# THE INFLUENCE OF PATIENT RACE AND SOCIOECONOMIC STATUS ON PROVIDERS' ASSESSMENT AND TREATMENT RECOMMENDATIONS FOR CHRONIC PAIN
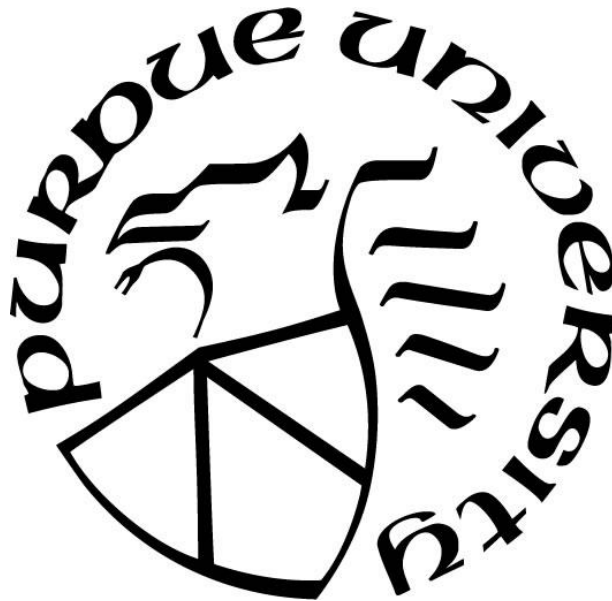
by

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**A Thesis**

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**Master of Science**



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# ABSTRACT

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     Treatment Recommendations for Chronic Pain.
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Compared to White and high socioeconomic (SES) patients, Black and low SES patients are less likely to receive adequate pain care, including receiving fewer analgesic medications. Providers may, inadvertently or not, contribute to these disparities in pain care via biased decision-making. Prior work suggests there is a complex relationship in which race and SES uniquely and interactively affect providers' clinical decisions, but few studies have examined the influence of patient race and SES simultaneously on providers' pain-related decisions. Furthermore, previous studies suggest that providers' attitudes about race and SES influence their clinical decisions. The present study examined the influence of patient race and SES and providers' implicit and explicit attitudes about race and SES on providers' pain-related decisions. Four hundred and seven medical residents and fellows made pain assessment (interference and distress) and treatment (opioids, opioid contracts, and workplace accommodations) decisions for 12 computer-simulated patients with chronic back pain that varied by race (Black/White) and SES (low/high). Subjects completed Implicit Association Tests to assess implicit attitudes and feeling thermometers to assess explicit attitudes about race and SES. Repeated measures ANOVAs indicated that patient race and/or SES had main effects on all pain-related decisions and had interaction effects on providers' ratings for interference, distress, and workplace accommodations. Providers' implicit attitudes about race and explicit attitudes about race and

SES predicted their pain-related decisions, but these effects were not consistent across all decisions. The current study highlights the need to examine the effects of patient race and SES together, along with providers' implicit and explicit attitudes, in the context of pain care. Results inform future work that can lead to the development of evidence-based interventions to reduce disparities in pain care.

# INTRODUCTION

In the United States, 116 million people suffer from chronic pain, surpassing the number of people affected by diabetes, coronary heart disease, and cancer combined.[1] Pain is defined as "a distressing experience associated with actual or potential tissue damage with sensory, emotional, cognitive, and social components."[2] Chronic pain is defined as pain lasting for more than three months, beyond the normal tissue healing time, and may arise from illness, injury, or unknown cause.[3] Pain can have profound effects on an individual's quality of life, including increased mental health problems and interference with social relationships and occupational functioning.[4,5] Pain is the most common reason Americans seek health care services and a leading cause of disability.[6] Consequently, pain is estimated to cost the US up to $635 billion each year in medical costs and lost productivity.[1]

Previous research demonstrates that Black and low SES individuals experience more pain compared to White and high SES individuals, respectively. Laboratory-based and clinical studies have found that compared to Whites, Black individuals report more pain, pain unpleasantness, and disability.[1,7-12] Laboratory-based studies on pain and SES are rare, but one such study demonstrated that lower SES is associated with lower pain threshold and tolerance.[13] In naturalistic settings, lower SES individuals are more likely to report pain[14,15] and disability.[16] A population-based study in Norway found poorer neighborhoods were associated with higher pain intensity, more widespread pain, increased disability, and use of analgesics.[17]

Race and SES are inherently intertwined, making it crucial to investigate how both affect pain experiences and outcomes. Only a few studies have examined race and SES simultaneously. The available evidence suggests a complex relationship in which race and SES interact to

directly and indirectly affect pain outcomes.[18] Previous studies often control for SES in an attempt to illuminate the unique effects of race on pain and overall health disparities.[15,19-21] Meghani and Chittams[22] assert that such an analytical approach is inappropriate given that race and SES are woven together. They explain that this approach may produce results showing a significant SES effect but not a significant race effect, which may lead to the erroneous conclusion that race does not matter. Yet, the socioeconomic distribution is not equal for Black and White individuals; Black individuals are more likely to be in lower SES categories that are associated with increased risk for pain and disability.[23-25] Compared to Whites, Black individuals are more than twice as likely to live in poverty (26% vs. 10%), and White households have higher median income compared to Black households ($71,300 v. $43,300).[26] Thus, treating both race and SES as primary variables of interest (i.e., not controlling for one or the other) in hypothesis-driven analyses is crucial to understand their complex relationship to pain outcomes.

Black and low SES individuals are at increased risk for having their pain undermanaged.[27-29] Compared to Whites, Black individuals are less likely to have their pain assessed[30,31] and recorded in their medical records.[32] Laypersons and health professionals are also more likely to underestimate the pain of Black individuals compared to White individuals.[33-37] In contrast, more recent studies using virtual human (VH) methodology (i.e., computer-simulated patients) have found that laypersons and health care professionals do not always judge the pain severity for Black and White individuals differently,[38-40] and some studies even suggested that many providers perceive Black patients as experiencing greater pain severity.[41-43]

For pain treatment, Black patients are less likely to receive opioids across medical settings.[44-47] One meta-analytic review determined that Black individuals were 29% less likely to be prescribed opioids than Whites, putting them at risk for being under-treated.[48] This is important

given that under-treated pain is associated with increased mental health problems and disability, interference with work and relationships, higher medical costs, and decreased productivity and quality of life.[1,49,50] However, some studies have not found significant differences in analgesic and opioid prescriptions for White and Black patients.[39,51-56] An additional factor to consider in this context is the use of opioid contracts, which have received increasing attention due to recent concerns about opioid misuse and overdose.[57] Opioid contracts outline the expectations of opioid use and the consequences for patients if they violate the contract (e.g., opioid discontinuation).[58] Previous work suggests that Black patients undergo more scrutiny surrounding prescription opioid use; they receive more drug testing, regular office visits, restricted early refills, and substance abuse referrals compared to White individuals.[32,59] Aside from opioid therapy, compared to Whites, Black individuals are more likely to have lower physician-rated disability and receive fewer pain-related disability benefits.[60,61] After pain-related disability settlements, Black individuals are more likely to have poorer outcomes, including higher levels of pain, disability, and financial struggle.[62,63]

Although socioeconomic disparities in pain have received less attention in the literature, the available evidence does suggest that low SES individuals are also at risk for undermanagement of pain. Some studies have shown that low SES individuals with back pain are less likely to receive lumbar disc herniation diagnoses despite equivalent prevalence rates and clinical manifestation of symptoms across SES groups.[64,65] Relatedly, compared to high SES individuals, low SES individuals are less likely to receive preventive health services, including cancer screenings, blood pressure monitoring, and cholesterol tests.[66,67] One might expect that similar disparities would manifest for pain assessment. In terms of pain treatment, clinical and vignette-based studies have demonstrated that compared to high SES patients, low SES patients are less

likely to receive opioids and other pain medications.[28,68-70] A qualitative study on chronic pain found that providers reported having increased suspicion about low SES patients misusing prescription analgesics, believed individuals of low SES exhibited more drug seeking behaviors, and felt uncomfortable prescribing them opioids.[37] Thus, one can assume providers would be more likely to use opioid contract monitoring with low SES individuals. Low SES individuals also have lower physician-rated disability, receive fewer pain-related disability benefits, and have poorer outcomes post-disability settlement compared to high SES individuals.[60,62,63]

Patient, provider, and system-level factors contribute to racial and SES disparities in pain.[27] However, the current project will focus on how providers may contribute to these disparities via their pain assessment and treatment recommendations. Ideally, when making clinical decisions, providers view each patient objectively and collect complete and accurate information on the patient's unique medical and social histories. This information is to be combined with physical exam findings and test results to inform the most appropriate treatment recommendations.[71] Yet, this ideal is not universally realized. Clinical assessment, diagnosis, and treatment recommendations vary beyond what would be expected from strict adherence to "objectivity."[72] Previous work has demonstrated that providers often use, intentionally or not, patient characteristics, such as race and SES, when making clinical decisions[49,73-76] and pain-related decisions specifically.[77-79] For example, in one study using VH patients, up to 54% of sampled nurses were significantly influenced by patient demographics (sex, race, and/or age) when making pain assessment and treatment decisions; however, none of the nurses demonstrated awareness of this influence.[80] This discrepancy is consistent with the broader literature on decision-making awareness.[81,82]

