AN INVESTIGATION OF MEDICAL TRAINEES' SELF-INSIGHT INTO THEIR CHRONIC PAIN MANAGEMENT DECISIONS

A Thesis

Submitted to the Faculty

of

Purdue University

by

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In Partial Fulfillment of the

Requirements for the Degree

of

Master of Science

December 2013

Purdue University

Indianapolis, Indiana

ACKNOWLEDGEMENTS

I would like to thank Adam T. Hirsh, Ph.D., for his guidance and mentorship throughout this project. I would also like to express gratitude to my committee, Leslie Ashburn-Nardo and Jesse Stewart, and study collaborators, Marianne Matthias and Matthew Bair for their thoughtful feedback and contributions. Additional thanks to Amanda Neufer and Stephanie Middleton for their research assistance.

This research was supported by the Indiana University Collaborative Research Grant (IUCRG) fund of the Office of the Vice President for Research and a Release Time for Research (RTR) grant from the IUPUI Office of the Vice chancellor for Research.

Finally, I would like to thank my fiancé, Cody, and my family for their unwavering support and love.

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ABSTRACT

Hollingshead, Nicole A. M.S., Purdue University, December 2013. An Investigation of Medical Trainees’ Self-Insight into their Chronic Pain Management Decisions. Major Professor: Adam T. Hirsh.

While the majority of chronic pain patients report receiving inadequate care, there is evidence that female and Black patients receive less analgesic medications and treatment for their chronic pain compared to male and White patients, respectively. While treatment disparities have been evidenced in the literature, there is little understanding of provider-factors, such as their decision-making awareness and attitudes, which may contribute to the differences in treatment. This investigation employed quantitative and qualitative procedures to examine the relationship between patient demographics and chronic pain treatment variability, providers’ awareness of these non-medical influences on their decisions, and the extent to which providers’ gender and racial attitudes associate with their treatment decisions. Twenty healthcare trainees made pain treatment decisions (opioid, antidepressant, physical therapy, pain specialty referral) for 16 computer-simulated patients presenting with chronic low back pain; patient sex and race were manipulated across vignettes. Participants then selected among 9 factors, including patient demographics, to indicate which factors influenced their treatment decisions for the simulated patients and completed gender and racial attitude measures. After online study completion, follow-up semi-structured interviews were conducted to discuss the medical/non-medical factors that influence trainees' clinical treatment decisions. Quantitative analysis indicated that 5%-25% of trainees were actually influenced ($p<0.10$) by patient sex and race in their treatments, and on the whole, trainees gave higher antidepressant ratings to White than Black patients ($p<.05$). Fifty-five percent demonstrated concordance, or awareness, between their actual and reported use of patient demographics. Follow-up McNemar's test indicated trainees were generally aware of the influence of demographics on their decisions. Overall, gender and racial attitudes did not associate with trainees' treatment decisions, except trainees' complementary stereotypes about Black individuals were positively associated with their opioid decisions for White patients. During qualitative interviews, aware and unaware trainees discussed similar themes related to sex and racial/ethnic differences in pain presentation and tailoring treatments. We found that (1) a subset of trainees were influenced by patient sex and race when making chronic pain treatment decisions, (2) trainees were generally aware of the influence of patient demographics, and (3) trainees discussed differences in pain presentation based on patients' sex and ethnic origin. These findings suggest trainees' are influenced by patient demographics and hold stereotypes about patient populations, which may play a role in their decision-making.

CHAPTER 1. INTRODUCTION

1.1 Introduction

There are inconsistent findings suggesting that female and Black patients receive less optimal pain management than male and White patients, respectively. While provider-related factors have been hypothesized in the literature, few investigations have examined how these factors may influence providers' chronic pain management. After providing an overview of chronic pain and treatment disparities, I outline the role that provider-related factors (e.g., awareness of decision-making influences, gender and racial attitudes) may play in influencing chronic pain treatment decisions.

1.2 Chronic pain

Chronic pain afflicts 116 million people in the United States, with healthcare costs estimated between $560-635 billion dollars (1). The number of individuals experiencing chronic pain exceeds the number of people with cancer, heart disease and diabetes combined (1). Pain is the number one reason why individuals seek healthcare, accounting for 80% of all physician visits (2). Seventy-one percent of chronic pain sufferers report having seen a physician or other medical professional in the past month, with many patients reporting their pain is undertreated (3).

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage (4). Acute pain is relatively brief, typically has a clear etiology, and is usually treated with pharmacological, physical and surgical treatments, which have high success rates for relieving pain (5). Chronic pain is prolonged and persistent pain experienced for at least three months and is often unsuccessfully treated with physical and medical treatments (5). Acute pain care primarily requires attention to the sensory components of pain, such as intensity, location and temporal characteristics (6). However, in the treatment of chronic pain, additional attention should be devoted to psychosocial and behavioral factors, as chronic pain is often associated with psychological distress and disability (2, 6). Chronic pain may stem from a physical source, but the pain experience and resulting disability often become disproportionate to the original presenting problem (5).

Chronic pain is commonly understood through the biopsychosocial model. Dualistic conceptualizations that the mind and body function separately and independently do not sufficiently recognize the importance of psychosocial factors on the experience of physical problems (2); such recognition is particularly important for chronic pain. The biopsychosocial model focuses on the complex interaction of biological, psychological and social factors (2). Based on this model, chronic pain is optimally managed by focusing on restoring patient functioning through the integration of physical and psychosocial factors related to pain (5). This is reflected in numerous clinical guidelines, which recommend treating chronic pain with pharmacological (e.g., opioids, NSAIDS, antidepressants) and non-pharmacological treatments (e.g., physical therapy, diet/exercise; 7, 8-12). Nevertheless, treatment recommendations vary across guidelines (13, 14), and perhaps because of this complexity, chronic pain patients often report poor pain management (3).

1.3 Medical training for chronic pain treatment

Currently there is a lack of training for chronic pain management in medical schools and residency programs in the United States. A 2011 survey of 104 US medical schools found that only 48 taught chronic pain, with an average of 0.5 lecture hours spent on this topic (15). This is striking given the prevalence of chronic pain and treatment utilization estimates (1-3).

This lack of training translates into a skill deficiency for providers. Across all specialty areas, graduating residents report feeling unprepared to treat chronic pain patients due to inadequate training (16). A survey of Internal Medicine and Family Medicine residents across US programs reported low levels of preparedness to treat low back pain (17). Chronic pain training deficiencies are not addressed after residency, with half of primary care physicians sampled reporting they felt “somewhat prepared” to counsel their patients about pain and a quarter felt “somewhat unprepared” or “very unprepared” (1, 18). Furthermore, physicians report insufficient training in opioid use as a barrier to following pain management guidelines (19).

1.4 Difficulties in treating chronic pain

Although healthcare providers see a higher percentage of chronic than acute pain, they report feeling less confident, less satisfied with patient interactions, and setting lower goals for chronic pain management than other types of pain (20). Sampled providers describe working with chronic pain as “frustrating” as they believe patients will never achieve pain relief (21-23). Chronic pain treatment is further complicated due to providers’ fears of patients becoming dependent on or abusing opioid medications (24). Negative attitudes about chronic pain and some of its treatments result in provider suspicion of pain reports (21, 22).

When no clear etiology or source of pain is present, as is often the case with chronic pain, healthcare professionals rely primarily on patients’ subjective reports (1, 18, 25). These reports vary based on the psychosocial factors experienced by each patient (8). Communication of the pain experience is often challenging as the patient and provider may have different languages, experiences, expectations, and frames of reference that influence their pain perception (6).

Medical providers and trainees report the subjective nature of pain complicates treatment decisions, especially when no objective pain source is identified (26). Healthcare providers often view chronic pain as a symptom of underlying pathology, rather than a primary problem deserving of treatment on its own right (1, 6). This is evidenced by providers extensively searching for an objective source of pain, resulting in patients being over-imaged and over-diagnosed (5). This diagnostic pursuit increases the likelihood of false-positive tests, commonly leading to an inaccurate diagnostic label that may be difficult to remove and contribute to the mismanagement of pain (5).

The lack of objective evidence is one reason why healthcare providers hold negative attitudes and misconceptions about chronic pain and its treatment (27). For instance, healthcare providers have been shown to use more sympathetic language and acknowledge patient suffering when pathology of pain has been identified than when no clear cause has been identified (21). The compounding factors of insufficient training and treatment difficulties result in pain assessment and treatment decisions that are vulnerable to provider attitudes and non-medical patient factors (28).

1.5 Treatment disparities evidenced in pain management

Patient demographic characteristics have been shown to influence pain assessment (29-35), which may result in suboptimal pain management and health disparities for certain patient populations. Health disparities are defined as differences in health outcomes and treatments between segments of the population, typically based on demographic attributes (36). Disparities have been reported in the literature for female and Black chronic pain patients.

1.5.1 Treatment disparities for female chronic pain patients

Women are more likely to report experiencing pain than men, with an increased prevalence of multiple pain syndromes (37-41). However, fewer women have adequate pain management as compared to men (42). For both acute and chronic pain, women are more likely than men to receive a non-specific, somatic diagnosis and be treated less extensively for their pain, even when presenting with the same severity of symptoms (43, 44). For example, Safdar et al. (2009) found that male patients were more likely to be administered opioid medication in the emergency room than female patients experiencing either acute or chronic pain (45).

Treatments may be influenced by providers' beliefs that men and women experience pain differently. The differences between gendered and biological pain responses should be noted. Biological differences refer to the physiological differences between men and women, while gender differences refer to the social construction of gender roles assigned to individuals based on their presenting sex (46). There is some evidence to suggest that, biologically, women may be more sensitive to pain than men, and pain response may fluctuate based on their menstrual phase (38, 47, 48). However, there is inadequate empirical evidence supporting treating patients differently based on their biological sex (38, 49-53). Psychological and social variables related to gendered response of pain may explain more of the variance between men and women's pain experience than biological differences (38, 54).

Gender differences exist in the presentation of pain. Women often describe their pain in "non-specific" terms, such as reporting the psychological impact of pain and failing to report a source for their pain. Men more often attribute pain to an etiology and describe events surrounding pain (55). Women also are more likely to use catastrophizing as a coping mechanism (i.e., focusing on the most extreme negative consequence), which has been shown to predict higher levels of disability and poorer quality of life (56-58). Gender differences in presentation may be part of the reason why women are more likely to receive a nonspecific, psychosocial diagnosis across a variety of health domains and are more likely to be treated with antidepressants than males (43, 59). In fact, laypersons of both genders expect females to be more willing to report pain and be more sensitive to pain (37, 60-65). There is inadequate research regarding treatment differences between men and women for non-pharmacological pain treatments (e.g., physical therapy and referral to a pain specialist).

1.5.2 Treatment disparities for Black chronic pain patients

Pain treatment disparities exist between individuals of different races and ethnicities. While race and ethnicity are often the combined focus of health disparities literature, they are different constructs. Race refers to a person's ancestry and is used to differentiate populations related by blood, common descent, or heredity (51). Ethnicity often encompasses race but also refers to characteristics related to social, psychological, cultural, and political aspects (66).

Most of the literature on pain disparities has focused on race differences, with Black patients often reporting poorer pain management than White patients. Dobscha et al. (2009) found that Black patients were less likely to rate their chronic pain treatment as "very good" or "excellent" as compared to White patients (67). Providers' treatments are influenced by race, as there is evidence that Black patients receive fewer opioids than Whites for their pain (42, 68-74). Even when Black patients sampled had significantly higher chronic pain scores compared to Whites, they were less likely to be prescribed opioid medications (75). Heins et al. (2006) found that White patients were 1.8 times more likely to receive opioids than Black patients presenting with acute or chronic pain in the emergency department (76). Opioid treatment differences between Black and White patients exist even after controlling for age, pain site, socioeconomic status (SES), and insurance (74, 77).

A relatively smaller literature also indicates that treatment disparities between Black and White pain patients expand beyond differences in opioid medications. A recent meta-analysis examining a variety of pain treatment types found that Black patients were undertreated across all analgesic medications (e.g., opioids and non-opioid/nonsteroidal anti-inflammatory drugs [NSAIDS]) and were 22% less likely than White patients to receive any analgesic medications (78). Retrospective chart-reviews of chronic and acute pain found Black pain patients received fewer analgesic medications and less aggressive management as compared to White pain patients (74, 79, 80). These treatment disparities were not explained by differences in symptom severity as Black patients sampled reported similar, and in some cases greater, pain levels than White patients (79, 80); these results suggest that treatment differences are not explained by providers' inability to accurately assess pain severity across patient race (81). A survey of chronic pain patients found White patients were more likely than Black patients to report receiving physical therapy (PT); however, it is unclear if this difference is a result of providers recommending PT less for Black patients or patient-related factors (e.g., access to PT; 75). This same chronic pain survey found no racial difference in utilization of a pain specialist (75). There is inadequate research regarding treatment disparities for antidepressant medication for pain management; however, Black patients have been found to receive less antidepressant prescriptions than White patients for depression (82).

The under-treatment of pain is striking given that Black individuals are more likely to experience pain and to face resulting decreased quality of life and disability (83-87). There is some evidence to support that Blacks have lower pain tolerance than Whites (65); however, the pain response has been shown to be mediated by high rates of chronic stress that Blacks face due to discrimination (88). Access barriers exist for Black chronic pain patients with one out of five Black individuals classified as uninsured and living below the federal poverty line (36). This decreased access to care results in higher rates of poor general health, which has been shown to moderate pain tolerance and the pain experience (58, 89). These findings are contrary to laypersons' perceptions that the typical Black person is less sensitive to pain and less willing to report pain than the typical White person (65). Every day stressors, cultural misconceptions, and decreased access to care, may account for higher rates of disability and poorer functioning for Black chronic pain patients (85, 90). Further research is needed to understand why Black chronic pain patients receive less adequate pain management as compared to White patients.

