

Psychology Senior Honors Thesis Final Manuscript

Pain perception and treatment recommendations: how do medical professionals make pain treatment decisions?

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Abstract

Across several medical domains, including but not limited to cancer treatment, hospice care, and emergency medicine, Black individuals have been shown to be less likely to be given opiates to treat pain than White individuals with identical conditions. These differences remain after controlling for other factors such as socioeconomic status and education, leading researchers to look for alternative explanations. Hoffman et al. (2016) explored the theory that these disparities are associated with the endorsement of perceived false-biological beliefs about Blacks, finding that White medical students and residents endorsing these beliefs were more likely to rate Black pain as lower than White pain and less likely to prescribe opiates to Blacks than to Whites. The present study aimed to replicate Hoffman et al.'s (2016) methodology among medical students at Tufts Medical Center, a large research hospital with a diverse patient pool. In addition, the researchers manipulated the instructions participants received to determine whether or not being instructed to empathize with the patient could reduce the pain perception and treatment gap between Blacks and Whites. While no effects were found to be statistically significant, perhaps due to an inadequate sample size (N=23), potential explanations for the observed effects and their directions are examined.

In the United States today, the amount and quality of healthcare is unevenly distributed among different groups, exacerbating long-lasting disparities that have harmed minorities such as the poor and non-Hispanic Blacks. One example of a discipline exhibiting significant disparities is pain management, with Blacks less likely to receive opiates than Whites across numerous conditions (Tamayo-Sarver et al., 2003). Though many theories exist that attempt to explain this gap in treatment, the literature remains inconclusive necessitating additional research examining the factors that influence provider treatment decisions. First, this paper discusses the relationship between race and healthcare disparities. Next based on previous research, we explored explore the possibility that endorsement of a set of perceived false-biological beliefs about Blacks was associated with racial bias in pain perception and treatment through an empirical experiment. Previous research suggests that White medical professionals endorsing these beliefs are likely to exhibit this bias due to both overprescribing opiates to White patients and underprescribing opiates to Black patients (Hoffman et al., 2016). Additional variables such as empathy and trust were also examined as potential factors that can influence a clinical encounter, and subsequently the perception and treatment of patient pain.

Racial and Ethnic Healthcare Disparities

Although healthcare disparities may manifest differently depending on the specific area of healthcare explored, these differences persistently disadvantage minority groups. Compared to non-Hispanic Whites between the ages of 18 and 65, non-Hispanic Blacks are less likely to have health insurance, be vaccinated against influenza, and participate in regular moderate physical activity (Centers for Disease Control and Prevention, 2005). Women of these groups are less likely to receive prenatal care in the first trimester (Centers for Disease Control and Prevention, 2005), and Black children are significantly more likely to be uninsured and sporadically insured

than White children (Flores & Lin, 2013), illustrating inequalities in access to healthcare that spread across generations.

Studies have shown that across several medical disciplines, Blacks are at risk of receiving lower quality care than whites (Freeman & Payne, 2000; Fiscella et al., 2000; Smedley, Stith, & Nelson, 2002; Moy, Dayton, & Clancy, 2005). Coupled with lower usage rates among minorities such as Blacks, poorer quality care has been associated with disparities in health outcomes. Minorities report lower treatment satisfaction, receive more potentially avoidable care, are readmitted to the hospital more often, and are more likely to have a disease go untreated than Whites (Fiscella et al., 2000). Researchers have replicated these findings through studies employing observational and cross-sectional designs, with many showing significant differences in quality of care, particularly among conditions relating to pain (Green et al., 2003; Bonham, 2001; Booker et al., 2016; Shavers et al., 2010). While partly due to historic racism and systematic barriers preventing minorities from receiving equal access to and availability of care, additional challenges such as language and cultural factors hinder progress toward more equitable care (Smedley, Stith, & Nelson, 2002). Furthermore, despite decreases in overt discrimination against minorities in the healthcare system, individuals still harbor negative implicit attitudes and negative stereotypes that continue to impede movements toward health equity (Smedley et al., 2002). These prove challenging to overcome, particularly when dealing with a complex issue such as pain, the focus of the present research. In pain management, any number of factors can influence both the manifestation and perception of an experience of pain, as providers and patients both bring individual experiences to the clinical interaction that can influence treatment decisions (Shavers, Bakos, & Sheppard, 2010).