Although it is sometimes appropriate to explicitly use patient demographic factors when making clinical decisions (e.g., reproductive cancers that occur exclusively in men or women, sickle cell anemia that is more prevalent in people of African ancestry), as a general guideline, such use is inconsistent with evidence-based practices and is consequential for patients.[36,83,84] Pain-related decisions may be particularly susceptible to the influence of patient demographics because of pain's subjective nature (i.e., pain is typically measured via self-report).[77] Providers may attempt to corroborate self-report data with "objective" evidence, such as x-rays or MRI scans; however, these measures may be unavailable, ambiguous, or conflict with self-report. Moreover, these "objective" measures are poor predictors of pain and disability.[85-87] Health care professionals may "fill in the gaps" of insufficient information with stereotypes associated with certain groups, leading to systematic differences in pain assessment and treatment recommendations across patient groups. One stereotype that may be particularly relevant to pain care is the belief that Black and low SES individuals feel less pain and are "tougher" than their demographic counterparts.[36] This stereotype might contribute to relatively fewer pain treatments being recommended to Black and low SES patients. Furthermore, because of risks associated with some pain treatments (e.g., opioids), health care professionals' judgements about patient trustworthiness and compliance may result in treatment disparities across patient groups. For instance, one study demonstrated that physicians view Black patients as less compliant, responsible, and intelligent than White patients;[88] thus, one might hypothesize that physicians who hold such views would be less likely to prescribe "high risk" medications—such as opioids—to Black patients.

Health care professionals (and the general public) have implicit and explicit attitudes about certain sociodemographic groups. These attitudes may lead to differences in the provision of

medical care. Implicit attitudes are evaluations that occur automatically without full awareness; they develop early in life from repeated exposure to stereotypes.[89] Explicit attitudes are deliberate and conscious evaluations in which people are able and motivated to "weigh the costs and benefits of various courses of action."[90] Health care professionals across specialties demonstrate low to moderate levels of implicit attitudes favoring White and high SES individuals over Black and low SES individuals, respectively.[91-99] In contrast, most providers endorse no or little explicit racial preferences in general.[96,100,101] However, many providers do explicitly endorse the belief that Whites are more compliant than Black individuals.[95] For SES, some studies have found that a majority of providers endorse an explicit general preference for high SES individuals over low SES individuals.[96,98]

Although considerable research attention has focused on the presence of implicit and explicit attitudes among laypersons and health care providers, less is known about the effects of such attitudes on clinical care. Implicit attitudes, in particular, may influence how health care professionals interact with patients and make medical decisions. Consequently, these influences may perpetuate health care disparities.[89] Some studies have found that Black patients rate providers with pro-White implicit attitudes lower on interpersonal care and patient-centeredness.[93,102-104] Furthermore, studies have shown that providers with pro-White implicit attitudes are more likely to provide treatment for coronary artery disease and diabetes for White patients than Black patients.[100,105] Specific to pain, Sabin[94] found that pro-White implicit attitudes in pediatricians predicted a decrease in prescribing opioids post-operatively for Black but not White patients.[94] Despite the consistency of these results, two recent systematic reviews on providers' implicit racial attitudes identified important limitations of the extant literature and concluded that evidence for the association between implicit attitudes and clinical care was

mixed.[91,106] Another limitation of the literature is the fact that few studies have examined implicit attitudes about SES and their relationship to clinical care; this is a critical gap given the substantial overlap of race and SES. Of the few studies that have been conducted to date, none found a significant relationship between providers' implicit SES attitudes and clinical decisions.[96,98,99,101]

Significant relationships between providers' explicit attitudes and clinical care have largely not been found.[103,104] However, Penner et al.[107] found that Black patients reported less positive medical interactions with providers who had relatively high pro-White implicit attitudes but low pro-White explicit attitudes than with providers who had relatively low or high levels of both implicit and explicit attitudes.[107] These results raise the possibility that explicit attitudes themselves may not play a key role in disparities, but the discrepancy between implicit and explicit attitudes (i.e., high implicit attitudes and low explicit attitudes) may predict treatment bias. If providers lack awareness of their implicit attitudes, they may be less likely to self-correct these attitudes to keep them from impacting their provision of clinical care.

In summary, research on the effects of both patient race and SES on pain care is limited despite these characteristics being inherently intertwined. Previous work on racial disparities in pain is mixed, and one explanation may be that these studies do not account for the role of SES. Although providers' implicit and explicit attitudes have been linked to health care disparities, the evidence is also scant and mixed. Previous work has not examined these attitudes in the context of chronic pain, which is particularly susceptible to the influence of patient demographics given its clinical uncertainty and potential treatment risks. Moreover, few studies have investigated the effects of attitudes about SES on clinical care. To address these knowledge gaps, the current study investigated how patient race and SES influence providers' pain-related decisions, and the

extent to which providers' implicit and explicit attitudes are related to these decisions. Medical residents and fellows of various specialties viewed 12 VH patients that varied by race (Black/White) and SES (low/high) and rated their assessment of each patient's pain-related interference and distress and their likelihood of recommending opioids, using an opioid contract if opioids were prescribed, and recommending workplace accommodations.

## Hypotheses

### Hypothesis 1

Providers will rate Black and low SES patients as experiencing less pain interference than White and high SES patients, respectively (Hyp 1a). Providers' implicit and explicit attitudes will moderate the relationship between patient group (race or SES) and providers' pain interference ratings. Providers with higher implicit or explicit preference for a patient group (Black/White or low SES/high SES) will rate patients from that group as experiencing more pain interference than patients from the opposing group (Hyp 1b).

### Hypothesis 2

Providers will rate Black and low SES patients as experiencing less distress than White and high SES patients, respectively (Hyp 2a). Providers' implicit and explicit attitudes will moderate the relationship between patient group (race or SES) and providers' distress ratings. Providers with higher implicit or explicit preference for a patient group (Black/White or low SES/high SES) will rate patients from that group as experiencing more distress than patients from the opposing group (Hyp 2b).

**Hypothesis 3**

Providers will be less likely to recommend opioid medications but more likely to use opioid contracts with Black and low SES patients than White and high SES patients, respectively (Hyp 3a). Providers' implicit and explicit attitudes will moderate the relationship between patient group (race or SES) and providers' opioid therapy ratings. Providers with higher implicit or explicit preference for a patient group (Black/White or low SES/high SES) will be more likely to recommend opioids to patients from that group but less likely to use an opioid contract with them than patients from the opposing group (Hyp 3b).

**Hypothesis 4**

Providers will be less likely to recommend workplace accommodations to Black and low SES patients than White and high SES patients, respectively (Hyp 4a). Providers' implicit and explicit attitudes will moderate the relationship between patient group (race or SES) and workplace accommodation ratings. Providers with higher implicit or explicit preference for a group (Black/White or low SES/high SES) will be more likely to recommend workplace accommodations to patients from that group than patients from the opposing group (Hyp 4b)

# METHODS

## Sample

Physician residents and fellows were recruited to participate across all medical specialties. Eligible providers were 18 years or older, spoke English, had access to a computer, and had not previously participated in research with VHs. Because the entire study was completed online, provider recruitment occurred across the US via emails to residency and fellowship programs. Other forms of recruitment included public notices and announcements in classes.

## Procedure

This study was approved by the Indiana University Institutional Review Board. The current study was part of a larger parent study investigating the effects of a perspective-taking intervention on providers' treatment biases. Providers who contacted study investigators were sent an eligibility screener via email. Eligible providers were provided a unique user ID and link to a secure website to complete the study. Upon entering the website, the initial page stated that the purpose of the study was to gain a better understanding of how health care providers make decisions about pain assessment and treatment. On the following page, providers were asked to enter their user ID and complete an informed consent form; therefore, only providers who completed the consent form could participate.

Providers completed a demographic questionnaire, viewed VH patient videos and text vignettes, rated pain assessment and treatment recommendations, and completed implicit and explicit attitude measures for race and SES. The vignette judgement task, explicit attitude

measures, and implicit attitude measures were randomized to avoid order effects. The study took providers approximately one hour to complete. Upon completion, providers were compensated with a $50 gift card.