1.6 Influence of patient demographics on decision-making

The aforementioned research on sex and race disparities in pain management has been largely observational in nature. There are few true experimental studies that manipulate patient variables to determine their influence on pain management decisions. Across several vignette studies, the most influential factors on pain assessment were patient-reported pain intensity and facial expression of pain (31, 32, 34, 35). Nevertheless, there is evidence from experimental studies that providers use other factors, including patient demographics, when making pain assessment ratings (29, 30, 32-35). Numerous vignette studies have found that both laypersons and healthcare providers rate female patients as experiencing higher pain intensity (29, 31, 32, 34, 35), greater pain unpleasantness (29, 31, 32, 34), more negative mood (29, 31, 34), and poorer coping than male patients (29, 31, 34). In these studies, Black patients were rated as having higher pain intensity (32, 34, 35), more pain unpleasantness (32, 34), and better coping (29) than White patients. Patient sex and race accounted for between 0% and 23% of the variance in laypersons' and nurses' pain assessment decisions (32, 34). Several of these studies also found considerable individual variability in both the size and direction of these effects, suggesting a need for additional research to better understand the provider factors that are associated with pain decision-making for diverse patients.

Although patient demographic influences on providers' pain perceptions have been cited in the literature, there are few experimental studies investigating the extent of sex and race influence on different treatment decisions for pain management. Vignette studies found that laypersons and healthcare trainees were more likely to recommend medical help for female and Black patients experiencing chronic pain (31, 32, 34, 35); however, "medical help" was not further clarified. Two other studies used true experimental methods to manipulate patient sex and race in order to examine the extent of patient demographics' influence on specific pain treatments. Tamayo-Sarver et al. (2003) found physicians were not influenced by vignette patients' race/ethnicity when recommending opioid treatment for patients presenting with either acute or chronic pain (70). However, this investigation presented participants with only 3 text-based vignettes (1 White, 1 Black, 1 Hispanic) and did not examine other commonly used analgesic medications, which calls into question the ecological validity and generalizability of their findings. Hirsh, George, & Robinson (2009) found that nurses were influenced by vignette patient sex and race when deciding to administer an opioid or a non-opioid treatment for acute pain, with more nurses being influenced by patient demographics for opioid treatments. On average, these nurses were more likely to prescribe an opioid medication to female and Black patients than male and White patients with acute pain (32). Individual differences in the size of these effects were again observed. For some nurses, the sex and race influences were substantial – accounting for as much as 30% of the variance in treatment ratings – whereas for others, these factors did not significantly influence their decisions (32). Moreover, these results differ from those of several observational studies reviewed previously. Further research examining patient sex and race influence on chronic pain treatment decisions may help account for this individual variability and clarify some of these contradictory findings.

Given the public health significance of chronic pain in the US, as well as the (somewhat inconsistent) findings of sex and race disparities in pain treatment, further investigation of patient sex and race influences on chronic pain management is needed.

Research is also needed to better understand how provider factors, such as their attitudes and decision-making awareness, influence their clinical decisions for diverse patients. Investigation into the provider factors that contribute to treatment disparities will enhance understanding of clinical decision-making and inform chronic pain training curricula.

1.7 Social Judgment Theory

In order to understand factors that may contribute to treatment disparities, it is important to understand how healthcare providers and trainees make clinical decisions. Social Judgment Theory (SJT) provides a framework for understanding the process of clinical decision-making (91-93). Research using SJT has found clinicians make decisions differently than they report, which suggests they lack full awareness about their clinical decision-making process (33, 92, 93). According to SJT, most clinical decisions are quasi-rational judgments, which is an area in a theoretical judgment spectrum that lies between analytic judgments (i.e., judgments are certain; based on known rules and application of knowledge) and judgments based on intuition (i.e., judgments are uncertain; influenced by numerous factors and each decision has many possible outcomes; 93). SJT is well-suited for providing insight into these quasi-rational judgments as it recognizes that a decision is rarely fully informed and is based on multiple variables and information (94).

This theory proposes that there are differences in the way that healthcare providers use information to guide decisions (93). Providers' decisions are guided by multiple sources of available information (termed proximal cues in the SJT framework; 94). For example, Wigton (1996) observed that the decision to prescribe an antibiotic for a patient's sore throat involved fifteen cues, such as fever, swollen nodes on neck, and patient preference for treatment. The influence of these proximal cues on providers' decisions will vary between contexts and providers; this influence is determined by a provider's attention to and weighing of the information presented in the environment (93, 94). Thus, different providers may make different decisions for the same clinical situation (93, 94).

Even when established treatment guidelines are available, research has shown that there is a wide variation in healthcare providers' decisions and information used to inform their judgments (92). In a vignette study, Smith, Gilhooly & Walker (2003) found that patients presenting with or without several symptoms of depression elicited considerable individual variability in physicians' prescription of an antidepressant (91). Low levels of agreement indicate either little consensus about best treatment or that decisions are more dependent on clinicians' idiosyncratic habits and preferences (91). These idiosyncrasies between providers have not been fully identified, but would provide further information regarding influences on provider treatment decisions in general and for chronic pain management in particular. As clinicians are often unsure about the optimal treatment of chronic pain (20), it is important to understand how clinicians' own predispositions may be guiding chronic pain treatment decisions.

Further insight into providers' decision-making process may help clarify the role of patient demographics in chronic pain management. As evidenced by previous work in this area [see Hirsh, George & Robinson (2009)] and the tenets of SJT, not all healthcare providers sampled will be influenced by patient sex and race. Moreover, the nature of these influences may differ across providers. Thus, it may be beneficial to examine provider factors that are hypothesized to play a role in this context, such as providers' awareness of their decision-making process and their attitudes about sex and race.

1.8 The role of awareness and attitudes on clinical decisions

A recent review of the literature revealed a gap in identifying factors that contribute to treatment disparities and noted the need to better understand clinical decision-making and the role of stereotyping and bias (28). A better understanding of how providers' decision-making and attitudes may contribute to health disparities can highlight areas for training to help diminish these differences (43).

1.8.1 Role of providers' awareness

Few studies on clinical decisions have investigated providers' awareness of their own decision-making process (for the purpose of this document, I will use the terms "self-aware" and "self-awareness" to refer specifically to awareness of the factors that influence providers' decisions). Self-awareness is an important quality in a provider as it better equips them to compare their decisions to social norms and guidelines (95).

Self-aware providers may be more inclined to tailor interventions based on patients' sex or race (96). For instance, opioid clinical guidelines recommend treatment should not be tailored based on patient sex alone (8); however, there is some emerging evidence suggesting women may require different levels of and respond differently to some opioids than males (51, 52). Providers who are familiar with these findings may be knowingly influenced by patient sex when making decisions about opioid medications for chronic pain. Moreover, focus groups found some physicians reported using race as a central factor to help guide their decisions for diabetes and hypertension treatments (97). These findings should not be overstated, however, as providers' reported use of sex and/or race may not coincide with the actual influence of these patient demographics on their decisions.

Few published studies have measured healthcare providers' level of awareness for their pain-related decisions. Two studies found that nurses were aware of using patients' facial expressions to guide acute pain management decisions, but there was mixed awareness regarding the use of patient demographics (33, 98). Hirsh, Jensen, and Robinson (2010) found none of the nurses sampled *reported* using patient sex, race, and/or age when making acute pain management decisions, but judgment analysis revealed between 13% and 31% of participants *actually* used one of these variables in their decision-making process. Edwards et al. (2002) found 61% of nurses reported using "patient characteristics" when making a decision to administer an opioid (98); however, this broad categorization could be interpreted by participants as encompassing more than just patient demographics. Moreover, as evidenced by Hirsh, Jensen, and Robinson (2010), self-reports may not always equate with actual use of patient characteristics in the decision to administer an opioid or other treatment. As Edwards et al. (2002) note in their study limitations, reports may be influenced by socially desirability (98). The inclusion of both self-report and a measure of actual use of patient characteristics will help clarify providers' level of awareness.

Further research is needed to better understand providers' level of awareness of the influence of patients' sex and race on their pain management decisions. Given the lack of empirical literature, it remains unclear if providers' awareness of demographic influence is associated with the quality of their pain management for certain patient populations. Some providers may knowingly use patients' sex and race in their treatment decisions to provide culturally centered care or to fit with stereotypes about patient populations; however, further investigation is necessary. Continued examination of provider awareness may improve patient care and inform chronic pain education.

1.8.2 Providers' attitudes

As providers have described treating chronic pain as "frustrating" (21, 22, 99) there is a possibility that providers' attitudes may contribute to chronic pain patients' reports of inadequate pain management (3). An attitude is a favorable or unfavorable learned response that helps individuals make sense of the world, and can guide cognitive and/or behavioral responses in a given environment or situation (100). Although the attitude-behavior relationship is still widely discussed in the literature, evidence suggests that when certain conditions are met (e.g., attitude is relevant to a situation), attitudes are more likely to influence behavior (101).

Healthcare providers' attitudes have been shown to be related to their pain management decisions. There is evidence that nurses and physicians hold cautious attitudes about opioids, and these attitudes were associated with lower intentions to administer opioids (19, 23, 98). Bishop et al. (2008) found physician attitudes about low back pain guided treatment decisions even when they deviated from treatment guidelines (102). Furthermore, physiotherapy students' attitudes regarding low back pain were predictive of activity advice and treatment approach (103).

1.8.2.1 Influence of gender and racial attitudes on chronic pain treatment decisions

Providers' gender- and race-biased attitudes could be one reason why women and Black chronic pain patients are at increased risk for suboptimal pain management compared to male and White patients (42, 67). The MODE model ("motivation and opportunity act as determinants of spontaneous versus deliberative attitude-to-behavior processes") has been used as a guiding framework in previous investigations to examine how biased attitudes may influence behavior. This model suggests individuals use a conscious and deliberate process to weigh the costs of acting in accordance with ones' attitudes. Individuals are more likely to be influenced by gender- and racially-biased attitudes when *motivation* is decreased (e.g., consequences of making a wrong decision are minimal) and there is little *opportunity* (e.g., minimal time or increased cognitive load) to reflect on their attitudes (101, 104). As providers have expressed suspicion of patient pain reports, believe chronic pain patients rarely achieve significant pain relief, and have little time to deliberate in clinical settings (21, 24, 105), providers with gender- and racially-biased attitudes may lack the necessary motivation and opportunity to consider the influence of their biased attitudes prior to treating female and Black chronic pain patients.

There is some evidence that providers’ gender attitudes may result in inadequate pain management in women. Hoffman and Tarzian’s (2001) review of the pain literature suggested that female pain reports were more likely to be attributed to psychological sources than male reports of pain (59). This was supported by subsequent vignette studies, which found healthcare providers rate female pain patients as experiencing more negative mood than males and perceive male patients’ pain as more urgent, severe, and disabling than females (30, 106). Hamberg, Risberg, Johansson, and Westman (2002) found gender differences in clinical communication when assessing acute pain, with medical students asking female patients about family aspects and male patients about occupational aspects of the pain experience (107). Furthermore, healthcare providers have expressed negative attitudes about the discussion of psychological contributions of pain (21). This is important in the context of pain disparities, due to evidence that females tend to use emotional-based descriptions of pain more than males. Moreover, although depression diagnosis and antidepressant treatment is more common in women than men, there is some evidence that biased gender attitudes may contribute to over-diagnosis of depression in women (59, 108). Taken together, these factors may lead to an inaccurate diagnosis of depression or personality disorder in female pain patients (109).

Healthcare providers' attitudes regarding women's gender roles may contribute to suboptimal pain management in female patients (96); however, few studies have actually measured healthcare providers' gender attitudes. Medical students surveyed predominately expressed "liberal" attitudes on a socio-cultural measure that included questions about gender roles; however, this same measure included items unrelated to gender attitudes (e.g., openness to alternative medical treatments; 21). Hatala and Case (2000) found that medical students had worse diagnosis accuracy for female patient cases than males, which the authors proposed was due to gender bias, yet, no measure of attitudes was used in the study design (110). To better understand the role of healthcare providers' gender attitudes on pain treatment decisions, it is critical that providers' attitudes be assessed directly with reliable and valid measures.

Although gender attitudes are scarcely measured in the literature, there is evidence to support that healthcare providers hold racially biased attitudes. Healthcare providers have been shown to hold a preference for White over Black individuals (111-114), even more so than the general public (113). Furthermore, it has been suggested that racial stereotyping from healthcare providers may influence their pain management decisions (115). Healthcare providers and trainees are often cautious when providing patients with opioids because of the risk of drug abuse (19, 23, 99, 112, 115). Epidemiologic data and mainstream portrayals of Black individuals may lead providers to develop negative attitudes regarding Black patients' potential misuse of medications (99, 112, 115-117). These "evidence-based" stereotypes may serve to reinforce providers' decisions to treat Black chronic pain patients differently than White patients; however, there is evidence that these population statistics are over-applied to individual patients (115). Furthermore, these statistics may be misleading as there is evidence that racial minorities are actually less likely to abuse prescription medicine (36).

There is some evidence that healthcare providers hold explicit negative racial attitudes toward Black individuals. Explicit attitudes are self-reported attitudes that are known or can be readily accessed by the individual (118). According to the MODE model, explicit attitudes are more likely to be displayed through a person's verbal behavior, particularly when motivation and opportunity to inhibit the influence of their attitudes is low (119). A national survey of explicit racial attitudes found providers preferred White over Black individuals at rates greater than the general public (113). To the author's knowledge, only two previous vignette studies examined providers' explicit racial attitudes and their relationship to treatment decisions. Green et al. (2007) and Sabin, Rivara, & Greenwald (2008) found providers did not report explicit racial preference, and their attitudes did not influence treatment decisions. However, these investigations did not use a validated measure of explicit attitudes; instead, participants answered two questions regarding if they "slightly preferred" White or Black individuals on a 5 point scale and rated their feelings towards Whites and Blacks on a 10 point thermometer from "cold" to "warm." Furthermore, one investigation administered the explicit attitude measure after an implicit racial attitude measure, which the authors acknowledged as a limitation that may have lead providers' to report socially desirable explicit attitudes (120).

