varied from r= -0.04 to r= 0.06. For the remainder of this paper, we report adjusted correlations for all measures that we correlated with decision-making scores. The version of vignette exposure did not meaningfully change the strength or direction of the correlations between weight IAT scores and clinical decision-making scores. See Table 17 through 22 for all correlations.

fat phobia scale.

Participant FFS scores ('1' low fat phobia to '5' high fat phobia) had low to no linear relationship with decisions on the hypertension and urinary frequency vignette.

modern homophobia scale.

Participant MHS sums ('12' low homonegativity to '60' high homonegativity) had a low to no linear relationship with decisions on the hypertension and urinary frequency vignette.

aim 3, moderation.

For all decision-making scores associated with the hypertension and urinary frequency vignettes, participants' weight statuses did not moderate responses regarding clinical decision-making scores. F ratios varied from 0.46 on the items about medication management (p=0.98) to 1.45 on the

items about weight management (p=0.09). See Tables 23 and 24 for complete summaries of ANOVA F ratios.

For most decision-making items associated with the hypertension and urinary frequency vignettes, participants' sexual identity did not moderate clinical decision-making. However, F ratios were statistically significant for two items. Participant sexual identity did moderate participant decision-making. These items included the likelihood of prioritizing education about a low sodium diet (F=2.41, p<0.01) on the hypertension vignette, and the likelihood of suspecting (F=1.86, p=0.04) on the urinary frequency vignette.

Discussion

We addressed gaps in bias and nursing literature by testing whether varying the weight and sexual identity statuses of patients in written clinical vignettes would influence nursing students' decision-making regarding care of these patients. We were able to document empirically that unconscious bias can influence decision-making among nursing students, which may in turn influence patient and population outcomes. Prior to our study, few studies had tested the effects of either weight bias or sexual identity bias among nurses or nursing students. To our knowledge, no study had ever used vignettes to assess sexual identity bias. We believe this is the first study to assess the interaction between weight and sexual identity of patients in vignettes for experimental purposes.

Overall, we found that for most items, the hypothetical patient's weight was a more salient variable in the vignette about hypertension and the hypothetical patient's sexual identity was a more salient variable in the vignette about urinary frequency. For example, most of our significant findings were related to hypothetical patients' weight statuses than sexual identity. At the same time, we demonstrated that we could not entirely disentangle intersecting and co-occurring identities and embodiments. Despite this entanglement, we documented complex but consistent ways that weight and sexual identity influenced nursing students' clinical decision-making.

The results for our first aim, to test the simultaneous influences of patient weight status and sexual identity on nursing students' clinical decision-making, among the statistically significant findings about vignettes, there were some findings that are of special clinical significance. For the vignette about hypertension, we note that the decision-making scores regarding participants' likelihood of providing education about weight management and exercise. For the decision-making item about weight management, we were not surprised to see moderate to large effect sizes of decision-making, indicating that participants were more likely to educate overweight and obese patients about eating a healthy diet to promote weight management. This made intuitive sense because most clinicians are trained knowing the important of promoting healthy weight. It would be interesting to conduct a qualitative study to explore the phenomenon of when clinicians choose to educate patients about weight management. This could be meaningful because it is common for overweight and obese patients to report that clinicians often prioritize education about weight management over the patients' own stated issues and health goals (Pearl, Puhl, & Dovidio, 2015).

Most clinicians, from an intuitive sense, would expect that overweight and obese people need education about exercise regardless of having a hypertension diagnosis because exercise can increase an individual's metabolic rate and aid in weight loss. We had expected that clinicians would prioritize exercise education for all patients with hypertension, regardless of weight status, because researchers have previously demonstrated that regular and moderate physical activity can reduce an individual's blood pressure. Therefore, we found the results to the exercise decision-making item clinically interesting. We found this result intriguing because the woman in the hypertension vignette has a new diagnosis of hypertension. One would think that regardless of weight status, at minimum a nurse would prioritize education about diet, exercise, and medication management to control hypertension. This finding seems to echo conclusions of similar studies that found doctors assumed thin people had

hypertension due to genetics rather than individual behaviors (Schwartz, Chambliss, Brownell, Blair, & Billington, 2012).

For the vignette about urinary frequency, we comment on the participants' decision-making scores about suspecting that urinary frequency might be caused by pregnancy among heterosexual women. Participants may have responded to this item assuming bisexual and queer women are less likely to get pregnant. This could explain why participants were consistently less likely to think that bisexual and queer patients would be pregnant, compared to the referent. Yet, these assumptions would be conflicting with recent research that sexual minority women have frequent unplanned pregnancies (Everett, McCabe, & Hughes, 2017). Clinicians are less likely to discuss contraception and pregnancy intentions with SMW compared to heterosexual women (Everett, Sanders, Myers, Geist & Turok, 2018). If nursing students assume that sexual identity is equivalent with sexual behavior, then they might assume that SMW have low or nonexistent risk to have an unwanted pregnancy.

Regarding the decision-making items with small to moderate effect sizes of decision-making on the hypertension vignette, participants who responded to decision-making items about bisexual and queer women were less likely to provide education to bisexual and queer women on a few items compared to heterosexual women. Without clear clinical rationale for this difference, participants may feel less comfortable or confident working with SMW patient compared to heterosexual women. This explanation aligns with evidence that nurses preferred to work with heterosexual patients than SMW (Sabin, Riskin, & Nosek, 2015). Just because some clinicians may not feel comfortable providing care to SMW does not mean they have negative feelings about SMW as patients. We could interpret this hesitancy as nurses not wanting to make mistakes based on gendered assumptions when working with sexual minorities.

We share an observation about the vignette versions that featured an underweight woman. For some of the decision-making items, participants responded quite differently for underweight women

compared to the referent. For example, heterosexual and underweight women were more likely than the referent to be educated about stress management (ES= -0.42, *p*=0.07). Similarly, participants were more likely to report that an underweight and heterosexual woman's urinary frequency is due to anxiety (ES= -0.21, p=0.41). Despite not being significant, we wanted to point out that underweight women had answers that were sometimes distinct from women who are normal weight.

The results for our second aim, to assess whether nursing students' self-reported explicit and implicit biases correlated with their decision-making scores, were mostly null. We had proposed that participants with high levels of self-reported bias would make similar decisions about patients based on the patient's weight status and sexual identity. We demonstrated that some of our decision-making items moderately correlated with explicit and implicit bias scores, but we must interpret these correlations with caution due to the number of correlations performed. To our knowledge, this is the first study to administer the FFS and MHS to a sample of nursing students, so we did know how to expect students to respond to them.

The results for our third aim, to examine whether students' self-reported weight or sexual identity moderated their decision-making scores, demonstrated that two of twenty-six F scores were significant. We found that participants' sexual identity moderated their decision-making scores about suspecting diabetes as a likely diagnosis for a patient with urinary frequency educating a patient with hypertension about eating a low sodium diet. However, we remain skeptical of these two F scores for a three key reasons. First, we may need to reanalyze this aim because many of our decision-making items had multimodal distributions, which is a problem because ANOVA assumes that items will have a normal distribution. Second, we only had 81 sexual minorities in our sample, so it is possible that we do not have a diverse enough sample for this to be a valid result. Third, this result does not seem logical. We expected participant weight status to moderate their responses about exercise and weight management because perhaps these people may be more likely to participant in weight-loss dieting and exercise. Yet,

there was no clear connection between sexual identity and likelihood to educate a patient about eating a low sodium diet.

Limitations

We acknowledge limitations of this study. Despite having a large, national sample of prelicensure nursing students, our analyses could have been stronger if our sample had more racial minorities and sexual minorities. Because we had 24 total versions of vignettes and only 84 racial minorities and 81 sexual minorities, we only had a few race and/or sexual minority participants who were randomized to some versions. Despite our sample not mirroring the diversity of the U.S., our sample does accurately reflect the current demographics of the nursing workforce (McMenamin, 2015).

One limitation of using ANOVA for most of our analyses is that not all our decision-making items had a normal distribution, which means that we must interpret with caution. Specifically, some of the responses to our vignette items had multimodal distributions. Ideally, these items would be analyzed using a statistical model that consider both distributions, such as a zip model.

Other important limitations are convenience sampling and our inability to calculate a response rate. We could not calculate a response rate because (a) we recruited on social media, (b) we have no way of knowing for sure which leaders of schools of nursing forwarded our study, and (c) we have no way of knowing how many students received the email invitation. For example, some leaders chose to forward the invitation to certain groups of students rather than their entire group of prelicensure nursing students.

Our study had two potential threats to internal validity while we were collecting data. First, while recruiting interested students, a nationally publicized and hotly debated viral video emerged about an unjust arrest of two black men at a Philadelphia Starbucks, which led the company to initiate company-wide implicit bias training (Rose, 2018). Second, we had planned to begin data collection via Facebook only days before Facebook's CEO was scheduled to testify before Congress about a scandal

involving disclosures on data breaches (Domonoske, 2018). Both events could have influenced participation in our survey, willingness to allow us to use their data after learning the true purpose of the study or influenced responses to the IAT and explicit bias measures if they knew the true purpose of the study.

A limitation of our clinical vignettes is that the patient is assumed to be cisgender, which is when a person's gender identity matches the social construct attached to their sex assigned at birth. This is problematic because we asked students to make decisions about women's health but did not make it clear if the patient was trans. While we do not believe this omission changed the results of our study, we do believe that it would have been clinically meaningful to acknowledge because participants' assessment of the hypothetical patients' presentation could have changed had they known the patient was cis or trans.

Implications

Acknowledging the limitations in our study design, we believe this study is timely and necessary because it has significant implications for nursing research, practice, and education.

research.

Researchers have used vignettes extensively in the context of examining implicit race and gender bias. However, researchers have less commonly used vignettes to study weight bias (Hebl & Xu, 2001; Nicholls, Pilsbury, Blake, & Devonport, 2015; Pantenberg et al., 2012; Pascal & Kurpius, 2012; Phelan et al., 2014), and to our knowledge, researchers have never used vignettes to study implicit sexual identity bias. Assessing implicit bias among clinicians regarding two characteristics, such as weight and sexual identity, separately or together, is novel. Because the consequences of these explicit and implicit biases are understudied, researches understand these biases poorly in clinical contexts. Currently, most implicit bias trainings focus on race and gender. Future researchers could replicate and extend existing bias habit-reducing interventions to include weight and sexual identity. Researchers

have documented that these interventions show promise in their ability to reduce biased decision-making processes in different samples and settings (Carnes et al., 2015; Devine, Forscher, Austin, & Cox, 2012).

practice.

The results of this study could help nursing students reflect on patient characteristics that might influence how they deliver patient-centered care. Over recent decades, scholars have attempted to promote patient-centered care by emphasizing the importance of patients' lived experiences (Elwyn et al., 2014). Patient-centered care is associated with improved outcomes, including improved self-management and clinical outcomes. Clinicians' bias is important to consider when promoting patient-centeredness, because bias could influence interpretations of patients' values, preferences, and experiences. The results of our study helped us better understand how nursing students assess clinical situations and make clinical decisions when patient characteristics are altered systematically in written vignettes. If nursing students better understood how patient-centered care is altered based on their implicit and explicit biases, then they could seek opportunities to reduce their biases, such as participating in bias-reduction interventions.

education.

The results of this study have implications for nursing education. Nursing educators should begin considering how to educate nurses using pedagogical approaches that are either weight-neutral or weight-sensitive. For example, nursing educators could (1) make students aware that people of size perceive the healthcare system to be a stigmatizing environment for people classified as overweight and obese (e.g., assuming they do not understand nutrition or do not exercise), and (2) make students take the weight IAT or respond to weight-related clinical vignettes to prompt discussion surrounding the origin of and potential solutions to weight bias. We also see a lot of potential for incorporating education on motivational interviewing about weight management for nursing students.

We have many concerns regarding how nursing schools are preparing nurses to care for sexual minorities. The nursing students in our sample demonstrated bias in clinical decision about SMW. Scholars have documented that nursing students have described nurses' implicit and explicit preferences for heterosexual people over queer women (Sabin, Riskin, & Nosek, 2015). Despite evidence that nursing students harbor these attitudes, nursing curricula rarely incorporate content on sexual minorities. De Guzman and colleagues (2018) recently published a content analysis of the most commonly used health assessment textbooks and identified all content regarding caring for lesbian, gay, bisexual, and transgender (LGBT) individuals. The scholars concluded that LGBT content is limited in quantity and depth in nursing textbooks and urged the inclusion of this content in future assessment texts to improve health outcomes for this marginalized population. We concur with this team's recommendation and we suggest that health professional programs build population-specific content and bias reduction strategies into curricula. Incorporating bias-reducing strategies could mitigate unconscious feelings that clinicians have about sexual minorities and other vulnerable populations.

Conclusion

Many researchers have documented important explicit and implicit biases among clinicians. We extended this body of literature that used vignettes to assess bias in clinical decision-making to a lesser-studied group of health professional students and types of bias. We tested whether the simultaneous influence of weight bias and sexual identity bias influences nursing students' clinical decision-making. We documented significant differences in how participants respond to questions, based on a hypothetical patient's weight and sexual identity. Most participants' decision-making scores did not correlate with their weight IAT or explicit bias scores. Participants' weight and sexual identity statuses did not moderate their decision-making responses to hypothetical patients in vignettes. Our findings could guide future interventions that aim to reduce bias in clinical decision-making or teach nursing students habit-reducing strategies to lessen the impact of their biases.

References

Bacon, J. G., Scheltema, K. E., & Robinson, B. E. (2001). Fat phobia scale revisited: The short form. *International Journal of Obesity*, *25*, 252-257.

Baral, S., Logie, C. H., Grosso, A., Wirtz, A. L., & Beyrer, C. (2013). Modified social ecological model: A tool to guide the assessment of the risks and the risk contexts of HIV epidemics. *BMC Public Health*, *13*, 482. https://doi.org/10.1186/1471-2458-13-482

Baker, T.K., Smith, G.S., Jacobs, R. H., Tolles, R., Kuhles, D., & Piasecki, M. (2017). A deeper look at implicit weight bias in medical students. *Advances in Health Science Education, 22*(4), 889-900. https://doi.org/10.1007/s10459-016-9718-1

Bauer, G.R. (2014). Incorporating intersectionality theory into population health research methodology: Challenges and the potential to advance health equity. *Social Science & Medicine, 110*, 10-17. https://doi.org/10.1016/j.socscimed.2014.03.022

Bronfrenbrenner, U. (1994). Ecological models of human Development. *International Encyclopedia of Education, 3*, 37-43.

Bowen, D. J., Balsam, K. F., & Ender, S. R. (2008). A review of obesity issues in sexual minority women. *Obesity, 16*, 221-228. https://doi.org/10.1038/oby.2007.34

Carnes, M., Devine, P. G., Manwell, L. B., Byars-Winston, A., Fine, E., Ford, C. E., … Sheridan, J. (2015). Effect of an intervention to break the gender bias habit for faculty at one institution: A cluster randomized, controlled trial. *Academic Medicine*, *90*(2)*,* 221–230. http://doi.org/10.1097/ACM.0000000000000552

Centers for Disease Control and Prevention (2018). About adults BMI. Retrieved from https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html

Crenshaw, K. (1989). Demarginalizing the intersection of race and sex: A Black feminist critique of antidiscrimination doctrine, feminist theory, and antiracist politics. *University of Chicago Legal Forum,* 136-167.

Chapman, E.N., Kaatz, A., & Carnes, M. (2013). Physicians and implicit bias: How doctors may unwittingly perpetuate health care disparities. *Journal of General Internal Medicine*, *28*(11), 1504-1510. https://doi.org/10.1007/s11606-013-2441-1

Dehon, E., Weiss, N., Jones, J., Faulconer, W., Hinton, E., & Sterling, S. (2017). A systematic review on the impact of physician implicit racial bias on clinical decision making. *Academic Emergency Medicine, 24*(8), 895-904. https://doi.org/10.1111/acem.13214

De Guzman, F. L. M., Ngalle, L., Scott, L. D., & Zerwic, J. J. (2018) LGBT inclusivity in health assessment textbooks. *Journal of Professional Nursing*, Advance online publication. https://doi-org.ezproxy.library.wisc.edu/10.1016/j.profnurs.2018.03.001

Devine, P. G., Forscher, P. S., Austin, A. J., & Cox, W. T. L. (2012). Long-term reduction in implicit race bias: A prejudice habit-breaking intervention. *Journal of Experimental Social Psychology*, *48*(6), 1267–1278. http://doi.org/10.1016/j.jesp.2012.06.003

Domonoske, C. (2018). Mark Zuckerberg tells senate: Election security is an 'arms race.' Retrieved from https://www.npr.org/sections/thetwo-way/2018/04/10/599808766/i-m-responsible-for-what-happens-at-facebook-mark-zuckerberg-will-tell-senate

Drakulich, K. (2015). Explicit and hidden racial bias in the framing of social problems. *Social Problems, 62*(3), 391–418. https://doi.org/10.1093/socpro/spu003

Egloff, B. & Schmukle, S. C. (2002). Predictive validity of an implicit association test for assessing anxiety. *Journal of Personality and Social Psychology*, *83*(6), 1441-1455. http://doi.org/10.1037//0022-3514.83.6.1441

Eliason, M.J. & Fogel, S.C. (2015). An ecological framework for sexual minority women's health: Factors associated with greater body mass. *Journal of Homosexuality*, *62*(7). https://doi.org/10.1080/00918369.2014.1003007

Elwyn, G., Deblendorf, C., Epstein, R., Marrin, K., White, J., & Frosch, D.L. (2014). Shared decision making and motivational interviewing: Achieving patient-centered care across the spectrum of health care problems.

Evans, S. C., Roberts, M. C., Keeley, J. W., Blossom, J. B., Amaro, C. M., Garcia, A. M., … Reed, G. M. (2015). Vignette methodologies for studying clinicians' decision-making: Validity, utility, and application in ICD-11 field studies. *International Journal of Clinical and Health Psychology. 15*(2), 160-170. https://doi.org/10.1016/j.ijchp.2014.12.001

Everett, B. G., McCabe, K. F., & Hughes, T. L. (2017). Sexual orientation disparities in mistimed and unwanted pregnancy among adult women. *Perspectives on Sexual and Reproductive Health, 49(3)*, 157-165. https://doi.org/10.1363/psrh.12032

Everett, B. G., Sanders, J. N., Myers, K., Geist, C., & Turok, D. K. (2018). 1 in 3: Challenging heteronormative assumptions in family planning health centers. *Contraception*, Advance Online Publication. https://doi.org/10.1016/j.contraception.2018.06.007

Foster, G. D., Wadden, T. A., Makris, A. P., Davidson, D., Sanderson, R. S., Allison, D. B., & Kessler, A. (2012). Primary care physicians' attitudes about obesity and its treatment. *Obesity Research, 11*(10). https://doi.org/10.1038/oby.2003.161

Garbers, S., McDonnell, C., Fogel, S. C., Eliason, M., Ingraham, N., McElroy, J. A., … Haynes, S. G. (2015). Aging, weight, and health among adult lesbian and bisexual women: A metasynthesis of the multisite "healthy weight initiative" focus groups. *LGBT Health, 2*(2). https://doi.org/10.1089/lgbt.2014.0082

Greene, M.Z., Meghani, S., Sommers, M., & Hughes, T.L. (in press). Healthcare-related correlates of cervical cancer screening among sexual minority women: An integrative review. *Journal of Midwifery and Women's Health.*

Greenwald, A. G., Poehlman, T. A., Uhlmann, E. L., & Banaji, M. R. (2009). Understanding and using the implicit association test: lll. Meta-analysis of predictive validity. *Journal of Personality and Social Psychology, 97*(1), 17-41.

Hatzenbuehler, M. L., Phelan, J. C., & Link, B. G. (2013) Stigma as a fundamental cause of population health inequalities*. American Journal of Public Health*, *103*(5), 813-821.

Hays, R. D., Spritzer, K. L., Thompson, W. W., & Cella, D. (2015). US general population estimate for "excellent" to "poor" self-rated health item. *Journal of general internal medicine*, 1-6.

Hebl, M. R. & Xu, J. (2001). Weighing the care: Physicians' reactions to the size of a patient. *International Journal of Obesity, 25*, 1246-1252. https://doi.org./10.1038/sj.ijo.0801681

Ingraham, N., Magrini, D., Brooks, J., Harbatkin, D., Radix, A., Haynes, S. G. (2017). Two tailored provider curricula promoting health weight in lesbian and bisexual women. *Women's Health Issues, 26*, S36-S42. https://doi.org/10.1016/j.whi.2016.04.001

Marceau, L., McKinlay, J., Shackelton, R., & Link, C. (2011). The relative contribution of patient, provider and organizational influences to the appropriate diagnosis and management of diabetes mellitus. *Journal of Evaluation in Clinical Practice, 17*(6), 1122–1128. http://doi.org/10.1111/j.1365-2753.2010.01489.x

McMenamin, P. (2015). Diversity among registered nurses: Slow but steady progress. Retrieved from http://www.ananursespace.org/blogs/peter-mcmenamin/2015/08/21/rn-diversity-note?ssopc=1

Meyer, I. H. (2003). Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: Conceptual issues and research evidence. *Psychological bulletin*, *129*(5), 674.

Morrison, M. A. & Morrison, T.G. (2002). Sexual orientation bias toward gay and lesbian women: Modern homonegative attitudes and their association with discriminatory behavioral intentions. *Journal of Applied Social Psychology, 41*(11). https://doi.org/10.1111/j.1559-1816.2011.00838.x

Nicholls, W., Pilsbury, L. & Devonport, T.J. (2015). The attitudes of student nurses towards obese patients: A questionnaire study exploring the association between perceived causal factors and advice giving. *Nurse Education Today, 37*, 33-37. http://dx.doi.org/10.1016/j.nedt.2015.11.009

Pantenburg, B., Sikorski, C., Luppa, M., Schomerus, G., König, H., Werner, P. & Riedel-Heller, S. G. (2012). Medical students' attitudes towards overweight and obesity. *PLoS ONE*, *7*(11): e48113. https://doi.org/10.1371/journal.pone.0048113

Paradies, Y., Truong, M., & Priest, N. (2013). A systematic review of the extent and measurement of healthcare provider racism. *Journal of General Internal Medicine, 29*(2), 364-387. http://dx.doi.org/10.1007/s11606-013-2621-z

Peabody J. W., Luck, J., Glassman P., Jain S., Hansen J., Spell M., et al. (2004). Measuring the quality of physician practice by using clinical vignettes: A prospective validation study. *Annals of Internal Medicine*, *141,* 771–780. https://doi.org/10.7326/0003-4819-141-10-200411160-00008

Pearl, R.L. & Puhl, R.M. (2018). Weight bias internalization and health: A systematic review. *Obesity Reviews*. Advance online publication. https://doi.org/10.1111/obr.12701

Pearl, R. L., Puhl, R. M., & Dovidio, J. F. (2014). Differential effects of weight bias experiences and internalization on exercise among women with overweight and obesity. *Journal of Health Psychology, 20*(12), 1626-1632. https://doi.org/10.1177/1359105313520338

Phelan, S. M., Dovidio, J. F., Puhl, R. M., Burgess, D. J., Nelson, D. B., Yeazel, M. W., … Van Ryan, M. (2013). Implicit and explicit weight bias in a national sample of 4,732 medical students: The medical student CHANGES study. *Obesity, 22*(4). https://doi.org/10.1002/oby.20687

Phelan, S. M., Burgess, D. J., Yeazel, M. W., Hellerstedt, W. L., Griffin, J. M., & Van Ryan, M. (2015). Impact of weight bias and stigma on quality of care and outcomes for patients with obesity. *Obesity Reviews, 16*(4). https://doi.org/10.1111/obr.12266

Polit, D. F. & Beck, C. T. (2006). The content validity index: Are you sure you know what's being reported? Critique and recommendations. *Research in Nursing & Health*, *29*(5), 489–497. http://dx.doi.org/10.1002/nur.20147.