Pain Treatment Disparities

Patient race has proven to be a strong predictor of whether or not a physician prescribes narcotic treatment for pain-related conditions. While the literature examining general analgesic pain medications such as ibuprofen provide mixed results, recent research focusing on opiate treatments have revealed a tendency for physicians to under prescribe opiates to Black patients (Tamayo-Sarver et al., 2003; Dickason et al., 2015; Heins et al., 2006; Smedley et al., 2002; Goyal et al., 2015). For example, a recent chart review of patients diagnosed with trigeminal neuralgia, a chronic disorder causing pain in the trigeminal nerve, revealed that Blacks were found to be less likely to be provided treatment than Whites presenting with the same condition (Reinard et al., 2016). Among children and adults under the age of 21 presenting with appendicitis in the emergency room, Blacks with severe pain were less likely to receive opiate pain treatment than Whites (Goyal et al., 2015).

These findings are consistent with an evaluation of pain-related emergency department (ED) visits showing that Whites were more likely to received opiates than Blacks (Pletcher et al., 2008). The researchers showed that Whites with pain received opiates during 31% of visits while Blacks with pain received opiates during only 23% of visits. These differences persisted over time and remained after adjusting for severity of pain, with a greater observed disparity as pain severity increased (Pletcher et al., 2008). Similar results were found when assessing pain care for cancer patients, palliative care settings, acute injuries, and chronic conditions (Anderson et al., 2009; Staton et al., 2007; Booker & Herr; Stein et al., 2016; Lee et al., 2016; Shavers et al., 2010). The pervasive evidence supporting widespread treatment disparities, particularly among chronic and acute pain conditions, suggests a need to examine the factors contributing to this disparate pain treatment among Blacks.

Potential Explanations: An Overview of Bias in Healthcare

Several studies illustrated the widespread treatment disparities across a range of conditions. While some of these racial disparities may be attributable to other factors such as socioeconomic status, education, etc., the differences in quantity and quality of pain-treatment remain when these factors are controlled (Tamayo-Sarver et al., 2003; Smedley et al., 2002). These findings suggest that there are other explanations for the observed differences that persist. Researchers began looking for social psychological paradigms that could help explain the observed differences. .

One possibility is that physicians knowingly and purposely under-prescribe pain medication to Black patients. While this form of explicit discrimination was practiced for decades, the current discrimination seems to be a result of structural racism rather than hateful attitudes (Williams & Rucker, 2000). Structural racism can be defined as the macro-level forces such as social forces and ideologies that interact to create and reinforce health inequities (Gee & Ford, 2011). Researchers explored other possibilities, including that physicians may hold implicit biases that influence their clinical interactions. Unlike explicit biases that result in overt discrimination, implicit attitudes operate on the subconscious level, making it difficult to recognize their existence and use (Smedley et al., 2002; Mathur et al., 2014). Therefore, certain implicit biases could emerge as physicians treat patients without them ever realizing that their preconceived notions are affecting their perceptions of patient pain. The Institute of Medicine's 2003 report *Unequal Treatment* identified these implicit biases towards certain groups as contributing factors to healthcare disparities by undermining communication between physicians and patients (Smedley et al., 2002). However, patients play a role in the clinical interaction as well, and patient factors can influence physician attitudes and behavior during evaluation of pain.

Patient Factors

Given pain's subjective nature, individual differences have the potential to interfere with an understanding of another's pain. Race and ethnicity have been shown to influence the clinical expression and perception of pain (Shavers, Bakos, & Sheppard, 2010), suggesting that cultural differences that patients carry into an interaction with their physicians play a role in patient-physician interactions (Portenoy et al., 2004). Additionally, some minority patients may be unwilling to cooperate with physicians because of a history of mistrust and wrongdoing. Previous injustices such as the Tuskegee Syphilis study in 1932, during which Black males were intentionally given then denied treatment for syphilis, have driven a wedge between Blacks and the healthcare system and have led Blacks to mistrust physicians and the healthcare system at large (Boulware et al., 2002). These negative encounters with the medical system have led Black patients to limit their use of preventative care and often resist engaging with the medical system (Armstrong et al., 2006). Moreover, mistrust and irregular visits to physicians prevents a strong patient-physician relationship from developing, further undermining the patients' chances for receiving their necessary treatment (Simon, 2012; Armstrong et al., 2013).