**Virtual Human Stimuli & Vignettes**

Providers viewed 12 videos of VH patients presenting with moderate-to-severe low back pain that varied by race (White/Black) and SES (low/high). There were three patients for each category (White/low SES, White/high SES, Black/low SES, Black/high SES). Patients also varied by gender, but the current study did not investigate gender differences. Videos were created with AutoDesk's Project Pinocchio, which allows for the development of realistic VHs. This program can apply standardized facial expressions and other parameters to patients of different sociodemographic groups of interest (i.e., race and SES), which maximizes experimental control and ecological validity. Patient race was distinguished by altering skin color and facial phenotypes. In the patient videos, patient SES was depicted by clothing; low SES patients wore clothing associated with low-income/prestige jobs (e.g., fast food worker, hotel housekeeping), and high SES patients wore clothing associated with high-income/prestige jobs (e.g., lawyer, computer programmer). These occupational categories were determined by Nam-Powers-Boyd Occupational Status Scale.[108] Occupation is a key indicator of SES.[22] The VH videos were 30 seconds long and depicted patients from the waist up seated in a standard outpatient exam room. The VH patients conveyed pain through facial expressions and body posture (i.e., bracing their lower back). These videos have been used in previous studies, and prior work has demonstrated that laypersons, medical trainees, and physicians can reliably differentiate VH patients' characteristics (e.g., race, sex, age).[38,40,55,56,79,109]

Each VH video was accompanied by a text vignette with additional patient information, including vital signs (e.g., blood pressure, heart rate), self-reported pain intensity and impact, pain etiology, and treatment history. Information presented in the vignettes varied to some degree across patients to enhance clinical realism but was otherwise equivalent apart from patient occupation. Stated occupation systematically varied to match patients' clothing, such that low SES patients were described as having low-income/prestige jobs, while high SES patients were described as having high-income/prestige jobs. The order of patient videos was randomized.

## Measures

### Demographic Questionnaires

Providers reported their age, sex, race/ethnicity, state of residence, current income, parental income, and information about their medical training program, including specialty, clinical experience, and experience with pain.

### Implicit Attitudes

Implicit attitudes about race and SES were measured with separate Implicit Association Tests (IATs).[110] For the race IAT, providers categorized facial images as Black or White people and evaluative words as good or bad (e.g., "pleasure"=good, "awful"=bad). Similarly, for the SES IAT, providers categorized higher or lower class words (e.g., "prosperous"=high, "needy"=low) and evaluative words. Providers were asked to press one computer key if the stimulus was a Black face (low SES word) or a good word and press a different key if the stimulus was a White face (high SES word) or a bad word. In reverse trials, providers were instructed to press one key for Black faces (low SES) and bad words and another key for White

faces (high SES) and good words. Faster responses to the White (high SES)/good and Black (low SES)/bad pairings than to the Black (low SES)/good and White (high SES)/bad pairings indicated a preference or implicit attitude favoring White individuals (high SES). The IAT produces a D score for each provider's implicit attitudes about race and SES. D scores range from -2 to +2 with positive values indicating a preference for White individuals (high SES), while negative values indicate a preference for Black individuals (low SES).[111] The IAT has demonstrated good reliability and validity[112] and has been shown to be a stronger predictor of prejudice and stereotypes than self-report.[113]

## Explicit Attitudes

Explicit attitudes about race and SES were measured with the Feelings Thermometer Scale. Providers were asked to rate their feelings toward Black and White individuals, and low and high SES individuals on four separate visual analog scales (VAS) from "extremely cold and unfavorable" (0) to "extremely warm and favorable" (100). Difference scores—White (high SES) minus Black (low SES)—were calculated as an indicator of explicit attitudes. Positive scores were interpreted as an explicit preference for White individuals (high SES). These instruments have been shown to be a reliable and valid method to assess feelings toward different social groups.[114,115]

## Pain Assessment and Treatment Recommendation Ratings

Providers made two pain assessment ratings. They rated how much pain interference and distress they believed each patient was experiencing on two separate VASs (0-100) from "no interference (distress)" to "extreme interference (distress)." Providers made three treatment recommendations. They rated the likelihood they would recommend opioid analgesics to the

patient, the likelihood they would use an opioid contract if they prescribed opioids to the patient, and the likelihood they would recommend that the patient take time off from work and/or seek workplace accommodations on three separate VASs (0-100) from "not at all likely" to "very likely." Similar scales have been used successfully in prior studies to assess providers' pain assessment and treatment recommendations.[28,116-118]

## Power Analysis

An a priori power analysis was conducted to determine the needed sample size to detect significant differences. Effect sizes were estimated from two studies that used similar methodology and examined racial differences in pain assessment and opioid treatment; effect sizes ranged from .28 to .93.[42,55] Referent effect sizes for SES were not available given the lack of relevant research. The current power analyses were conducted using G*Power with a two-tailed dependent samples t-test, alpha=.05, and power=.80.[119] Using a conservative estimate of effect size (.28), 103 providers would be needed to detect a significant difference. Over 500 providers completed the larger parent study; therefore, the current study was adequately powered to test the specific hypotheses.

## Data Analyses

Analyses were completed in SPSS and Mplus. Repeated measures analyses of variances (rANOVAs) were used to examine main effects of patient race and SES and their interaction for each pain assessment and treatment rating. For rANOVA analyses, all data were normally distributed and met assumptions for parametric testing. Maximum likelihood (ML) linear regressions were used to estimate the extent that implicit and explicit attitudes predicted differences in providers' treatment recommendations for Black/White and low SES/high SES

patients. Several outcome distributions violated normality; for these distributions, maximum likelihood robust (MLR) estimation was used. However, because there were no statistical or substantive differences between the ML and MLR results, for simplicity, only ML results are reported.

**The Effects of Patient Race and SES on Providers' Pain-Related Decisions**

Prior to testing hypotheses, providers' assessment and treatment ratings for each patient combination were averaged. Each patient demographic combination (White/low SES, White/high SES, Black/low SES, Black/high SES) was represented by three unique patients. For the pain assessment outcome, providers' interference ratings were averaged across the three unique patients representing each patient combination, resulting in one (average) interference rating for each of the four patient combinations. The same process was used for distress assessment ratings and the three pain treatment ratings. Repeated measures ANOVAs were used to examine main effects of patient race and SES and their interaction for each pain assessment and treatment rating (Hypotheses 1a, 2a, 3a, 4a). Significant interactions were examined with Bonferroni-corrected pairwise comparisons.

**The Effects of Patient Race (SES) and Providers' Implicit/Explicit Attitudes**

ML linear regressions were used to determine if providers' implicit attitudes about race (SES) moderated the relationship between patient race (SES) and providers' decisions (Hypotheses 1b, 2b, 3b, 4b). Providers' assessment and treatment ratings for the 6 Black and 6 White patients (6 low SES and 6 high SES patients) were averaged. For each outcome, provider's mean Black rating (low SES) was subtracted from their mean White rating (high SES) to create a difference score. These difference scores were regressed on providers' race (SES)

IAT scores. Slopes equal to zero indicated no difference in ratings for Black and White (low SES and high SES) patients, thus, no moderation. Slopes not equal to zero indicated that ratings for Black (low SES) and White (high SES) patients were different; thus, implicit attitudes moderated the relationship between patient race (SES) and providers' ratings. Analyses to determine if explicit attitudes moderated the relationship between patient race (SES) and providers' pain-related ratings were completed in the same fashion as those for implicit attitudes (Hypotheses 1b, 2b, 3b, 4b). For these analyses, race (SES) IAT scores were replaced with feeling thermometer difference scores (White minus Black, high SES minus low SES). Statistical significance was set at $p < .01$ to account for multiple comparisons (.05/5 outcome variables=.01).

# RESULTS

## Sample Demographics

The final sample consisted of 407 providers (see Table 1). The sample was predominately male (59.2%) with a mean age of 29.7 years (SD=3.09). Approximately 68% identified as White, 25% as Asian, 2% as Black, and 5% as other or not reported. Additionally, approximately 5% identified as Hispanic. The majority of the sample had less than a year of professional health care experience (74%) and worked in a hospital setting (86%). On average, providers rated their clinical experience with pain as 41.64/100 (SD=24.09).

Table 1. Provider Characteristics

| N=407 | n (%)/ Mean (SD) |
|---|---|
| Sex | |
| Male | 241 (59%) |
| Female | 166 (41%) |
| Age | 29.70 (3.09) |
| Race | |
| White | 278 (68%) |
| Asian | 105 (25%) |
| Black | 8 (2%) |
| Other/Not reported* | 17 (5%) |
| Ethnicity | |
| Not Hispanic | 388 (95%) |
| Hispanic | 19 (5%) |
| Practice setting | |
| Hospital | 350 (86%) |
| Outpatient clinic | 48 (11.8%) |
| Nursing home/hospice | 3 (.7%) |
| Other | 6 (1.5%) |
| Health care experience | |
| <1 year | 301 (74%) |
| 1-4 years | 94 (23%) |
| 5-9 years | 12 (3%) |
| Clinical experience with pain | 41.64 (24.09) |
| *Not reported (n=1) | |

**Providers' Implicit and Explicit Attitudes**

Providers exhibited a slight implicit preference for White over Black individuals (M=.31 [SD=.38]) and a strong implicit preference for high over low SES individuals (M=.90 [SD=.35]). On explicit measures, providers rated White (t[387]=-3.27, p<.01, $d_{rm}$=-.14) and low SES (t[397]=3.22, p=<.01, $d_{rm}$=.17) individuals as more favorable than Black and high SES individuals, respectively.