Polit, D. F. & Beck, C. T. (2017). Nursing research: Generating and assessing evidence for nursing practice (10th edition). South Holland, Netherlands: Wolters Kluwer.

Puhl, R.M & Heuer, C.A. (2009). The stigma of obesity: A review and update. *Obesity, 17*(5), 941-964. http://doi.org/10.1038/oby.2008.636

Robinson, B. E., Bacon, L. C., & O'reilly, J. (1993). Fat phobia: Measuring, understanding, and changing anti-fat attitudes. *International Journal of Eating Disorders, 14*(4). https://doi.org/10.1002/1098-108X(199312)14:4%3C467::AID-EAT2260140410%3E3.0.CO;2-J

Rose, J. (2018). 'I'm not aware of that': Starbucks employees receive racial bias training. Retrieved from https://www.npr.org/2018/05/29/615263473/thousands-of-starbucks-stores-close-for-racial-bias-training

Samuels, E. A., Boatright, D., Sanchez, L. D., Heron, S. L., Liferidge, A. T., Wilson, T. , … Burton, J. H. (2017). Clinical vignettes Inadequate to assess impact of implicit bias: Concerning limitations of a systematic review. *Academic Emergency Medicine, 24,* 1531-1532. doi:10.1111/acem.13317

Inquisit 5 [Computer software]. (2018). Seattle, WA, USA. Retrieved from https://www.millisecond.com.

NCSS 12. (2018). Kaysville, UT, USA. Retrieved from https://www.ncss.com

Sabin, J. A., Riskind, R. G., & Nosek, B. A. (2015). Health care providers' implicit and explicit attitudes toward lesbian women and gay men. *American Journal of Public Health*, *105*(9), 1831–1841. http://doi.org/10.2105/AJPH.2015.302631

Sabin, J., Marini, M., & Nosek, B. A. (2012). Implicit and explicit anti-fat bias among a large sample of medical doctors by BMI, race/ethnicity and gender. *PloS one*, *7(11), e48448.* https://doi.org/10.1371/journal.pone.0048448

Schwartz, M. B., Chambliss, H. O., Brownell, K. D., Blair, S. N., & Billington, C. (2012). Weight bias among health professionals specializing in obesity. *Obesity Research, 11*(9). https://doi.org/10.1038/oby.2003.142

Steel, L. S., Tinmouth, J. M., & Lu, A. (2006). Regular health care use by lesbians: A path analysis of predictive factors. *Family Practice, 23*(6), 631-636. https://doi.org/10.1093/fampra/cml030

Table 1
Participant responses to screening, consent and debriefing questions

Screening questions	Participants who started the survey (N=883)		Participants who completed the survey (N=420)	
Are you fluent in English? (N=883)	Yes	878 (99.4%)	Yes	417
	No	5 (0.6%)	No	0
Are you currently enrolled in a prelicensure nursing program in the U.S.? (N=877)	Yes	792 (90.3%)	Yes	417
	No—Pre-nursing	31 (3.5%)	No	0
	No—RN to BSN	24 (2.7%)		
	No—Graduate	27 (3.1%)		
	No—International	3 (0.03%)		
What type of nursing program do you attend? (N=792)	Baccalaureate	596 (75.3%)	Baccalaureate	311 (74.6%)
	Post-Baccalaureate	14 (0.02%)	Post-Baccalaureate	9 (2.2%)
	Associate Degree	181 (22.9%)	Associate Degree	97 (23.3%)
	Diploma	1 (0.001%)	Diploma	0 (0%)
Consent and debriefing				
Consented to study	Yes	788	Yes	417
	No	3	No	0
Consent post debriefing	N/A		Yes	417
			No	3

Table 2
Participant responses to demographic questions (N=417)

Demographic questions		
What is your gender? [a]	Man	45 (10.8%)
	Woman	370 (88.7%)
	Prefer to not respond	2 (0.5%)
Which of the following best represents how you think of yourself? [b, c]	Straight	334 (80.1%)
	Mostly straight	38 (9.1%)
	Bisexual	19 (4.6%)
	Queer	5 (1.2%)
	Mostly gay	2 (0.5%)
	Mostly lesbian	5 (1.2%)
	Gay	2 (0.5%)
	Lesbian	4 (1%)
	Questioning	2 (0.5%)
	Pansexual	1 (1%)
	Asexual	3 (0.7%)
	Prefer to not respond	2 (0.5%)
Are you Hispanic or Latino/Latina/Latinx?	Yes	38 (9.1%)
	No	375 (89.9%)
	Don't know	4 (1%)
Which one or more of the following would you say is your race? (check all that apply) [d]	White	353 (84.7%)
	Black	19 (4.6%)
	Native American	14 (3.4%)
	Asian	36 (8.6%)
	Native Hawaiian	6 (1.4%)
	Another	9 (2.2%)
	Don't know	1 (0.2%)
	Prefer to not respond	9 (2.2%)
Body mass index (CDC categorization), based on self-self-reported weight and height	Underweight	9 (2.2%)
	Normal weight	224 (53.7%)
	Overweight	98 (23.5%)
	Obese	78 (18.7%)
	Prefer to not respond	8 (1.9%)
What is your age?	20 or younger	102 (24.5%)
	21-25	207 (49.6%)
	26-30	45 (10.8%)
	31-35	24 (5.8%)
	36-40	14 (3.4%)
	>40	25 (6%)
In your nursing school public or private?	Public	300 (71.9%)
	Private	105 (25.2%)
	Don't know	12 (2.9%)
How did you learn about this study?	University email	407 (97.6%)
	Facebook	7 (1.7%)
	Other	3 (0.7%)

Notes. [a] No participant endorsed: non-binary, agender, genderfluid, another identity not listed, and don't know.
[b] We included a question about transgender identity. No participant identified as transgender.
[c] No participant endorsed the following: don't know or another orientation not listed.
[d] Some response options are abbreviated in this table. The survey read: Black or African American, Native American and/or Alaska Native, Native Hawaiian and/or Pacific Islander. We dichotomized race for analyses. Seventy-eight participants (19.2%) identified with at least one race minority category.

Table 3

Omnibus test (False discovery Rate) of differences in decision-making scores as functions of weight status and sexual identity of hypothetical patients in vignettes about hypertension and urinary frequency

Decision-making in response to vignette about hypertension [a]	*df*	*F*	*p*	*Decision-making in response to vignette about urinary frequency* [b]	*df*	*F*	*p*
Medication management	*11*	*1.24*	*0.26*	*Urinary tract infection*	*11*	*1.21*	*0.28*
Low-sodium diet	*11*	*2.24*	*0.01**	*Diabetes*	*11*	*3.12*	*0.00**
Weight management	*11*	*5.26*	*0.00**	*Anxiety*	*11*	*0.71*	*0.73*
Exercise	*11*	*3.76*	*0.00**	*Pregnancy*	*11*	*1.88*	*0.04**
Alcohol	*11*	*1.42*	*0.16*	*Sexually transmitted infection*	*11*	*0.73*	*0.71*
Smoking	*11*	*0.90*	*.55*				
Sleep	*11*	*0.73*	*.71*				
Stress	*11*	*1.28*	*0.23*				

Notes: [a] The hypertension vignette has 12 versions and eight outcome measures.

[b] The urinary frequency vignette has 12 versions and five outcome measures.

* p-value < 0.05

Table 4

Estimating effect sizes of patients' weight status and sexual identity on decision-making about participants' likelihood to provide patient education about medication management in the context of hypertension, compared to a reference patient

Vignette Versions [b]	Ref. M [c]	Ref. n	Comp. M [d]	Comp. n	*d* [e]	CI lower	CI upper	*p*	*FDR* [f]
Het. UW	8.32[g]	41	8.54	37	-0.10	-0.55	0.34	0.65	0.81
Het. OW	8.32	41	7.57	30	0.31	-0.16	0.78	0.2	0.75
Het. OB	8.32	41	8.59	37	-0.13	-0.57	0.32	0.57	0.81
Bi. UW	8.32	41	8.85	34	-0.28	-0.74	0.17	0.21	0.75
Bi. NW	8.32	41	8.15	34	0.08	-0.38	0.53	0.73	0.81
Bi. OW	8.32	41	8.19	37	0.06	-0.39	0.5	0.81	0.81
Bi. OB	8.32	41	8.44	29	-0.05	-0.53	0.42	0.81	0.75
Q UW	8.32	41	8.85	26	-0.26	-0.75	0.24	0.3	0.81
Q NW	8.32	41	8.53	38	-0.10	-0.54	0.34	0.65	0.81
Q OW	8.32	41	8.72	39	-0.21	-0.65	0.23	0.34	0.75
Q OB	8.32	41	7.74	35	0.25	-0.21	0.7	0.29	0.75

Notes. [a] The heterosexual/normal weight vignette version is the reference vignette.

[b] Het = heterosexual, Bi = bisexual, Q = Queer. UW = underweight, NW = normal weight, OW=overweight, OB = obese

[c] Reference mean

[d] Comparison mean

[e] Cohen's d

[f] False discovery rate

[g] Participants responded to a 10-point ordinal scale, 1 'not at all likely' to 10 'very likely.'

Table 5

Estimating effect sizes of weight status and sexual identity on decision-making about likelihood to provide patient education about eating a low-sodium diet for a hypothetical patient in a vignette about hypertension, compared to a reference patient

Vignette Versions [b]	Ref. M [c]	Ref. n	Comp. M [d]	Comp. n	*d* [e]	CI lower	CI upper	*p*	*FDR* [f]
Het. UW	7.66[g]	41	7.24	37	0.19	-0.25	0.64	0.4	0.73
Het. OW	7.66	41	7.53	30	0.06	-0.41	0.53	0.8	0.95
Het. OB	7.66	41	8.32	37	-0.31	-0.76	0.14	0.17	0.46
Bi. UW	7.66	41	6.79	34	0.37	-0.09	0.82	0.12	0.46
Bi. NW	7.66	41	6.97	34	0.30	-0.16	0.76	0.2	0.46
Bi. OW	7.66	41	7	37	0.28	-0.16	0.73	0.21	0.46
Bi. OB	7.66	41	7.69	29	-0.02	-0.49	0.46	0.95	0.95
Q UW	7.66	41	6.15	26	0.65	0.15	1.15	0.11	0.46
Q NW	7.66	41	7.58	38	0.04	-0.4	0.48	0.87	0.95
Q OW	7.66	41	7.92	39	-0.13	-0.13	0.31	0.55	0.86
Q OB	7.66	41	7.51	35	0.07	0.07	0.52	0.77	0.95

Notes. [a] The heterosexual/normal weight vignette version is the reference vignette.

[b] Het = heterosexual, Bi = bisexual, Q = Queer. UW = underweight, NW = normal weight, OW=overweight, OB = obese

[c] Reference mean

[d] Comparison mean

[e] Cohen's d

[f] False discovery rate

[g] Participants responded to a 10-point ordinal scale, 1 'not at all likely' to 10 'very likely.'

Table 6

Estimating effect sizes of weight status and sexual identity on decision-making about likelihood to provide patient education about weight management for a hypothetical patient in a vignette about hypertension, compared to a reference patient

Vignette Versions [b]	Ref. M [c]	Ref. n	Comp. M [d]	Comp. n	*d* [e]	CI lower	CI upper	*p*	*FDR* [f]
Het. UW	6.71[g]	41	6.38	37	0.13	-0.31	0.57	0.57	0.63
Het. OW	6.71	41	7.4	30	-0.28	-0.75	0.19	0.24	0.33
Het. OB	6.71	41	8.38	37	-0.78*	-1.24	-0.32	<0.01*	0.01*
Bi. UW	6.71	41	6.26	34	0.17	-0.29	0.63	0.47	0.57
Bi. NW	6.71	41	5.62	34	0.43	-0.03	0.89	0.07	0.26
Bi. OW	6.71	41	7.38	37	-0.29	-0.74	0.15	0.19	0.3
Bi. OB	6.71	41	7.59	29	-0.39	-0.87	0.09	0.11	0.28
Q UW	6.71	41	6.38	26	0.12	-0.37	0.62	0.63	0.63
Q NW	6.71	41	5.89	38	0.33	-0.12	0.77	0.15	0.28
Q OW	6.71	41	8.28	39	-0.73*	-1.18	-0.28	0.001*	0.01*
Q OB	6.71	41	7.51	35	-0.35	-0.8	0.11	0.13	0.28

Notes. [a] The heterosexual/normal weight vignette version is the reference vignette.

[b] Het = heterosexual, Bi = bisexual, Q = Queer. UW = underweight, NW = normal weight, OW=overweight, OB = obese

[c] Reference mean

[d] Comparison mean

[e] Cohen's d

[f] False discovery rate

[g] Participants responded to a 10-point ordinal scale, 1 'not at all likely' to 10 'very likely.'

Table 7

Estimating effect sizes of weight status and sexual identity on decision-making about likelihood to provide patient education about exercise for a hypothetical patient in a vignette about hypertension, compared to a reference patient

Vignette Versions [b]	Ref. M [c]	Ref. n	Comp. M [d]	Comp. n	*d* [e]	CI lower	CI upper	*p*	*FDR* [f]
Het. UW	5.59[g]	41	5.97	37	-0.17	-0.62	0.27	0.43	0.59
Het. OW	5.59	41	6.83	30	-0.51	-0.99	-0.03	0.08	0.15
Het. OB	5.59	41	7.22	37	-0.77*	-1.23	-0.31	<0.01*	0.01*
Bi. UW	5.59	41	5.59	34	0.00	-0.45	0.45	0.31	0.49
Bi. NW	5.59	41	5.71	34	-0.05	-0.51	0.4	0.82	0.82
Bi. OW	5.59	41	6.84	37	-0.56*	-1.01	-0.11	0.01*	0.04*
Bi. OB	5.59	41	6.66	29	-0.48	-0.96	0.01	0.05*	0.11
Q UW	5.59	41	5.35	26	0.10	-0.39	0.59	0.69	0.82
Q NW	5.59	41	5.42	38	0.07	-0.37	0.51	0.75	0.82
Q OW	5.59	41	6.82	39	-0.56*	-1.01	-0.12	0.01*	0.04*
Q OB	5.59	41	6.66	35	-0.50	-0.95	-0.04	0.03*	0.08

Notes. [a] The heterosexual/normal weight vignette version is the reference vignette.

[b] Het = heterosexual, Bi = bisexual, Q = Queer. UW = underweight, NW = normal weight, OW=overweight, OB = obese

[c] Reference mean

[d] Comparison mean

[e] Cohen's d

[f] False discovery rate

[g] Participants responded to a 10-point ordinal scale, 1 'not at all likely' to 10 'very likely.'

Table 8

Estimating effect sizes of weight status and sexual identity on decision-making about likelihood to provide patient education about alcohol for a hypothetical patient in a vignette about hypertension, compared to a reference patient

Vignette Versions [b]	Ref. M [c]	Ref. n	Comp. M [d]	Comp. n	*d* [e]	CI lower	CI upper	*p*	*FDR* [f]
Het. UW	7	41[g]	7.24	37	-0.10	-0.55	0.34	0.64	0.74
Het. OW	7	41	6.77	30	0.08	-0.39	0.55	0.72	0.74
Het. OB	7	41	6.46	37	0.21	-0.24	0.66	0.35	0.55
Bi. UW	7	41	6.41	34	0.25	-0.2	0.71	0.28	0.51
Bi. NW	7	41	7.78	34	-0.34	-0.8	0.12	0.74	0.74
Bi. OW	7	41	5.84	37	0.45	0	0.9	0.05*	0.28
Bi. OB	7	41	6.28	29	0.30	-0.18	0.77	0.22	0.51
Q UW	7	41	6.77	26	0.09	-0.41	0.58	0.73	0.74
Q NW	7	41	6.11	38	0.37	-0.07	0.82	0.099	0.363
Q OW	7	41	6.36	39	0.26	-0.18	0.7	0.24	0.51
Q OB	7	41	5.8	35	0.46	0	0.91	0.05*	0.28

Notes. [a] The heterosexual/normal weight vignette version is the reference vignette.

[b] Het = heterosexual, Bi = bisexual, Q = Queer. UW = underweight, NW = normal weight, OW=overweight, OB = obese

[c] Reference mean

[d] Comparison mean

[e] Cohen's d

[f] False discovery rate

[d] Comparison mean

[e] Cohen's d

[f] False discovery rate

[g] Participants responded to a 10-point ordinal scale, 1 'not at all likely' to 10 'very likely.'

Table 9

Estimating effect sizes of weight status and sexual identity on decision-making about likelihood to provide patient education about smoking for a vignette about hypertension, compared to a reference patient

Vignette Versions [b]	Ref. M [c]	Ref. n	Comp. M [d]	Comp. n	*d* [e]	CI lower	CI upper	*p*	*FDR* [f]
Het. UW	8.22[g]	41	8.62	37	-0.23	-0.68	0.22	0.3	0.91
Het. OW	8.22	41	7.77	30	0.21	-0.26	0.68	0.37	0.91
Het. OB	8.22	41	8.24	37	-0.01	-0.45	0.43	0.96	0.96
Bi. UW	8.22	41	8.12	34	0.05	-0.41	0.5	0.83	0.91
Bi. NW	8.22	41	8.44	34	-0.11	-0.57	0.34	0.62	0.91
Bi. OW	8.22	41	8.03	37	0.09	-0.35	0.54	0.67	0.91
Bi. OB	8.22	41	7.59	29	0.30	-0.17	0.78	0.21	0.91
Q UW	8.22	41	8.42	26	-0.11	-0.6	0.38	0.66	0.91
Q NW	8.22	41	8.08	38	0.07	-0.37	0.51	0.75	0.913
Q OW	8.22	41	8.05	39	0.08	-0.36	0.52	0.73	0.91
Q OB	8.22	41	7.49	35	0.33	-0.12	0.79	0.15	0.91

Notes. [a] The heterosexual/normal weight vignette version is the reference vignette.

[b] Het = heterosexual, Bi = bisexual, Q = Queer. UW = underweight, NW = normal weight, OW=overweight, OB = obese

[c] Reference mean

[d] Comparison mean

[e] Cohen's d

[f] False discovery rate

[d] Comparison mean

[e] Cohen's d

[f] False discovery rate

[g] Participants responded to a 10-point ordinal scale, 1 'not at all likely' to 10 'very likely.'

Table 10

Estimating effect sizes of weight status and sexual identity on decision-making about likelihood to provide patient education about sleep for a hypothetical patient in a vignette about hypertension, compared to a reference patient

Vignette Versions [b]	Ref. M [c]	Ref. n	Comp. M [d]	Comp. n	*d* [e]	CI lower	CI upper	*p*	*FDR* [f]
Het. UW	4.66[g]	41	4.84	37	-0.08	-0.52	0.37	0.72	0.89
Het. OW	4.66	41	4.33	30	0.14	-0.33	0.61	0.57	0.89
Het. OB	4.66	41	4.12	37	0.22	-0.22	0.67	0.39	0.71
Bi. UW	4.66	41	3.97	34	0.32	-0.14	0.77	0.17	0.62
Bi. NW	4.66	41	4.06	34	0.27	-0.19	0.73	0.24	0.66
Bi. OW	4.66	41	3.84	37	0.39	-0.06	0.84	0.09	0.62
Bi. OB	4.66	41	4.48	29	0.09	-0.39	0.56	0.73	0.89
Q UW	4.66	41	4.54	26	0.05	-0.44	0.54	0.84	0.924
Q NW	4.66	41	3.92	38	0.32	-0.12	0.77	0.15	0.62
Q OW	4.66	41	4.64	39	0.01	-0.43	0.45	0.97	0.97
Q OB	4.66	41	4.2	35	0.20	-0.25	0.65	0.38	0.71

Notes. [a] The heterosexual/normal weight vignette version is the reference vignette.

[b] Het = heterosexual, Bi = bisexual, Q = Queer. UW = underweight, NW = normal weight, OW=overweight, OB = obese

[c] Reference mean

[d] Comparison mean

[e] Cohen's d

[f] False discovery rate

[d] Comparison mean

[e] Cohen's d

[f] False discovery rate

[g] Participants responded to a 10-point ordinal scale, 1 'not at all likely' to 10 'very likely.'

Table 11

Estimating effect sizes of weight status and sexual identity on decision-making about likelihood to provide patient education about stress for a hypothetical patient in a vignette about hypertension, compared to a reference patient

Vignette Versions [b]	Ref. M [c]	Ref. n	Comp. M [d]	Comp. n	*d* [e]	CI lower	CI upper	*p*	*FDR* [f]
Het. UW	6.24[g]	41	7.22	37	-0.42	-0.87	0.03	0.07	0.55
Het. OW	6.24	41	5.4	30	0.32	-0.16	0.79	0.19	0.7
Het. OB	6.24	41	6.08	37	0.07	-0.38	0.51	0.77	0.95
Bi. UW	6.24	41	6.23	34	0.00	-0.45	0.46	0.99	0.99
Bi. NW	6.24	41	6.06	34	0.07	-0.38	0.53	0.75	0.95
Bi. OW	6.24	41	5.35	37	0.37	-0.08	0.82	0.1	0.55
Bi. OB	6.24	41	6.03	29	0.08	-0.39	0.56	0.73	0.95
Q UW	6.24	41	5.92	26	0.12	-0.37	0.61	0.63	0.95
Q NW	6.24	41	6.08	38	0.06	-0.38	0.5	0.78	0.95
Q OW	6.24	41	6.23	39	0.00	-0.43	0.44	0.98	0.99
Q OB	6.24	41	5.89	35	0.14	-0.31	0.59	0.54	0.95

Notes. [a] The heterosexual/normal weight vignette version is the reference vignette.

[b] Het = heterosexual, Bi = bisexual, Q = Queer. UW = underweight, NW = normal weight, OW=overweight, OB = obese

[c] Reference mean

[d] Comparison mean

[e] Cohen's d

[f] False discovery rate

[d] Comparison mean

[e] Cohen's d

[f] False discovery rate

[g] Participants responded to a 10-point ordinal scale, 1 'not at all likely' to 10 'very likely.'