Research also suggests providers' implicit racial attitudes (attitudes that may or may not be readily apparent to the individual, that are often automatically and unintentionally activated, and are more likely to predict non-verbal behavior) may influence their treatment decisions (118). Physicians have been found to hold implicit attitudes that Black patients are less cooperative and less compliant than White patients (116, 120). In a vignette study, residents were shown to hold an implicit preference for Whites and had a decreased likelihood of treating Black patients presenting with thrombolysis (116). However, two other vignettes studies found pediatricians and medical students also held an implicit preference for Whites, but these attitudes did not translate into pain assessment or treatment differences (114, 120).

As there is some indication that providers hold gender and racial bias, and that these attitudes may influence their treatment decisions, additional research is needed to better understand the role of these attitudes in chronic pain management decisions. Explicit attitudes, in particular, have the potential to be addressed and altered through training in order to reduce their impact on patient care (121). Future examination of these relationships may inform educational efforts that reduce biased attitudes and their influence on clinical decisions.

1.9 Mixed methods

Enhanced understanding of how healthcare providers make decisions and how provider factors impact their treatment decisions may help to diminish chronic pain treatment disparities. A review of the pain disparities literature specifically calls for research to better understand clinical decision-making and the role of provider stereotyping, while using techniques that allow for greater generalizability of findings (28). Mixed methods designs may be particularly useful in this research, as these designs are often better able to capture the multi-faceted nature of chronic pain management decision-making.

Mixed methods designs have received increasing attention and support in the literature (122-124). While previous conceptualizations considered qualitative and quantitative examinations to be dichotomous, many argue that mixed methods have been used since the proposal of the multi-trait multi-matrix (MTMM) by Campbell and Fiske in 1959, and that the majority of scientific findings are often based on multiple sources and types of data (123, 124). Mixed methods are particularly useful in healthcare research as they draw upon the strengths and perspectives of each method to capture the wide-range of influences present in a clinical setting (124). Mixed methods designs have also been recently identified by the NIH as able to improve the quality of disparities research by providing real-life contextual understanding and multi-level perspectives (125). With this in mind, I contend that quantitative lens model designs and qualitative interview data collectively can increase our understanding of clinical decision-making for pain management.

1.9.1 Lens model

Lens model designs are well-suited to increasing our understanding of disparities in clinical decision-making, as they provide a quantitative estimate of the influence of patient factors, such as sex and race, on providers' clinical decisions (92). The lens model assumes that judgments are contextually determined and based on an individuals' attention to- and weighing of multiple pieces of information available in the environment (92, 126).

Research using Social Judgment Theory framework supports the usefulness of the lens model as a powerful and important tool for studying clinical decision-making (92). Using this methodology, researchers are able to calculate the level of influence of each variable of interest, or "cue," on each decision. Importantly, this influence is calculated while holding unmeasured variables constant, so that the unique effect of each systematic change in cue is determined (e.g., an influence of patient sex and/or race; (92, 126). Decisions are typically measured with visual analogue scales (VAS), which participants use to make ratings for each decision. For example, participants may rate their likelihood of giving a patient an opioid medication for pain on a scale of "highly unlikely" to "highly likely". These ratings are then analyzed across cues in order to quantify the amount of influence of each cue across participants' decisions (94, 126). Going back to the previous example, a participant may be less likely to give an opioid to female patients than male patients; therefore, the cue, "patient sex," would be influential in the decision to administer an opioid.

The lens model facilitates a better understanding of the factors that influence providers' treatment decisions than traditional research designs, as it allows for analyses at the level of the individual provider (idiographic analyses) and overall sample (nomothetic analyses). An idiographic view of the data provides a quantitative estimate of the influence of factors, such as patient sex and race, on each provider's treatment decisions. Idiographic analysis provides a better understanding of the influence of hypothesized cues by examining cues for each participant before averaging data across participants at the group level (94). Individual analyses may uncover trends within cues of interest that are normally lost in traditional group analyses. For example, Smith et al. (2003) found that group-based analysis indicated that clinicians generally understood clinical guidelines for the treatment of depression; however, at the individual level it was revealed that individual clinician judgments exhibited considerable variability and ranged from "patient definitely should not be prescribed an antidepressant" to "guidelines indicate an antidepressant" for the same vignettes. Moreover, the cues of interest can function in opposite directions for different participants. For instance, some participants may be less likely to give female patients an opioid, while other participants may be less likely to give male patients an opioid. These differential cue influences are typically averaged out and lost in traditional group analyses, which may lead to the misleading conclusion that patient sex is not influential in pain management decisions. This averaging process may miss important individual differences in decision-making and may lead to suboptimal policy recommendations.

To the author's knowledge, only one previous vignette study of chronic pain has used lens model methodology to examine the influence of patient sex and race in healthcare trainees. Stutts, Hirsh, George, and Robinson (2010) found across 107 healthcare trainees, female and Black chronic pain patients were rated as experiencing higher pain intensity, more pain unpleasantness, more negative mood, and requiring a higher need for medical help than males and White patients. Similarly, idiographic review found 6-12% of trainees rated females higher and 2-7% of trainees gave higher ratings to Black patients across pain assessments. In contrast, other participants rated males and White patients higher across pain assessments. These findings highlight the fact that the direction of cue influence may vary across individual participants.

This examination supports the use of both idiographic and nomothetic analyses to enhance understanding of clinical decision-making. In these studies, although group analysis indicated that different treatments were sometimes provided to male vs. female and White vs. Black patients among the overall sample of participants, idiographic review showed that only a subset of participants was significantly influenced by patient demographics when making decisions. Furthermore, individual analysis revealed variability in the direction of the influence of patient sex and race among the participants. To better understand treatment disparities for chronic pain, this methodology could be used to provide insight into the influence of patient demographics across various treatment types and individual participants.

1.9.2 Qualitative methods

A mixed-methods approach consists of integrating quantitative and qualitative data. Semi-structured interviews are a common form of qualitative data in which a structured, but flexible, interview guide is used that allows the interviewer to follow up with additional questions and probes, as needed (127). Completed interviews are examined by thematic analysis to identify, analyze, and report patterns within the interviews (128). Parallel data analysis is a common approach for integrating qualitative and quantitative data. In this approach, the data sets are collected separately and then integrated once individual analyses are complete (122). In parallel analysis, qualitative data is used to provide further insight into little researched processes (125). Qualitative data can be used to highlight statistically significant findings by examining *convergent* evidence (qualitative and quantitative lead to the same conclusion), *complementary* evidence (qualitative and quantitative results supplement each other), and/or *divergent* evidence (qualitative and quantitative results are, at times, contradictory; 122).

Two studies have used qualitative data to provide insight into providers' treatment of chronic pain. In Matthias et al. (2010), interviewed providers stressed the importance of the patient-provider relationship and voiced common concerns in the treatment of chronic pain, such as pressure from medical centers and patients to treat pain with opioids, questioning the credibility of pain reports, and suspicion of drug diversion. Corrigan et al. (2011) found first-year medical students shared similar concerns after journaling about their first primary care rotation experience. The students noted the difficulty in treating chronic pain due to uncertain pain etiology/assessment and reported suspicion of patients being "untruthful or manipulative" to obtain opioids (105). To the author's knowledge, no qualitative study has been published examining the influence of patient demographics on providers' chronic pain assessment and treatment.

Semi-structured interviews will provide a fuller picture of the influence of patient sex and race, as well as other factors, on chronic pain management decisions. Previous examinations of clinical decision-making have been criticized for failing to account for social context, such as provider factors, practice setting, and healthcare systems information (28). An additional limitation of the chronic pain disparities literature is studies rarely consider patient factors that may affect decisions, such as SES or previous substance abuse history (115). Mixed-methods would likely provide a deeper understanding of the role of patient sex and race on treatment decisions, while also allowing providers' the opportunity to discuss the role of other factors that may influence their chronic pain treatment decisions for diverse patients. Furthermore, mixed-methods may allow for a better understanding of provider factors that influence their chronic pain management decisions. Qualitative interview methodology may also enhance understanding of providers' self-awareness of their own decision-making processes, as well as their attitudes towards treating chronic pain, in general, and female and Black chronic pain patients, specifically.

1.10 Purpose of this study

Chronic pain is a critical public health issue due to its high prevalence, healthcare costs, and management difficulties. Pain treatment disparities have been documented in the literature, with female and Black patients reporting worse pain management compared to male and White patients, respectively. While some evidence suggests healthcare providers and trainees are influenced by patient demographics when providing acute pain care, the influence of patient sex and race on chronic pain management decisions remains unclear. Furthermore, little is known about provider factors, such as their attitudes and decision-making awareness, which may contribute to differential pain care for female and Black chronic pain patients.

The current study was conceived to better understand the patient and provider factors that influence chronic pain treatment. This study uses a mixed-methods approach that integrates quantitative and qualitative data to examine the influence of patient sex and race on healthcare trainees' treatment decisions. Trainee awareness of their treatment decisions will be examined by comparing the actual influence of patient demographics on treatment decisions, as captured by lens model methodology, with trainees' self-reported factors (including patient demographics) that influence their decisions. Trainees' gender- and racial-attitudes will also be assessed both quantitatively and qualitatively to examine their relationship with pain management decisions. The results of this mixed-methods approach may provide suggestions to improve patient care and chronic pain education.

1.11 Study overview

This study used a mixed methods approach to examine: 1) the influence of patient sex and race on healthcare trainees' pain management decisions; 2) trainees' level of awareness of their decision-making process; and 3) the extent to which trainees' gender- and racial-attitudes are associated with chronic pain decisions. Twenty trainees made pain management decisions for 16 clinical vignettes of patients presenting with chronic pain that varied based on sex (Male or Female) and race (Black or White). For each vignette, trainees rated their likelihood of recommending different pain treatment types. After making treatment decisions, trainees reported which factors, including patient demographic characteristics, influenced their treatment decisions. Participants also completed standardized measures assessing their attitudes about gender and race. The quantitative data was analyzed with both individual and group-based statistics. To supplement participants' quantitative data, qualitative interviews were conducted to gain a deeper understanding of how trainees make pain treatment decisions for diverse patients in clinical settings. These interviews will provide further insight into trainees' awareness and attitudes about sex and race in the context of chronic pain management.

1.11.1 Hypotheses

Study hypothesis 1: Idiographic quantitative statistical analyses will indicate that a subset of healthcare trainees are significantly influenced by patient sex and race in their treatment decisions. Moreover, I hypothesize that when differences emerge at the nomothetic level of analysis, female and Black patients will receive significantly lower treatment ratings, (opioid, antidepressant [except in the case of female patients], physical therapy, and referral to a pain specialist), than male and White patients, respectively.

Study hypothesis 2: Healthcare trainees will demonstrate little self-awareness about the influence of patient sex and race on their pain management decisions. Specifically, there will be little concordance between trainees' actual use of demographics (measured during quantitative analysis) and their reported use of demographics during the quantitative and qualitative portions of this study.

Study hypothesis 3: Trainees’ gender- and racial-attitudes will be associated with their pain treatment ratings. Specifically, higher scores on the gender and race attitude measures (i.e., more negative attitudes about women and Blacks, respectively) will be associated with lower opioid ratings for female and Black patients (relative to male and White patients, respectively), and higher scores on the gender attitude measure will be associated with higher antidepressant ratings for female patients (relative to males). Given the insufficient literature on disparities for other commonly used treatments for chronic pain, I propose no hypotheses about the relationship between trainees’ racial-attitudes and likelihood to recommend an antidepressant nor trainees’ gender- and racial-attitudes and likelihood to recommend physical therapy or referral to a pain specialist. Should patient sex or race account for a significant amount of the variance in providers’ treatment decisions, gender and racial attitudes will be examined as potential mediators/confounders of this observed relationship.

CHAPTER 2. METHODS

2.1 Participants

This investigation was a secondary analysis of a larger study that recruited various healthcare providers, such as physicians and nurses. Healthcare providers were recruited to participate in both the quantitative and qualitative portion of this study. To participate, providers must be at least 18 years of age and enrolled in a medical training program or currently working as a healthcare provider. Participants were recruited from the Indiana University School of Medicine by the use of email listservs and posted flyers. Recruitment materials indicated that the study was examining, “Clinical Decision-Making for Pain Management,” and was interested in gaining a better understanding of how healthcare trainees and providers make decisions for chronic pain patients.

Participants who completed the online portion of the study indicated at the end of the study if they were interested in being contacted for future studies. Only those participants who answered positively were recruited to participate in the follow-up qualitative portion, which consisted of a one-on-one interview to discuss treatment decision-making for chronic pain patients.

2.2 Procedure

This study used a mixed methods design that consists of both an online quantitative study and individual qualitative interviews. This study received approval from the Indiana University Institutional Review Board (IRB #1102004842). Only those 20 trainees who completed a follow-up interview were included in this analysis. This will allow for a more in-depth examination of participants' clinical decision-making, awareness, and attitudes by examining specifically their qualitative and quantitative data. Both study portions took no more than one hour each to complete. Participants were compensated with a $75 Amazon.com gift card for each portion of the study they completed.

2.2.1 Quantitative study

The quantitative portion of the study was administered online. Participants contacted the study investigators through a study email to indicate their interest. Interested participants were screened for eligibility (e.g., over 18 years of age, healthcare trainee or provider); less than 5% of individuals who contacted study investigators did not meet eligibility requirements. Eligible participants were given a unique username and password and directed to the study webpage. The introduction page explained that the study purpose was to gain a better understanding of how providers and trainees make decisions about chronic pain management. After logging in, participants were asked to consent to the online portion of the study. Participants were then asked to provide demographic information. After reviewing the instructions page, participants were asked to make treatment decisions for a series of clinical vignettes. Next, they completed a battery of self-report measures, including measures assessing attitudes toward women and Black individuals. Participants then reported the information they used when making decisions for the vignettes. Finally, they were asked to guess at the study purpose. Directions given to participants and a list of the measures used in the online study are included in Appendix A.