Additional factors contributing to under-treatment of Black pain include poor healthcare literacy and language barriers, further clouding the communication between physicians and patients (Smedley et al., 2002). Consequently, Black patients often have a more difficult time conveying their experience of pain to the physician examining them. Even when the experience of pain is communicated effectively, Blacks are at a greater risk than Whites of being perceived as engaging in drug-seeking behavior when asking for pain medication (Shavers, Bakos, & Sheppard, 2010). Patient-physician relationships can be further harmed by the presence of negative implicit attitudes toward a patient based on his or her race.

Providers and Implicit Bias

Over the past few decades, healthcare settings emerged as a prominent domain for biases to operate. While in an ideal world physicians would not be subject to the same implicit and explicit biases that influence the ways in which all human beings interact with the world, the reality is that doctors are still human and operate with stereotypes every day while treating patients. Green et al. (2007) demonstrated that while physicians did not explicitly state a preference for Whites over Blacks, IATs showed implicit attitudes that favored Whites. Reliance on stereotypes is particularly problematic when individuals face high levels of cognitive load and stress, limiting their ability to filter bias from their thoughts and interactions (Smedley et al., 2002). Given the high-stress, fast-paced medical environment, physicians' interactions with patients of different racial/ethnic backgrounds are vulnerable to bias playing a role (Dovidio & Fiske, 2012; Mossey, 2011). Studies have shown that White physicians can have a more difficult time perceiving and assessing the pain of their Black patients than when assessing White patients (Shavers, Bakos, & Sheppard, 2010). This is believed to be due, in part, to difficulty assessing the pain of patients of a different cultural background. The cultural context surrounding an experience of pain helps to shape the way individuals, physicians included, react to pain and perceive pain in others. If physicians cannot adequately understand patient pain or patients cannot communicate their pain, physicians may instead rely on other factors such as stereotypes and personal beliefs to guide their treatment plans.

Research by Tamayo-Sarver et al. (2003) showed physicians are more likely to exhibit disparate prescribing patterns when the experience of pain is caused by a subjective experience such as back pain than when the cause is objective such as a broken bone. The ability for physicians to see a physical cause of the pain removes some of the subjectivity to the patient's experience of pain, enabling them to avoid relying on other means to determine treatment

(Tamayo-Sarver et al., 2003). However, if a physician is treating a patient of a different cultural background for a condition that does not have a visible cause, the physician may be more likely to rely on unrelated factors such as race and socioeconomic status when evaluating the patient. Communication breakdowns between non-White patients and White physicians contribute to these difficulties, leading physicians to rely more heavily on stereotypes about groups (Shavers, Bakos, & Sheppard, 2010).

One consequence of poor perception of patient pain is disparate treatment recommendations (Shavers et al., 2010; Kolonoff, 2009; Mossey, 2011). Physicians were found to be equally likely to prescribe opioids to Blacks and Whites with a long bone fracture, but less likely to prescribe opioids to blacks with back pain and migraines (Tamayo-Sarver et al., 2003). However, the researchers found inconclusive evidence that unconscious social class and race biases are associated with clinical decision-making. Other studies have shown that White physicians are more likely to underestimate the pain of Black patients versus White patients (Staton et al., 2007), yet implicit and explicit racial attitudes have not been shown to be predictors of this bias (Haider et al., 2015).

Potential Explanation: False-biological Beliefs about Blacks

Recent work by Trawalter, Hoffman, and Waytz (2012) revealed a potential alternative explanation for treatment differences, finding that White individuals assume that Blacks feel less pain than Whites, perhaps because Blacks are perceived to be tougher due to the hardships they have faced. Hoffman and Trawalter's (2016) recent work supports this theory by demonstrating that perceptions of hardship helped to shape participants' perceptions of pain, such that participants endorsing the belief that hardship leads to toughness rated Black targets as feeling less pain than white targets. In the 2012 study, the researchers found that Black football players

who sustained an injury in a game were more likely to play in the following game than White players with comparable injuries, perhaps because the teams' physicians assumed they were not in as much pain as their White counterparts (Trawalter, Hoffman, & Waytz, 2012). Follow-up studies using nurses and nursing students showed that even medical personnel believe that Blacks feel less pain than Whites (Trawalter, Hoffman, and Waytz, 2012).