Table 12

Estimating effect sizes of weight status and sexual identity on decision-making about likelihood of a patient having a urinary tract infection for a hypothetical patient in a vignette about urinary frequency, compared to a reference patient

Vignette Versions [b]	Ref. M [c]	Ref. n	Comp. M [d]	Comp. n	*d* [e]	CI lower	CI upper	*p*	*FDR* [f]
Het. UW	9.11[g]	27	8.48	34	0.36	-0.15	0.87	0.33	0.77
Het. OW	9.11	27	9.23	31	-0.11	-0.62	0.41	0.69	0.84
Het. OB	9.11	27	8.86	43	0.17	-0.32	0.65	0.49	0.80
Bi. UW	9.11	27	9.1	29	0.01	-0.52	0.53	0.98	0.99
Bi. NW	9.11	27	9.45	33	-0.35	-0.86	0.16	0.17	0.77
Bi. OW	9.11	27	9.49	35	0.4	-0.9	0.11	0.13	0.77
Bi. OB	9.11	27	9.39	33	-0.26	-0.77	0.25	0.31	0.77
Q UW	9.11	27	8.83	40	0.16	-0.33	0.65	0.51	0.80
Q NW	9.11	27	9.11	38	0	-0.49	0.49	0.99	0.99
Q OW	9.11	27	9.39	33	-0.24	-0.75	0.27	0.35	0.77
Q OB	9.11	27	8.98	41	0.09	-0.39	0.58	0.69	0.84

Notes. [a] The heterosexual/normal weight vignette version is the reference vignette.

[b] Het = heterosexual, Bi = bisexual, Q = Queer. UW = underweight, NW = normal weight, OW=overweight, OB = obese

[c] Reference mean

[d] Comparison mean

[e] Cohen's d

[f] False discovery rate

[d] Comparison mean

[e] Cohen's d

[f] False discovery rate

[g] Participants responded to a 10-point ordinal scale, 1 'not at all likely' to 10 'very likely.'

Table 13
Estimating effect sizes of weight status and sexual identity on decision-making about likelihood of a patient having diabetes for a hypothetical patient in a vignette about urinary frequency, compared to a reference patient

Vignette Versions [b]	Ref. M [c]	Ref. n	Comp. M [d]	Comp. n	*d* [e]	CI lower	CI upper	*p*	*FDR* [f]
Het. UW	4.11[g]	27	3.88	34	0.09	-0.42	0.59	0.74	0.99
Het. OW	4.11	27	4.29	31	-0.06	-0.58	0.45	0.81	0.99
Het. OB	4.11	27	4.53	43	-0.16	-0.64	0.32	0.51	0.80
Bi. UW	4.11	27	3.07	29	0.42	-0.11	0.95	0.12	0.44
Bi. NW	4.11	27	3.45	33	0.29	-0.22	0.8	0.27	0.59
Bi. OW	4.11	27	4.14	35	-0.01	-0.51	0.49	0.96	0.99
Bi. OB	4.11	27	4.12	33	0	-0.51	0.5	0.99	0.99
Q UW	4.11	27	2.78	40	0.58	0.08	1.08	0.02*	0.22
Q NW	4.11	27	3.66	38	0.18	-0.32	0.67	0.48	0.80
Q OW	4.11	27	5	33	-0.35	-0.87	0.16	0.17	0.47
Q OB	4.11	27	5.22	41	-0.41	-0.9	0.08	0.098	0.44

Notes. [a] The heterosexual/normal weight vignette version is the reference vignette.
[b] Het = heterosexual, Bi = bisexual, Q = Queer. UW = underweight, NW = normal weight, OW=overweight, OB = obese
[c] Reference mean
[d] Comparison mean
[e] Cohen's d
[f] False discovery rate
[d] Comparison mean
[e] Cohen's d
[f] False discovery rate
[g] Participants responded to a 10-point ordinal scale, 1 'not at all likely' to 10 'very likely.'

Table 14

Estimating effect sizes of weight status and sexual identity on decision-making about likelihood of a patient having anxiety for a vignette about urinary frequency, compared to a reference patient

Vignette Versions [b]	Ref. M [c]	Ref. n	Comp. M [d]	Comp. n	*d* [e]	CI lower	CI upper	*p*	*FDR* [f]
Het. UW	2.96[g]	27	3.4	34	-0.21	-0.71	0.3	0.41	0.99
Het. OW	2.96	27	2.97	31	0	-0.52	0.51	0.99	0.99
Het. OB	2.96	27	2.81	43	0.09	-0.4	0.57	0.73	0.99
Bi. UW	2.96	27	3.38	29	0.19	-0.72	0.33	0.48	0.99
Bi. NW	2.96	27	3.15	33	0.11	-0.62	0.4	0.68	0.99
Bi. OW	2.96	27	3	35	0.02	-0.52	0.48	0.94	0.99
Bi. OB	2.96	27	2.91	33	0.03	-0.48	0.53	0.91	0.99
Q UW	2.96	27	3.63	40	-0.31	-0.8	0.19	0.22	0.99
Q NW	2.96	27	3.61	38	-0.28	-0.78	0.21	0.26	0.99
Q OW	2.96	27	3	33	-0.02	-0.53	0.49	0.93	0.99
Q OB	2.96	27	2.98	41	-0.01	-0.5	0.48	0.98	0.99

Notes. [a] The heterosexual/normal weight vignette version is the reference vignette.

[b] Het = heterosexual, Bi = bisexual, Q = Queer. UW = underweight, NW = normal weight, OW=overweight, OB = obese

[c] Reference mean

[d] Comparison mean

[e] Cohen's d

[f] False discovery rate

[d] Comparison mean

[e] Cohen's d

[f] False discovery rate

[g] Participants responded to a 10-point ordinal scale, 1 'not at all likely' to 10 'very likely.'

Table 15

Estimating effect sizes of weight status and sexual identity on decision-making about likelihood of a patient being pregnant for a hypothetical patient in a vignette about urinary frequency, compared to a reference patient

Vignette Versions [b]	Ref. M [c]	Ref. n	Comp. M [d]	Comp. n	*d* [e]	CI lower	CI upper	*p*	*FDR* [f]
Het. UW	4[g]	27	4.23	34	-0.09	-0.59	0.42	0.66	0.79
Het. OW	4	27	4.23	31	-0.1	-0.61	0.42	0.72	0.79
Het. OB	4	27	3.77	43	0.09	-0.39	0.57	0.7	0.79
Bi. UW	4	27	3.1	29	0.42	-0.11	0.95	0.12	0.66
Bi. NW	4	27	3.85	33	0.06	-0.45	0.57	0.8	0.8
Bi. OW	4	27	3.16	35	0.38	-0.12	0.89	0.33	0.79
Bi. OB	4	27	3.63	33	0.16	-0.35	0.67	0.54	0.79
Q UW	4	27	2.75	40	0.55	0.05	1.05	0.3	0.79
Q NW	4	27	3.45	38	0.22	-0.28	0.71	0.39	0.79
Q OW	4	27	2.82	33	0.52	0.01	1.04	0.05*	0.55
Q OB	4	27	2.83	41	0.5	0.01	0.99	0.5	0.79

Notes. [a] The heterosexual/normal weight vignette version is the reference vignette.

[b] Het = heterosexual, Bi = bisexual, Q = Queer. UW = underweight, NW = normal weight, OW=overweight, OB = obese

[c] Reference mean

[d] Comparison mean

[e] Cohen's d

[f] False discovery rate

[d] Comparison mean

[e] Cohen's d

[f] False discovery rate

[g] Participants responded to a 10-point ordinal scale, 1 'not at all likely' to 10 'very likely.'

Table 16

Estimating effect sizes of weight status and sexual identity on decision-making about likelihood of a patient having a sexually transmitted infection for a hypothetical patient in a vignette about urinary frequency, compared to a reference patient

Vignette Versions [b]	Ref. M [c]	Ref. n	Comp. M [d]	Comp. n	*d* [e]	CI lower	CI upper	*p*	*FDR* [f]
Het. UW	6.89[g]	27	6.09	34	0.32	-0.19	0.83	0.21	0.88
Het. OW	6.89	27	6.25	31	0.28	-0.24	0.8	0.29	0.88
Het. OB	6.89	27	6.79	43	0.04	-0.44	0.52	0.86	0.98
Bi. UW	6.89	27	6.21	29	0.3	-0.22	0.83	0.25	0.88
Bi. NW	6.89	27	6.24	33	0.28	-0.23	0.79	0.32	0.88
Bi. OW	6.89	27	7.17	35	-0.13	-0.63	0.37	0.61	0.98
Bi. OB	6.89	27	6.82	33	0.03	-0.48	0.54	0.9	0.98
Q UW	6.89	27	6.88	40	0	-0.48	0.49	0.98	0.98
Q NW	6.89	27	6.87	38	0.01	-0.49	0.5	0.97	0.98
Q OW	6.89	27	6.52	33	0.16	-0.35	0.67	0.54	0.98
Q OB	6.89	27	7.02	41	-0.06	-0.54	0.43	0.81	0.98

Notes. [a] The heterosexual/normal weight vignette version is the reference vignette.

[b] Het = heterosexual, Bi = bisexual, Q = Queer. UW = underweight, NW = normal weight, OW=overweight, OB = obese

[c] Reference mean

[d] Comparison mean

[e] Cohen's d

[f] False discovery rate

[d] Comparison mean

[e] Cohen's d

[f] False discovery rate

[g] Participants responded to a 10-point ordinal scale, 1 'not at all likely' to 10 'very likely.'

Table 17

Correlations (Pearson's *r*) between weight implicit association test (IAT) D-scores and decision-making responses regarding hypothetical patients with varied weight status and sexual identity in vignettes about hypertension, controlling for participant weight status, sexual identity, gender, race, ethnicity, and age

Vignette Version [a]	Medication management	Low sodium	Weight management	Exercise	Alcohol	Smoking	Sleep	Stress
Het UW	0.12	-0.02	-0.27	-0.11	-0.21	-0.07	-0.09	-0.01
Het NW	-0.07	0.19	-0.02	-0.07	-0.15	0.06	-0.12	0.03
Het OW	0.44	-0.05	0.01	0.3	0.09	0.27	0.4	0.53
Het OB	0.16	-0.27	-0.2	-0.46	-0.41	-0.02	-0.03	-0.16
Bi UW	0.53	-0.32	-0.13	0.01	-0.27	-0.31	0.13	0.16
Bi NW	-0.3	-0.23	-0.18	-0.18	0.15	0.17	-0.06	0.29
Bi OW	-0.11	0.16	0.07	0.19	-0.16	0.08	-0.01	-0.17
Bi OB	-0.09	-0.07	-0.23	-0.43	0.31	-0.16	-0.01	0.15
Q UW	0.35	0.17	0.1	-0.11	-0.29	-0.16	-0.25	-0.08
Q NW	-0.25	-0.24	0.003	-0.04	0.04	0.05	-0.27	-0.14
Q OW	-0.04	-0.01	-0.13	-0.13	0.07	0.29	0.03	0.25
Q OB	0.47	-0.23	0.04	0.29	0.01	-0.003	0.13	-0.02

Notes. Het = heterosexual, Bi = bisexual, Q = Queer. UW = underweight, NW = normal weight, OW = overweight, OB = obese.

Table 18

Correlations (Pearson's *r*) between weight implicit association test (IAT) D-scores and decision-making responses regarding hypothetical patients with varied weight status and sexual identity in vignettes about urinary frequency, controlling for participant weight status, sexual identity, gender, race, ethnicity, and age

Vignette Version [a]	Urinary tract infection	Diabetes	Anxiety	Pregnancy	Sexually transmitted infection
Het UW	-0.32	-0.35	-0.29	0.17	-0.2
Het NW	0.46	0.18	0.65	0.49	0.4
Het OW	-0.11	-0.17	-0.11	-0.19	0.01
Het OB	0.19	0.03	0.14	-0.04	-0.11
Bi UW	0.19	-0.16	-0.27	-0.43	0.004
Bi NW	-0.29	0.2	-0.03	0.07	-0.16
Bi OW	-0.005	-0.07	0.11	-0.14	0.08
Bi OB	0.09	-0.09	0.05	0.35	0.01
Q UW	-0.23	0.22	0.32	-0.12	-0.06
Q NW	0.37	-0.12	0.16	-0.23	-0.22
Q OW	0.07	0.41	0.08	-0.04	0.007
Q OB	0.02	0.09	0.02	0.03	0.15

Notes. There are 12 versions of each vignette: Het = heterosexual, Bi = bisexual, Q = Queer. UW = underweight, NW = normal weight, OW=overweight, OB = obese.

Table 19

Correlations (Pearson's *r*) between Fat Phobia Scale Scores and decision-making responses regarding hypothetical patients with varied weight status and sexual identity in vignettes about hypertension, controlling for participant weight status, sexual identity, gender, race, ethnicity, and age

Vignette Version [a]	Medication management	Low sodium	Weight management	Exercise	Alcohol	Smoking	Sleep	Stress
Het UW	-0.19	0.01	-0.11	-0.23	-0.08	-0.04	-0.02	0.1
Het NW	-0.39	-0.26	-0.008	-0.12	-0.19	-0.19	-0.26	-0.22
Het OW	-0.36	-0.11	-0.14	-0.5	-0.5	-0.22	-0.43	-0.53
Het OB	0.06	0.004	0.14	0.11	-0.19	0.03	-0.15	-0.11
Bi UW	0.31	-0.17	0.1	0.05	-0.14	-0.02	0.18	-0.23
Bi NW	0.12	-0.02	-0.04	-0.32	-0.08	-0.24	-0.27	-0.13
Bi OW	-0.3	0.11	0.23	0.27	0.02	-0.17	0.08	-0.17
Bi OB	0.16	0.25	0.25	0.54	-0.21	-0.43	-0.14	-0.22
Q UW	0.15	-0.08	0.13	-0.02	0.12	0.08	0.07	0.28
Q NW	-0.16	-0.18	-0.13	-0.3	-0.48	-0.18	-0.03	-0.18
Q OW	-0.06	0.13	-0.14	0.15	0.13	0.22	0.21	0.33
Q OB	-0.19	0.06	-0.16	-0.25	-0.16	0.04	-0.2	0.22

Notes. Het = heterosexual, Bi = bisexual, Q = Queer. UW = underweight, NW = normal weight, OW = overweight, OB = obese.

Table 20

Correlations (Pearson's *r*) between Fat Phobia Scale Scores and decision-making responses regarding hypothetical patients with varied weight status and sexual identity in vignettes about urinary frequency, controlling for participant weight status, sexual identity, gender, race, ethnicity, and age

Vignette Version [a]	Urinary tract infection	Diabetes	Anxiety	Pregnancy	Sexually transmitted infection
Het UW	-0.29	-0.01	0.08	0.07	-0.23
Het NW	0.28	0.35	0.49	0.49	0.54
Het OW	-0.16	-0.05	0.07	-0.11	0.13
Het OB	-0.09	0.22	-0.1	0.16	0.24
Bi UW	0.0004	0.03	0.19	0.05	0.09
Bi NW	-0.18	0.05	-0.08	0.34	0.22
Bi OW	0.1	0.35	-0.07	-0.05	-0.39
Bi OB	-0.21	-0.12	-0.24	-0.19	-0.04
Q UW	-0.58	-0.06	0.35	0.11	0.3
Q NW	0.35	-0.05	0.26	-0.07	0.21
Q OW	0.27	-0.03	0.03	0.29	0.3
Q OB	0.16	0.27	-0.13	-0.25	0.09

Notes. There are 12 versions of each vignette: Het = heterosexual, Bi = bisexual, Q = Queer. UW = underweight, NW = normal weight, OW=overweight, OB = obese.

Table 21

Correlations (Pearson's *r*) between Modern Homonegativity Scale sums and decision-making responses regarding hypothetical patients with varied weight status and sexual identity in vignettes about hypertension, controlling for participant weight status, sexual identity, gender, race, ethnicity, and age

Vignette Version [a]	Medication management	Low sodium	Weight management	Exercise	Alcohol	Smoking	Sleep	Stress
Het UW	0.01	-0.03	-0.01	-0.14	0.33	0.1	0.02	-0.04
Het NW	-0.13	0.21	-0.08	0.34	-0.08	0.12	0.27	0.13
Het OW	-0.09	-0.15	0.1	0.05	0.3	0.32	0.37	0.16
Het OB	-0.004	-0.12	-0.2	-0.31	-0.09	-0.3	-0.29	-0.1
Bi UW	0.22	-0.36	-0.03	-0.22	-0.31	-0.01	-0.19	-0.31
Bi NW	-0.01	0.05	-0.13	-0.2	-0.03	0.25	-0.07	-0.28
Bi OW	0.01	-0.04	-0.16	-0.16	-0.12	-0.08	0.29	-0.1
Bi OB	0.02	0.2	0.13	-0.13	0.15	0.04	-0.01	-0.31
Q UW	-0.08	0.1	0.2	0.02	-0.01	0.08	0.24	0.35
Q NW	0.22	-0.09	0.05	-0.24	0.14	0.09	0.07	-0.17
Q OW	-0.22	-0.26	-0.48	-0.47	0.1	0.12	0.2	0.03
Q OB	-0.21	0.11	-0.21	-0.23	-0.12	-0.1	-0.24	0.1

Notes. Het = heterosexual, Bi = bisexual, Q = Queer. UW = underweight, NW = normal weight, OW = overweight, OB = obese.

Table 22

Correlations (Pearson's *r*) between Modern Homonegativity Scale sums and decision-making responses regarding hypothetical patients with varied weight status and sexual identity in vignettes about urinary frequency, controlling for participant weight status, sexual identity, gender, race, ethnicity, and age

Vignette Version [a]	Urinary tract infection	Diabetes	Anxiety	Pregnancy	Sexually transmitted infection
Het UW	-0.14	0.21	0.19	0.59	-0.03
Het NW	0.2	-0.17	0.02	-0.17	-0.29
Het OW	-0.06	0.35	0.54	0.43	0.25
Het OB	0.05	-0.17	-0.22	-0.16	0.09
Bi UW	0.3	0.1	-0.19	-0.27	-0.3
Bi NW	-0.32	0.35	0.12	0.18	0.16
Bi OW	-0.06	0.33	0.1	0.33	-0.55
Bi OB	-0.28	0.19	-0.09	0.29	0.21
Q UW	-0.09	-0.15	-0.07	-0.06	0.14
Q NW	0.06	-0.26	-0.05	0.2	-0.09
Q OW	0.33	0.19	-0.23	-0.2	0.11
Q OB	0.13	0.28	0.16	0.005	0.21

Notes. There are 12 versions of each vignette: Het = heterosexual, Bi = bisexual, Q = Queer. UW = underweight, NW = normal weight, OW=overweight, OB = obese.

Table 23
Results of ANOVA examining moderation of clinical decision-making scores for a vignette about hypertension, based on participants' sexual identity and weight

Participant weight status * Vignette Version	***df***	**F**	***p***	**Participant sexual identity * Vignette Version**	***df***	**F**	***p***
Medication management	11	0.46	0.98	Medication management	11	0.89	0.55
Low-sodium diet	11	0.73	0.81	Low-sodium diet	11	2.41	< 0.01*
Weight management	11	1.45	0.09	Weight management	11	0.70	0.74
Exercise	11	0.65	0.88	Exercise	11	0.55	0.87
Alcohol	11	1.08	0.37	Alcohol	11	0.86	0.58
Smoking	11	1.28	0.18	Smoking	11	1.02	0.43
Sleep	11	0.51	0.97	Sleep	11	0.51	0.90
Stress	11	0.46	0.98	Stress	11	0.89	0.55

Notes: [1] The hypertension vignette has 12 versions and eight outcome measures.
* p-value < 0.05

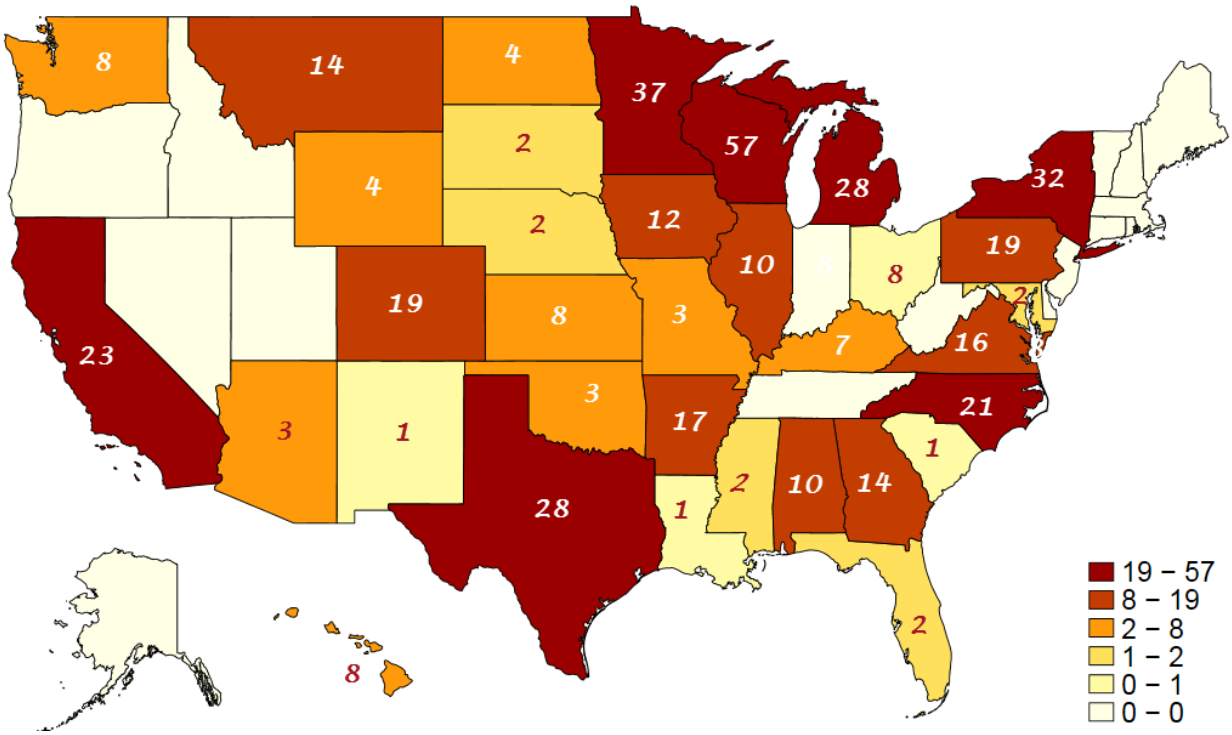
Table 24
Results of ANOVA examining moderation of clinical decision-making scores for a vignette about urinary frequency, based on participants' sexual identity and weight