2.2.1.1 Clinical vignettes

Participants for the online portion of the study were presented with a series of computer-simulated images of patients experiencing pain. The simulated patients were created using innovative FaceGen Modeller software (129). FaceGen is a novel tool that allows the creation of realistic facial stimuli based on the Facial Action Coding System (FACS; 130). FACS is an anatomically based facial expression coding system that uses 58 Action Units related to facial expressions and emotions (130). For instance, the facial expression of pain consists of lowering brow, nose wrinkling/upper lip raising, tightening of the orbital muscles surrounding the eye, and eye closure (131-133). FaceGen software allows for the presentation and standardization of patient pain expressions across the manipulated variables of interest (e.g., sex and race), thus, increasing the experimental control and ecological validity of the stimuli (130). Similar virtual human

(VH) technology has been used in previous studies on pain decision-making with participants rating the clinical vignettes as highly realistic and reflective of real clinical scenarios (30, 31).

Participants were presented with still images of 16 simulated patients who vary by sex and race variables. The images were accompanied by text-based information about patients' medical status and history, which was standardized for all patients [see Figure 2.1]. For all patients, the text-based vignettes presented equivalent information regarding the patients' vital signs (within normal limits) and history of chronic pain (e.g., pain began from a back injury one year prior). In addition, all patients were described as being open to all treatment types with no treatment contraindications. The patient vignettes were presented in random order.

<table>
<tr><td>Temperature: 98.7</td><td>BP: 113/70</td><td>Pulse: 71</td><td>Respiration: 21</td><td>Mental Status: A/O X 3</td></tr>
<tr><td colspan="5">The patient presents with lower back pain of approximately one year duration. The patient reports that the pain began after lifting a heavy box at home. The pain is located in the lower back and limits the patient's ability to perform normal daily activities. The patient expresses an openness to any treatment recommendation and has no absolute contraindications for the treatments listed below (i.e., there are no medical reasons to avoid certain treatments). The patient denies any other physical or mental health symptoms.†</td></tr>
</table>

Figure 2.1 Virtual human images and text vignette

† The larger investigation examined the influence of patients' mental status. Alternative text for depressed patient vignettes included, "The patient denies any other physical health symptoms. The patient does report symptoms of depression over the past 6 months."

2.2.1.2 Lens model

Lens model methodology was used to provide a quantitative estimate of how influential patient sex and race were in each trainee's clinical decision (92). Participants made pain treatment decisions using visual analogue scales (VASs). Participants used separate scales to rate their likelihood to consider/recommend a list of commonly prescribed treatments for chronic pain (see Treatment Decisions below).

2.2.1.3 Measures

2.2.1.3.1 Demographic information

Participants provided information regarding their age, sex, race/ethnicity, and current level of healthcare training. Participants rated on separate VASs their clinical and personal experience with chronic pain from 0 ("Not at all experienced") to 100 ("Very experienced").

2.2.1.3.2 Treatment decisions

Participants in the larger study rated their likelihood to consider/recommend a list of 10 commonly used treatments for chronic pain: 1) opioid/narcotic pain medication; 2) non-opioid/non-narcotic medication; 3) antidepressant medication; 4) over-the-counter pain medication; 5) lifestyle activities, such as diet and/or exercise; 6) physical therapy; 7) ice, heat, and/or analgesic cream; 8) referral to a mental health provider for counseling; 9) referral to a pain specialist; 10) no intervention at this time; return in 1 month. Participants provided their ratings on separate VASs anchored from 0 (“Not at all likely”) to 100 (“Extremely likely”). Although this list does not exhaust the chronic pain treatments available to providers and patients, it does include common treatments recommended by clinical guidelines (134).

Based on previous findings and current gaps in the literature, for the purposes of this study, only four treatments were analyzed: 1) opioid/narcotic pain medication; 2) antidepressant medication; 3) physical therapy; 4) referral to a pain specialist. The pharmacological treatments were chosen to help further understand previously identified sources of treatment disparities (i.e., opioid and antidepressant medication). The majority of the disparities research has focused on opioid medications for the treatment of pain; however, findings remain inconsistent (45, 70). While little is known about antidepressant treatment disparities in the context of pain, research on antidepressants has found women are prescribed antidepressant medication at twice the rate of males with depression (135), and Black depressed patients receive less antidepressant medications than White patients (82). Furthermore, non-pharmacological treatments, such as physical therapy and referral to a pain specialist, have been recommended in clinical guidelines for pain management (9); however, these treatment options have been under-researched. These treatments may be susceptible to patient demographic influences due to provider concerns about credibility of pain reports and perceived access to treatment.

2.2.1.3.3 Gender attitudes

The Ambivalent Sexism Inventory (ASI) is a 22-item measure of gender attitudes. The ASI integrates positive and negative attitudes that can lead to gender stereotypes (136, 137). The Benevolent Sexism (BS) scale assesses "positive" attitudes toward women in traditional gender roles, such as protective paternalism, idealization of women, and desire for intimate relationships; an example item is, "Women, compared to men, tend to have a superior moral sensibility" (137). The ASI also includes a Hostile Sexism (HS) scale that assesses negative attitudes about women, such as dominative paternalism, derogatory beliefs, and heterosexual hostility. An example from this scale is the item, "Most women fail to appreciate fully all that men do for them" (137). Participants indicated their agreement with each statement on a 0 (disagree strongly) to 5 (agree strongly) scale, with some items reverse scored. Higher scores on the ASI indicate more negative attitudes in regards to women. For these analyses, total scores (e.g., mean of all items on the ASI), and subscale scores (e.g., means for BS and HS) were analyzed.

Glick and Fiske (1996) previously assessed reliability and found the ASI to have good internal consistency (*Cronbach's alpha* range from 0.73 to 0.92). The BS and HS subscales have also been found to be reliable across samples (BS α =0.73-0.85; HS α =0.80-0.92; 136, 137). The ASI was also found to be uncorrelated with measures of self-deception but weakly correlated with impression management (r= 0.13-0.31); however, the authors found there were multiple weak relationships across the impression management scale and concluded the measure had minimal risk of social desirability bias (137).

2.2.1.3.4 Racial attitudes

The Complimentary Stereotypes and Negative Prejudice scale (CSNP) is a 30-item scale used to assess explicit racial biases toward Black individuals. Similar to the ASI, the CSNP integrates two types of racial attitudes, positive and hostile (138). The Complimentary Stereotypes (CS) scale measures positive stereotypes of Black people as athletic, rhythmic, musical, and socially and sexually competent. An example of a positive stereotype is the item, “A Black person is wasting an opportunity by not getting involved in athletics” (138). The CSNP also includes a scale of Negative Prejudice (NP) that assesses negative stereotypes of Black people’s inherent inferiority, their role in government policy and interracial contact. An example of a negative stereotype is, “The welfare system really just allows Black people to ‘mooch’ money from the government” (138). Although traditional measures of stereotype tend to focus solely on negative stereotypes, positive stereotypes are harmful as they often serve to legitimize discrimination and ignore individuality among Black individuals (138). Participants indicated their agreement with each statement on a 1 (strongly disagree) to 7 (strongly agree) scale with some items reverse scored. Higher scores on the CSNP indicate more negative attitudes about Black individuals. For these analyses, total scores (e.g., mean of all items on the CSNP), and subscale scores (e.g., means for CS and NP) were analyzed.

Previous examinations support the reliability and internal consistency of the CSNP, with *Cronbach's alpha* ranging from 0.82 to .90 (138). The CS and NP subscales have been found to be reliable across different racial and ethnic groups (CS α =0.71-.89; NP α =0.80-.87; 138). Previous examinations have found convergent validity between the CS and NP, as the two subscales were consistently and positively correlated (*r*= 0.14-0.34), indicating individuals who hold negative stereotypes also tend to hold complimentary stereotypes (138). The CSNP was also found to be not correlated with measures of impression management and self-deception, indicating minimal susceptibility to social desirability (138).

2.2.1.3.5 Information used

Participants indicated which information they used when making treatment decisions for the simulated patients. Participants choose from a list of items that included items such as patient vital signs, pain history, facial expression of pain, and patient demographics. They rated each item using a VAS from 0 ("Minimal influence") to 100 ("Maximal influence"). Item selection of "patient demographics" was used to examine trainees' awareness.

2.2.1.3.6 Guess at study purpose

Because study transparency and social desirability is a concern with vignette-based studies, as well as those examining explicit attitudes, participants were asked to guess at the purpose(s) and/or hypothesis(es) of the study. Responses to this open-ended question were examined in order to understand any influence participants' awareness of the study purpose may have had on their responses.

2.2.2 Qualitative study

Twenty participants, who indicated their willingness to be contacted for future studies on the online portion of the study, were recruited for follow-up semi-structured interviews to discuss their reasons and motivations for choosing chronic pain treatments in clinical settings. These interviews will provide a fuller picture of the influence of patient sex and race on chronic pain decisions, as well as other patient- and provider-related factors that may influence their decisions.

The interview guide was created after a series of meetings between the inter-disciplinary research team. This team consisted of two physician-researchers, a health psychologist, and a communication researcher with expertise in chronic pain management and patient-provider communication. The interviewer was a clinical psychology graduate student with qualitative research experience. To enhance the reliability of the data collection, the same interviewer conducted all 20 interviews. Each interview took place in either the laboratory space located on Indiana University-Purdue University Indianapolis campus or in a private room at the Indiana University School of

Medicine's library. The interviews were approximately 1 hour in duration and each participant was compensated with a $75 Amazon.com gift card.

The interview guide was based, in part, on the guide used in a previous qualitative study on physician decision-making for pain (24). The interview guide consisted of open-ended questions and probing questions to explore participants' perspectives and opinions on pain treatments. Questions were designed to elicit conversation regarding trainees' reasons and motivations for using particular pain treatments with particular patients they have worked with in clinical settings, including discussion of why they favor/disfavor particular treatment options. In order to ensure that participants discuss a wide-range of treatment options, they were asked during the course of the interview to review a list of treatment options that mirror the same treatment types from the online study. The interviews also included questions pertaining to how decisions might vary depending on patient factors, such as sex and race, which are particularly relevant to this study, as well as other factors such as age and SES.

The interview guide was piloted internally by the interviewer. Practice interviews were conducted with clinical psychology graduate students to finalize the specific wording, phrasing, and sequence of the questions prior to conducting the interviews with study participants. The interview guide is presented in Appendix B.

2.3 Statistical analyses

Differences in demographic characteristics (e.g., age, sex, race) between the 20 trainees and the larger sample of 100 participants were examined using independent *t*-tests and chi-square analyses.

2.3.1 Influence of patient sex and race on trainees' decisions

The statistical data software SPSS was used for all quantitative analyses.

2.3.1.1 Idiographic analyses

To test the hypothesis that a subset of healthcare trainees will be influenced by patient sex or race in their treatment decisions, individual multiple regression analyses were used to examine each participant's decision. VH sex and race cues served as the independent variables and were entered simultaneously in the regression models. Treatment (opioids, antidepressants, physical therapy, referral to pain specialist) ratings were the dependent variables in each model. A linear equation was produced that optimally weights each sex and race cue in terms of its predictive contribution to the decision. The standardized regression coefficient (β) in each regression model represents the weight of each cue in each decision. This weight represents the unique contribution and importance of each cue in the individual participant's clinical decision. A significant β indicates that a sex or race cue was reliably used in a particular treatment decision. The coefficient of multiple determination (R^2) represents the amount of variance in pain assessment and treatment ratings accounted for by the sex and race cues. A significant R^2 indicates the sex and race cues (independently or collectively) were sufficiently weighted to result in a reliable decision equation. In other words, R^2 is an index of how “relevant” the cues were to participants’ decisions. Consistent with previous studies investigating patients’ sex and race (31), β and R^2 values will be examined at both the .05 and .10 alpha level.

2.3.1.2 Nomothetic analyses

Traditional group-based analyses were used to further examine my first hypothesis. Following idiographic analyses for all participants, descriptive statistics were used to determine: 1) the number of participants who were significantly influenced by patient sex and/or race ($p < .10$) for each treatment type, 2) the amount of variance accounted for by patient sex and race in trainees’ decisions; the semi-partial correlations values for each patient variable within each treatment decision were squared, and descriptive statistics were used to summarize these values, 3) the average R^2 for each treatment decision (i.e., the average amount of variance in treatment ratings that were accounted for by both patient cues), and 4) the variability in trainees’ “use” of the patient demographic cues (i.e., compare the number of trainees who gave higher ratings to male/female patients and White/Black patients).

Nomothetic statistical analyses were used to examine the hypothesis that female and Black patients will receive different treatment ratings (e.g., lower treatment ratings, except in the case of antidepressants for female patients) than male and White patients, respectively. After computing average treatment ratings for the sample, paired samples t-tests were used to compare the average ratings between male/female vignettes and Black/White vignettes. These analyses were used to examine sex and race differences regarding the four treatment recommendations in the overall sample. Effect sizes were calculated for significant results using the equivalent of Cohen's *d* for dependent cases (d_z).

2.3.1.2.1 Trainees' level of self-awareness

In order to examine my second hypothesis regarding trainees' awareness of the influence of patient sex and race on their pain management decisions, I compared the number of trainees that actually used sex and race in their treatment decisions (as determined by significant β values for each treatment decision [see idiographic analysis]) to the number of trainees who reported using sex and race cues in their treatment decisions (as determined by their responses to the "Information Used" questionnaire). Actual and reported use were analyzed as dichotomous variables.

Trainees' actual and reported use of patient demographics were examined by both frequency and concordance analyses. Specifically, the percentage of the sample that endorsed or denied using demographics and the percentage that significantly used or did not use patient demographics in their treatment decisions are reported. Concordance (e.g., those who endorsed and actually used [positive agreement], and those who did not endorse and did not use [negative agreement]) and discordant (e.g., those who endorsed and did not use, and those who did not endorse and did use) indices are reported. McNemar's test was used to examine participants' awareness. This test indicates whether the level of disagreement between participants' actual and reported use is statistically significant ($p < .05$).

2.3.1.2.2 Trainees' racial and gender attitudes

For my third hypothesis, I expect gender- and racial-attitudes will be associated with providers' treatment ratings. Pearson's correlations were calculated to examine the linear relationship between both the 1) total ASI and CSNP attitude scores and 2) separate subscale scores for each attitude measure and treatment decisions (e.g., ASI total score, Benevolent Sexism score, and Hostile Sexism score will be correlated separately with female opioid ratings). Separate correlations were calculated for male vs. female patients and White vs. Black patients. Fisher r-to-z transformation analyses were used to test for differences in the magnitude of these relationships. For example, participants' ASI total scores were correlated with their opioid treatment ratings for both male and female patients, and the Fisher r-to-z analyses were used to examine significant differences in the magnitude of these two correlation coefficients.