The researchers then examined the nature of this belief in another study, hypothesizing that Blacks were seen as superhuman relative to White people. Their findings supported this theory, with Whites more likely to associate and attribute superhuman characteristics to Blacks than to Whites (Waytz, Hoffman, & Trawalter, 2014). Superhumanization of Blacks was also shown to be a predictor of a lower pain perception toward Black targets, supporting the theory that false beliefs about Blacks can alter the perception of how Blacks feel pain. Hoffman et al. (2016) showed that White laypeople who strongly endorsed false biological beliefs about Blacks reported lower levels of pain for the Black patients than for the White patients. This effect was replicated in a second study involving medical students and residents, with participants endorsing false beliefs rating black pain as lower and making less accurate treatment recommendations while participants not endorsing beliefs rated black pain as higher and showed no bias in recommendations. Since the study was conducted among a population of medical students and residents, it is unknown if these false-biological beliefs are also held by attending physicians with years of practice and experience. The researchers recommended that future studies extend the subject pool to attending physicians, an objective of the current study. Given the added uncertainty surrounding subjective experiences of pain and the relative dearth of research in this area, objective causes of pain were the best conditions to use while examining the factors influencing physician treatment decisions because they helped control for some of the

subjectivity that remains poorly understood in the literature. The present research replicated the materials of Hoffman et al. (2016) by using a fracture and a kidney stone as the test cases for these reasons.

Perspective-taking as a Potential Moderator of Pain disparities: The Role of Empathy

Another potential explanation is that physicians have lower levels of empathy for non-White patients. Therefore, physicians would have a greater difficulty gauging the amount of pain a patient is experiencing, leading them to decrease the amount of treatment physicians recommend. However, previous research has shown inconclusive results (Burgess et al., 2006; Drwecki et al., 2011), necessitating additional examination of the intersection between empathy and pain perception/treatment disparities

While differences in empathy for White vs. Black patients in a healthcare context has not been extensively explored by previous research, empathy could play a role in closing the pain-treatment gap. Research by Drwecki et al. (2011) has demonstrated that an empathy-inducing perspective-taking intervention can help reduce the pain-perception disparities among nurses. Participants instructed to empathize with the patients they read about were asked to “imagine how patients’ pain affected patients’ lives” while participants receiving the control instructions were asked to “provide patients with the best care” (Drwecki et al., 2011). When provided with the control instructions, a significant pro-White treatment bias emerged. However, when participants were provided with the perspective-taking intervention, this bias was reduced by 55%.. These results were replicated by Wandner et al (2015), with participants in the perspective-taking group more likely to focus on the patient’s perspective while making treatment decisions as opposed to focusing on cues such as age, sex, and race. It is unknown if the effects of false-biological beliefs on clinical decision-making can be mediated. I employ a

similar tactic to examine the effects of a perspective-taking intervention on physicians' perceptions of pain and subsequent treatment recommendations.

Implications

This thesis will continue exploring a new area of research investigating the prevalence and effects of false-biological beliefs in the healthcare system. The present research can help researchers and physicians better understand the impact that many factors involved in medical decision-making, including possibly the endorsement of false-biological beliefs, can have on physician treatment recommendations. Thus, the findings of this research has the potential to help facilitate the development of strategies to mitigate these effects and reduce pain-treatment disparities among Blacks in the United States.

Method

Participants

Participants were third and fourth year medical students at Tufts University Medical School). Potential participants were contacted directly through email with the help of one of the Deans of the medical school. An initial email was sent, followed by reminder emails at one and three weeks after the first email. . A standard message explaining that the study is part of a project for a senior honors thesis was included in the recruitment messages. In total, 46 participants clicked on the survey link. However, only 23 participants completed the entire survey. See Table 1 for a full demographic breakdown of participants by gender and by condition.

Design

We used a 2 (race: White and Black) by 2 (instructions: control or perspective-taking) mixed-methods design to test the study's hypotheses. Race was a within-subjects factor with all participants viewing both a White and a Black case and instructions was a between-subjects factor. Participants were gender matched to cases and then randomly assigned to either the perspective-taking or control instructions. Medical students were offered the opportunity to enter a raffle for one of two \$25 gift cards. In a separate Qualtrics form, participants were asked to provide an email they would like to be contacted at regarding compensation. Medical students were only contacted if they won the raffle.