Participant weight status * Vignette Version	***df***	**F**	***p***	**Participant sexual identity * Vignette Version**	***df***	**F**	***p***
Urinary tract infection	11	1.06	0.39	Urinary tract infection	11	0.73	0.71
Diabetes	11	1.21	0.24	Diabetes	11	1.86	0.04*
Anxiety	11	1.4	0.11	Anxiety	11	1.10	0.36
Pregnancy	11	0.88	0.62	Pregnancy	11	0.99	0.45
Sexually transmitted infection	11	0.69	0.85	Sexually transmitted infection	11	1.27	0.24

Notes: [1] The Urinary Frequency vignette has 12 versions and five outcome measures.
* p-value < 0.05

Figure 1

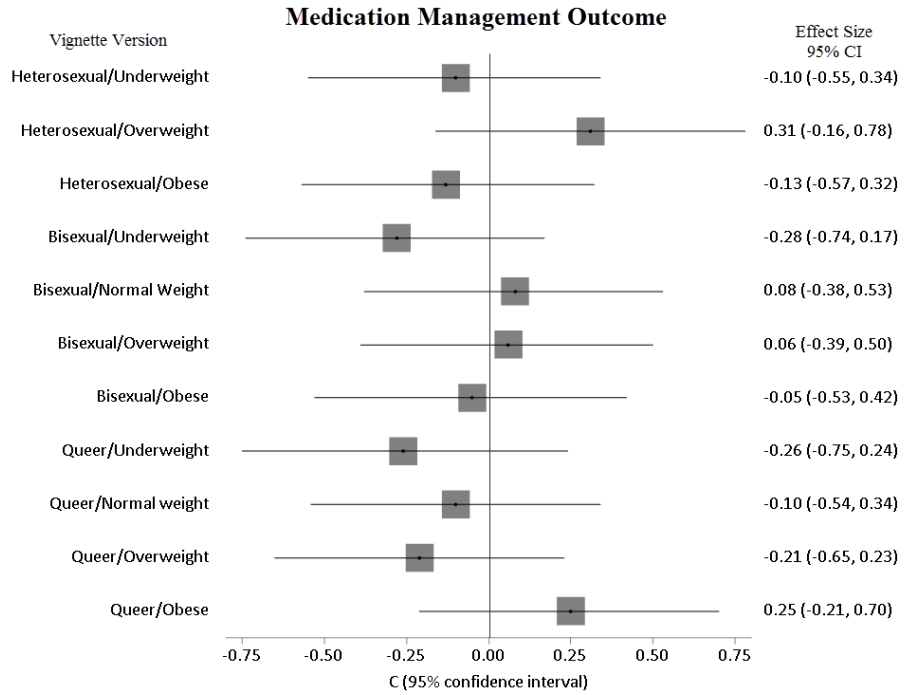
Geographical representation of sample (N=417) of prelicensure nursing students

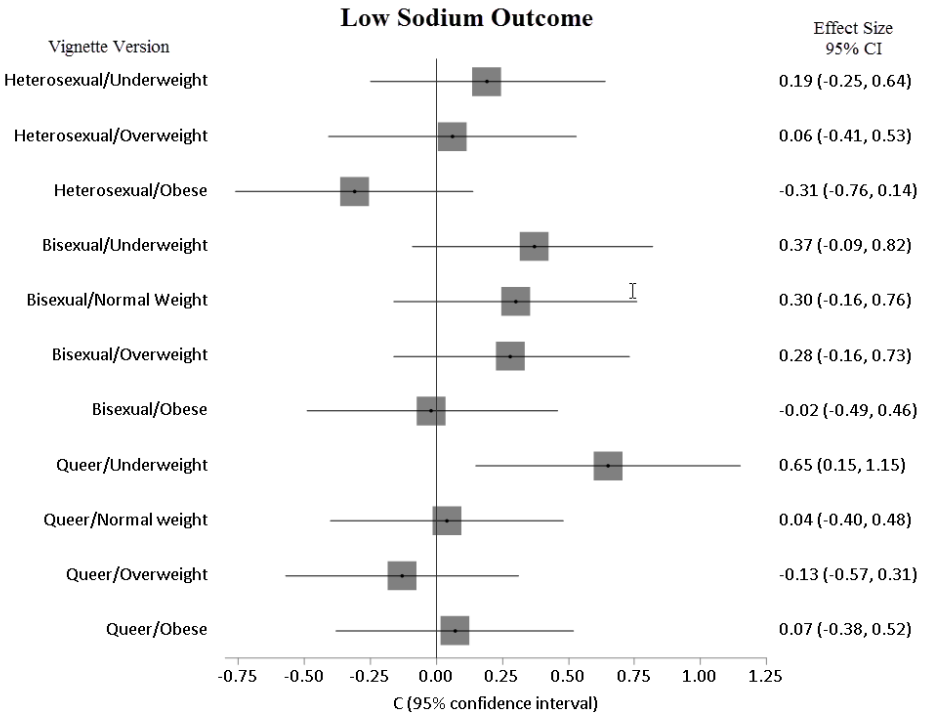


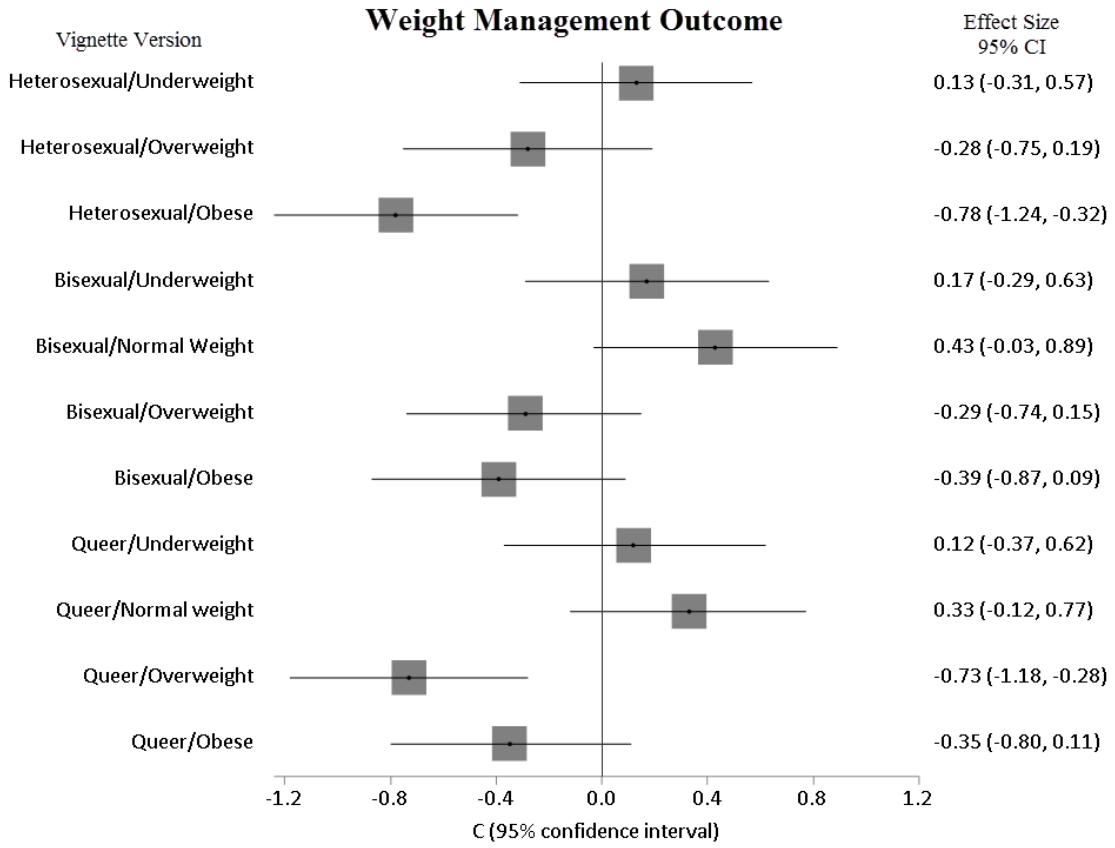
Notes. We invited participants from all U.S. states and territories.

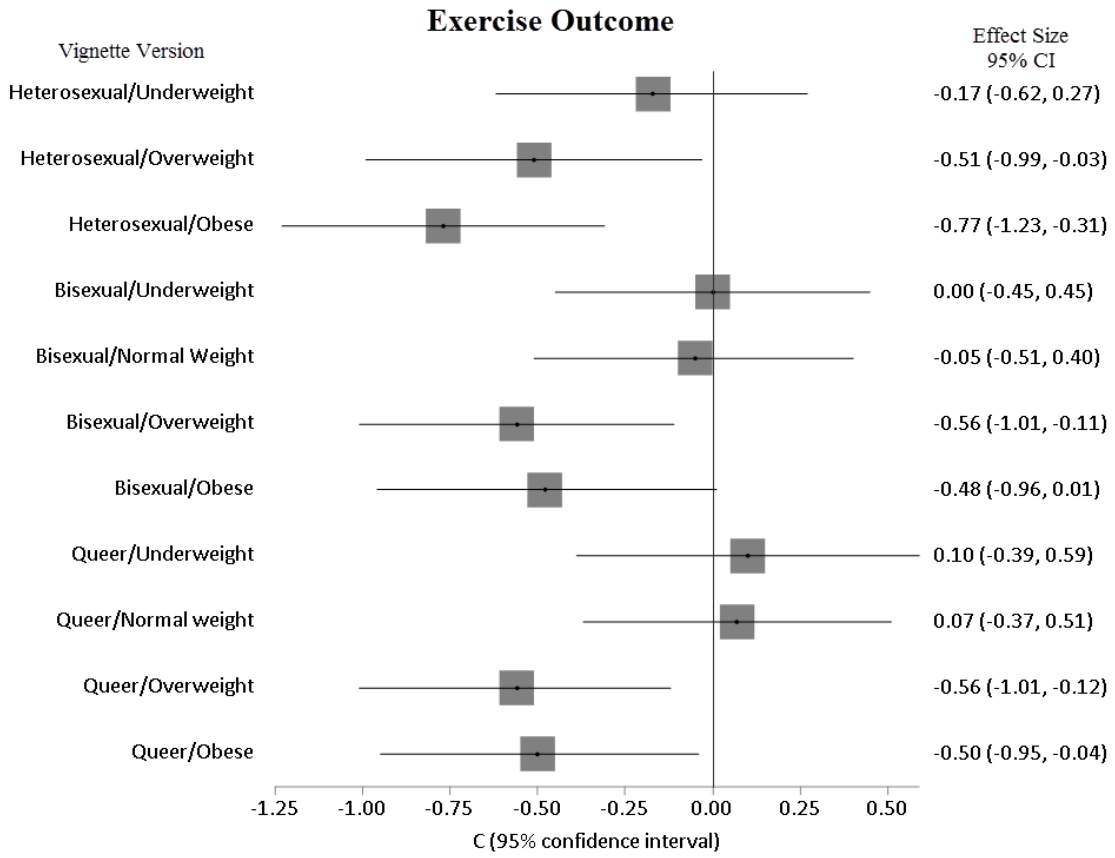
Appendix 1

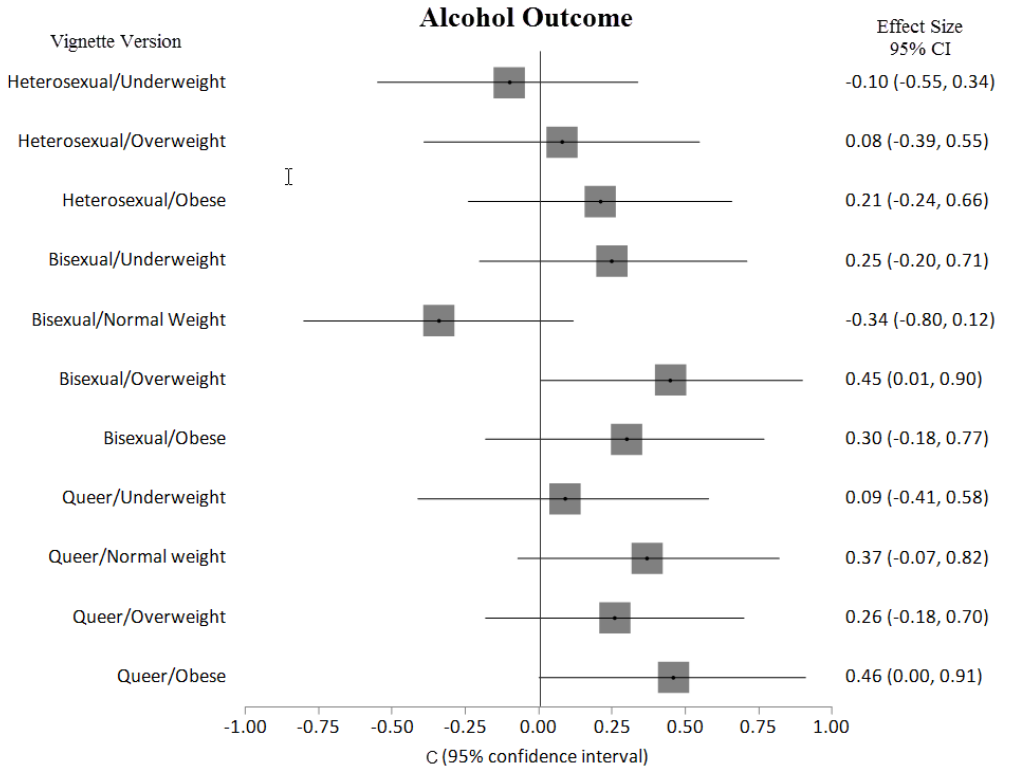
Forest plots featuring effect sizes decision-making responses regarding hypothetical patients with varied weight status and sexual identity in vignettes about hypertension (Note: Outcomes below refer to decision-making responses)

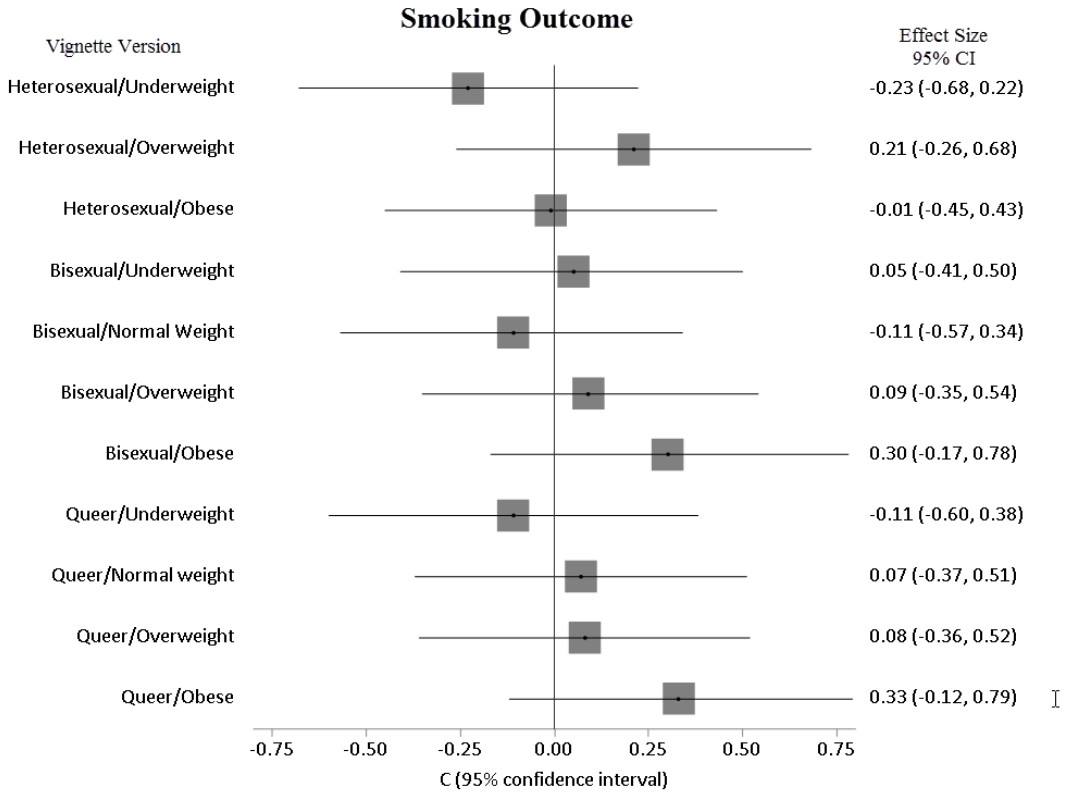


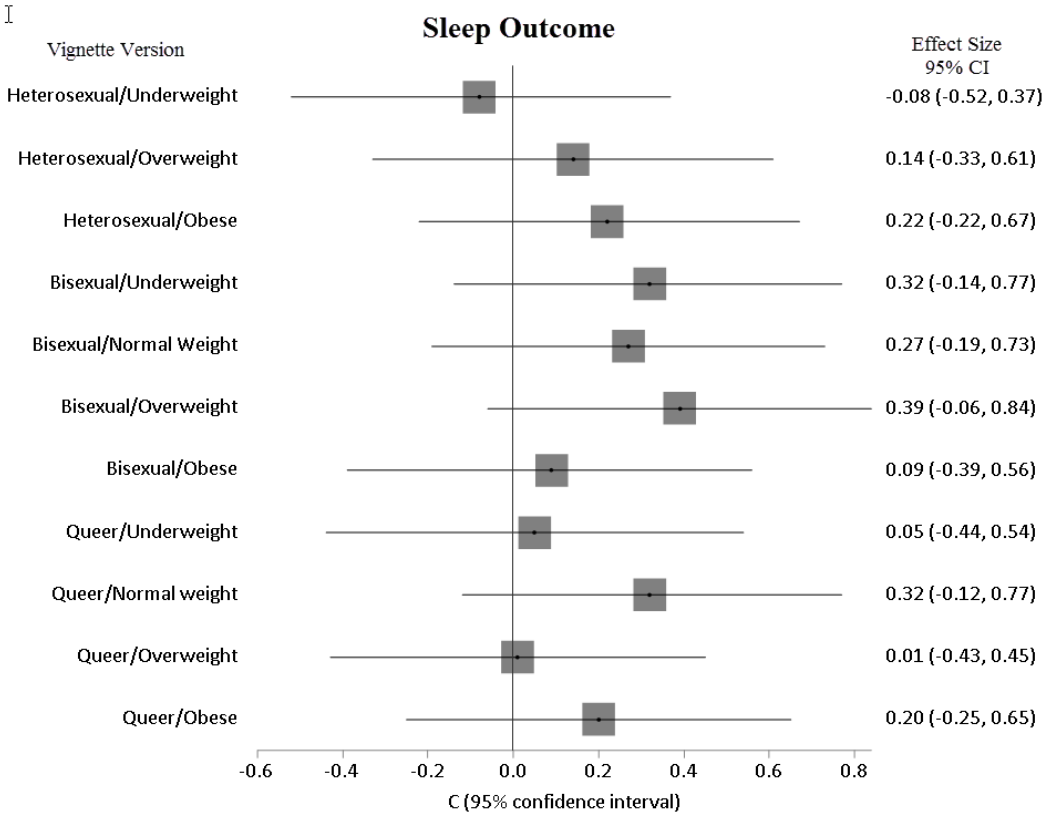



Weight Management Outcome
Vignette Version
Effect Size
95% CI
Heterosexual/Underweight
0.13 (-0.31, 0.57)
Heterosexual/Overweight
-0.28 (-0.75, 0.19)
Heterosexual/Obese
-0.78 (-1.24, -0.32)
Bisexual/Underweight
0.17 (-0.29, 0.63)
Bisexual/Normal Weight
0.43 (-0.03, 0.89)
Bisexual/Overweight
-0.29 (-0.74, 0.15)
Bisexual/Obese
-0.39 (-0.87, 0.09)
Queer/Underweight
0.12 (-0.37, 0.62)
Queer/Normal weight
0.33 (-0.12, 0.77)
Queer/Overweight
-0.73 (-1.18, -0.28)
Queer/Obese
-0.35 (-0.80, 0.11)
-1.2
-0.8
-0.4
0.0
0.4
0.8
1.2
C (95% confidence interval)


Exercise Outcome
Vignette Version
Effect Size
95% CI
Heterosexual/Underweight
-0.17 (-0.62, 0.27)
Heterosexual/Overweight
-0.51 (-0.99, -0.03)
Heterosexual/Obese
-0.77 (-1.23, -0.31)
Bisexual/Underweight
0.00 (-0.45, 0.45)
Bisexual/Normal Weight
-0.05 (-0.51, 0.40)
Bisexual/Overweight
-0.56 (-1.01, -0.11)
Bisexual/Obese
-0.48 (-0.96, 0.01)
Queer/Underweight
0.10 (-0.39, 0.59)
Queer/Normal weight
0.07 (-0.37, 0.51)
Queer/Overweight
-0.56 (-1.01, -0.12)
Queer/Obese
-0.50 (-0.95, -0.04)
-1.25
-1.00
-0.75
-0.50
-0.25
0.00
0.25
0.50
C (95% confidence interval)


Alcohol Outcome
Vignette Version
Effect Size
95% CI
Heterosexual/Underweight
-0.10 (-0.55, 0.34)
Heterosexual/Overweight
0.08 (-0.39, 0.55)
Heterosexual/Obese
0.21 (-0.24, 0.66)
Bisexual/Underweight
0.25 (-0.20, 0.71)
Bisexual/Normal Weight
-0.34 (-0.80, 0.12)
Bisexual/Overweight
0.45 (0.01, 0.90)
Bisexual/Obese
0.30 (-0.18, 0.77)
Queer/Underweight
0.09 (-0.41, 0.58)
Queer/Normal weight
0.37 (-0.07, 0.82)
Queer/Overweight
0.26 (-0.18, 0.70)
Queer/Obese
0.46 (0.00, 0.91)
-1.00 -0.75 -0.50 -0.25 0.00 0.25 0.50 0.75 1.00
C (95% confidence interval)


Smoking Outcome
Vignette Version
Effect Size
95% CI
Heterosexual/Underweight
-0.23 (-0.68, 0.22)
Heterosexual/Overweight
0.21 (-0.26, 0.68)
Heterosexual/Obese
-0.01 (-0.45, 0.43)
Bisexual/Underweight
0.05 (-0.41, 0.50)
Bisexual/Normal Weight
-0.11 (-0.57, 0.34)
Bisexual/Overweight
0.09 (-0.35, 0.54)
Bisexual/Obese
0.30 (-0.17, 0.78)
Queer/Underweight
-0.11 (-0.60, 0.38)
Queer/Normal weight
0.07 (-0.37, 0.51)
Queer/Overweight
0.08 (-0.36, 0.52)
Queer/Obese
0.33 (-0.12, 0.79)
-0.75 -0.50 -0.25 0.00 0.25 0.50 0.75
C (95% confidence interval)