Should attitudes account for a significant portion of variance in trainees' treatment decisions, attitudes will be tested as potential mediators/confounders. To quantify the effect of attitudes as potential mediators/confounders of the relationship between patient demographic characters and trainees' treatment decisions, hierarchical regression models will be constructed. VH sex or race is included in Step 1 of separate models, with gender and racial attitudes (separate analyses for total and subscale attitude scores) added at Step 2, respectively. Treatment ratings are the DVs in respective models. The change in effect size is computed as $(B_{\text{VHsex/race step1}} – B_{\text{VHsex/race step2}})/ B_{\text{VHsex/race step1}} \times 100$. Sobel's tests are conducted to examine whether the mediator/confounder partially accounted for any of the observed changes within the models.

2.3.1.2.3 Qualitative interviews

All interviews were transcribed verbatim from audio recordings by a HIPAA-certified transcription office. The interviewer checked all transcripts for accuracy and removed any identifying information.

Interview data analysis included the inter-disciplinary research team. During the first phase of data analysis, each member of the team read each transcript independently for overall impressions and discussed noticeable patterns or salient statements during biweekly meetings. After these initial discussions, the team continued to read the interviews independently and regularly met to discuss the interviews and develop a preliminary list of themes reflected in the data. This iterative process continued until no new themes had been identified and saturation had occurred. Based on similar qualitative chronic pain research, the interdisciplinary team worked to ensure that codes were grounded in the data by meeting the criteria of recurrence and repetition in order to ensure codes are not influenced by individual notions or bias (24). Once a preliminary codes list had been created, the team continued to review transcripts and discuss any codes that could be collapsed into overarching categories, eliminate codes due to lack of support from the data, and discuss any discrepancies. Once a consensus had been reached, a final code list was formulated.

Next, the interviewer used the final code list to code the previously reviewed transcripts independently. The team again met regularly on every fourth transcript to ensure inter-rater reliability and to refine the final code list as needed. Once all of the transcripts had been properly coded, the interdisciplinary team searched for patterns and variations among responses to ascertain whether some trainees had generally more positive or negative experiences and attitudes toward treating chronic pain and specific chronic pain patient populations.

All of the transcripts were coded and analyzed using Atlas-ti (Atlas-ti Scientific Software Development GmbH, Berlin, Germany).

2.4 Power analysis

The current study was powered for the idiographic analyses of the lens model approach. In order to ensure the model's parameters were sensitive enough to detect judgment differences, this study employed a profile-to-cue ratio of 8:1 (16 vignettes with 2 cues of interest), which exceeds the recommended ratio of 5:1 and increases the power of the study (94). In addition, each possible cue combination was presented four times to further enhance statistical power.

An a priori power analysis was conducted for the nomothetic analyses using G*Power (139). To calculate power, effect sizes were estimated from a study that used similar research methodology and participants, and also examined sex and race differences in pain treatment decisions (see 32). In that study, effect sizes for patient sex and race ranged from 0.59 to 0.70. The current power analysis was based on a two-tailed dependent samples t-test, $\propto = 0.05$, and power = 0.80 to determine the sample sizes needed to detect significant differences at the nomothetic level of analysis. The power analysis estimated this study would need a sample size ranging from 19 to 25 participants (based on an effect size of 0.70 and 0.59, respectively); 21 participants are needed based on the average of these effect sizes (effect size = [0.59+0.70]/2 = 0.65). This study recruited 20 participants, which falls in the range suggested by the power analysis. I contend this study is sufficiently powered (for nomothetic analyses examining sex and race influences on treatment decisions) with 20 participants. Lens model studies with an adequate profile-to-cue ratio have increased power at the group-level of analysis due to greater reliability of each participant's responses through the use of multiple observations (94). Moreover, each patient cue combination was presented four times to further enhance statistical power. Finally, the mixed methods approach used in this study will enhance its overall quality and statistical power (125).

CHAPTER 3. RESULTS

3.1 Sample characteristics

The final sample consisted of 20 trainees (Table 3.1). The majority of trainees were female (65%). Most trainees reported their race as Caucasian (65%) or Asian American (20%). Average age of the sample was approximately 27 years old (*SD*= 3.03). All trainees were currently enrolled in an academic program at the Indiana University School of Medicine, with 10 trainees currently enrolled in medical school and the other half in residency training. Trainees' indicated an average of 29.5 (*SD* = 26.8) clinical experience and an average of 27.2 (*SD* = 23.3) personal experience with chronic pain. Although a validated interpretation rubric for this measure is not available, I interpret these data to indicate that trainees' average clinical and personal experience was small-to–medium.

Table 3.1 Demographic characteristics

	n	% total
Training Experience		
Medical student	10	50%
Medical resident	10	50%
Sex		
Female	13	65%
Male	7	35%
Race/ethnicity		
Caucasian	13	65%
Asian	4	20%
African-American	1	5%
Hispanic	1	5%
Middle-eastern	1	5%

As this was a secondary analysis, the 20 trainees were compared to the larger sample participants (n=100) to examine any group differences. No significant differences emerged between the age [t(98)=1.04, p=.302], sex [$\chi^2(1)=1.96$, p=.16], race [$\chi^2(3)=.438$, p=.93], or ethnicity [$\chi^2(1)=.344$, p=.558] of the two samples.

3.2 Measurement information

Descriptive information on trainees' attitude scores, experience ratings, and treatment decision ratings are presented in Table 3.2. Pearson's correlations were calculated to examine discriminant validity across measures (Table 3.3). As found in a previous investigation, the ASI and CSNP scales were positively correlated (138). Furthermore, the ASI's Hostile Sexism scale was negatively correlated with trainees' personal experience with chronic pain (*r*=-.45, p<.05), and the CSNP's Complementary

Stereotypes scale was positively correlated with trainees' opioid ratings (*r*=.45, p<.05). The theoretical significance of these correlations is questionable, suggesting that these results are likely spurious or due to unmeasured variables.

Table 3.2 Descriptive information for measures

Measures	Mean (*SD*)	Range
Ambivalent Sexism Inventory	1.9 (*.84*)	0.5 – 3.5
Benevolent Sexism	2.2 (*.86*)	0.5 - .3.8
Hostile Sexism	1.7 (*.74*)	0.3 – 3.5
Complementary Stereotypes Negative Prejudice	3.1 (*.74*)	1.9 – 4.3
Complementary Stereotypes	3.7 (*.94*)	2.2 – 5.5
Negative Prejudice	2.6 (*.83*)	1.2 – 4.2
Trainees' experience with chronic pain		
Clinical experience	29.5 (*26.8*)	0.0 – 74
Personal experience	27.2 (*23.3*)	0.0 – 75
Treatment ratings		
Opioid ratings	18.2 (*20.1*)	0.0 – 62.0
Antidepressant ratings	38.7 (*14.2*)	0.5 – 62.6
Physical therapy ratings	74.7 (*28.5*)	0.0 – 100
Refer to pain specialist ratings	11.9 (*14.4*)	0.0 – 51.6

ASI ratings from 0-5 (higher sexist attitudes)
CSNP ratings from 1-7 (higher racist attitudes)
Experience ratings on 0-100 ("Very experienced") VAS
Treatment ratings on 0-100 ("Extremely likely") VAS

Table 3.3 Discriminate validity between measures

	ASI			CSNP			Clinical experience	Personal experience	Opioids	Antidep.	PT	Refer to PS
		BS	HS		CS	NP						
ASI total score	1	.89$^{\pm}$	.92$^{\pm}$	.78$^{\pm}$	.57*	.74$^{\pm}$	.27	-.40	.14	-.13	-.10	.26
BS subscale		1	.65*	.67*	.51*	.61*	.26	-.28	-.01	-.09	-.01	.20
HS subscale			1	.75$^{\pm}$	.53*	.73$^{\pm}$	.24	-.45*	.25	-.14	-.16	.27
CSNP total score				1	.86†	.82$^{\pm}$	.13	-.34	.32	.10	-.12	.16
CS subscale					1	.41	-.09	-.28	.45*	-.03	-.18	.08
NP subscale						1	.33	-.29	.06	.21	.01	.21
Clinical experience							1	-.12	-.11	-.19	.34	-.26
Personal experience								1	-.40	.04	-.06	-.02
Opioid ratings									1	.21	-.08	.42
Antidepressants										1	.01	.36
PT ratings											1	-.02
Refer to PS ratings												1

$^{\pm}$ p<.001; * p<.05

Cells represent Pearson's correlation coefficients

3.3 Study hypothesis 1: Influence of patient demographics

Individual regression equations were computed for each participant to model his/her decision-making influences across 4 chronic pain treatments (opioid, antidepressant, physical therapy, referral to a pain specialist). Each regression model consisted of 2 independent variables (VH sex and race) that were entered simultaneously. Each trainee's VH sex and race beta value and their combined R^2 value is presented in Table 3.4.

Table 3.4 β and R^2 values for each cue across decision

User	Opioids			Antidepressants			Physical Therapy			Referral to pain specialist		
	Sex	Race	R^2	Sex	Race	R^2	Sex	Race	R^2	Sex	Race	R^2
1	-.17	.29	.11	-.18	-.03	.03	<.01	<.01	<.01	-.11	.17	.04
2	<.01	<.01	<.01	.01	-.02	<.01	-.05	-.41	.17	-.24	.28	.14
3	-.51*	.21	.31†	-.46†	-0.29	.29	.16	.05	.03	-.09	.13	.03
4	-.08	.39	.16	-.07	-.03	.01	<.01	<.01	<.01	-.26	.26	.13
5	-.47†	.21	.26	.14	-.15	.04	<.01	<.01	<.01	-.28	.05	.08
6	.23	-.41	.22	.34	-.16	.14	-.25	-.20	.10	<.01	<.01	<.01
7	.23	.30	.15	.03	.05	.01	.26	.26	.13	.40	.34	.27
8	.05	.40	.16	-.03	-.03	.01	-.18	.29	.12	.40	-.01	.16
9	.06	-.25	.07	.08	.09	.02	.22	.44†	.24	-.11	-.05	.02
10	.32	.02	.10	-.40	-.40	.32†	.45†	-.08	.21	-.12	.21	.06
11	-.25	-.25	.13	-.01	-.26	.07	.05	.24	.06	.14	.14	.04
12	-.23	-.15	.07	.16	.06	.03	.28	-.34	.19	.55*	.04	.31†
13	<.01	.02	.01	-.01	-.01	<.01	-.54*	.15	.31†	<.01	<.01	<.01
14	.48†	-.16	.26	-.07	-.17	.04	.08	.10	.02	-.08	-.21	.05
15	.07	-.07	.01	.21	-.31	.14	<.01	.45†	.20	.26	-.26	.13
16	.09	.37	.14	-.17	-.11	.04	-.21	-.02	.04	<.01	<.01	<.01
17	.16	-.23	.08	.08	-.08	.01	<.01	<.01	<.01	.11	.44	.21
18	.12	-.02	.02	-.10	-.12	.03	-.11	-.11	.03	.15	<.01	.02
19	-.26	.24	.12	-.08	.03	.01	-.26	-.50†	.31†	-.21	-.16	.07
20	-.48†	.16	.26	.13	.02	.02	-.18	-.36	.16	-.02	.22	.05

† p<.10, * p<.05

Note: Sex and Race values represent beta weights (β). R^2 values represent the amount of variance accounted for by both Sex and Race

+β in *Sex* or *Race* column, trainee gave higher treatment ratings to male or White patients

-β in *Sex* or *Race* column, trainee gave higher treatment ratings to female or Black patients

3.3.1 Idiographic analyses

Significant results of the idiographic analyses are presented in Table 3.5 and discussed below.

Table 3.5 Idiographic analyses

Cue		Treatment Decision				
		Opioid	Antidepressant	Physical Therapy	Referral to a Pain Specialist	Total
Sex	Male	3	1	1	0	5
	Female	1	0	1	1	3
Race	White	0	0	1	0	1
	Black	0	0	2	0	2

Columns represent the treatment decision. Rows represent the individual cue level. Cell values represent the number of participants with a significant policy for a particular treatment decision (column), weighted toward a particular individual cue (row). For example, under the *Opioid* column, in the *Sex* row, there is three for *Male* and one for *Female*. This indicates that four total participants used VH sex as a consistent cue (p<.10) when recommending opioid treatments. Specifically, three trainees gave higher opioid ratings to male VH, and one trainee gave higher opioid ratings to female VH.

3.3.1.1 Opioid recommendations

Results indicated that 4 trainees (20% of all participants) had a statistically reliable cue use when recommending opioid treatment. One trainee had a statistically significant (p<.05) cue use for patient sex, and 3 trainees had a cue use for patient sex that approached significance (p<.10). Of these four trainees, three trainees gave higher opioid recommendations to male patients than to female patients, and one trainee gave higher opioid recommendations to female patients. Race was not a statistically reliable cue (at p<.05 or p<.10) for any of the 20 trainees when making opioid treatment decisions.

3.3.1.2 Antidepressant recommendations

One trainee (5% of all participants) had a statistically reliable cue use when recommending antidepressant treatment (p<.10). This trainee gave higher antidepressant treatment ratings for male patients compared to female patients. Race was not a statistically reliable cue for any of the participants when making antidepressant treatment decisions.

3.3.1.3 Physical therapy recommendations

Five trainees were influenced by patient demographics for physical therapy (PT) recommendations (25% of all participants). Patient sex was consistently used by 2 of these trainees. One gave higher ratings to female patients (p<.10), and one gave higher PT ratings to male patients (p<.05). Three trainees reliably used patient race (p<.10). Two gave higher PT ratings to Black than White patients, with the other trainee giving higher PT ratings to White than Black patients.