**Providers' Pain-Related Decisions**

**Study Hypothesis 1: Interference Ratings**

**Hyp 1a: Effect of patient race and SES on providers' interference ratings.**

The main effect of patient race on providers' pain interference ratings was not significant (F[1,407]=2.38, p=.12, $\eta_p^2$=.01; see Table 2). However, the main effect of patient SES on providers' interference ratings was significant (F[1,407]=159.58, p<.01, $\eta_p^2$=.28). Providers ascribed more pain interference to low SES than high SES patients. There was a significant interaction between patient race and SES (F[1,407]= 15.83, p<.01, $\eta_p^2$=.04; see Figure 1). For high SES patients, providers ascribed higher pain interference to Black than White patients ($\eta_p^2$=.03), whereas there were no racial differences for low SES patients.

**Hyp 1b: Implicit/explicit attitudes and providers' interference ratings.**

Neither providers' race IAT scores (B=.32, p=.72) nor SES IAT scores (B=-.44, p=.75) predicted differences in their pain interference ratings (see Table 3). Additionally, neither providers' race feeling thermometers scores (B=.03, p=.19) nor SES feeling thermometers scores (B=.00, p=.87) predicted differences in their pain interference ratings.

**Interference**



Figure 1. Patient race and SES effects on providers' interference ratings

## Study Hypothesis 2: Distress Ratings

### Hyp 2a: Effect of patient race and SES on providers' distress ratings.

The main effect of patient race on providers' distress ratings was significant ($F[1,407]=28.77$, $p<.01$, $\eta_p^2=.07$; see Table 2). Providers ascribed more distress to Black than White patients. The main effect of patient SES was also significant ($F[1, 407]=75.44$, $p<.01$, $\eta_p^2 =.16$). Providers ascribed more distress to low than high SES patients. There was a significant interaction between patient race and SES ($F[1, 407]=13.00$, $p<.01$, $\eta_p^2 =.03$; see Figure 2). For high SES patients, providers ascribed more distress to Black than White patients ($\eta_p^2=.08$), whereas race differences did not emerge for low SES patients.

### Hyp 2b: Implicit/explicit attitudes and providers' distress ratings.

Results of analyses for providers' race IAT scores predicting differences in their distress ratings trended toward significance ($B=1.92$, $p=.02$; see Table 3). A stronger implicit preference for White individuals was associated with higher distress ratings for White than Black patients. Providers' SES IAT scores did not predict differences in their distress ratings ($B=-.99$, $p=.37$).

Additionally, neither providers' race feeling thermometers scores (B=.04, p=.08) nor SES feeling thermometers scores (B=.01, p=.63) predicted differences in their distress ratings.
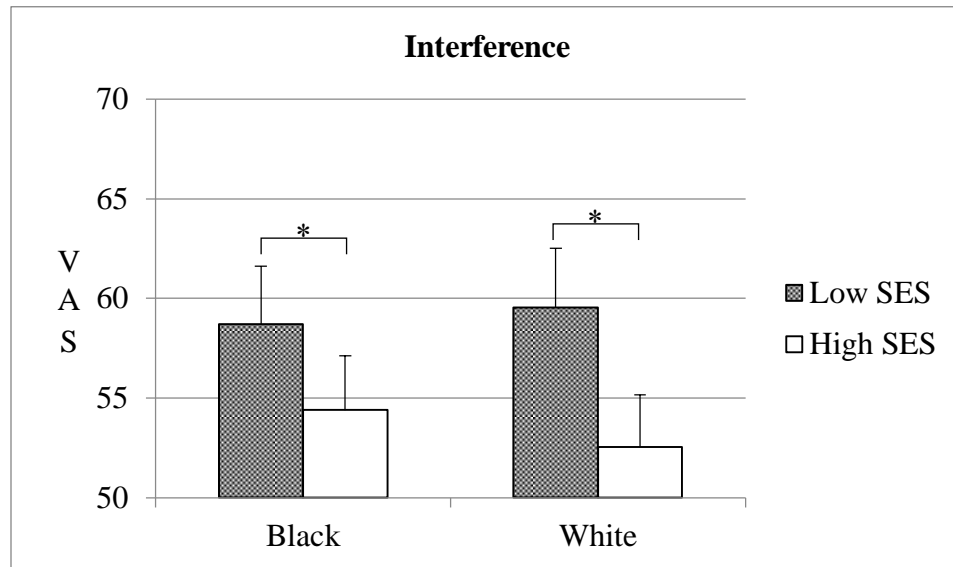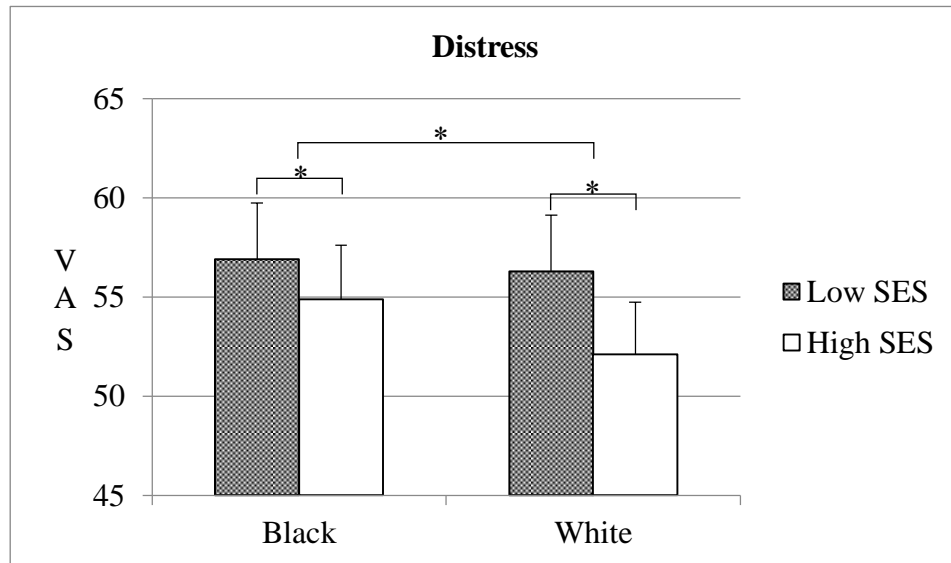


Figure 2. Patient race and SES effects on providers' distress ratings

## Study Hypothesis 3: Opioid Therapy Ratings

### Hyp 3a: Effects of patient race and SES on providers' opioid therapy ratings.

The main effect of patient race on opioid treatment ratings was significant ($F[1,407]=13.18$, $p<.01$, $\eta_p^2=.03$; see Table 2). Providers were more likely to recommend opioids for Black than White patients. The main effect of patient SES on opioid treatment ratings was also significant ($F[1,407]=24.52$, $p<.01$, $\eta_p^2=.06$). Providers were more likely to recommend opioids for low than high SES patients. There was not a significant interaction between patient race and SES on opioid treatment ratings ($F[1,407]=2.39$, $p=.12$, $\eta_p^2=.01$; see Figure 3).

The main effect of patient race on opioid contract ratings was not significant ($F[1, 407]=.20$, $p=.66$, $\eta_p^2=.00$; see Table 2). However, the main effect of patient SES on opioid contracts was significant ($F[1, 407]=17.19$, $p<.01$, $\eta_p^2=.04$). Providers were more likely to use

opioid contracts with low than high SES patients. There was not a significant interaction between patient race and SES on opioid contract ratings (F[1,407]=.001, p=.98, $\eta_p^2$=.00; see Figure 4).

**Hyp 3b: Implicit/explicit attitudes and provider's opioid therapy ratings.**

Neither providers' race IAT scores (B=.88, p=.33) nor SES IAT scores (B=-.27, p=.83) predicted their opioid treatment recommendations (see Table 3). Providers' race feeling thermometers scores significantly predicted their opioid recommendations (B=.05, p=.01). A stronger explicit preference for White individuals was associated with higher opioid treatment ratings for White than Black patients. However, providers' SES feeling thermometers scores did not predict differences in their opioid recommendations (B=.01, p=.56).