Sleep Outcome
Vignette Version
Effect Size
95% CI
Heterosexual/Underweight
-0.08 (-0.52, 0.37)
Heterosexual/Overweight
0.14 (-0.33, 0.61)
Heterosexual/Obese
0.22 (-0.22, 0.67)
Bisexual/Underweight
0.32 (-0.14, 0.77)
Bisexual/Normal Weight
0.27 (-0.19, 0.73)
Bisexual/Overweight
0.39 (-0.06, 0.84)
Bisexual/Obese
0.09 (-0.39, 0.56)
Queer/Underweight
0.05 (-0.44, 0.54)
Queer/Normal weight
0.32 (-0.12, 0.77)
Queer/Overweight
0.01 (-0.43, 0.45)
Queer/Obese
0.20 (-0.25, 0.65)
-0.6
-0.4
-0.2
0.0
0.2
0.4
0.6
0.8
C (95% confidence interval)

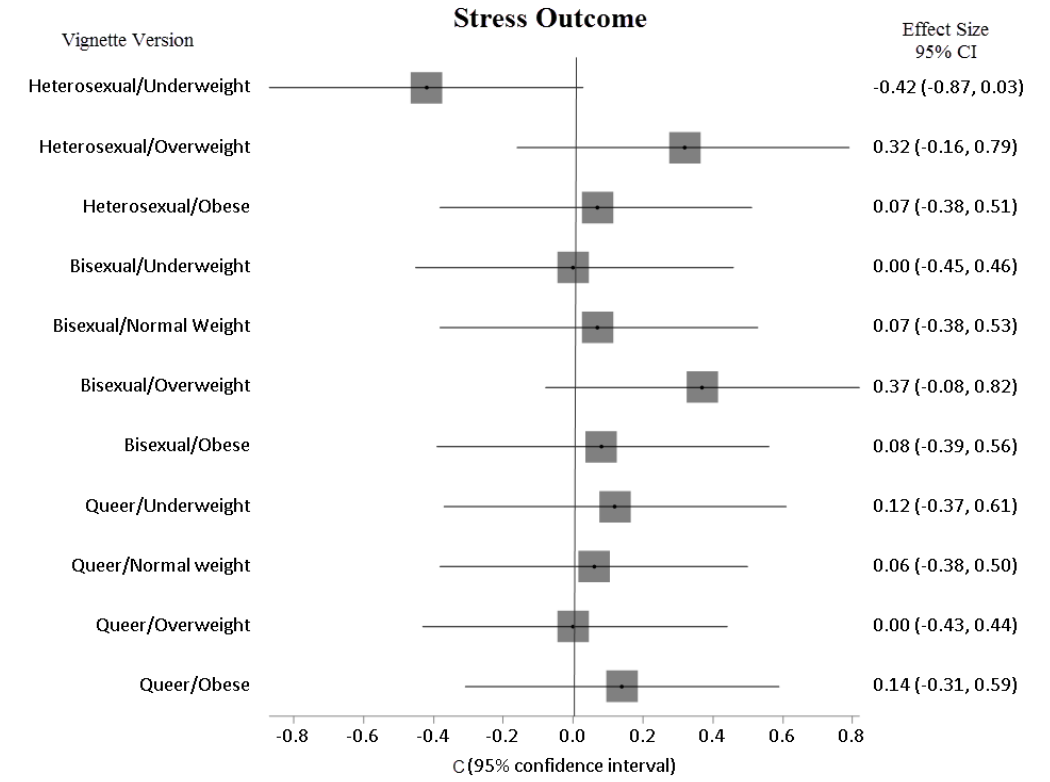
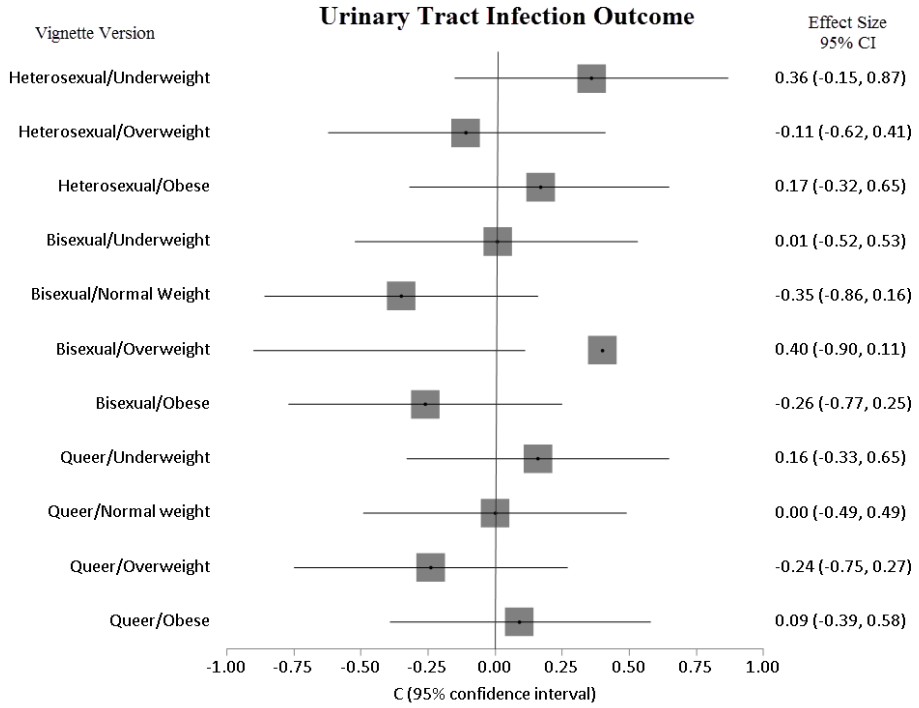
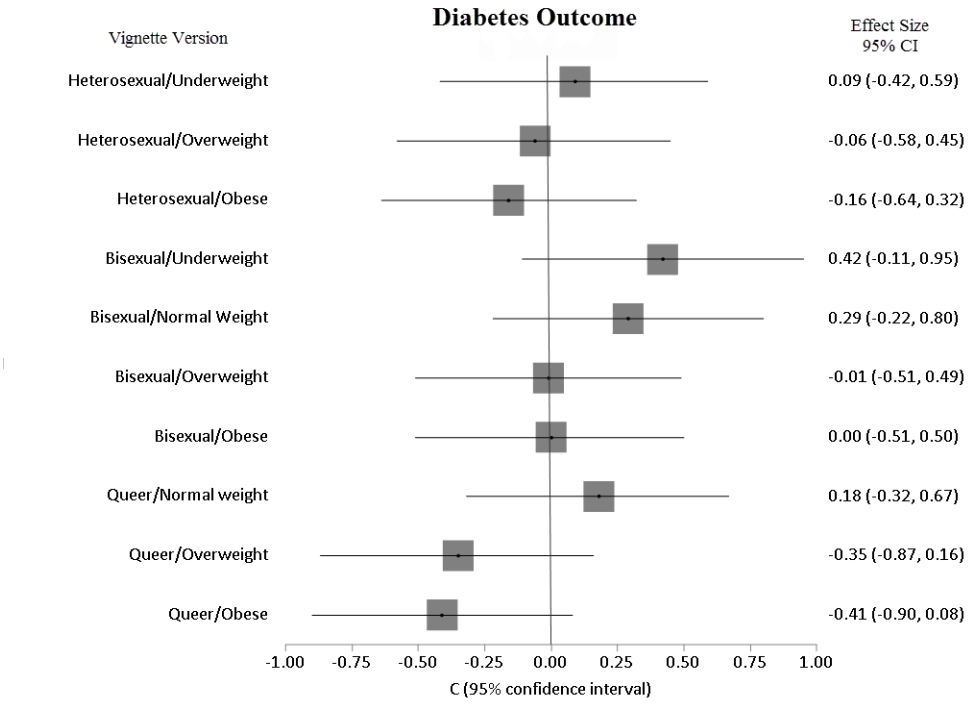
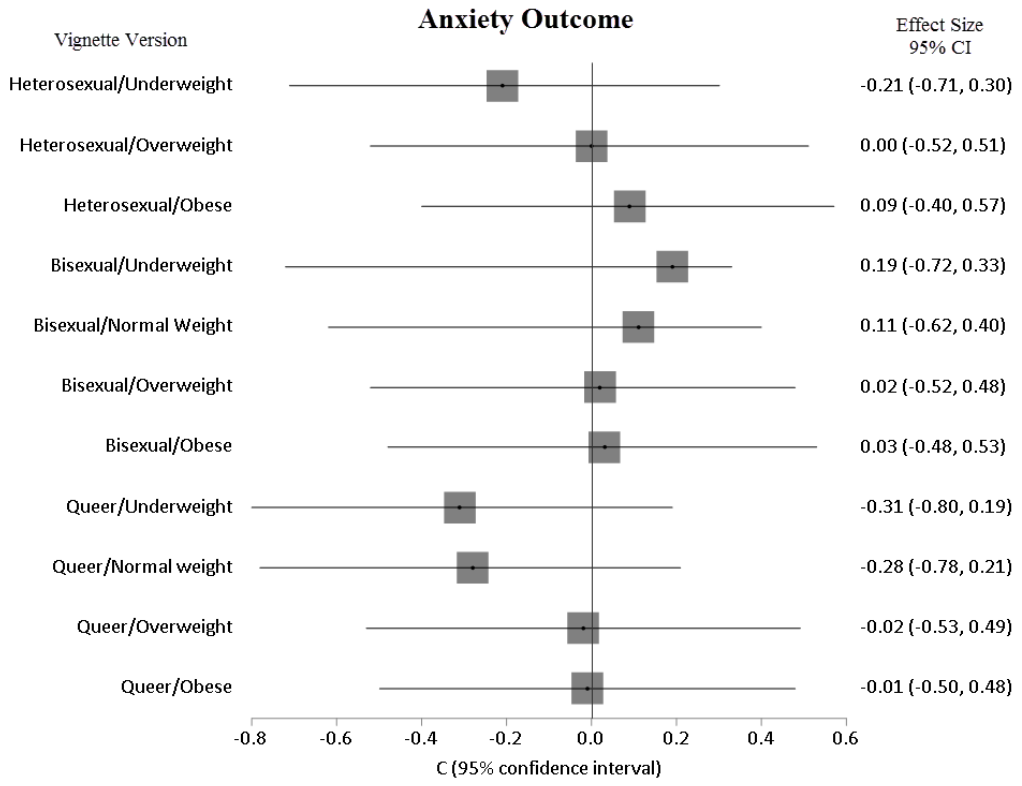

Stress Outcome
Vignette Version
Effect Size
95% CI
Heterosexual/Underweight
-0.42 (-0.87, 0.03)
Heterosexual/Overweight
0.32 (-0.16, 0.79)
Heterosexual/Obese
0.07 (-0.38, 0.51)
Bisexual/Underweight
0.00 (-0.45, 0.46)
Bisexual/Normal Weight
0.07 (-0.38, 0.53)
Bisexual/Overweight
0.37 (-0.08, 0.82)
Bisexual/Obese
0.08 (-0.39, 0.56)
Queer/Underweight
0.12 (-0.37, 0.61)
Queer/Normal weight
0.06 (-0.38, 0.50)
Queer/Overweight
0.00 (-0.43, 0.44)
Queer/Obese
0.14 (-0.31, 0.59)
-0.8
-0.6
-0.4
-0.2
0.0
0.2
0.4
0.6
0.8
C (95% confidence interval)

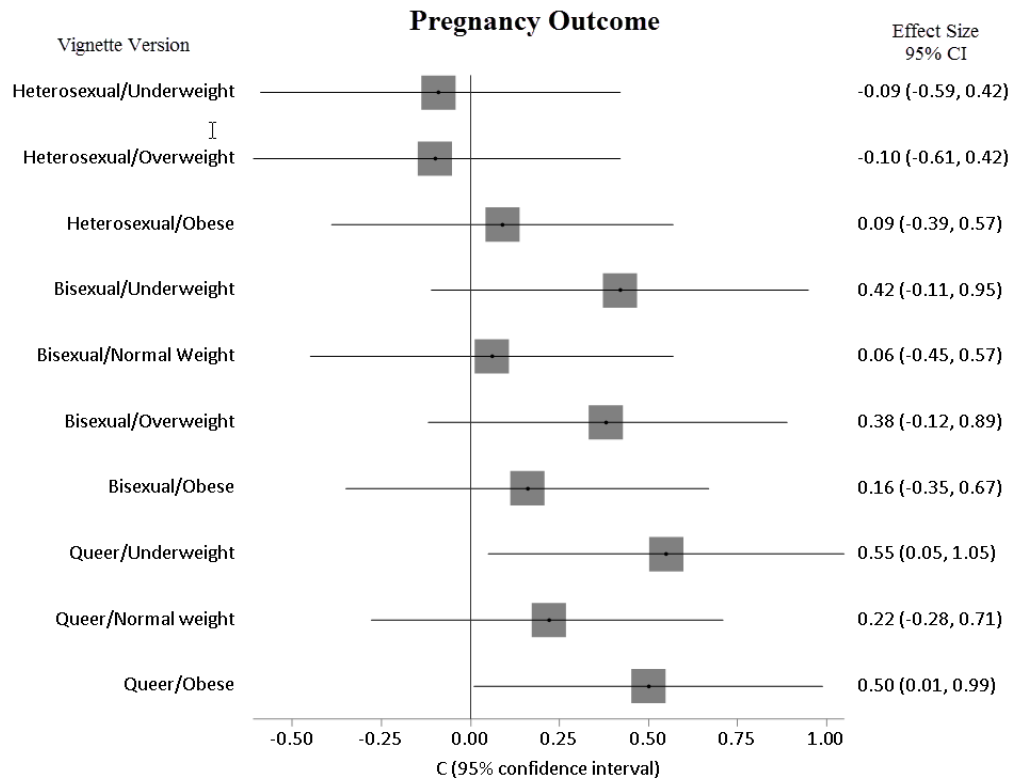
Figure Appendix 2

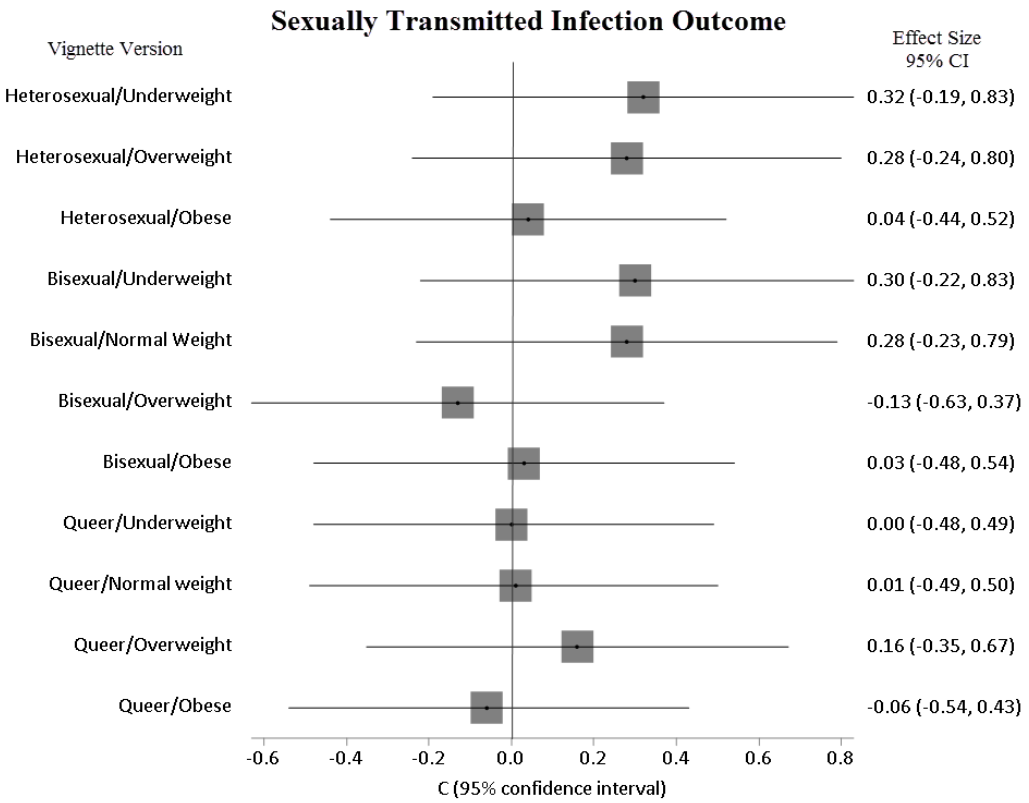
Forest plots featuring effect sizes decision-making responses regarding hypothetical patients with varied weight status and sexual identity in vignettes about urinary frequency (Note: Outcomes below refer to decision-making responses)





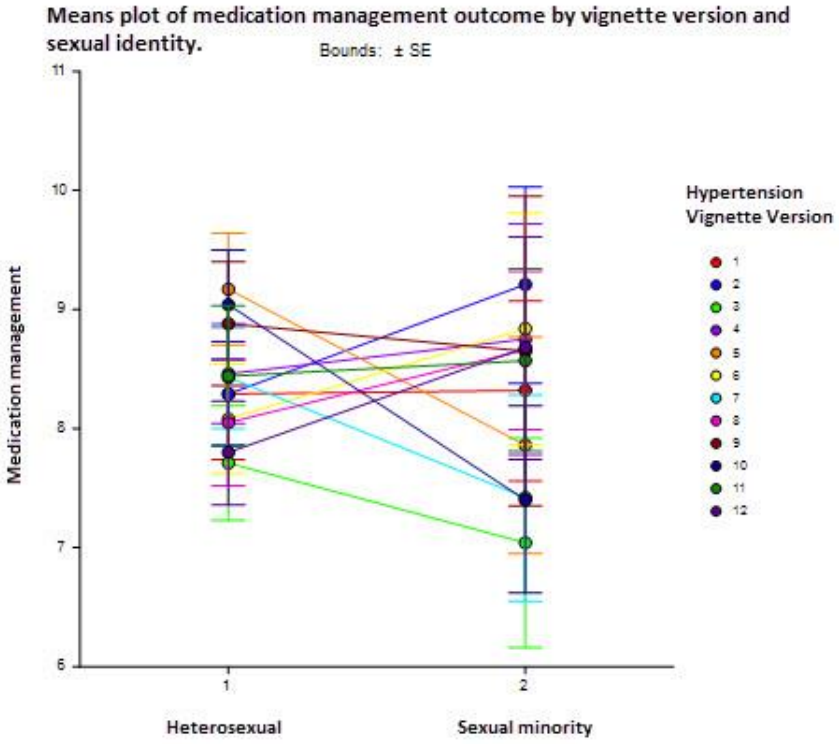

Anxiety Outcome
Vignette Version
Effect Size
95% CI
Heterosexual/Underweight
-0.21 (-0.71, 0.30)
Heterosexual/Overweight
0.00 (-0.52, 0.51)
Heterosexual/Obese
0.09 (-0.40, 0.57)
Bisexual/Underweight
0.19 (-0.72, 0.33)
Bisexual/Normal Weight
0.11 (-0.62, 0.40)
Bisexual/Overweight
0.02 (-0.52, 0.48)
Bisexual/Obese
0.03 (-0.48, 0.53)
Queer/Underweight
-0.31 (-0.80, 0.19)
Queer/Normal weight
-0.28 (-0.78, 0.21)
Queer/Overweight
-0.02 (-0.53, 0.49)
Queer/Obese
-0.01 (-0.50, 0.48)
-0.8
-0.6
-0.4
-0.2
0.0
0.2
0.4
0.6
C (95% confidence interval)

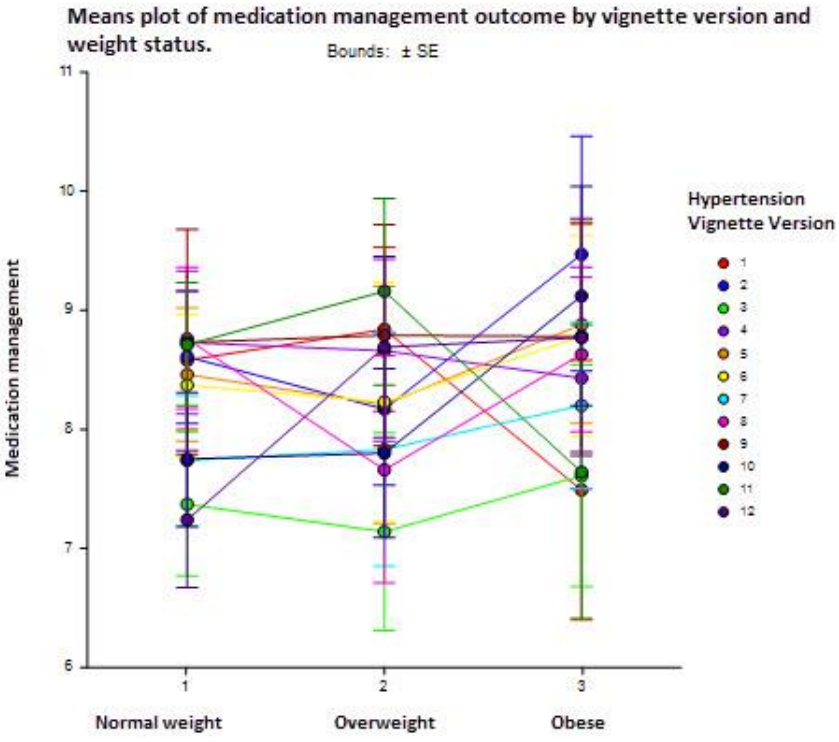

Pregnancy Outcome
Vignette Version
Effect Size
95% CI
Heterosexual/Underweight
-0.09 (-0.59, 0.42)
Heterosexual/Overweight
-0.10 (-0.61, 0.42)
Heterosexual/Obese
0.09 (-0.39, 0.57)
Bisexual/Underweight
0.42 (-0.11, 0.95)
Bisexual/Normal Weight
0.06 (-0.45, 0.57)
Bisexual/Overweight
0.38 (-0.12, 0.89)
Bisexual/Obese
0.16 (-0.35, 0.67)
Queer/Underweight
0.55 (0.05, 1.05)
Queer/Normal weight
0.22 (-0.28, 0.71)
Queer/Obese
0.50 (0.01, 0.99)
-0.50
-0.25
0.00
0.25
0.50
0.75
1.00
C (95% confidence interval)


Sexually Transmitted Infection Outcome
Vignette Version
Effect Size
95% CI
Heterosexual/Underweight
0.32 (-0.19, 0.83)
Heterosexual/Overweight
0.28 (-0.24, 0.80)
Heterosexual/Obese
0.04 (-0.44, 0.52)
Bisexual/Underweight
0.30 (-0.22, 0.83)
Bisexual/Normal Weight
0.28 (-0.23, 0.79)
Bisexual/Overweight
-0.13 (-0.63, 0.37)
Bisexual/Obese
0.03 (-0.48, 0.54)
Queer/Underweight
0.00 (-0.48, 0.49)
Queer/Normal weight
0.01 (-0.49, 0.50)
Queer/Overweight
0.16 (-0.35, 0.67)
Queer/Obese
-0.06 (-0.54, 0.43)
-0.6
-0.4
-0.2
0.0
0.2
0.4
0.6
0.8
C (95% confidence interval)