3.3.1.4 Referral to a pain specialist recommendations

One trainee (5% of all participants) had a statistically significant cue use when recommending referral to a pain specialist ($p<.05$). This trainee gave higher pain specialist ratings to female patients than for male patients. Race was not a statistically reliable cue for any of the trainees.

3.3.1.5 Variance accounted for by patient sex and race

Examination of R^2 values across trainees found both patient sex *and* race accounted for as much as 31% (mean = 13%) of the variance in trainees' ratings to treat with an opioid and as much as 32% (mean = 6%) in their decision ratings to treat with an antidepressant. Additionally, patient demographics accounted for as much as 31% (mean = 12%) of the variance in trainees' PT ratings, and 31% (mean = 9%) in their ratings to refer to a pain specialist.

To quantify the amount of variance accounted for by patient sex and race, separately, semi-partial correlations were examined for each treatment decision (Table 3.6). The following values represent the maximum amount and average amount of variance (in parentheses) accounted for by each sex and race cue. Results of these calculations indicated that patient sex accounted for as much as 27% (7%) and race accounted for as much as 18% (6%) of the variance in trainees' opioid ratings, respectively. Patient sex and race accounted for as much as 21% (3%) and 16% (3%), respectively, of the variance in trainees' ratings to treat with an antidepressant. Patient sex and race accounted for as much as 29% (5%) and 26% (7%), respectively, in trainees' ratings to recommend PT, and 31% (5%) and 19% (4%) in their ratings to refer to a pain specialist. Further descriptive data is presented in Table 3.6.

Table 3.6 Cue variance within decision

Treatment Decision	Sex	Race	R^2
	Mean (*SD*)	Mean (*SD*)	Mean (*SD*)
	Range	Range	Range
Opioid	.07 (.09)	.06 (.05)	0.13 (.09)
	<.01-.27	<.01-.18	<.01-.31
Antidepressant	.03 (.06)	.03 (.04)	.06 (.09)
	<.01-.21	<.01-.16	<.01-.32
Physical Therapy	.05 (.07)	.07 (.08)	.12 (.10)
	<.01-.29	<.01-.26	<.01-.31
Referral to a Pain Specialist	.05 (.07)	.04 (.05)	.09 (.09)
	<.01-.31	<.01-.19	. <.01-.31

Note: Sex and Race values represent squared semi-partial correlations. R^2 values represent the amount of variance accounted for by both Sex and Race.

3.3.2 Nomothetic analyses

Nomothetic results indicated that 10 trainees had a consistent cue use ($p<.10$) across treatment decisions. Thus, 50% of trainees sampled used patient sex or race in a statistically consistent manner when making pain treatment decisions. Seven of these 10 trainees (35% of all participants) had at least 1 significant patient sex cue coefficient (standardized beta), and 3 trainees (15% of all participants) had at least 1 significant patient race cue coefficient. No trainees were consistently influenced by patient sex *and* race within or across treatment decisions, and only one trainee was reliably influenced by patient sex across more than one treatment (e.g., use of patient sex for both opioid and antidepressant decisions).

For each trainee, average treatment ratings were calculated across patient sex and race. Normality assumptions were violated or almost violated for the majority of treatment ratings. Thus, paired samples *t*-tests and Wilcoxon signed-rank tests were run for all analyses. Results were the same for both sets of analyses; for ease of interpretation, *t*-test findings are reported in Table 3.7.

Table 3.7 Nomothetic analyses

Decision	Cue		Mean (*SD*)	t	d_z
Opioid	Sex	Male	17.73 (20.9)	*ns*	<.01
		Female	17.72 (20.4)		
	Race	White	17.13 (19.5)	*ns*	.28
		Black	18.31 (21.5)		
Antidepressant	Sex	Male	36.74 (16.8)	*ns*	.05
		Female	37.12 (17.1)		
	Race	White	38.64 (17.2)	2.159*	.48
		Black	35.22 (16.7)		
Physical Therapy	Sex	Male	75.61 (29.0)	*ns*	.09
		Female	76.07 (29.1)		
	Race	White	76.64 (29.7)	*ns*	.16
		Black	75.67 (28.5)		
Refer to Pain Specialist	Sex	Male	11.78 (15.3)	*ns*	.20
		Female	11.19 (13.9)		
	Race	White	10.98 (15.1)	*ns*	.25
		Black	12.00 (14.3)		

* $p<0.05$
t used for paired samples t-tests
d_z, Cohen's d used as effect size indices for paired samples t-tests
ns, not significant

Paired-samples t-tests found that average ratings for opioid, antidepressant, and physical therapy did not differ significantly between male and female patients. Although referral to a pain specialist ratings did not reach statistical significance, there was a small effect of males receiving higher referral ratings than female patients [t(19)=.888, p=.38, d_z=.20]. Average antidepressant ratings were significantly different between White and Black patients. Specifically, on average, trainees gave higher antidepressant ratings to White than Black patients [t(19)=2.159, $p<0.05$, d_z=.48]. Two other treatment options did not reach statistical significance; however, small effects were detected. Specifically, there was a small effect of Black patients receiving higher opioid ratings than White patients [t(19)=-1.231, p=.23, d_z=.28], and Black patients received higher referral to a pain specialist ratings than White patients [t(19)=-1.140, p=.27, d_z=.25].

Exploratory independent samples t-tests were used to compare treatment ratings between male and female trainees, as well as between White and non-White trainees. These analyses found no significant differences between male (n=7) and female (n=13) trainees' ratings for opioids, physical therapy, or referral to a pain specialist; however, there was a non-significant trend for female trainees to give higher antidepressant ratings than male trainees [t(18)=-2.077, p=.052, d_z=.85]. Similarly, there were few differences between White (n=13) and non-White (n=7) trainees, except non-White trainees gave higher physical therapy ratings than White trainees [t(18)=-1.764, $p<.05$, d_z=.74]. Given the small sample size, these findings should be interpreted with caution.

To examine whether social desirability responses were influencing trainees' treatment decision ratings, paired-samples t-tests were used to compare treatment ratings for trainees who guessed correctly at the study's purpose (n=15) and ratings for trainees who guessed incorrectly (n=5) at the end of the online study. No significant treatment rating differences occurred between these two groups (p=*ns*), suggesting that awareness of the study's purpose did not influence trainees to make different ratings.

3.4 Study hypothesis 2: Trainee awareness of decision-making influences

At study conclusion, participants were asked to indicate the information they used to make treatment ratings for the patients. From a provided list, participants indicated each factor that influenced their decisions and rated the amount of influence for each selected item on a VAS scale. Participants' responses to the item, "Patients' demographic characteristics (e.g., sex, race, age)" were used to evaluate the extent to which trainees demonstrated consistency in the cues they reported using versus the cues they actually used in their decision-making process.

Examination of trainee's responses indicated that 13 out of 20 trainees (65% of all participants) reported using patient demographics when making treatment decisions for the chronic pain vignettes. This finding is in contrast to the idiographic regression analyses, which indicated that 35% and 15% of all trainees used patient sex and race, respectively, in a statistically reliable manner. Thus, while 13 trainees reported using patient demographics, only 10 trainees were actually influenced by either patient sex or race.

Crosstabulation was used to further examine concordance between trainees' reported use of patient demographics (0= Did not report being influence; 1= Reported being influenced) and their actual use of patient sex and race as indicated by the results of idiographic regression analyses (0 = Not statistically influenced; 1= Influenced by patient sex or race [p<0.10]).

Of those 13 trainees who reported using demographics, 6 were not statistically influenced by patient sex or race in their treatment decisions; the remaining 7 trainees reported being influenced and were actually influenced by patient demographics in their treatment decisions. Alternatively, of those 7 trainees who did not report using patient demographics in their treatment decisions, 4 were not statistically influenced by either patient sex or race; the remaining 3 trainees were influenced by patient demographics. Thus, 11 (55%) trainees demonstrated concordance (which suggests awareness of their decision-making processes), and 9 (45%) trainees demonstrated discordance (which suggests unawareness) between the reported and actual influence that patient demographics had on their chronic pain treatment decisions. Additionally, of the 11 concordant ("aware") trainees, 7 demonstrated awareness of being influenced by patient demographics, and 4 trainees demonstrated awareness of not being reliably influenced by patient demographics in their treatment decisions. Of the 9 discordant ("unaware") trainees, 3 trainees demonstrated unawareness that they were reliably influenced by patient demographics in their treatment decisions, and 6 trainees reported using patient demographics but did not reliably use these patient factors in their treatment decisions.

McNemar test revealed that the sample did not demonstrate statistically significant discordance between their reported and actual use of patient demographics (p = .51). Based on my operational definition of awareness (i.e., concordance between reported and actual use of patient demographics), the sample generally demonstrated awareness of their decision-making processes for chronic pain treatment decisions.

In order to further examine trainees' level of awareness, sex and race beta weights were re-evaluated using a more liberal p<.20 to indicate whether trainees were significantly influenced by patient demographics. This more liberal alpha-level resulted in one trainee being re-categorized as "aware" of using patient demographics, which resulted in 12 concordant and 8 discordant trainees. A follow-up McNemar test yielded similar results to the previous analysis, in that the sample did not demonstrate significant discordance between their reported and actual use of patient demographics (p=.29).

3.5 Study hypothesis 3: Treatment decision relationship to attitudes

Attitude scores for each participant were calculated based on the mean of the overall attitude measures as well as scores for each measure's subscale (e.g., positive or negative attitudes). Four participants had one missing item from either the racial or gender attitude measure. Missing item responses were imputed with the mean of the missing subscale's score (140). Both the ASI and CSNP were found to have good internal consistency in this sample (ASI *Cronbach's alpha* = .90, CSNP *Cronbach's alpha* =.86). Descriptive information of trainees' attitude scores is presented in Table 3.2.

Pearson correlations were used to examine the relationship between participants' gender and racial attitudes (total and sub-scale scores) and each treatment decision rating for male, female, White, and Black patients (Table 3.8). Opioid ratings for White patients were positively correlated with scores on the complimentary stereotypes subscale of the CSNP (r =.48, p<.05); thus, endorsement of more "positive" stereotypes about Black individuals were related to higher opioid ratings for White patients. No other significant correlations were found between attitude scores and treatment recommendations. Fisher r-to-z transformation analyses were used to examine differences in the correlations between treatment ratings (for different patient demographic groups) and attitude scores; for instance, I examined differences in the correlation coefficients between male and female opioid ratings and gender attitude scores (total and sub-scales). These analyses found no significant differences between correlation coefficients, indicating that gender and racial attitudes are not more strongly associated with female and Black treatment recommendations than male and White recommendations, respectively, as hypothesized.

Table 3.8 Gender and racial attitude correlations

		Patient Sex		Patient Race	
Treatment Decision	Attitude Scale	Male	Female	White	Black
Opioid	Total score	.139	.180	.357	.315
	Positive scale	-.012	.031	.482*	.421
	Negative scale	.243	.277	.094	.088
Antidepressant	Total score	-.116	-.092	.004	.261
	Positive scale	-.244	-.147	-.125	.165
	Negative scale	.014	-.029	.148	.282
Physical Therapy	Total score	-.06	.005	-.006	-.103
	Positive scale	.094	.135	-.083	-.177
	Negative scale	-.185	-.110	.088	.021
Refer to PS	Total score	.287	.252	.171	.211
	Positive scale	.171	.135	.102	.119
	Negative scale	.338	.308	.192	.245

*p<.05
Values represent Pearson's correlation coefficients
For gender attitudes, correlations were run between treatment ratings for male and female patients, and the ASI total score, BS (positive) scale, and HS (negative) scale
For racial attitudes, correlations were run between treatment ratings for White and Black patients, and the CSNP total score, CS (positive) scale, and NP (negative) scale

For exploratory analyses, gender and racial attitudes were tested as potential mediators/confounders of the relationship between patient demographics and treatment decisions. Hierarchical regression analyses were used to determine change in influence of either patient sex or race (percent change in unstandardized B) when scores on the gender/racial attitude subscales were present in the model. However, patient sex and race accounted for such a small amount of the variance in providers' treatment decisions (maximum B for sex, 12.76 p=.433, and race, 7.78 p=.123), that further analysis of the role of gender and racial attitudes was not indicated.

Further exploratory analyses examined any differences in attitudes based on trainees' reported demographic information. Independent samples t-tests found male and female trainees endorsed similar gender and racial attitudes, and White and non-White trainees endorsed similar gender attitudes. However, non-White trainees reported more negative racial attitudes overall [$t(18)=-2.148$, $p<.05$, $d_z=.97$] and more hostile racial prejudice specifically [$t(18)=-2.679$, $p<.05$, $d_z=1.3$]. Given the small sample size and the heterogeneous group of non-White participants (see Table 3.1), replication is needed before drawing strong conclusions from these findings.

3.6 Qualitative results

All 20 trainees who participated in the quantitative portion of the study participated in qualitative interviews. Of those contacted, I had a response rate of 52%. Twenty-two providers were asked to participate in an interview, but did not respond to the invitation. Independent samples t-tests revealed no significant difference in treatment ratings, clinical experience with pain, or gender/racial attitude scores between providers who did not respond to the invitation (n=22) and providers who participated in follow-up interviews (n=24, including the 20 trainees used in this investigation). However, providers who did not respond to the invitation had more personal experience with chronic pain than providers who were interviewed [$t(44)=2.176$, $p<.05$, $d_z=.59$].

Trainees were interviewed between 2 and 8 weeks after completion of the online portion of the study. Across all interviews, trainees spoke extensively about the need to consider patients' previous pain histories to determine treatment, such as the type/cause of pain and the severity/intensity of the patients' reported pain. Additionally, trainees spoke about their comfort-level with common chronic pain treatments, including their hesitancy to prescribe certain treatments. The majority of this discussion centered on their discomfort and hesitancy to use opioid medications for chronic pain. The frequency of discussed themes is presented in Table 3.9.

Table 3.9 Qualitative themes

Theme	Aware	Unaware
Most common themes		
Patients' pain history	100%	100%
Provider comfort level with treatments	100%	100%
Themes surrounding patient sex		
Tailoring/individualizing treatments	100%	100%
Patient presentation and description of pain	78%	82%
Themes surrounding patient race		
Patient presentation and description of pain	78%	100%
Beliefs about cultural differences	44%	56%

To better understand the influence of providers' level of awareness of their treatment decision-making, interviews were examined between trainees who were statistically concordant between actual and reported use of demographics (Aware) and those who were discordant between their actual and reported use (Unaware).