Neither providers' race IAT (B=-1.47, p=.15) nor SES IAT (B=-1.07, p=.41) scores predicted providers' opioid contract ratings (see Table 3). Providers' race feeling thermometers scores did not predict their opioid contract ratings (B=-.03, p=.26), but providers' SES feeling thermometers scores did significantly predict their opioid contract ratings (B= -.06 p<.01). A stronger explicit preference for high SES individuals was associated with higher opioid contract ratings for low than high SES individuals.
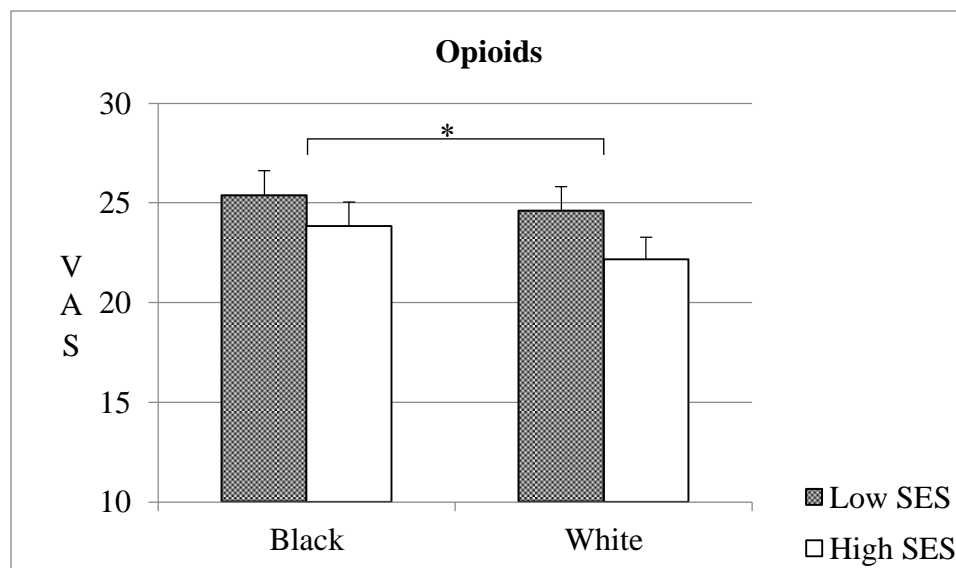


Figure 3. Patient race and SES effects on providers' opioid ratings
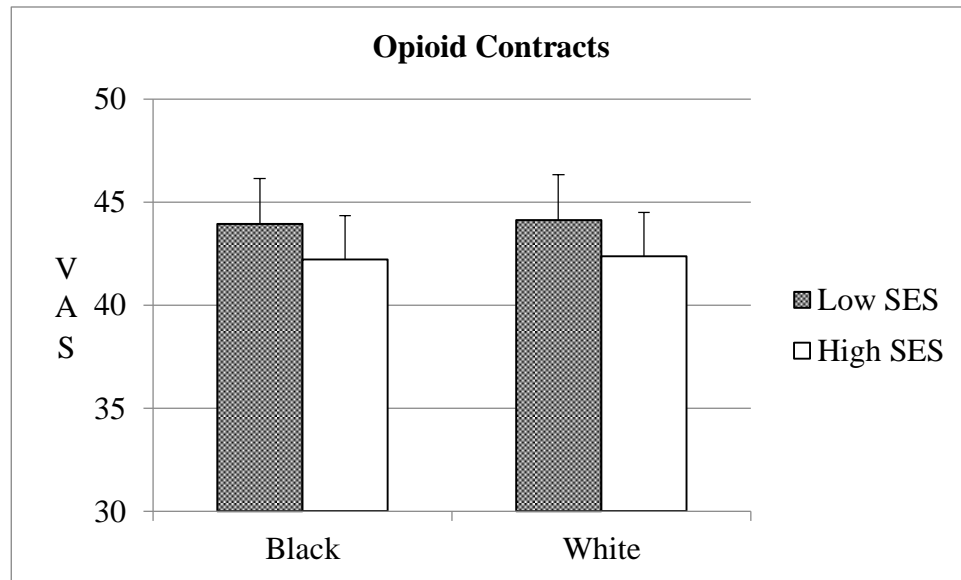
**Opioid Contracts**



Figure 4. Patient race and SES effects on providers' opioid contract ratings

**Study Hypothesis 4: Workplace Accommodations**

   **Hyp 4a: Effects of patient race and SES on providers' workplace accommodations ratings.**

   The main effect of patient race on providers' workplace accommodation ratings was significant (F[1,407]=10.52, p<.01, $\eta_p^2$=.03; see Table 2). Providers were more likely to recommend workplace accommodations for White than Black patients. The main effect of patient SES was also significant (F[1, 407]=211.45, p<.01, $\eta_p^2$ =.34). Providers were more likely to recommend workplace accommodations for low than high SES patients. There was a significant interaction between patient race and SES (F[1, 407]=22.61, p<.01, $\eta_p^2$ =.05; see Figure 5). For low SES patients, providers were more likely to recommend workplace accommodations to White than Black patients ($\eta_p^2$=.06), whereas race differences did not emerge for high SES patients.

**Hyp 4b: Implicit/explicit attitudes and providers' workplace accommodation ratings.**

Providers' race IAT scores significantly predicted their workplace accommodation ratings (B=2.92, p<.01; see Table 3). A stronger implicit preference for White individuals was associated with higher workplace accommodation ratings for White than Black patients. Providers' SES IAT scores did not predict SES differences in their workplace accommodation ratings (B=.98, p=.61). Providers' race feeling thermometers scores did not predict race differences in their workplace accommodations ratings (B=.05, p=.07), but providers' SES feeling thermometers scores did significantly predict their workplace accommodation ratings (B=.10, p<.01). A stronger explicit preference for high SES individuals was associated with higher workplace accommodation ratings for high than low SES patients.
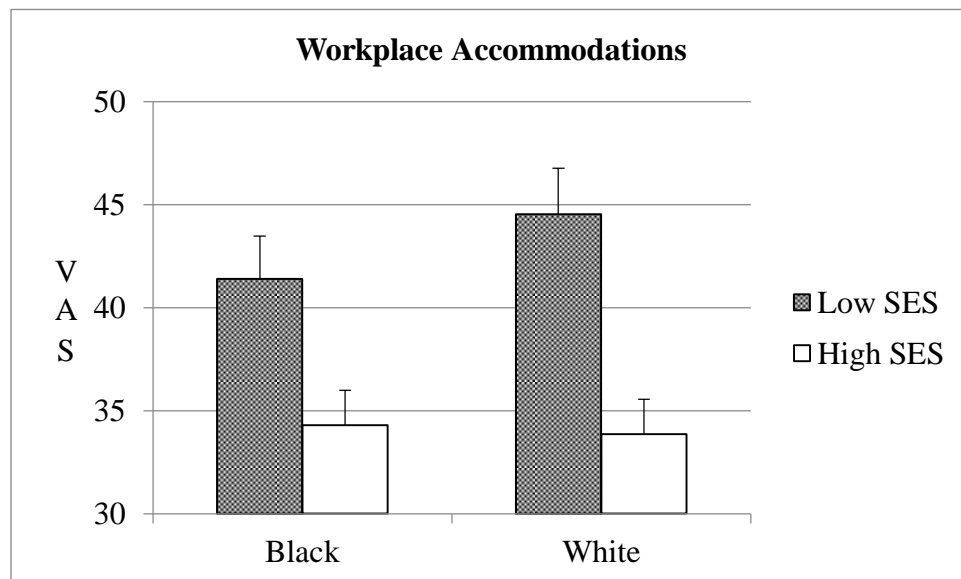


Figure 5. Patient race and SES effects on providers' workplace accommodation ratings

Table 2. Results of rANOVAs examining the effects of patient race and SES on providers'
pain-related decisions

| Decision | Patient Variable | | Mean (SD) | F | $\eta_p^2$ |
|---|---|---|---|---|---|
| Interference | Race | *Black* | 56.55 (17.33) | 2.38 | .01 |
| | | *White* | 56.04 (17.37) | | |
| | SES | *Low* | 59.11 (17.16) | 159.58** | .28 |
| | | *High* | 53.48 (18.04) | | |
| | Race X SES | | | 15.83** | .04 |
| Distress | Race | *Black* | 55.87 (17.03) | 28.77** | .07 |
| | | *White* | 54.20 (17.24) | | |
| | SES | *Low* | 56.59 (17.21) | 75.44** | .16 |
| | | *High* | 53.49 (17.25) | | |
| | Race X SES | | | 13.00** | .03 |
| Opioids | Race | *Black* | 24.60 (22.60) | 13.18** | .03 |
| | | *White* | 23.37 (22.45) | | |
| | SES | *Low* | 24.97 (22.86) | 24.52** | .06 |
| | | *High* | 23.00 (22.38) | | |
| | Race X SES | | | 2.39 | .01 |
| Opioid Contract | Race | *Black* | 43.07 (36.64) | 0.20 | .00 |
| | | *White* | 43.24 (36.27) | | |
| | SES | *Low* | 44.03 (36.40) | 17.19** | .04 |
| | | *High* | 42.29 (36.59) | | |
| | Race X SES | | | .001 | .00 |
| Workplace Accommodations | Race | *Black* | 37.83 (23.88) | 10.52** | .03 |
| | | *White* | 39.20 (23.14) | | |
| | SES | *Low* | 42.96 (24.10) | 211.45** | .34 |
| | | *High* | 34.07 (23.77) | | |
| | Race X SES | | | 22.61** | .05 |