Measures

The primary dependent measures of interest were the pain-perception ratings, the type of treatment and dosage recommended, and endorsement of false-biological beliefs. These specific questions and scales were taken from Hoffman et al.'s (2015) study. In addition, we measured "physician" trust in the "patients" using the Physician Trust in Patient Scale (Thom et al., 2012), measures of empathy, and the factors that physicians rely on when treating a patient for pain

Materials

The researchers used a standardized email to reach out to potential participants directly and to department heads at each of the hospitals used. The entire study was conducted using Qualtrics surveys. See Appendix 1 for all measures, appendix 2 for all instrumentation, and appendix 3 for all recruitment materials used in the study.

Initially, participants were informed that the study aimed to examine the ways in which clinicians perceive pain and make treatment recommendations. An unstated goal of the study was

to explore the effect of the endorsement of false-biological beliefs about Blacks on pain-perception and treatment recommendations. The study itself was composed of four main parts: instructions, clinical cases with questions, additional measures including empathy scales and statements about biological beliefs, and demographic questions. The cases, measures of false-biological beliefs, and a few of the questions were taken directly from the Hoffman et al. (2016) study examining false-biological beliefs among medical students and residents. The present study also included additional questions exploring physician motivation and trust in patients using the Physician Trust in Patients Scale (PTPS) developed by Thom et al. (2011) which has been validated as a measure of Primary Care Physicians' (PCP) trust in patients. See Appendix 1 for all scales and see Table 2 for reliability analysis of each scale.

The clinical cases (see Appendix 2 for all cases) were modeled after cases that are used in medical school training and included a brief medical history, review of systems, physical examination results, and any additional relevant test results or information. Within each case, race was manipulated by providing a stereotypically White or Black name and by indicating perceived race in a physical description of the patient. All names had been previously pretested by Hoffman et al. (2016). Each case presented a male or female patient depending on the gender of the participant, with participants gender-matched to the cases. The patient presented with either a broken ankle or a kidney stone and was either White or Black. Prior to seeing the cases, participants were randomly assigned to see either the control or the perspective-taking instructions. These instructions were adapted from studies showing perspective-taking to be an effective strategy for reducing pain-perception and treatment differences (Drwecki et al., 2011; Wandner et al., 2015). Participants in the control condition read "make the best, most accurate treatment decisions for each patient," and were reminded of this goal by the statement "try to

make your best treatment decisions” prior to viewing the cases”. Participants in the experimental condition received the same instructions, except they were additionally instructed to “attempt to imagine how each of your patients feels while you are examining them,” at the beginning of the experiment, were reminded of this goal before each case by the statement “try to imagine how your patient feels about his or her pain and how this pain is affecting his or her life,” and were further instructed to “spend a moment imagining how your patient feels about his or her pain and how this pain is affecting their life” after reading through each case.”. Therefore, the study consisted of four conditions: White and control instructions (1), Black and control instructions (2), White and perspective-taking instructions (3), and Black and perspective-taking instructions (4).

After viewing each case, participants were asked to assess the patient’s severity of pain on a Likert type scale (from 0 being low severity to 10 being extremely severe) and to provide an open ended treatment recommendation. Similar to Hoffman et al. (2016), treatment recommendations were compared to best-practice treatment recommendations as determined by a separate group of physicians and coded as incorrect if participants fail to prescribe opiates or prescribe an insufficient quantity. Additional questions about lifestyle recommendations, the use of perspective taking, and the extent to which the patient’s experience of pain influences treatment decisions were also provided. Participants were also be presented with the PTPS after each case (on a scale from 1 being not confident at all to 5 being completely confident) and asked about the factors that went into their decision-making process while deciding on a treatment. After viewing both cases, participants completed two empathy scales to measure state and trait empathy: the empathic concern scale which was taken from Drwecki et al. (2011) and an adjusted perspective-taking scale which we modified from the IRI subscale to accommodate

physicians' experiences. Participants were also asked to what extent it was appropriate to take the patient's perspective while evaluating them for pain and recommending treatment. Next, participants were provided with the 15-statement biological belief scale and asked to indicate the extent to which they agree with each statement. Some of the statements were true while others were false. At the end of the study, participants were asked to indicate their age, race, department, hospital, any previous experience learning about racial bias in the medical field, and if and when they realized that the researchers were examining racial disparities in pain perception and treatment. Participants were also asked to indicate the race for each patient they saw as a manipulation check for race.