Two methods were used to examine whether themes varied between aware and unaware trainees. In the first method, the interviewer reviewed trainees' discussion of the influence of patient sex and race and attempted to classify the trainee as either "aware" or "unaware" based solely on their discussion. These blind ratings were then compared to the statistical assignments. This method proved to be unreliable in determining whether "aware" and "unaware" trainees discussed different themes based on patient sex and race.

The second method used the statistical assignments of trainees' level of awareness, and examined prominent themes regarding the influence of patients' demographic characteristics between the two groups.

3.6.1 Discussion of patient sex

The most frequent theme surrounding discussion of patients' sex was whether the trainee found it appropriate to tailor and individualize treatment based on sex. Trainees who were aware of their decision-making influences were more likely to discuss being *un*comfortable using different treatments based solely on patients' sex, unless there was evidence for tailoring treatments, e.g., "[I]f there are studies that show…women work better with certain medications than men, then if there's evidence that backs it up, I'd be willing to try it" (Participant 22, Aware). This discussion is interesting in light of the fact that the majority of aware providers were more likely to both consistently use and report using patient demographics. Thus, although trainees discuss the necessity of evidence-based support to tailor treatments based on patients' sex, they were statistically influenced by patient sex in their online treatment decisions. However, unaware trainees were more likely to discuss that there are differences in risk factors between men and women that would make tailoring more appropriate, e.g., “[P]retending a women’s risk factor for depression is the same as a man’s is not medically sound. Women are at a higher risk for depression…so I think really you incorporate the sex into their clinical picture.” (Participant 14, Unaware). This discussion mirrors part of the quantitative findings that the majority of unaware trainees were more likely to report using patient demographics; however, these trainees were not statistically influenced by patient demographics in statistical analyses.

The second most common theme was differences in patients’ presentation and description of their chronic pain. A typical response of trainees, regardless of level of awareness, related to patients’ description of pain, e.g., “[M]en are more linked to injury of a specific work environment whereas women seem to have more generalized pain issues.” (Participant 10, Aware trainee). Trainees also commented on differences in presentation, e.g., “The women are more emotional with it. They’re the ones that typically start break down and crying in the room; where the men kind of hide it and don’t want to kind of show that this is a weakness in their life so they don’t really talk about it. They just want a solution.” (Participant 11, Unaware).

3.6.2 Discussion of patient race

The majority of trainees discussed differences in description and presentation of pain between ethnic, but not racial, groups. Aware trainees did not recognize any differences between Black and White pain patients, e.g., “Between African-American and Caucasians, I am not really sure that there is any difference in presentation”

(Participant 21, Aware). However, aware trainees discussed differences between Hispanic patients and other racial/ethnic groups. Discussions typically centered on beliefs about cultural differences, such as differences in how Hispanic patients present with pain, e.g., “I just think that Latinos, they come quicker and they have sometimes minor pain….” (Participant 21, Aware). One trainee expressed frustration with this stereotype, “I’ve heard a lot of my colleagues discuss the Hispanic population as having like silly complaints…I feel like they’re being overly dismissive of the Hispanic abdominal pain complaints…” (Participant 1, Aware). The trainee then noted, “I feel like that attitude has probably influenced how I’m seeing patients because…I try to filter out the fact that I’ve heard [and] read about biases in medicine” (Participant 1, Aware).

Similarly trainees who demonstrated a lack of concordance between reported and actual use of demographics did not discuss any differences between Black and White chronic pain patients, e.g., “African-American or Caucasian…they’re pretty similar. When they’re in pain, they present like they’re in pain…there’s really no difference between those two” (Participant 3, Unaware). Unaware trainees also discussed Hispanic patients’ pain presentations, specifically that Hispanic individuals view pain as a “part of daily life” and do not “manifest pain” as much as other race/ethnicities (Participant 2, Unaware). Discussion of Hispanic population’s pain was summed up plainly by one trainee: “As a rule, the Hispanic population does not have chronic pain” (Participant 14, Unaware). Thus, aware and unaware trainees were willing to discuss unique aspects of the Hispanic patient’s experiences with chronic pain. Aware trainees were consistently more likely to comment on Hispanic patients presenting quickly to hospitals when in pain; whereas, unaware trainees typically commented that Hispanic patients rarely present or express pain. However across both groups, there was very little discussion regarding perceived differences between Black and White patients' pain experiences or how patients' race may influence their treatment decisions.

CHAPTER 4. DISCUSSION

Female and Black individuals are at increased risk for sub-optimal pain care, which may be related to differences in providers' pain decisions and/or their gender and racial attitudes. Additionally, it is unclear whether providers are aware of the factors, such as patient sex and race, which influence their pain treatment decisions. Using novel virtual human technology and lens model methodology, this study found that half of the trainees sampled were reliably influenced by patient demographics when making treatment decisions, and the majority of these trainees were generally aware of this influence. Trainees' racial attitudes – specifically, their complimentary stereotypes about Black individuals – were positively associated with their opioid recommendations for White chronic pain patients. During interviews, trainees discussed differences in pain presentation and description based on patient sex and ethnicity. Trainees' discussions were generally consistent regardless of their decision-making awareness.

In line with my first hypothesis, almost half of the trainees (40%) were influenced by patient sex in their treatment decisions. However, at the group-level, no significant sex differences in treatment ratings were detected. At the idiographic level of analysis, patient sex was most influential for opioid ratings, with 4 (out of 20) trainees consistently using patient sex in their opioid ratings; three of which gave higher opioid ratings to male patients. Furthermore, patient sex accounted for an average of 7% of the variance in trainees' opioid treatment ratings. Thus, although patients' sex was not a consistently strong predictor overall in trainees' treatment decisions, it was reliably used by some providers. These individual differences are typically overlooked in traditional group-based analyses. Considering the prevalence of chronic pain and frequency of healthcare utilization among this patient population (1), as well as sex differences in rates of different pain conditions (54), accounting for individual differences in clinical decision-making can allow researchers to better isolate provider-related factors that may contribute to treatment disparities and help develop effective educational interventions.

Trainees were also influenced by patient race. As hypothesized, group differences emerged with White patients receiving higher antidepressant ratings than Black patients. This aligns with recent findings that Black patients with depression are less likely than White depressed patients to be treated with antidepressants (82). Although non-significant, there were small-to-moderate effect sizes for Black patients to receive higher opioid and referral to pain specialist ratings than White patients. These findings are not consistent with the majority of published retrospective investigations, which found Black patients received significantly less opioid medication for their pain than White patients (78-80). However, other vignette pain studies have found similar opioid treatment recommendations for Black pain patients (see 32, 70, 141). A possible explanation for these inconsistencies in the literature is that patient race may serve as a proxy variable for true variables that influence providers, such as patients' SES and access to care. These patient factors, which are typically confounded with race, are often unmeasured in retrospective study designs but may be controlled in vignette study designs. Indeed, some trainees noted that patients' SES is often confounded with race, e.g., "I don't think there is a difference amongst races [presenting in pain to the hospital]. It's more socioeconomic status and in this area it seems that the lower socioeconomic status that I've seen in the hospital is usually an African-American or Hispanic patient…" (Participant 6, Aware). Some trainees noted patient SES is more likely to influence their decisions than race, e.g., "[My treatment decision] factors in on the economic status too. So race alone…wouldn't be enough to change the treatment" (Participant 10, Aware). Often discussed were issues due to access to care, insurance status, and transportation difficulties. These factors were not systematically manipulated in the current study; thus, it was not possible to examine their influence on participants' treatment decisions. Future investigations should manipulate additional patient factors with patient demographics, such as issues surrounding low SES, to examine the unique and combined influence of these factors on treatment decisions.

At the group-level, White patients received significantly higher antidepressant ratings than Black patients; however, at the idiographic level, no trainee was reliably influenced by patient race in their antidepressant recommendations. Although these seem to contradict each other, nonsignificant differences at the idiographic level can add up to significant differences at the nomothetic level. These findings suggest that, rather than antidepressant treatment differences being driven by a small number of trainees, the *majority* of trainees sampled gave slightly higher antidepressant ratings to

White than Black patients. The clinical implications of this interpretation are unclear at this time. Additional research is needed to better understand how providers use antidepressants for diverse patient with chronic pain and the effects of even small variation in treatment decisions for different patients.

Trainees demonstrated greater awareness of their decision-making influences than hypothesized and found in previous work (32, 142-144). However, qualitative results did not differ considerably between concordant (“aware”) and discordant (“unaware”) trainees. While the quantitative measure of awareness indicated that the majority of aware trainees were both influenced by and reported use of patient demographics, trainees in this group discussed being uncomfortable tailoring treatments based on patients’ sex. This apparent contradiction between trainees’ quantitative and qualitative findings could be due to several factors. First, providers were asked to report their use of “patient demographics,” which may be too broad of a category; providers may be more or less aware of being influenced by a specific patient demographic variable such as sex or race. Furthermore, this question included “age” as a demographic characteristic for consideration. Trainees may have endorsed using patients’ demographics but were more aware of being influenced by patients’ age, as opposed to sex or race. Secondly, trainees may feel comfortable reporting demographic influences in anonymous online formats, but be uncomfortable discussing these influences in face-to-face interviews due to social desirability.

Nevertheless, trainees were relatively candid in their discussion of Hispanic patients’ presentations of chronic pain. The interviews uncovered a range of attitudes toward Hispanic patients -- from Hispanic individuals do not experience chronic pain to Hispanic patients present too frequently with uncommon pain complaints. Future investigations should examine how providers' attitudes about Hispanic patients may influence their pain care. This is particularly important as the Hispanic population in recent years has become the fastest growing demographic group (145), and this population is over-represented in occupations that put individuals at an increased risk of developing chronic pain (146-149).

Contrary to my third hypothesis, trainees' gender and racial attitudes were not significantly associated with their treatment for female and Black patients, respectively. However, trainees' complimentary racial attitudes were associated with their opioid ratings for White patients. One aspect of the complimentary stereotypes assessed on the racial attitude measure is that Black persons are more athletic than White individuals (138). These "positive" stereotypes about Black persons' physical capabilities may result in providers' believing Black patients have a higher pain tolerance than White persons. Similarly, a recent investigation found laypersons rated a typical White person as being more sensitive to pain than the typical Black person (65). However, given the lack of literature to support this relationship, this finding should be interpreted with caution. This interpretation would be strengthened if racial attitudes had also been found to be negatively associated with Black patients' opioid ratings.

There are other potential clinical and research implications of this study. This investigation builds upon previous disparities work by using rigorous and clinically relevant methodology. Half of sampled trainees were influenced by patient sex or race in their treatment decisions, which suggests that early and continued attention to identifying and reducing pain disparities during medical training is needed. While trainees demonstrated some awareness of their decision-making influences, medical curricula could focus on enhancing all trainees' awareness of their treatment decision influences, which will likely improve patient care, particularly for ambiguous and emotionally-charged medical conditions like chronic pain. Furthermore, trainees expressed some negative attitudes, both on validated measures and during interviews, about female and Black chronic pain patients. Efforts that directly intervene on these attitudes during medical training and continuing education may help reduce treatment disparities.

Future research on disparities and awareness may want to consider the following recommendations. Given the inconsistent literature on treatment disparities, more research is needed to better understand variability in pain treatment across patient sexes and races. Future investigations should examine provider awareness of being influenced by patient sex and race, separately, as awareness may vary between these two patient factors. Additionally, the role of other provider attitudes, including implicit attitudes, attitudes towards socioeconomic status, and attitudes towards Hispanic individuals, should be investigated to examine their role in unequal pain management. Furthermore, given the qualitative results of the current study and the relative dearth of research on pain in Hispanic individuals, future research is needed to better understand the pain experiences of Hispanic patients, as well as providers' attitudes and treatment practices with this rapidly growing population. Additionally, shared decision-making may be important to examine in the treatment of chronic pain, particularly when patients and providers have different demographic characteristics.

Some limitations of this study should be addressed. Although the VH technology has been used successfully in previous studies, with participants rating the vignettes as realistic and reflective of actual clinical scenarios (30, 31), one should be cautious when generalizing these findings to actual clinical practice. Although patient vignettes give researchers more experimental control than trained actors, they do create an artificial environment that may not reflect an actual clinical setting. In addition, this study used self-report attitude measures and individual interviews, which may be susceptible to participants providing socially desirable answers. This concern may be particularly relevant to the current study, as trainees were interviewed after completing the online study, and the majority of trainees' guessed correctly at the study's hypotheses/purpose. Based on the a priori power analysis, group-analyses may just reach adequate power with 20 participants. However, this lens model study used a favorable profile to cue ratio (8:1, which exceeds the suggested 5:1) and included 4 replications of each cue combination, which enhances power based on the increased number of ratings across cues. Finally, this study included a limited number of healthcare trainees from a mid-western medical school, which may limit the generalizability of these findings to other healthcare provider trainees and types, as well as those in other parts of the country.

In summary, this investigation used novel mixed methodology to better understand trainees' chronic pain treatment decision-making and the influence of patient sex and race on their decisions. Patient sex or race was influential in half of the trainee’s decisions for recommending opioids, antidepressants, physical therapy, or referral to a pain specialist. Trainees’ demonstrated some awareness of the influence patient demographics had on their decision-making process. Although certain types of explicit racial attitudes appear to be associated with trainees’ opioid treatment decisions for White patients, sex- and race-related attitudes were not prominently related to trainees’ treatment decisions. Additionally, qualitative interviews supplemented the quantitative findings, specifically in regards to trainees’ awareness and attitudes. Future investigations should include additional patient factors to examine possible mediators and moderators of pain treatment disparities.

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APPENDICES

Appendix A Instructions for completing online study

Please follow these instructions and those on the following pages very carefully.