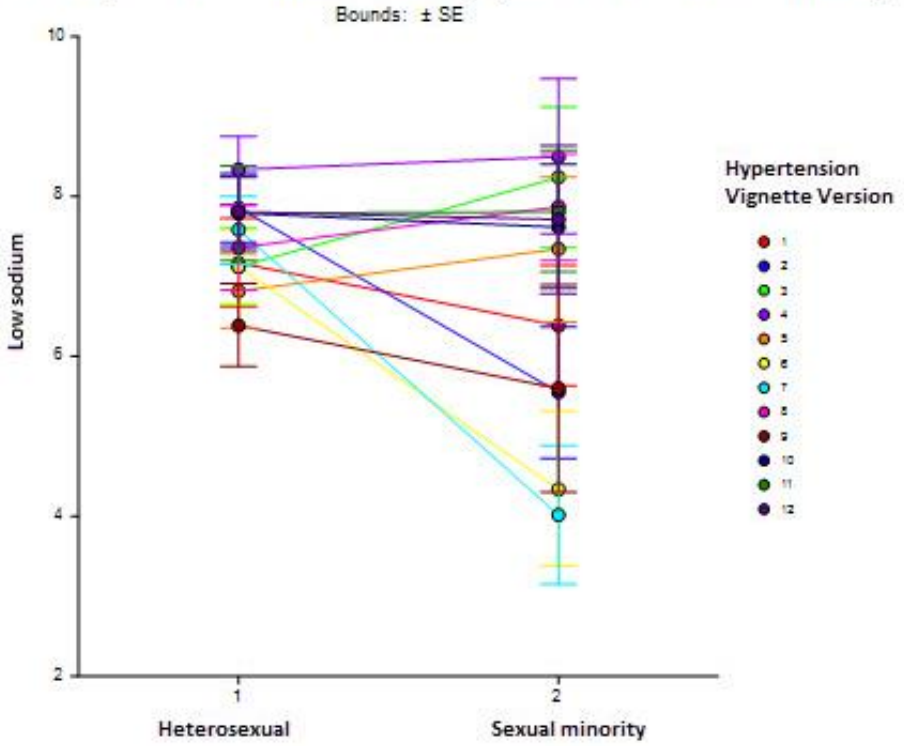
Appendix 3

Means plots of decision-making scores for the hypertension vignettes, demonstrating outcome measures by vignette version and moderating variable

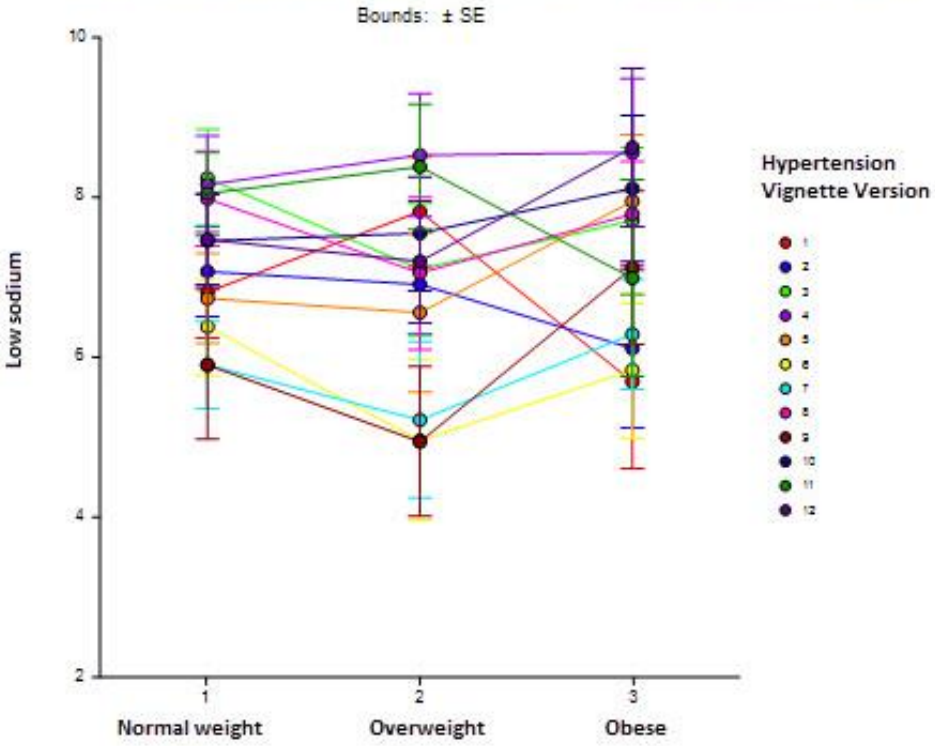




Means plot of low sodium outcome by vignette version and sexual identity.

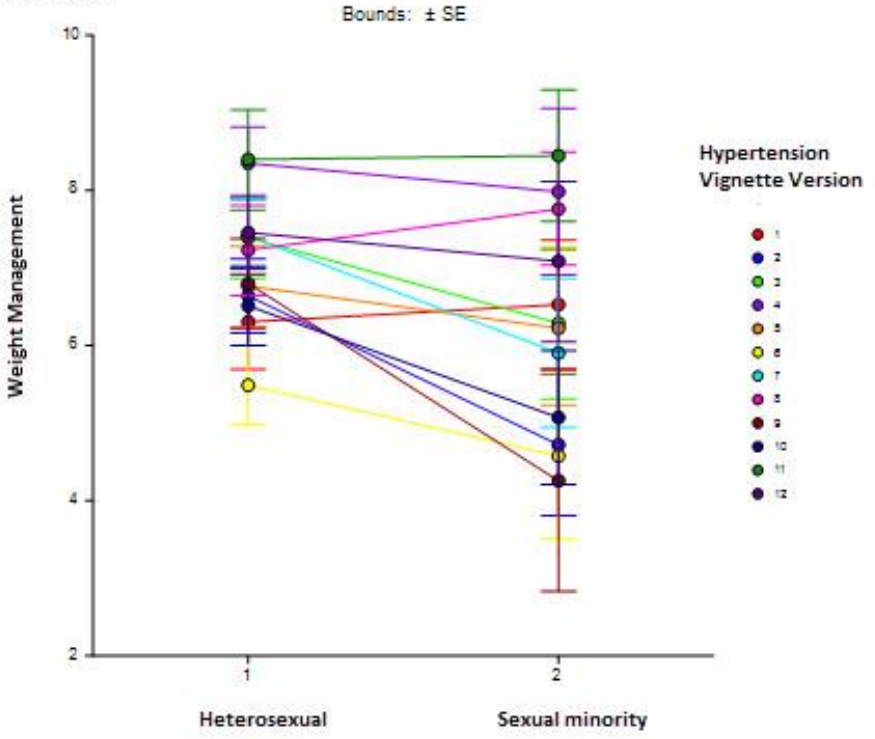


Means plot of low sodium outcome by vignette version and weight status.

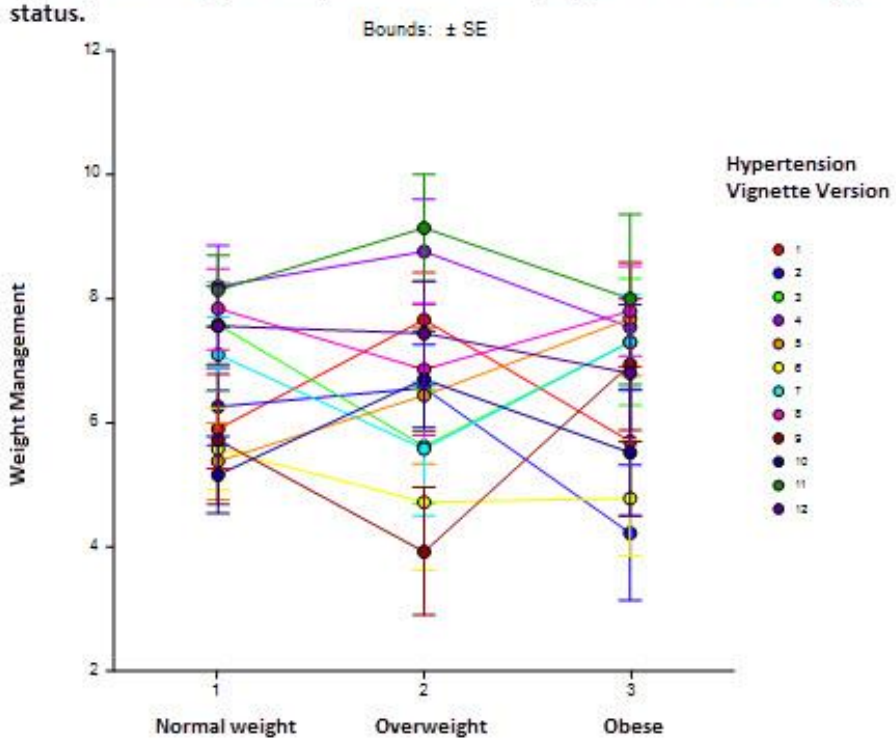


⊥

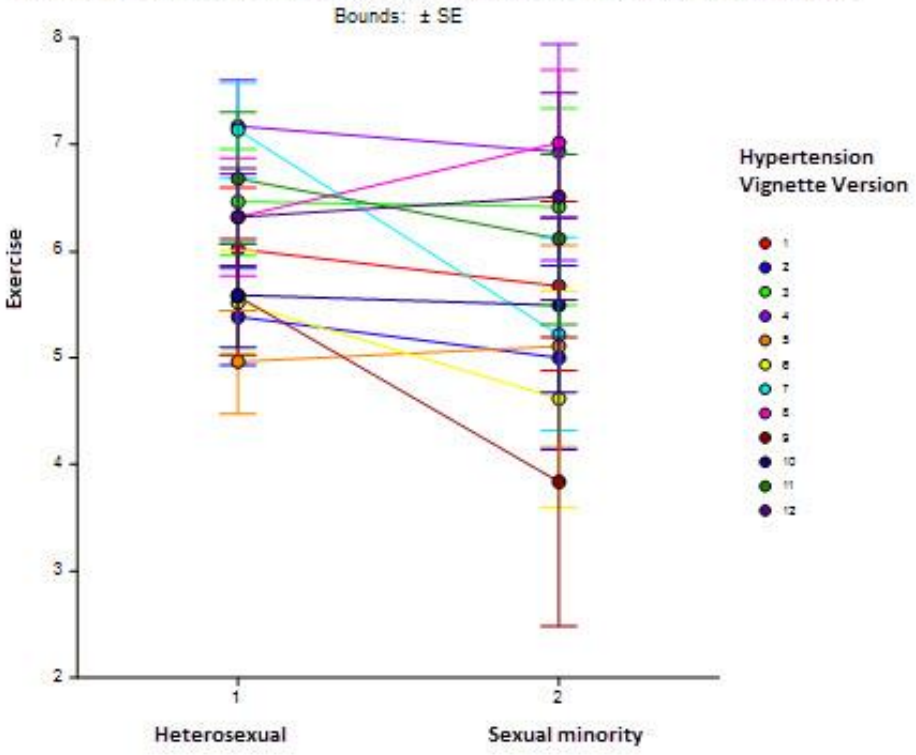
Means plot of weight management outcome by vignette version and sexual identity.



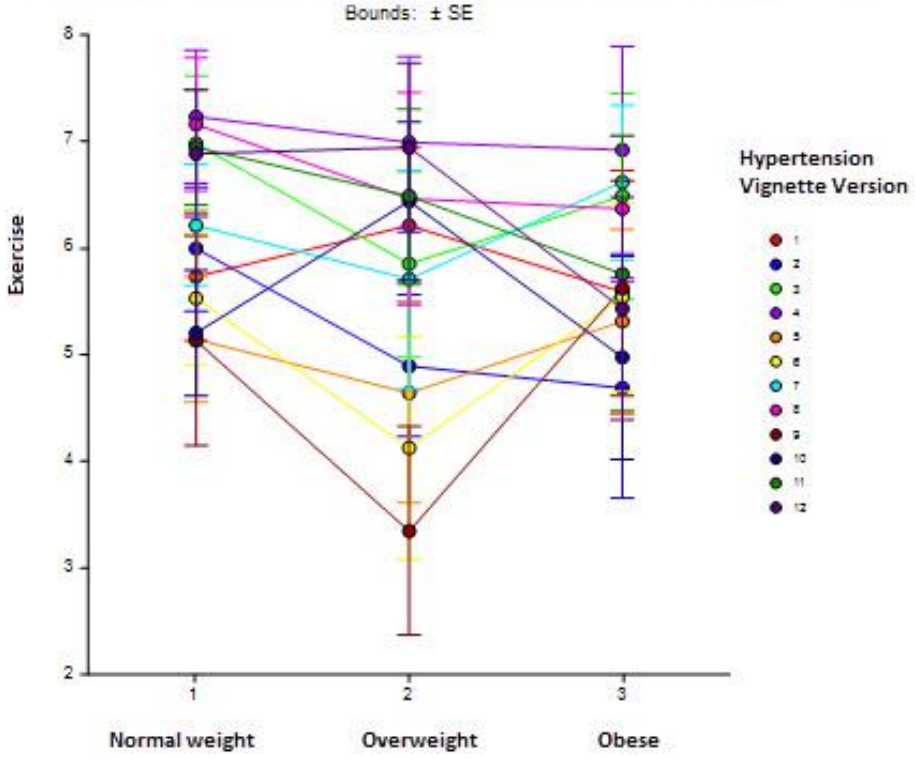
Means plot of weight management outcome by vignette version and weight status.



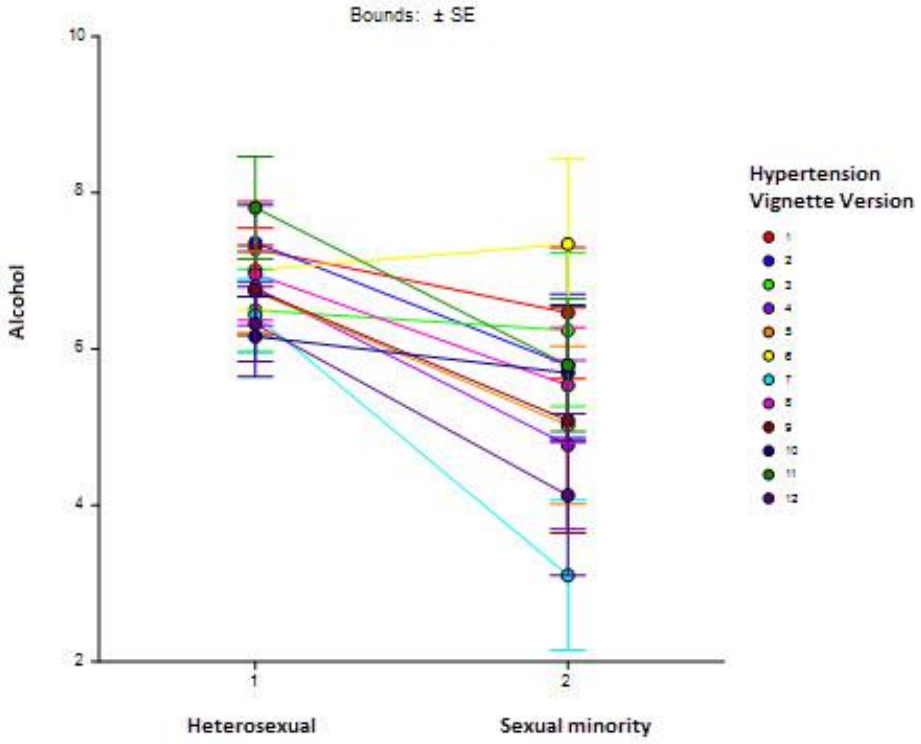
Means plot of exercise outcome by vignette version and sexual identity.



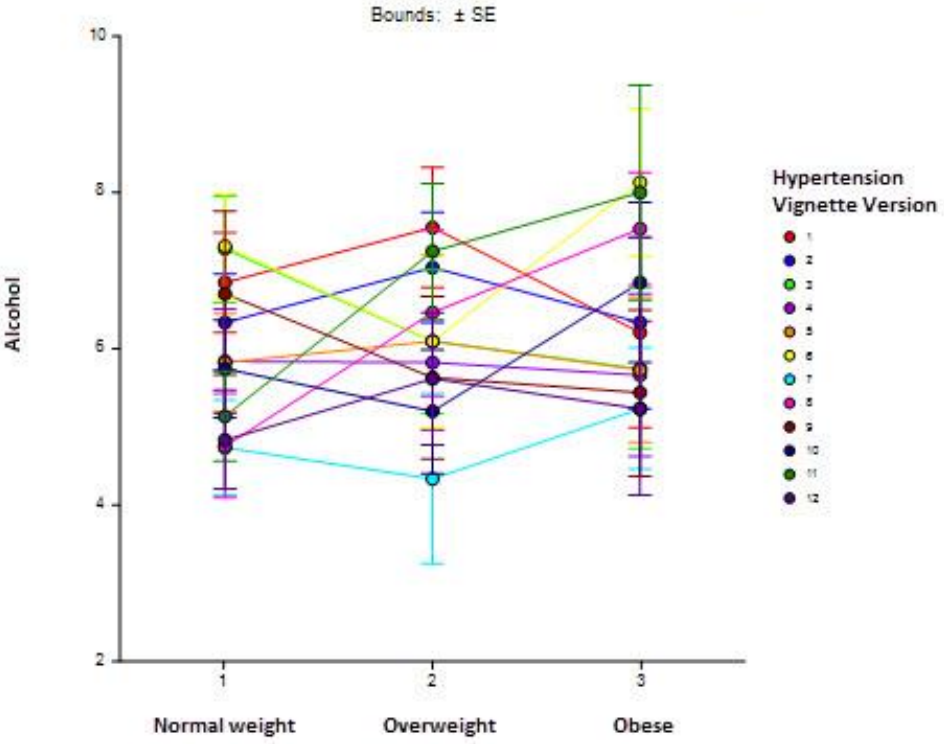
Means plot of exercise outcome by vignette version and weight status.



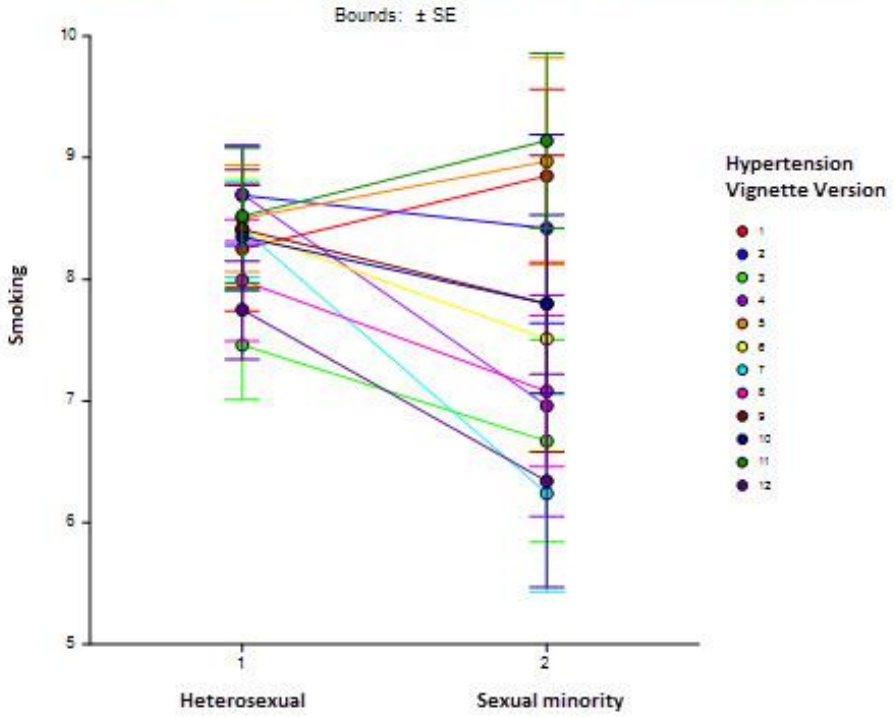
Means plot of alcohol outcome by vignette version and sexual identity.



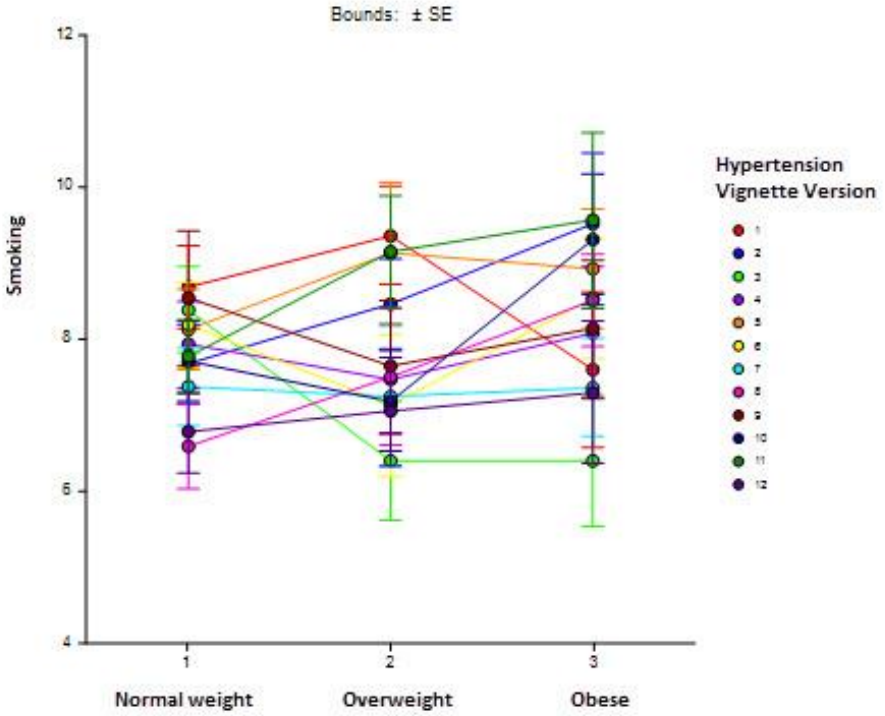
Means plot of alcohol outcome by vignette version and weight status.