**$p<.01$

Table 3. Regression analyses examining IAT and feeling thermometer scores moderating providers' pain related decisions

| Pain Decision | Moderator | B | SE | β | p | $R^2$ |
|---|---|---|---|---|---|---|
| Interference | Race IAT | 0.32 | 0.88 | 0.02 | 0.72 | - |
| | SES IAT | -0.44 | 1.40 | -0.02 | 0.75 | - |
| | Race Feeling Thermometer | 0.03 | 0.02 | 0.07 | 0.19 | - |
| | SES Feeling Thermometer | 0.00 | 0.02 | 0.01 | 0.87 | - |
| Distress | Race IAT | 1.92 | 0.81 | 0.12 | 0.02 | 0.01 |
| | SES IAT | -0.99 | 1.12 | -0.05 | 0.37 | - |
| | Race Feeling Thermometer | 0.04 | 0.02 | 0.09 | 0.08 | - |
| | SES Feeling Thermometer | 0.01 | 0.02 | 0.02 | 0.63 | - |
| Opioid | Race IAT | 0.88 | 0.90 | 0.05 | 0.33 | - |
| | SES IAT | -0.27 | 1.25 | -0.01 | 0.83 | - |
| | Race Feeling Thermometer | 0.05 | 0.02 | 0.13 | 0.01 | 0.02 |
| | SES Feeling Thermometer | 0.01 | 0.02 | 0.03 | 0.56 | - |
| Opioid Contracts | Race IAT | -1.47 | 1.02 | -0.07 | 0.15 | - |
| | SES IAT | -1.07 | 1.31 | -0.04 | 0.41 | - |
| | Race Feeling Thermometer | -0.03 | 0.03 | -0.06 | 0.26 | - |
| | SES Feeling Thermometer | -0.06 | 0.02 | -0.14 | <0.01 | 0.02 |
| Workplace Accommodations | Race IAT | 2.92 | 1.11 | 0.13 | <0.01 | 0.02 |
| | SES IAT | 0.98 | 1.89 | 0.03 | 0.61 | - |
| | Race Feeling Thermometer | 0.05 | 0.03 | 0.09 | 0.07 | - |
| | SES Feeling Thermometer | 0.10 | 0.03 | 0.15 | <0.01 | 0.02 |

# DISCUSSION

The purpose of the study was to examine the unique and interactive effects of patient race and SES on providers' pain-related decisions and to explore the extent that providers' implicit and explicit attitudes about race and SES moderated these relationships. Results indicated that there were significant main effects of race and SES for opioid therapy. Providers were more likely to recommend opioids for Black and low SES patients than their demographic counterparts, and providers were more likely to use opioid contracts with low SES than high SES patients. There were interaction effects for providers' decisions about interference, distress, and workplace accommodations. Furthermore, providers' implicit attitudes about race and explicit attitudes about race and SES predicted some of their pain-related decisions.

Providers ascribed higher interference to low SES patients and higher distress to Black and low SES patients compared to their demographic counterparts. These results are counter to hypotheses (Hyp 1a, 2a). They also do not support related work on pain assessment showing that laypersons and health care professionals believe Black, low SES, and individuals who are less "privileged" are "tough" and experience less pain;[35-37,120] thus, due to perceiving these patients as experiencing less pain, observers may also assume they experience less interference and distress. Yet, the opposite was found in the current study. Additionally, the interference results contradict clinic and worker compensation-based studies in which Black and low SES patients have their pain underestimated and are rated as less disabled than their demographic counterparts by physicians.[33,34] One explanation for this inconsistency between the current study and prior work is that the current study used VH methodology which allows for more experimental control but does not capture the full complexity of real-world clinical environments. In fact, in previous

studies using VH methodology, Black patients were perceived as experiencing greater pain intensity, unpleasantness, and having a higher need for medical care than White patients.[41-43] Race and SES differences in real clinical settings may be due, in part, to third variables that are controlled for in the VH methodology. This may include other patient factors, such as psychological health and non-verbal pain expression. Moreover, other provider factors that were not assessed in the current study may influence decision-making, including providers' beliefs about pain, which may differ across race and SES categories. For example, prior studies has suggested that laypersons, both Black and White, believe Black individuals are less willing to report pain than White individuals.[37] Applied to pain care, if a Black person is seeking treatment for chronic pain, a provider with these beliefs may perceive them as experiencing significant pain because the act of seeking treatment would require the Black patient to counteract this unwillingness to report pain. Providers may apply these same beliefs about willingness to report pain to low SES patients. Similarly, Black and low SES individuals tend to have less access to medical care;[121] thus, if a Black or low SES patient presents in clinic, despite these barriers, providers may perceive them as experiencing substantial pain.

Providers were more likely to recommend opioids to Black and low SES patients than their demographic counterparts, which is inconsistent with hypotheses (Hyp 3a). The higher interference and distress ratings for Black and low SES patients may partially explain the higher opioid recommendations. Another factor may be the "ideal" conditions of the VH methodology. Real medical settings place high cognitive load (i.e., mental workload) on providers via time pressures, noise levels, and interruptions.[122] According to the dual process model (DPM)[77] of decision-making and prior studies, people are more likely to be influenced by stereotypes when making decisions under high cognitive load.[77,123-125] In the current study, providers had ample

time to make decisions and likely had less chaotic environments compared to real clinical settings. Interpreted through the lens of the DPM, the ideal conditions of the VH methodology allowed providers to engage in deliberate and conscious cognitive processes, which may include egalitarian beliefs towards Black and low SES individuals.[77] They may also be aware of previous work demonstrating that White patients receive more opioid prescriptions than Black patients. Furthermore, the alleged opioid crisis—the rapid increase in prescriptions for opioids and subsequent misuse—is portrayed by the media and perceived by many to be a "suburban White problem."[126,127] Providers in the current study may have been able to access these thoughts about being egalitarian or the opioid crisis due to the low cognitive load of the methodology and subsequently were more likely to recommend opioids to Black and low SES patients.

Aligned with hypotheses (3a), providers were more likely to recommend opioid contracts to low SES than high SES patients. These results support previous work demonstrating that providers use opioid contracts with patients they have a subjective "hunch" will misuse and that providers believe low SES patients are more likely to misuse opioids and exhibit drug-seeking behaviors.[57,128] Providers were also more likely to recommend workplace accommodations to White than Black patients. This aligns with the work of Tait and Chibnall[60,61] who found that White patients received more pain-related disability benefits compared to Black patients. However, in contrast to Tait and Chibnall,[60,61] providers were more likely to recommend workplace accommodations to low than high SES patients. Providers may associate low SES with blue-collared, physically-demanding jobs. Likewise, one study found that providers were more certain about assigning disability when patients had a history of physical labor.[129] Providers in the sample may also be aware that low SES individuals are more likely to experience pain and

disability compared to high SES individuals and consequently recommended them workplace accommodations.[14-17]

A novel aspect of the current study is that we examined the interaction effects of patient race and SES on providers' pain-related decisions. Race differences in interference and distress ratings emerged, such that providers ascribed higher ratings for Black than White patients; however, this difference only occurred among high SES patients. One explanation for this interaction is that providers may be aware that racial health disparities exist for Black patients regardless of SES.[130] Several reasons for these pervasive disparities include increased early life adversity among Black individuals, lower income levels compared to White counterparts with equivalent education levels, and the experiences of racism and discrimination.[130] Consequently, providers may assume high SES Black patients are at a disadvantage and perceive them as experiencing greater pain-related interference and distress despite the advantage of having higher SES. Providers may view low SES patients as experiencing greater interference and distress regardless of race because of their awareness that low SES patients have poor access to medical care and/or assume they have more physically demanding jobs. Providers were also more likely to recommend workplace accommodations for White than Black patients, but this emerged only for low SES patients. Again, providers may be aware that low SES patients have poor access to medical care and assume they hold physically demanding jobs and thus recommend them workplace accommodations. However, providers may also be influenced by the racial stereotype that low SES Black individuals are lazy and welfare-seeking compared to low SES White individuals who diligently work at physically-demanding jobs.[131,132] As a result, providers may perceive Black patients as requiring fewer workplace accommodations than White patients. Recent work demonstrates that the general public still hold these negative perceptions of Black

individuals.[131,132] Providers may not exhibit racial differences in ratings for workplace accommodations for high SES patients because they assume these patients are hardworking—regardless of race—because of their prestigious jobs.