Prior to making your ratings, you must:

- Read each patient's clinical summary fully and carefully
- Review each patient's vital sign information fully and carefully
- View each patient's image

For each patient, you will be asked to:

- Rate the level of pain this patient has been experiencing
- Rate the level of psychological distress this patient has been experiencing

For each patient, you will also be asked to:

- Rate the likelihood that you would consider/recommend the pain management practices listed below in the care of this patient.
    - Prescription of opioid/narcotic pain medication*
    - Prescription of non-opioid/non-narcotic pain medication
    - Prescription of antidepressant medication*
    - Over-the-counter pain medication
    - Lifestyle activities such as diet and/or exercise
    - Physical therapy*
    - Ice, heat, and/or analgesic cream
    - Referral to a mental health provider for counseling
    - Referral to a pain specialist*
    - No intervention at this time; return in 1 month

*This investigation examined 4 out of the 10 treatment considerations/recommendations

Each of your ratings will be made on scales consisting of a horizontal line and "slider" that you can adjust to indicate the point on the line that best represents your rating. To make your ratings:

- Place your mouse cursor over the "slider"

- While holding the left mouse button down, move the slider to the point on the line that represents your rating

When making your ratings, it is important that you only use the information provided on the screen, and that you not think about previous patients and ratings you have already completed.

You must complete all of the ratings for a given patient before moving onto the next patient. When you have completed your ratings for a patient, click the "next" button at the bottom of screen to move onto the next patient.

Appendix B Demographics questionnaire

1) Age: _____

2) Sex: ☐Male ☐ Female

3) Race/Ethnicity

☐ Asian/Pacific Islander
☐ Black/African American
☐ Hispanic/Latino
☐ Native American/Eskimo/Aleut
☐ White/Caucasian
☐ Other (please specify) __________

4) In what state do you currently live? [Drop down box listing the states]

5) Are you currently a student in an undergraduate psychology course?

☐No (please skip the next question and proceed to question 7)
☐Yes (please answer the next question)

6) What is your current class standing?

☐Freshman
☐Sophomore
☐Junior
☐Senior
☐Other (please specify) __________

7) Are you currently in a training program to be a healthcare provider?

☐No (please skip the next question and proceed to question 9)
☐Yes (please answer the next question)

8) What type of training program are you currently in?

☐Undergraduate nursing
☐Undergraduate medical

☐Graduate nursing
☐Medical residency
☐Medical fellowship
☐Other (please specify) __________

9) Are you currently a practicing healthcare provider?

☐No (please skip questions 10-14 and proceed to question 15)
☐Yes (please answer the remaining questions)

10) What type of healthcare provider are you (select the one that most applies)?

☐Physician (not a Resident or Fellow)
☐Physician (Resident or Fellow)
☐Advanced Practice Provider (e.g., Physician Assistant, Advanced Practice Nurse)
☐Registered Nurse

11) Years of professional healthcare experience (do not include time spent in training):

____

12) Current practice setting (select the one that most applies)

☐Hospital
☐Nursing Home
☐Hospice
☐Outpatient clinic
☐Emergency Room/Urgent Care
☐Other (please specify) __________

13) Current clinical specialty (select the one that most applies)

☐Anesthesiology
☐Critical Care
☐Emergency Medicine
☐Family Medicine
☐Gastroenterology
☐Internal Medicine

☐Neurology
☐Obstetrics/Gynecology
☐Oncology
☐Orthopedics
☐Pediatrics
☐Physical Medicine and Rehabilitation
☐Primary Care
☐Psychiatry
☐Rheumatology
☐Surgery
☐Other (please specify) ___________

14) Rate your level of clinical experience with chronic pain

Not at all experienced ____ Very experienced

15) Rate your level of personal experience (self and/or others) with chronic pain

Not at all experienced ____ Very experienced

Appendix C Ambivalent Sexism Inventory

Below is a series of statements concerning men and women and their relationships in contemporary society. Please indicate the degree to which you agree or disagree with each statement.

1. No matter how accomplished he is, a man is not truly complete as a person unless he has the love of a woman.

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree strongly	disagree somewhat	disagree slightly	agree slightly	agree somewhat	agree strongly

2. Many women are actually seeking special favors, such as hiring policies that favor them over men, under the guise of asking for "equality."

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree strongly	disagree somewhat	disagree slightly	agree slightly	agree somewhat	agree strongly

3. In a disaster, women ought not necessarily to be rescued before men.

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree strongly	disagree somewhat	disagree slightly	agree slightly	agree somewhat	agree strongly

4. Most women interpret innocent remarks or acts as being sexist.

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree	disagree	disagree	agree	agree	agree
strongly	somewhat	slightly	slightly	somewhat	strongly

5. Women are too easily offended.

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree	disagree	disagree	agree	agree	agree
strongly	somewhat	slightly	slightly	somewhat	strongly

6. People are often truly happy in life without being romantically involved with a member of the other sex.

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree	disagree	disagree	agree	agree	agree
strongly	somewhat	slightly	slightly	somewhat	strongly

7. Feminists are not seeking for women to have more power than men.

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree	disagree	disagree	agree	agree	agree
strongly	somewhat	slightly	slightly	somewhat	strongly

8. Many women have a quality of purity that few men possess.

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree	disagree	disagree	agree	agree	agree
strongly	somewhat	slightly	slightly	somewhat	strongly

9. Women should be cherished and protected by men.

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree	disagree	disagree	agree	agree	agree
strongly	somewhat	slightly	slightly	somewhat	strongly

10. Most women fail to appreciate fully all that men do for them.

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree	disagree	disagree	agree	agree	agree
strongly	somewhat	slightly	slightly	somewhat	strongly

11. Women seek to gain power by getting control over men.

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree	disagree	disagree	agree	agree	agree
strongly	somewhat	slightly	slightly	somewhat	strongly

12. Every man ought to have a woman whom he adores.

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree	disagree	disagree	agree	agree	agree
strongly	somewhat	slightly	slightly	somewhat	strongly

13. Men are complete without women.

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree	disagree	disagree	agree	agree	agree
strongly	somewhat	slightly	slightly	somewhat	strongly

14. Women exaggerate problems they have at work.

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree strongly	disagree somewhat	disagree slightly	agree slightly	agree somewhat	agree strongly

15. Once a woman gets a man to commit to her, she usually tries to put him on a tight leash.

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree strongly	disagree somewhat	disagree slightly	agree slightly	agree somewhat	agree strongly

16. When women lose to men in a fair competition, they typically complain about being discriminated against.

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree strongly	disagree somewhat	disagree slightly	agree slightly	agree somewhat	agree strongly

17. A good woman should be set on a pedestal by her man.

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree strongly	disagree somewhat	disagree slightly	agree slightly	agree somewhat	agree strongly

18. There are actually very few women who get a kick out of teasing men by seeming sexually available and then refusing male advances.

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree strongly	disagree somewhat	disagree slightly	agree slightly	agree somewhat	agree strongly

19. Women, compared to men, tend to have a superior moral sensibility.

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree strongly	disagree somewhat	disagree slightly	agree slightly	agree somewhat	agree strongly

20. Men should be willing to sacrifice their own well being in order to provide financially for the women in their lives.

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree strongly	disagree somewhat	disagree slightly	agree slightly	agree somewhat	agree strongly

21. Feminists are making entirely reasonable demands of men.

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree strongly	disagree somewhat	disagree slightly	agree slightly	agree somewhat	agree strongly

22. Women, as compared to men, tend to have a more refined sense of culture and good taste.

☐	☐	☐	☐	☐	☐
0	1	2	3	4	5
disagree strongly	disagree somewhat	disagree slightly	agree slightly	agree somewhat	agree strongly

Appendix D Complementary Stereotypes and Negative Prejudice Scale

Please indicate your level of agreement with the items below.

1. There are so many Black criminals because Black people are naturally more aggressive.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

2. Black people do not have a natural "instinct" for athletics.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

3. Housing laws should be passed that encourage greater racial integration of neighborhoods.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

4. A Black person is wasting an opportunity by not getting involved in athletics.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

5. I think the way Black people talk and the expressions they use are cool.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

6. The success of Black athletes has nothing to do with their natural ability.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

7. Black people often have a difficult time picking up the beat to music.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

8. Black people have a unique quality of sexuality that most White people don’t have.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

9. There will always be racial differences in intelligence.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

10. I think it would be fun to have a Black roommate.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

11. There are so many Black athletes in professional sports because of their innate ability.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

12. Black people should learn to work hard rather than look for “freebies” and “handouts.”

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

13. Black people usually aren’t very stylish in their appearance.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

14. A natural sense of rhythm makes rapping easy for Black people.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

15. Affirmative Action is not just reverse discrimination against White people.

☐	☐	☐	☐	☐	☐	☐
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

16. As a whole, White people aren't smarter than Black people.

☐	☐	☐	☐	☐	☐	☐
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

17. The welfare system really just allows Black people to "mooch" money from the government.

☐	☐	☐	☐	☐	☐	☐
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

18. It's just not natural to see a Black person and a White person holding hands and kissing.

☐	☐	☐	☐	☐	☐	☐
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

19. It's true that White men really can't jump as well as Black men.

☐	☐	☐	☐	☐	☐	☐
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree

20. Black people could be as successful as White people if they only worked harder.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

21. Most Black people have a sense of coolness that White people don’t have.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

22. White people lose a lot of jobs to Black people because of racial quotas in hiring processes.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

23. Black men and women give off an aura of sensuality.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

24. I can’t understand why a White person would want to date a Black person.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

25. When music starts playing, I expect Black people to start moving to the beat.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

26. White choirs put on a much better performance than Black choirs.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

27. I would have no problems with dating a Black person.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

28. Black people should take advantage of their natural abilities to sing and dance.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

29. The government is already spending too much time catering to the wishes of Black people.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

30. I enjoy groups that are racially diverse.

☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Appendix E Information used questionnaire

Please select the information you used when making your pain assessment and treatment ratings for the patients (check all that apply). For each item that you select, rate how influential it was, on average, to your pain ratings. Use the slider to indicate the level of influence.

1. ☐Pain history (e.g., duration of pain, cause of pain, prior treatment)
   Minimal influence ____ Maximal influence

2. ☐Patients’ description of the pain (e.g., location, level of interference with activities)
   Minimal influence ____ Maximal influence

3. ☐Patients’ facial expressions
   Minimal influence ____ Maximal influence

4. ☐Patients’ demographic characteristics (e.g., sex, race, age)
   Minimal influence _______________________________________ Maximal influence

5. ☐Patients’ vital sign values
   Minimal influence ____ Maximal influence

6. ☐Patients’ movement
   Minimal influence ____ Maximal influence

7. ☐Patients’ mental health symptoms
Minimal influence ____ Maximal influence

8. ☐Your own personal experience in managing and/or interacting with patients with pain
Minimal influence ____ Maximal influence

9. ☐Your intuition
Minimal influence ____ Maximal influence

10. ☐Other (please explain): ___________
Minimal influence ____ Maximal influence

Appendix F <u>Guess at study purpose</u>

In the box below, please indicate what you think is the purpose(s) of this study?

Appendix G Interview guide

Thank you for speaking with me today. [Introduce yourself and describe your role in the project.] This interview will include mostly open-ended (discussion) type questions. If you want clarification on any question, feel free to ask.

I want to be sure you understand that what I hear and collect from you will be confidential. Your answers and quotes may be used in presentations and publications, but your name and other identifiers will not be used. We are going to record this session and transcribe our discussion today. The only people who will have access to this information are the project investigators and the transcriptionist. Is that okay with you? Do you have any questions before we begin? [When no, turn on the recorder and record ID information on tape; include date, time, participant ID, and your name].

1. How do you decide what treatments to use for patients with chronic pain? What factors influence your decision making? Are there any particular treatments you feel most comfortable using or any that you avoid?
   - [Make sure subject discusses both aspects (comfortable and avoid).]
   - [If only one type of treatment is discussed (e.g., opioids), probe for others.]
   - [If reply is to refer to others, probe for whom and why.]

2. On this card is a list of several chronic pain treatments. Which of these stand out to you and why?

- Opioid/narcotic pain medications
- Non-opioid/non-narcotic pain medications [prescription NSAIDs such as meloxicam (Mobic), etodolac (Lodine), nabumetone (Relafen)]
- Antidepressant medication [e.g. amitriptyline (Elavil), nortriptyline (Pamelor), duloxetine (Cymbalta), venlafaxine (Effexor)]
- Over-the-counter pain medication
- Lifestyle activities such as diet or exercise
- Physical therapy
- Ice, heat, or analgesic cream
- Referral to a mental health provider for counseling
- Referral to a pain specialist
- [Probe: which would/do you use most often? Least often?]

3. How do you decide what types of pain treatments to use for *particular* patients?

- Are there certain treatments you avoid for particular patients? Why?

4. For each of the different pain treatments, in what types of patients are you most likely to use these treatments?

- What other patient factors influence your treatment decision?

5. How frequently do you see depression in patients with chronic pain?

- Does the presence of depression influence your opinions about pain treatment?

6. How diverse are the patients you see?

- [Probes: men/women, young/old, racial and ethnic diversity]

7. In thinking about the diversity of patients with chronic pain, what kinds of differences have you noticed between men and women?

- [Probes: differences in how they present, differences in the types of treatments you use, differences in how they respond to treatment]
- What are your thoughts about tailoring pain treatment for patients based on their sex?

8. Have you noticed differences between pain patients of different socioeconomic levels?

- [Probes: differences in how they present, differences in the types of treatments you use, differences in how they respond to treatment]
- [Probes: high SES patients]
- [Probes: transportation difficulties, keeping appointments with you or other providers, paying for medications and other treatments, problems with drug diversion or having drugs stolen]

9. Have you noticed differences between patients of different races/ethnicities?

- [Probes: differences in how they present, differences in the types of treatments you use, differences in how they respond to treatment]
- [Probe for other race and ethnic groups; including Caucasian]

10. How often do you think incorrect or inappropriate use of pain treatments is a problem?

- For what types of patients is this more of a problem?
- [Probe for other treatments if only opioids are discussed.]

11. Any additional thoughts or comments about chronic pain that you would like to share?