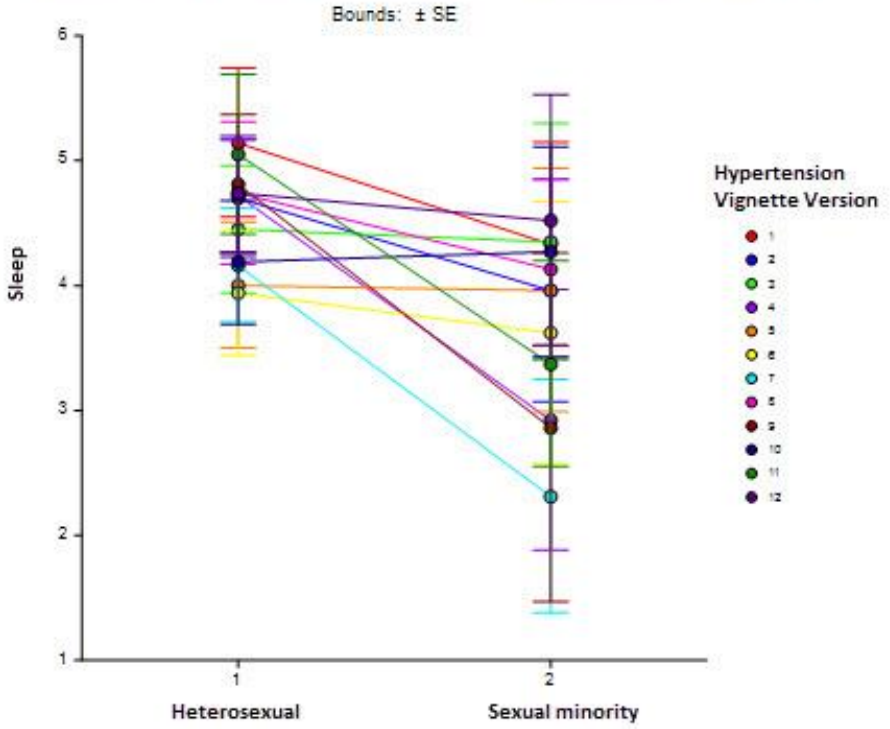
Means plot of smoking outcome by vignette version and sexual identity.



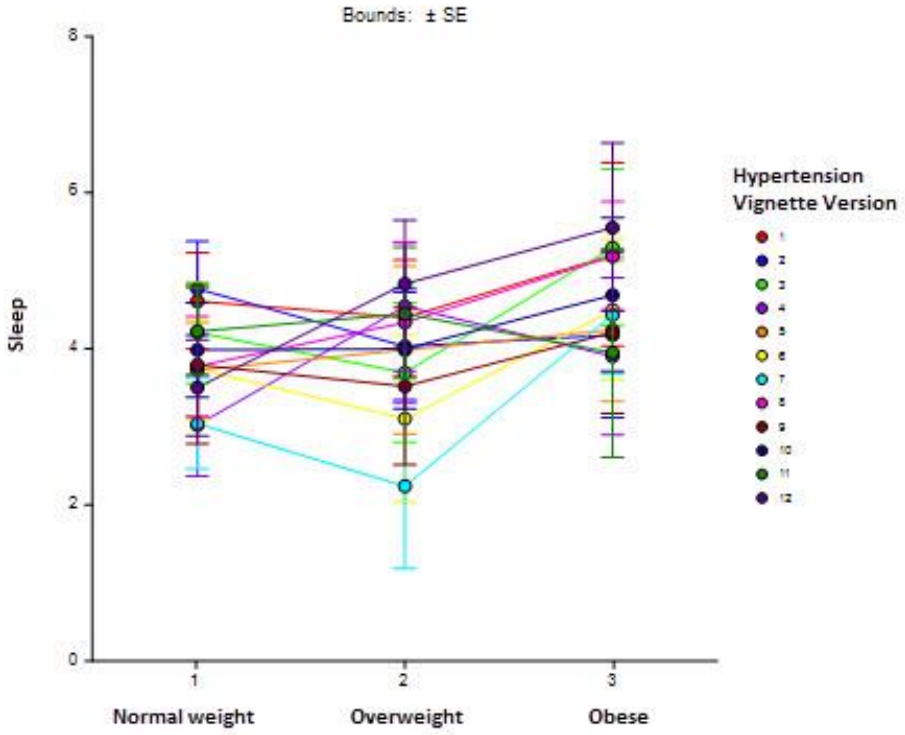
Means plot of smoking outcome by vignette version and weight status.

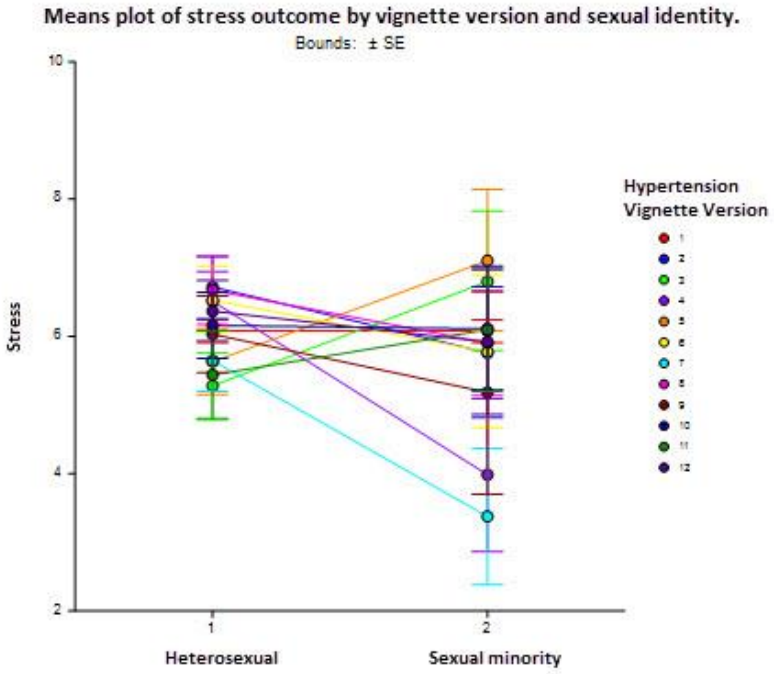


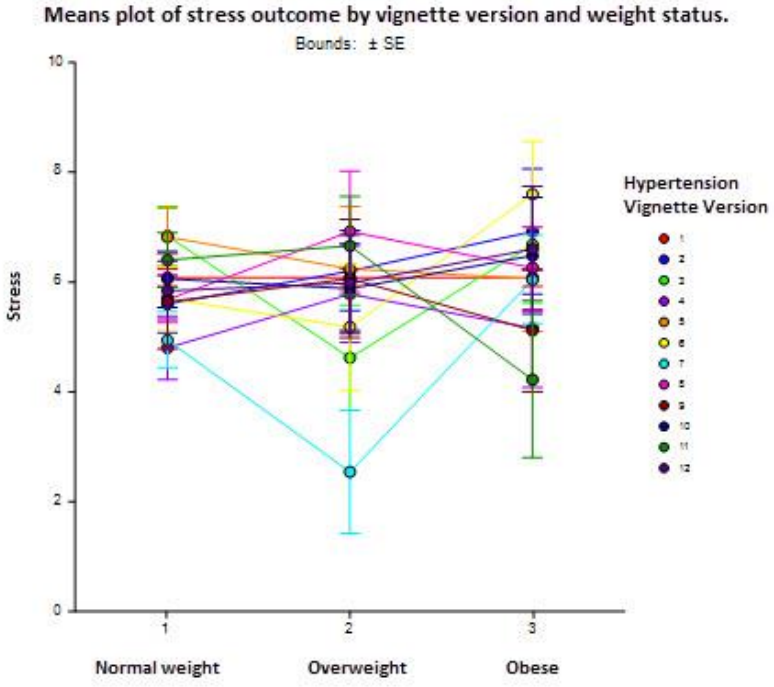
Means plot of sleep outcome by vignette version and sexual identity.



Means plot of sleep outcome by vignette version and weight status.



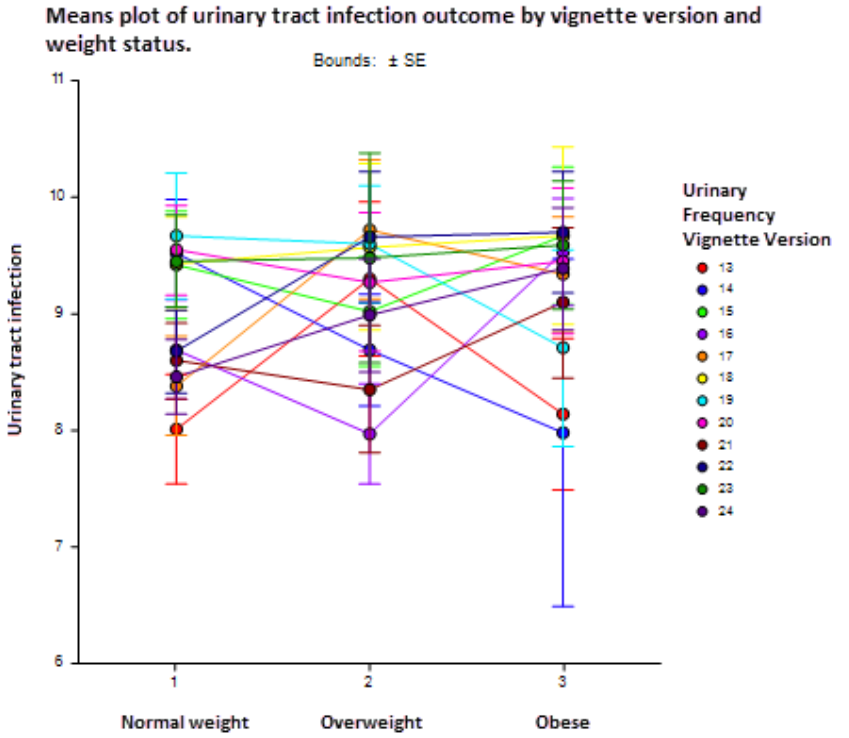


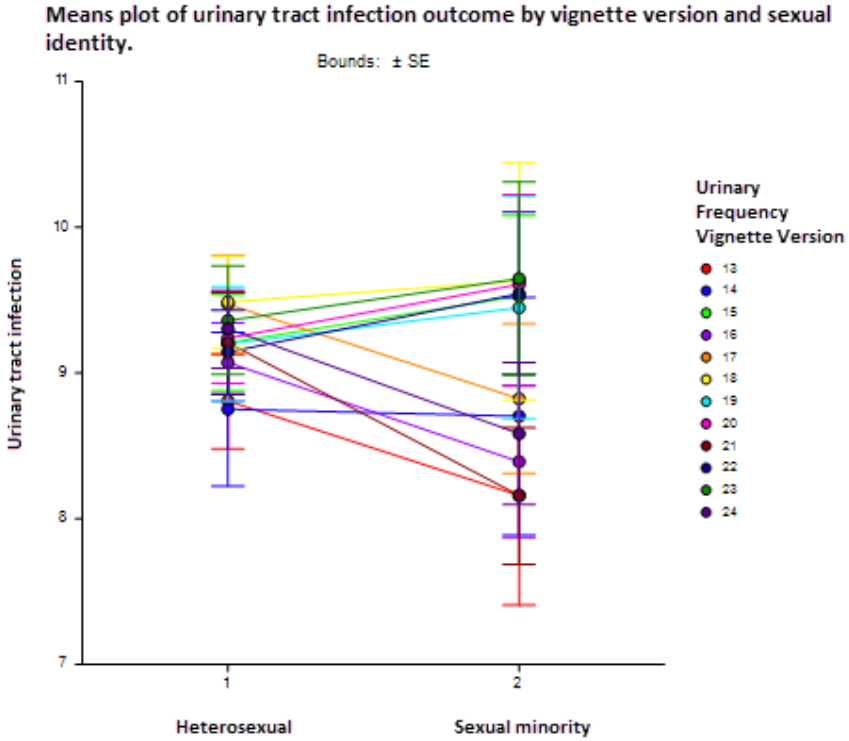


Notes. The underweight participants (n=9) were categorized as normal weight for the sake of these analyses.
Vignette versions are as follow: (1) heterosexual/underweight, (2) heterosexual/normal weight, (3) heterosexual/overweight, (4) Heterosexual/obese, (5) bisexual/underweight, (6) bisexual/normal weight, (7) bisexual/overweight, (8) bisexual/obese, (9) queer/underweight, (10) queer/normal weight, (11) queer/overweight, (12) queer/obese.

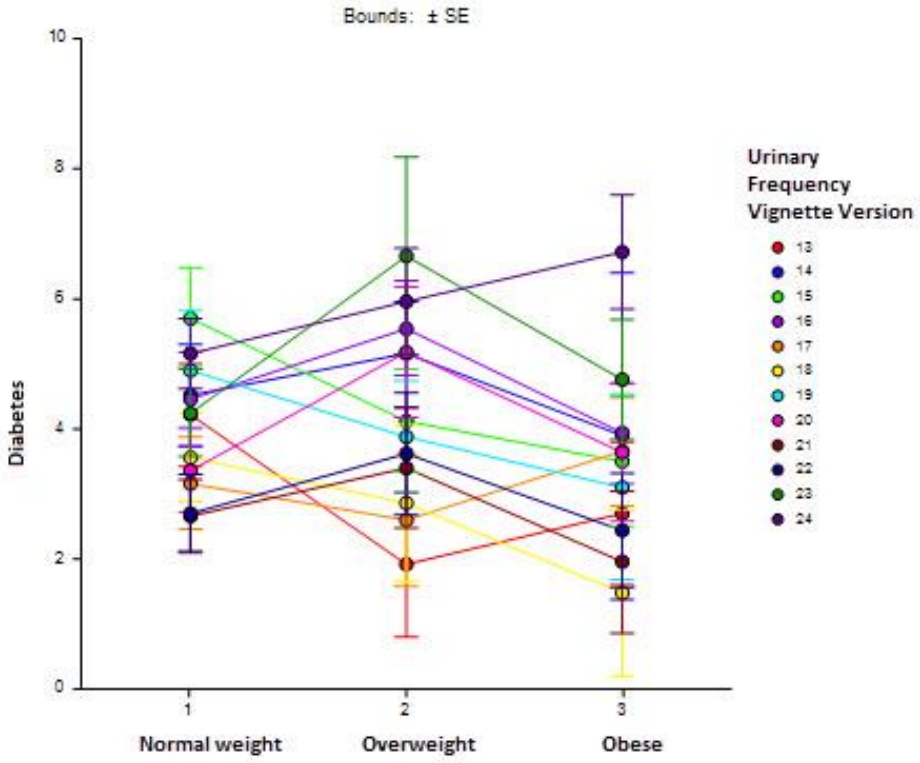
Appendix 4

Means plots of decision-making scores for the urinary frequency vignettes, demonstrating outcome measures by vignette version and moderating variable

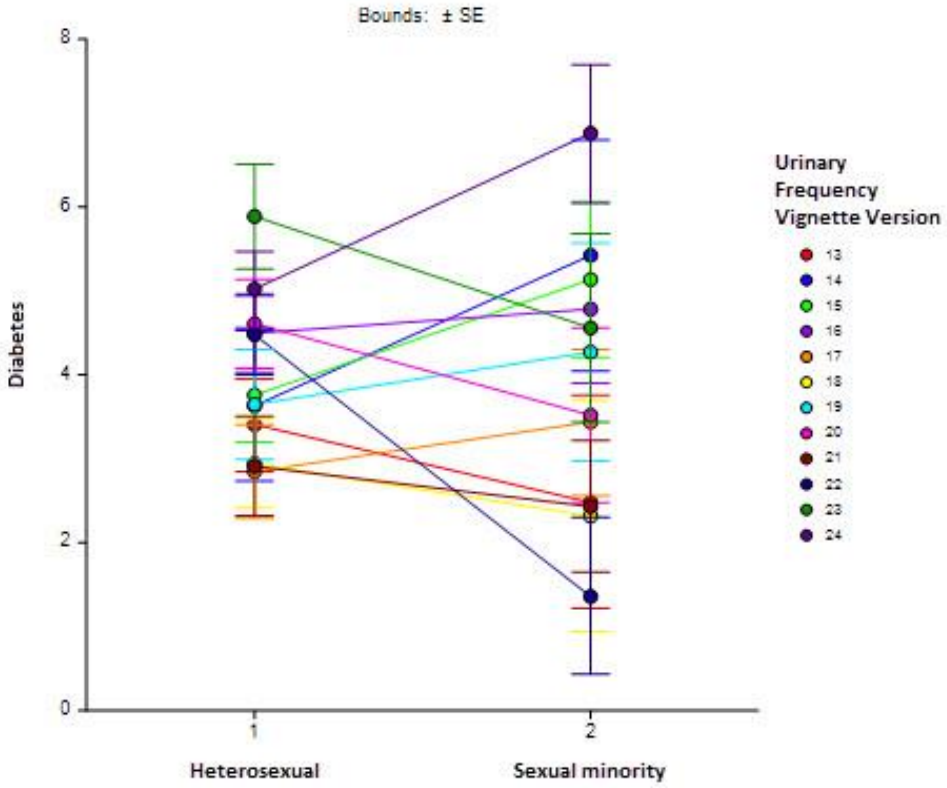




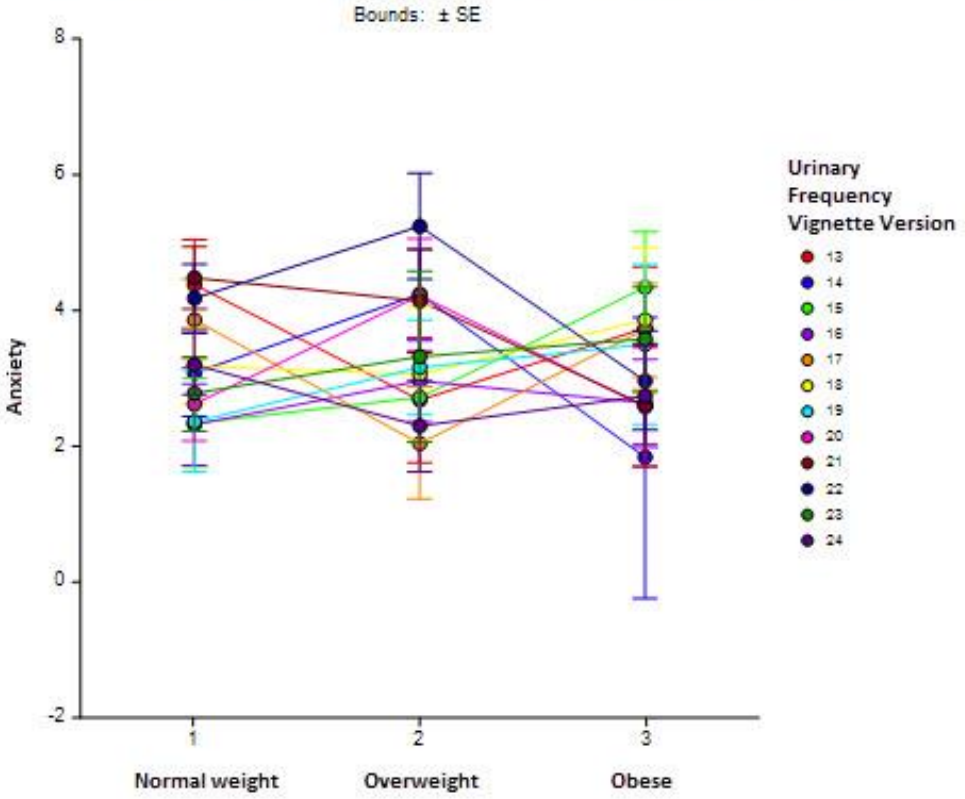
Means plot of diabetes outcome by vignette version and weight status.



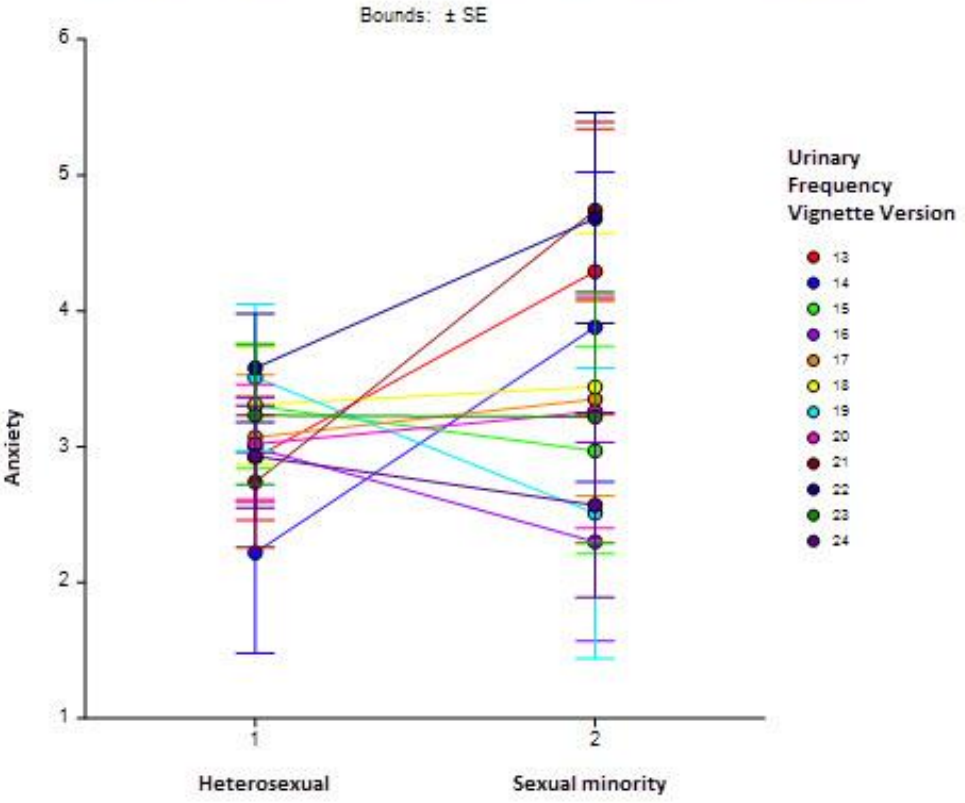
Means plot of diabetes outcome by vignette version and sexual identity.