These interaction effects can also be interpreted through a different lens in which patient SES is considered the "main effect" and patient race is the moderator. From this perspective, providers ascribed more interference and distress to low SES patients and were more likely to recommend them workplace accommodations compared to high SES patients, but these SES effects were stronger for White than Black patients. Collectively, these results suggest that providers are influenced more by patient SES when making pain-related decisions for White compared to Black patients. One explanation for this is that providers may assume Black patients have lower SES and less variability in income than White patients, even when holding similarly prestigious jobs, as was represented in the vignettes. There is some truth to this assumption; among adults with at least a bachelor's degree, Black households have a median income of $82,300 while White households have a median income of $106,600.[26] Another explanation for these race X SES interactions is that 68% of the sample was White (vs. 2% Black), which is similar to the current race distribution of providers in real clinical settings (75% White vs. 6% Black).[133] According to the out-group homogeneity effect,[71,134] people view individuals from an outgroup (i.e., Black patients for White providers) as being more alike and individuals from their own group (i.e., White patients for White providers) as having unique characteristics. Applied to the current study, White providers may have been less attuned to SES differences among Black than White patients.

In addition to examining the effects of patient race and SES on providers' pain-related decisions, we also investigated the influence of providers' implicit and explicit attitudes.

Supporting prior work, providers in the current study demonstrated a slight implicit preference for White over Black individuals and a strong implicit preference for high over low SES individuals.[91,99,101] Furthermore, providers with an implicit preference for White individuals rated White patients as more distressed and were more likely to recommend workplace accommodations for them compared to Black patients. A literature search indicates that neither of these outcome variables have been examined in the context of implicit attitudes and chronic pain. Although the implicit attitudes did not moderate the relationship between patient race and all of providers' pain related-decisions, significant results aligned with previous work demonstrating that providers with pro-White implicit attitudes were more likely to provide care for White than Black patients in the context of post-operative pain care, cardiovascular health, and diabetes.[94,100,105] Additionally, research and theory suggests that providers' attitudes and beliefs about patient groups (e.g., race, SES) influence how they interpret and perceive patients' symptoms.[75,135] Thus, despite the patients in the current study being equivalent (except for race and SES), the results indicate that providers with a stronger implicit preference for White people were more likely to perceive them as in distress compared to Black patients. Implicit attitudes about SES were more pronounced than for race; however, they did not moderate the relationship between patient SES and providers' decisions. The small literature on providers' implicit SES attitudes and provision of care, which includes acute and post-operative pain care, has not found a significant relationship.[96,98,99,101] Collectively, the results suggest that interventions targeting providers' implicit attitudes may be more useful for reducing racial disparities than SES disparities in pain care, although the urgency of such interventions is questionable given the relatively small effects.

Providers reported a small explicit preference for White over Black individuals and a small explicit preference for low SES over high SES individuals; the former is consistent with prior work but the latter is not.[96,100] Furthermore, providers with a stronger explicit preference for White individuals were more likely to recommend opioids for White than Black patients. Providers with a stronger explicit preference for high SES individuals were more likely to use opioid contracts with low SES patients but were more likely to recommend workplace accommodations for high SES patients. These findings about explicit attitudes are noteworthy in the context of previous work which has not found a relationship between providers' explicit attitudes and clinical care. However, previous work has investigated the effects of providers' attitudes and beliefs on Black patients' perceptions of patient-centered care, their satisfaction, and patient-provider talk time ratios[104,107,136]—not providers' medical or pain care decisions. The pain treatment decisions in the current study with significant results—opioids, opioid contracts, and workplace accommodations—may require deliberation, including the influence of explicit attitudes, because of the risks and consequences associated with them. For opioids and opioid contracts, providers may be concerned about assessing for patient characteristics, such as demographics, they believe put a patient at risk for misuse. For workplace accommodations, providers may be concerned that patients who request workplace accommodations are at-risk for discrimination and termination from employers, despite protections like the Americans with Disabilities Act. Moreover, workplace accommodations likely require extra steps from providers, such as writing letters, speaking to employers, or potentially being involved in litigations. Consequently, providers may deliberate more about workplace accommodations because of their potential consequences for patients and extra burdens for themselves. Another explanation for the significant explicit attitude results derives from the DPM. According to this model, high

cognitive load situations, like in real clinical settings, suppress the influence of explicit attitudes.[77] In contrast, the VH methodology used in the current study allows providers to make decisions in more ideal circumstances (e.g., unlimited time). Moreover, watching the 30-second videos of VH patients may encourage providers to "pause" and alleviate some of their cognitive load. Another item to note is that the treatment decisions with significant results—opioids, opioid contracts, and workplace accommodations—had higher variability than the other decisions in the current study. This may be due to the lack of clinical guidelines around pain care. Thus, significant results may be due to sampling variability and type I error.

The current study has several limitations. First, as discussed previously, despite their methodological advantages, VH patients do not fully encapsulate the complexities of real-world clinical environments. Second, social desirability is a potential limitation of this study. Providers were asked about sensitive and controversial topics, such as their attitudes about race and SES as well as opioid therapy, so some providers may have answered, unintentionally or not, in a socially desirable manner. Third, although a large body of evidence supports the IAT's validity and utility, it has been criticized, in particular, regarding its construct validity and test-retest reliability.[137,138] Fourth, because the patient vignettes described chronic low back pain, the results may not generalize to other pain conditions. Finally, the provider sample consisted of physician residents and fellows who were largely White and working in hospital settings; thus, the results may not apply to other health care professionals or settings.

This is one of the first studies to demonstrate that both patient race and SES uniquely and interactively impact providers' decisions for chronic pain. Results also suggest that providers' implicit and explicit attitudes about race and SES play a role in the assessment and treatment of chronic pain for diverse patients. Future studies should continue to investigate the effects of

different patient, provider, and contextual factors and their interactions on providers' decisions about chronic pain. For instance, Burgess[139] argues that the high cognitive load conditions of the health care environment may encourage the use of implicit stereotyping in providers, leading to differences in decision-making and consequently patient outcomes. Thus, providers that work in clinical settings under high cognitive load may be particularly likely to be influenced by implicit stereotypes. In fact, providers who work in clinics that serve minority patients are more likely to experience higher cognitive load via more complex patients and fewer resources (e.g., space, staff).[140] Furthermore, the current study investigated providers' general implicit and explicit preferences for Black and White individuals and for low SES and high SES individuals. Future studies could investigate the effects of attitudes and beliefs more specific to pain and medical care, including pain tolerance and compliance (e.g., Black individuals are more pain tolerant than White individuals). Future studies may also include the development and implementation of interventions to reduce pain care disparities. The current results suggest that interventions will need to target both demographic variables. In sum, this study represents a crucial step in understanding providers' contributions to disparities in pain care and may eventually lead to evidence-based interventions to combat these disparities.

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# APPENDIX A. FEELING THERMOMETER

Please rate the following items. Use the slider to indicate your level of feeling.

My feelings towards African Americans are…

*Extremely cold or unfavorable* _____*Extremely warm or favorable*

My feelings towards European Americans are…

*Extremely cold or unfavorable* _____*Extremely warm or favorable*

My feelings towards poor people are…

*Extremely cold or unfavorable* _____*Extremely warm or favorable*

My feelings towards rich people are…

*Extremely cold or unfavorable* _____*Extremely warm or favorable*

# APPENDIX B. VIRTUAL HUMAN PAIN-RELATED RATINGS

*\*Items investigated in the current study are italicized*

**Pain management ratings:**
*Rate the level of distress that you think this patient has been experiencing over the past few days*

_____

*"no distress"*                                                                              *"extreme distress"*

*Rate the level of pain-related interference in daily activities that you think this patient has been experiencing over the past few days*

_____

*"no interference"*                                                                          *"extreme interference"*

**Rate the likelihood that you would use the following treatments to relieve the patient's pain**
*1. Oral opioid analgesic (e.g., oxycodone, hydrocodone)*

_____

*"not at all likely"*                                                                              *"very likely"*

2. Oral non-opioid analgesic (e.g., acetaminophen, ibuprofen)

_____

"not at all likely"                                                                              "very likely"

3. Physical therapy

_____

"not at all likely"                                                                              "very likely"

4. Referral to a pain specialist

_____

"not at all likely"                                                                              "very likely"

*5. In the event that you prescribed an opioid analgesic for this patient, how likely are to you to use an opioid contract*

_____

*"not at all likely"*                                                                              *"very likely"*

6. To what extent do you feel compassion towards this patient?

_____

"not at all"                                                    "extremely"

7. To what degree do you believe the patient is overacting?

_____

"stoic"                                                    "exaggerating"

*8. To what degree do you recommend the patient take time off from work and/or seek workplace accommodations?*

_____

*"not at all"*                                                    *"extremely"*

9. Rate your level of comfort in providing care for this patient

_____

"not at all comfortable"                          "extremely comfortable"

# APPENDIX C. EXAMPLE TEXT VIGNETTE

Sample patient vignette of a high SES patient is presented below with parenthetical content representing information for a low SES patient.

| Height | Weight | Temperature | Blood Pressure | Heart Rate | Respiratory Rate | Mental Status | Pain Report |
|--------|--------|-------------|----------------|------------|------------------|---------------|-------------|
| 5 ft. 11 in. | 175 lbs. | 98.7 | 118/79 | 75 bpm | 16 rpm | A/O X 4 | 7/10 |

Mr. Williams is a 42-year-old man who presents to your office. He reports having chronic low back pain that began a year ago. The patient is a computer systems manager (a fast-food attendant), and states his pain flared up a few days ago while moving furniture at home. His usual pain is rated as 4 out of 10. He rates his current pain as 7 out of 10 and describes it as sharp and throbbing. Mr. Williams states that the pain makes it difficult to walk or sit comfortably. He also reports feeling more tired than usual and having trouble sleeping at night. He denies bowel or bladder dysfunction, or any other neurological symptoms. His physical exam is unremarkable except for moderate paralumbar tenderness and an antalgic gait. He has tried taking over-the-counter acetaminophen and using an ice pack to relieve his pain, but with no success. Mr. Williams is interested in something stronger to relieve his pain. He has no absolute contraindications for common treatment options for chronic pain.
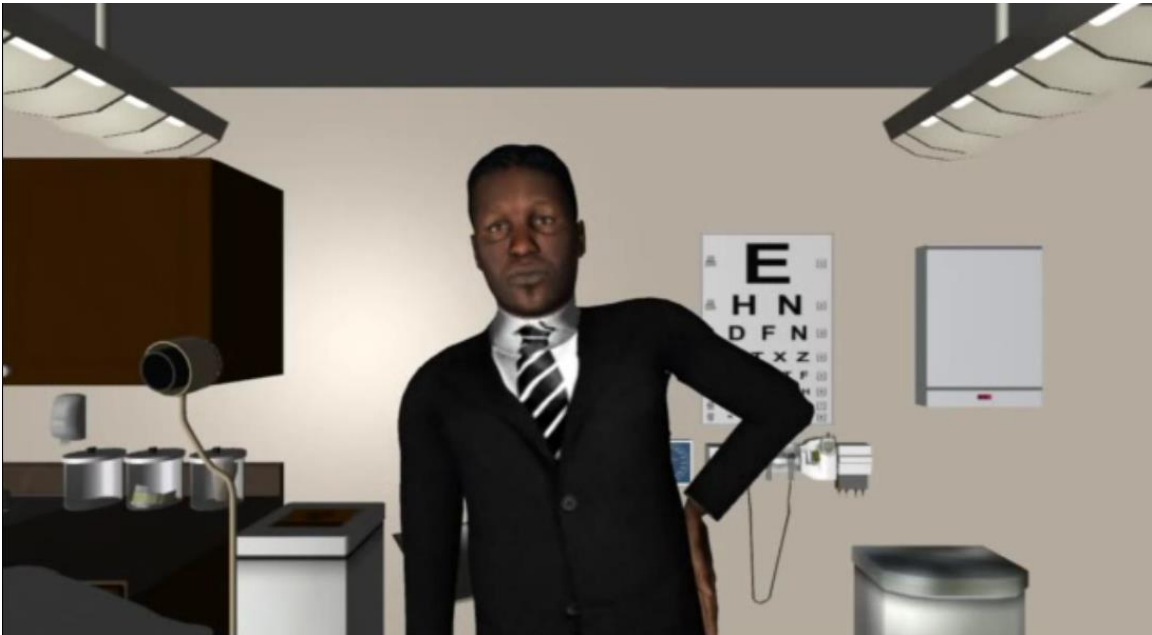
# APPENDIX D. EXAMPLE VIRTUAL HUMAN PATIENT VIDEO STILLS
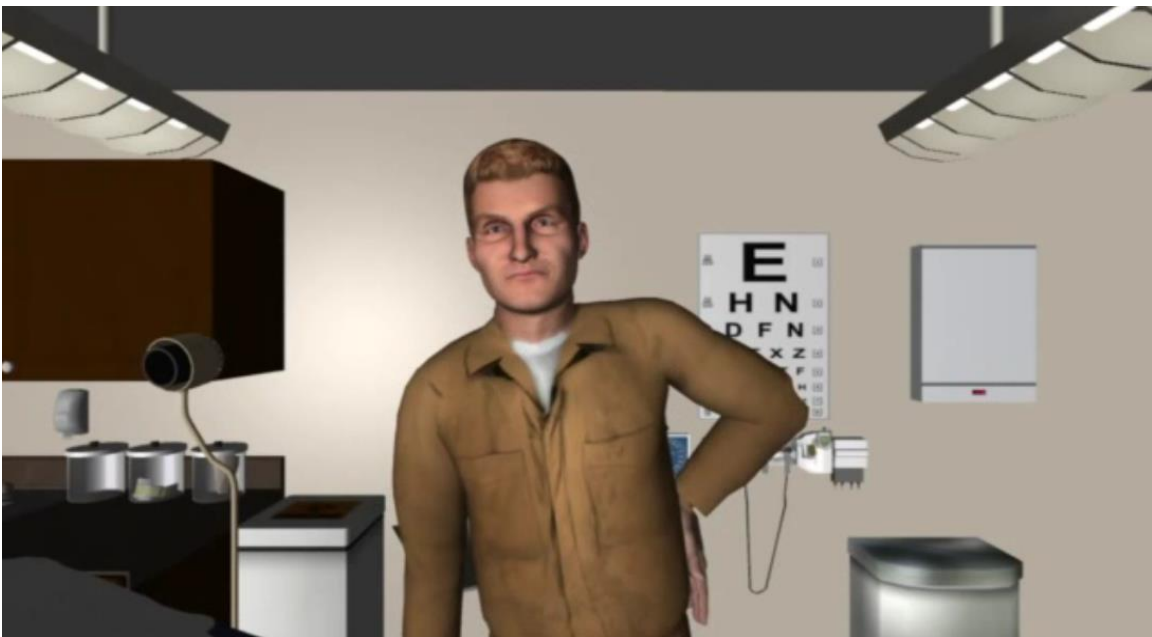


Figure 6. Black/high SES patient video still



Figure 7. White/low SES patient video still

# APPENDIX E. DEMOGRAPHIC QUESTIONNAIRE

Demographics questionnaire

1) Age: ☐

2) Sex:
  ☐ Male
  ☐ Female

3) Ethnicity:
  ☐ Not Hispanic or Latino
  ☐ Hispanic or Latino

4) Race:
  ☐ American Indian/Alaska Native
  ☐ Asian
  ☐ Native Hawaiian or Other Pacific Islander
  ☐ Black or African American
  ☐ White
  ☐ More than one Race (please specify ☐

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

6) Please select your parents' annual household income:
  ☐ Less than $10,000
  ☐ $10,000 - $18,999
  ☐ $19,000 - $37,999
  ☐ $38,000 - $50,000
  ☐ $51,000 - $75,000
  ☐ Greater than $75,000

7) Please select your annual household income:
  ☐ Less than $10,000
  ☐ $10,000 - $18,999
  ☐ $19,000 - $37,999
  ☐ $38,000 - $50,000
  ☐ $51,000 - $75,000
  ☐ Greater than $75,000

8) Are you currently in a training program to be a healthcare provider?
  ☐ No (please skip the next question and proceed to question 10)
  ☐ Yes (please answer the next questions)

9. What type of training program are you currently in?
- ☐ Nursing school
- ☐ Medical school
- ☐ Graduate nursing school (e.g., nurse practitioner, nurse anesthetist, Doctor of Nursing Practice)
- ☐ Medical residency
- ☐ Medical fellowship
- ☐ Occupational therapy
- ☐ Physical therapy
- ☐ Other (please specify)[_____]

10) Are you currently a practicing healthcare provider?
- ☐ No (please skip questions 11-14 and proceed to question 15)
- ☐ Yes (please answer the next questions)

11) 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
- ☐ Occupational Therapist
- ☐ Physical Therapist

12) Years of professional healthcare experience (do not include time spent in training):
- ☐ <1 year
- ☐ 1-4 years
- ☐ 5-9 years
- ☐ 10-14 years
- ☐ 15-19 years
- ☐ 20-24 years
- ☐ 25 years or more

13) Current practice setting (select the one that most applies)
- ☐ Hospital
- ☐ Nursing Home
- ☐ Hospice
- ☐ Outpatient clinic
- ☐ Emergency Room/Urgent Care
- ☐ Other (please specify[_____]

14) 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 ☐_____)

15) Rate your level of clinical experience with chronic pain (VAS 0-100)

"Not at all experienced" _____ "Very experienced"