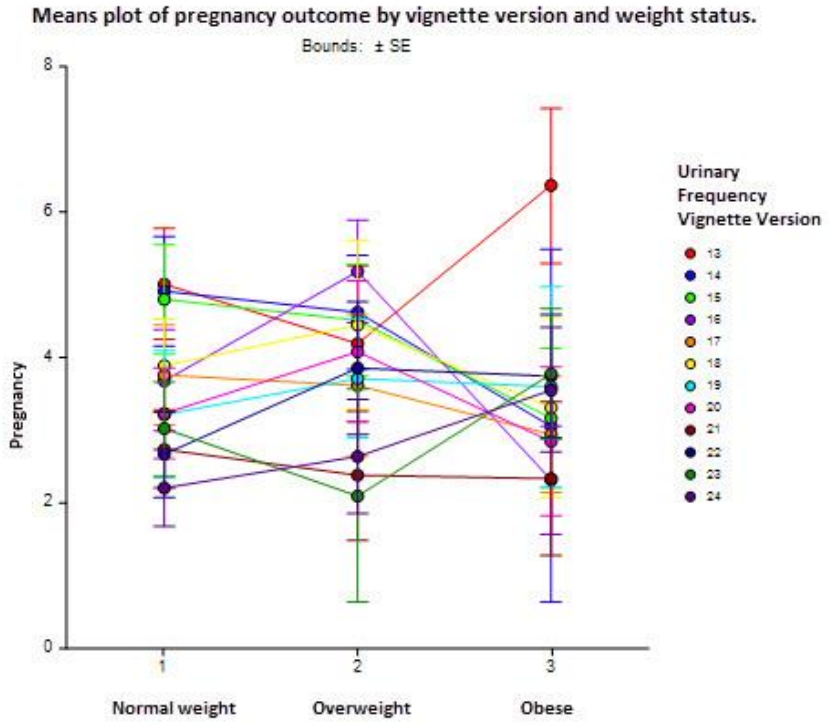


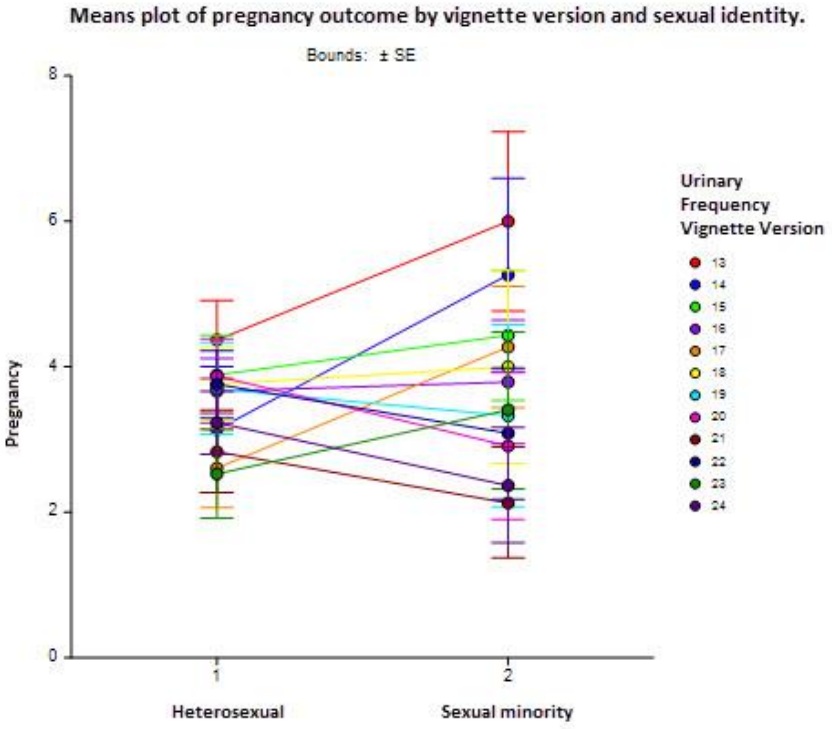
Means plot of anxiety outcome by vignette version and weight status.



Means plot of anxiety outcome by vignette version and sexual identity.







Notes. The underweight participants (n=9) were categorized as normal weight for the sake of these analyses.
Vignette versions are as follow: (13) heterosexual/underweight, (14) heterosexual/normal weight, (15) heterosexual/overweight, (16) Heterosexual/obese, (17) bisexual/underweight, (18) bisexual/normal weight, (19) bisexual/overweight, (20) bisexual/obese, (21) queer/underweight, (22) queer/normal weight, (23) queer/overweight, (24) queer/obese.

CHAPTER 5:

Summary

In Chapter 2 of this dissertation, I summarized the results of a systematic review to examine the characteristics of effective clinical vignettes and corresponding decision-making scores that have assessed bias in clinical decision-making about race, gender, socioeconomic status, sexual orientation, gender, weight, and age. This review was guided by the PRISMA Statement. Prior to conducting this systematic review, Paradies (2014) and colleagues conducted a similar systematic review, only they had focused on race bias, and they compared existing measures to assess clinician bias, including clinical vignettes. My review built on this team's work by extending their assessment to many types of bias. From this review, I identified two gaps: few scholars had conducted experimental studies to assess bias in clinical decision-making among nurses or nursing students, and few scholars had used clinical vignettes to assess weight bias and sexual identity bias. I highlighted three key findings in the discussion: (1) In about one quarter of the included studies, scholars demonstrated significant bias in responses to clinical vignettes, many of which used a vignette about pain or were designed to detect age or weight bias. Researchers who demonstrated moderate bias in responses to vignettes were designed to detect weight bias.

Overall, the authors of the reviewed studies concluded that clinical vignettes that used race as their independent variables detected small to nonexistent levels of race bias among physicians. (2) Vignettes that had corresponding outcome measures that used multiple choice response options appeared to be less effective in detecting bias compared to ordinal scales. (3) There did not appear to be a benefit in detecting bias using a video, photo, or computerized vignette over a written clinical vignette. I used the findings to design my initial clinical vignettes discussed in Chapter 3 and to inform my experiment in Chapter 4.

In Chapter 3, I established content validity for three new written clinical vignettes in an iterative process. Initially, I received feedback on the accuracy of my clinical scenarios (e.g., hypertension diagnosis, etc.) from mentors, including nurses, nurse practitioners, nursing faculty, and experts in

women's health. I finalized initial versions of three clinical vignettes and then subjected them to content validity testing through feedback from a different group of carefully selected content experts in nursing education and bias research. I employed a novel approach to the design of these clinical vignettes because I designed them to vary both weight status and sexual identity simultaneously. I created corresponding response items that were representative of clinical decisions that are expected of nursing students. The responses I generated and tested were new to the field because bias in clinical decision making has not been studied in nursing students. I used Polit & Beck's (2006; 2017) method to obtain data and then to describe the content validity indices for the clinical vignettes, which varied from 0.88 to 1.00. I described the content validity indices of the corresponding decision-making items, which varied from 0.63 to 1.00. Finally, I revised our vignettes and corresponding items based on expert feedback. I used my revised vignettes in the experimental study in Chapter 4.

In Chapter 4, I described the experiment in which I examined whether varying patients' weight and sexual identity statuses in written clinical vignettes influenced nursing students' hypothetical clinical decision-making in comparison to a heterosexual patient with a normal body mass index (BMI). I met the following sub-aims: (1) I tested the combined influences of patient weight status and sexual identity on nursing students' clinical decision-making, (2) I assessed whether nursing students reported explicit and implicit biases, as demonstrated by scores on existing measures, influenced their decision-making responses to vignettes that varied hypothetical patients' weight status and sexual identity, and (3) I examined whether students' self-reported weight or sexual identity moderated their decision-making responses to patients' in vignettes.

Aim 1 results are probably the most interesting and clinically important results from this study. In addition to meeting my aims, I also estimated effect sizes of the vignettes that varied weight and sexual identity of patients on participants' responses to decision-making scores, compared to the referent vignette of heterosexual and normal weight. Generating these effect sizes helped to illustrate

patterns in participants' responses. For example, most of the vignette versions that featured normal weight women had small effect sizes on decision-making, regardless of sexual identity. This suggests that for some clinical decisions, participants' weight was a more crucial factor that influenced their responses, than sexual identity.

For the hypertension vignette, the versions that featured overweight and obese women often yielded large and negative effect sizes, regardless of sexual orientation. I interpreted this to mean that my sample of nursing students were more likely to recommend behaviors regarding weight (e.g., diet, exercise) to overweight and obese women, compared to normal weight and underweight women. This suggests that nursing students believe that overweight and obese people need education about weight management and exercise to aid their hypertension control more so than do to normal weight people.

Regardless of weight status, the woman featured in the hypertension vignette had a new diagnosis of hypertension; nursing students were asked to prioritize patient education for this woman. We observed that mean decision-making scores on most items were higher for overweight and obese patients compared to underweight and normal weight patients. Given very little information about the patient, the nursing students may have had to rely on stereotypes about weight. *A*lthough many people equate weight bias with anti-fat bias, an important part of interpreting weight bias is that people hold subconscious beliefs about normal weight people, too.

For aim 2, I correlated the weight IAT, Fat Phobia Scale, and Modern Homonegativity Scale with clinical decision-making responses to vignettes, controlling for participants' weight, sexual identity, race, gender, age, and ethnicity. Most correlations were weak or non-significant. Based on scatter plots, we saw non-linear relationships for most correlations; this pattern could have limited our ability to detect significant correlations. No scale had a consistently moderate or strong correlation with the responses to decision-making items. Also, the directions of relationships between decision-making scores and other measures (i.e., IAT, FPS, MHS) were often not consistent across type to vignettes. These findings

are consistent with other studies where researchers correlated implicit and explicit bias measures with decision-making among other types of clinicians (Paradies et al., 2014).

For aim 3, I concluded that for most decision-making responses to vignettes, participants' own weight status and sexual identity did not moderate their decision-making scores to vignettes. This contrasts with what I had predicted; that participants' weight status and sexual identity would be (a) significant covariates in analyzing participants' decision-making, implicit bias scores, and explicit bias scores, and (b) would moderate participants' decision-making scores. After consulting with a statistician, I learned that I must interpret my findings for this aim with caution. This is because, in part, several of the decision-making items had multimodal distributions rather than normal distributions. To apply ANOVA, one would want to have outcome variables with normal distributions. If I were to reanalyze the data for this aim, then I would need to identify which items need to be reanalyzed using a model that can consider more than one distribution for a single decision-making score, such as a zip model. The results to this aim could change after I apply another analytic approach.

Future Aims

I plan to use the data I collected in Chapter 4 to pose questions that could make a meaningful contribution to bias literature relevant to health care. I have yet to analyze participants' responses to four feeling thermometers about weight (i.e., explicit feelings about underweight, normal weight, overweight, and obese women). I plan to examine whether either the Fat Phobia Scale (FPS) or weight feeling thermometers are correlated with the weight implicit association test (IAT), and if the weight feeling thermometers correlate with the FPS. Scholars have documented different strengths of correlations between explicit and implicit weight bias measures, but they have also used significantly different samples. For example, Brochu and Morrison (2007) used the weight IAT and several explicit bias measures to examine undergraduate psychology students' (N=76) implicit and explicit weight bias, and they found no significant correlations between explicit and implicit measures of weight bias.

However, other scholars have reported small correlations between the IAT and different explicit weight bias measures in large clinician samples (Sabin, Marini, & Nosek, 2012). Using an online, convenience sample of adults, one team found small correlations between weight feeling thermometers and an implicit weight bias measure; their implicit bias measure was not the weight IAT (Anselmi, Vianello, & Robusto, 2013).

However, these teams used different explicit weight bias measures than I administered in my experimental study about weight and sexual identity biases. As discussed in Chapter 4, scholars continue to be skeptical of the IAT's construct validity because they believe it tests for salience of attributes rather than bias (Rothermund & Wentura, 2004). I think one issue with the weight IAT is that it may measure familiarity with stereotypes about weight rather than weight bias. Yet, it is a widely-used test that demonstrated moderate predictive validity in a meta-analysis (Greenwald et al., 2009). Analyzing the construct validity of my measures could help guide future decisions regarding continued use of the weight IAT in descriptive studies and interventions. Or, perhaps I should consider using a different implicit bias measure because I encountered barriers to administering the IAT cost-effectively, the software is not compatible with all possible user devices, and the construct validity of IATs is questionable.

Using my experimental data, I would like to analyze responses to a third vignette about vaginal discharge and itching. This vignette was followed by eleven decision-making items. I did not include results about this vignette in Chapter 4 because I need to analyze these data differently than I did for the responses to the hypertension and urinary frequency vignettes.

I will also analyze participants' responses to the feeling thermometers about sexual identity that I did not include in my Chapter 4 analyses. I did not analyze these previously because they have limited evidence of reliability and validity, whereas the MHS is a reliable and valid instrument (see Chapter 4 for details on psychometrics). Because there are only three versions of the vignette about vaginal discharge,

rather than 12 versions like the two vignettes discussed in Chapter 4, this means that a lot more participants responded to the vaginal discharge vignette, compared to the other two with 12 versions each. With more participants responding to each version, then there will likely be more variance in participants' demographic factors compared to the other vignettes. This means that if I were to test if sexual identity moderated participants' decision-making responses, then I might have enough sexual minorities responding to these items to have meaningful results.

Writing a separate paper on explicit sexual identity bias among prelicensure nursing students could be a meaningful contribution to the literature because among all bias contexts, sexual identity bias is certainly one of the least researched. Sabin, Riskind and Nosek (2015) recently examined providers' sexual identity IAT scores and explicit sexual identity bias scores, which I summarized in Chapter 4. The team concluded that implicit pro-heterosexual bias (i.e., a positive IAT score meaning they prefer heterosexual people over lesbian or gay people) was pervasive among providers, but their sample endorsed minimal explicit pro-heterosexual bias. I interpreted this to mean that even though most of the sample subconsciously preferred heterosexual people, they rarely explicitly reported that they prefer heterosexual people. Interestingly, I propose that my results may tell a different story. Based on preliminary analyses, the Modern Homonegativity Scale may demonstrate minimal explicit bias against queer women. Yet, I predict the feeling thermometers about sexual identity may demonstrate that even though mean participants' scores for all sexual identities were high (i.e., they reported mostly "warm" feelings about women regardless of their sexual identity), participants' mean scores on the feeling thermometers for heterosexual women were tellingly higher compared to bisexual and queer women.

Future Directions

Over the last two years of engaging with bias research and education initiatives among health care workers, I have noticed that the public has become increasingly aware of the potential influence that subconscious bias has on interpersonal relationships, communities, institutions, and public policy.

Since beginning my dissertation, scholars and media professionals have often discussed the harmful effects of implicit bias among police officers (Schmidt et al., 2017). Perhaps most publicly, during and after a 2016 presidential debate, presidential candidates discussed the merit of implicit bias training for police officers (Powell, 2016). Some scholars remain skeptical about whether this kind of training can mitigate subconscious, harmful behaviors.

Without question, the public currently has an increased awareness of implicit bias and its potential consequences for minorities and other marginalized groups who receive prejudicial treatment from society. Pair this public awareness with scholars trying to understand if clinician bias influences clinical decision-making, and if biased decision-making influences health disparities; I believe that I am beginning my career as an independent researcher at an ideal time to receiving funding and stakeholder buy-in to conduct further research and possibly design bias-reducing interventions for nurses and nursing students.

I hope to develop and implement bias habit-reducing interventions for nursing students. Before I actively pursue developing this type of intervention, I would like to conduct a qualitative study using a sample of prelicensure nursing students as follow-up to my dissertation. I would like to ask follow-up questions about how they believe bias does or does not influence their clinical decision-making. I could use focus groups to allow for a permissive and nonthreatening setting, but I would like to remain open to other possible approaches, such as an observation method because with focus groups, group composition might influence how forthcoming student would be. Scholars have recently suggested that if clinical vignettes do not consistently reveal bias in clinical decision-making, then perhaps an observational design may be a more rigorous and meaningful approach than an experimental design (Dehon et al., 2017; Samuels et al., 2017). Yet, the major limitation of an observational design would be potential social desirability bias.

I will not necessarily make weight and sexual identity bias the sole foci of future bias habit-reducing interventions for prelicensure nursing students. For example, some scholars have found that it is effective to help people recognize bias as a habit and to practice bias-reducing strategies, rather than to focus on educating people about a specific type of bias (Carnes, Fine, & Sheridan, 2015). Yet, continuing to build an understanding of how to effectively examine and reduce these specific types of bias will continue to be a professional interest of mine.

One component of a future intervention could include perspective-taking, compared to a control task, specifically for overweight and obese people. Participants randomized to the experimental intervention would be presented a picture of a person of size and then asked to write a narrative about what it is like for this person to seek healthcare at a primary care clinic. However, the control participants would be instructed to write the narrative through the perspective of the person in the picture. A control group performs the same type of task, but only writes the narrative from their own perspective. Scholars have demonstrated that this type of intervention can improve attitudes towards racial minorities (Vescio et al., 2003), the elderly (Edwards et al., 2017), overweight people (Meadows et al., 2017; Phelab et al., 2017), among others. Empathy training interventions, such as perspective-taking, which scholars often cite as being more effective than strategies that solely aim to reduce anti-fat bias (Meadows et al., 2017). It could be meaningful to pair perspective taking with an intervention to increase in clinical competence in interacting with higher-weight patients (Kushner et al., 2014),

A future direction of mine will be to continue to think critically about which theory or theories could guide my research on bias habit-reducing interventions for nursing students. As previously discussed in Chapter 4, I believe the Social Ecological Model is ideal to guide interventions about weight and sexual identity, separately or simultaneously. Eliason & Fogel (2015) used a social ecological framework infused with minority stress theory to illuminate factors that might cause sexual minority women to weigh more than heterosexual women. Eliason and Fogel explained that weight stigma

combines with other forms of oppression, such as homophobia and racism, and affects sexual minority women's mental and physical health, as well as access to healthcare and health education. I could adapt their social ecological framework, paired with minority stress theory, to guide a future implicit bias intervention about sexual minority women.

Yet, the SEM could not guide all parts of a bias-reducing intervention. If I wanted to change bias behaviors, then I would want to consider theories about motivation and psychological needs. I will also consider other theories that have guided similar interventions. For example, Carnes' team (2015a) used the concept of self-efficacy to teach participants how to overcome gender bias in their intervention aimed at reducing bias in hiring practices in an academic setting.

I believe that incorporating implicit attitudes into theories commonly used in nursing would be innovative and meaningful. Nurse researchers frequently study the attitudes of patients, nurses, and caregivers because numerous health behavior frameworks suggest that attitudes influence behaviors (Manns-James, 2015). However, most nursing researchers assess explicit attitudes, but not implicit attitudes. Additionally, cultural competency training often focuses on explicit characteristics. If nurse researchers were to use an implicit bias measure in studies about nursing decision-making, caregiver behaviors, or patients' health behaviors, then they could investigate implicit bias as a mediator between concepts such as attitudes, self-efficacy, and self-esteem (Manns-James, 2015).

In Chapter 2 through Chapter 4 I engaged with three distinct types of scholarship that are innovative because I identified and filled gaps in bias and nursing literature. In this summary chapter I proposed future directions for my research. In this summary chapter I proposed how I could build on this dissertation in the future and potentially design interventions to reduce bias among nurses and nursing students, thus improving interpersonal interactions between nurses and their patients.

References

Anselmi, P., Vianello, M., & Robusto, E. (2013). Preferring thin people does not imply derogating fat people. A Rasch analysis of the implicit weight attitude. *Obesity, 21,* 261–265. http://doi.org/10.1002/oby.20085

Brochu, P. M., & Morrison, M. A. (2007). Implicit and explicit prejudice toward overweight and average-weight men and women: Testing their correspondence and relation to behavioral intentions. *Journal of Social Psychology*, 147, 681–706.

Carnes, M., Devine, P. G., Manwell, L. B., Byars-Winston, A., Fine, E., Ford, C. E., … Sheridan, J. (2015a). Effect of an intervention to break the gender bias habit for faculty at one institution: A cluster randomized, controlled trial. *Academic Medicine: Journal of the Association of American Medical Colleges*, *90*(2), 221–230. http://doi.org/10.1097/ACM.0000000000000552

Carnes, M., Fine, E., & Sheridan, J. (2015b). Breaking the bias habit: A workshop to promote racial equity in hiring and clinical practice. Retrieved from https://wiseli.engr.wisc.edu/docs/EvalReport_DFM_2015.pdf

Edwards, D. J., McEnteggart, C., Barnes-Holmes, Y., Lowe, R., Evans, N., & Vilardaga, R. (2017). The impact of mindfulness and perspective-taking on implicit associations toward the elderly: A relational Frame theory account. *Mindfulness*, *8*(6), 1615–1622. http://doi.org/10.1007/s12671-017-0734-x

Eliason, M.J. & Fogel, S.C. (2015). An ecological framework for sexual minority women's health: Factors associated with greater body mass. *Journal of* Homosexuality. 62(7). https://doi.org/10.1080/00918369.2014.1003007

Gooblar, D. (2017). Yes, you have implicit biases, too. *The Chronical of Higher Education*. Retrieved from https://www.chronicle.com/article/Yes-You-Have-Implicit-Biases/241797

Manns-James, L. (2015). Finding what is hidden: A method to measure implicit attitudes for nursing and health-related behaviors. *Journal of Advanced Nursing, 71(5),* 1005-1018. https://doi.org/10.1111/jan.12626

Meadows, A., Higgs, S., Burke, S. E., Dovidio, J. F., van Ryn, M., & Phelan, S. M. (2017). Social dominance orientation, dispositional empathy, and the need for cognitive disclosure moderate the impact of empathy-skills training, but not patient contact, on medical students' negative attitudes toward higher weight patients. *Frontiers in Psychology, 8*, 504. https://doi.org/10.3389/fpsyg.2017.00504

Paradies, Y., Truong, M., & Priest, N. (2014). A systematic review of the extent and measurement of healthcare provider racism. *Journal of General Internal Medicine, 29(2),* 364–387. http://doi.org/10.1007/s11606-013-2583-1

Phelan, S. M., Puhl, R. M., Burke, S. E., Hardeman, R., Dovidio, J. F., Nelson, D. B., … van Ryn, M. (2015). The mixed impact of medical school on medical students' implicit and explicit weight bias. *Medical Education*, *49*(10), 983–992. http://doi.org/10.1111/medu.12770

Powell, J. A., (2016). Implicit bias in the presidential debate. Retrieved from https://haasinstitute.berkeley.edu/implicit-bias-presidential-debate

Rothermund, K. & Wentura, D. (2004). Underlying processes in the Implicit Association Test (IAT): Dissociating salience from associations. Journal of Experimental Psychology, General. ***133****, 139–165. http://doi.org10.1037/0096-3445.133.2.139*

Samuels, E. A., Boatright, D., Sanchez, L. D., Heron, S. L., Liferidge, A. T., Wilson, T. , … Burton, J. H. (2017). Clinical vignettes Inadequate to assess impact of implicit bias: Concerning limitations of a systematic review. *Academic Emergency Medicine, 24,* 1531-1532. doi:10.1111/acem.13317

Sabin, J. A., Riskind, R. G., & Nosek, B. A. (2015). Health care providers' implicit and explicit attitudes toward lesbian women and gay men. *American Journal of Public Health*, *105*(9), 1831–1841. http://doi.org/10.2105/AJPH.2015.302631

Sabin, J., Marini, M., & Nosek, B. A. (2012). Implicit and explicit anti-fat bias among a large sample of medical doctors by BMI, race/ethnicity and gender. *PloS one*, *7(11), e48448.* https://doi.org/10.1371/journal.pone.0048448

Schmidt, J., Boyle, T., Vedantam, S., Penman, M… Klahr, R. (2017). The 'thumbprint of our culture': Implicit bias and police shootings. *National Public Radio.* Retrieved from https://www.npr.org/2017/06/05/531578107/the-thumbprint-of-the-culture-implicit-bias-and-police-shootings

Vescio T. K., Sechrist, G. B., & Paolucci, M. P. (2003). Perspective taking and prejudice reduction: The mediational role of empathy arousal and situational attributions. *European Journal of Social Psychology, 33*, 455–472.