Procedures

After being recruited through email, participants clicked on the Qualtrics link that brought them to the first part of the study. They were presented with the informed consent and asked if they agree to participate in the study. If they selected no, they were immediately taken to the end of the survey and thanked for their time. If they selected yes, they were asked to indicate their gender and age and were randomly assigned to either the control or perspective-taking level and gender matched to the medical cases. Participants were informed that they would see two medical cases, be asked questions about the patient, and provide a treatment recommendation. The rest of the instructions varied depending on the instruction condition. After receiving the appropriate instructions, all participants were shown both a White and a Black case. One of the cases involved a patient with a broken ankle and one involved a patient with a kidney stone. Participants were allowed to view the cases for as long as they liked and they were able to reference the cases while answering the follow-up questions. After each case, participants rated the patient's pain, provide a treatment recommendation, took the PTPS, listed the factors that

went into their decision, and answered a few additional measures relating to their recommendation. The two empathy scales were then provided, along with a question asking about the appropriateness of perspective taking during medical decision-making. The measure of false-biological beliefs was presented following the empathy scales. Next, participants were asked a host of questions about demographic information and participant experience learning about bias in the medical system. Finally, participants were be probed for suspicion, asked to indicate the races of the patients they read about, debriefed, and linked to a separate survey to provide their email for compensation. Medical students were then offered the opportunity to enter the raffle.

Results

Demographics

Of the 44 participants who clicked on the survey link, 23 did not complete the survey in its entirety. Of the remaining 23 participants, 26 were female and 18 were male. Even though 6 of the participants were non-White, no one was excluded based on race because of the very small sample size. Similarly, participants were not excluded based on failing a manipulation check. Furthermore, even if individual participants indicated the wrong race of the patient, they were likely still made aware of the races of the patients they were evaluating given that the race was explicitly stated in the text of each case.

Manipulation Checks

Race:

At the end of the survey, participants were asked to indicate the race of the patient they had evaluated in each case. Most of the participants (82.6%) correctly indicated that the Black

patient's race was Black while just over half (56.6%) of the participants correctly indicated that the White patient's race was White. This difference in participant success suggests that the manipulation of race, particularly among the White patients, may not have been salient enough to convey racial identity.

Perspective-taking.

Repeated-measures ANOVAs were conducted to analyze whether the instructions manipulation resulted in greater perspective taking of the patients for participants receiving the perspective-taking instructions compared to those receiving the control instructions. Participants receiving the control instructions ($M=5.143$, $SE=.26$) reported taking the patients' perspective to the same degree as participants receiving the perspective-taking instructions ($M=5.056$, $SE=.325$), regardless of patient race, $F(1,21)=.044$, $p=.836$. There was no significant interaction between patient race and instruction condition, $F(1,21)=.633$, $p=.435$. Additionally, participants receiving the control instructions ($M=5.286$, $SE=.302$) reported the patient's experience of pain as being equally influential in their treatment decision as participants receiving the perspective-taking instructions ($M=4.611$, $SE=.376$), regardless of race, $F(1,21)=1.957$, $p=.176$. While this was a non-significant difference, there was a trend developing that suggests the patient's experience of pain had more influence on participant decision-making in the control level of the instructions than in the perspective-taking level. There was no significant interaction between patient race and instruction condition, $F(1,21)=1.626$, $p=.216$. Contrary to Drwecki et al. (2011), the instructions manipulation did not appear to differentially affect the use perspective-taking between the two instructions groups.

The perspective-taking manipulation check questions were re-evaluated as secondary dependent variables using paired t-tests. Participants reported taking the patients perspective as

much for Black patients ($M=5.26$, $SE=.211$) as for White patients ($M=4.96$, $SE=.231$), $t(22)=1.576, p=.129$. Though the difference is not significant, this result is trending toward showing that Black patients elicited more perspective-taking than White patients. Participants reported that the patient's experience of pain influenced treatment recommendations more for Black patients ($M=5.26$, $SE=.290$) than for White patients ($M=4.78$, $SE=.243$), $t(22)=2.043$, $p=.053$. This suggests that the extent to which the patient's experience of pain may influenced treatment recommendations depended on the race of the patient, with Blacks' experiences having a higher influence than Whites' experiences. See Figures 1 and 2 for a graphical representation of these relationships.

Biological Belief Scale

Our intention was to analyze the relationship between false-biological belief scale, patient race, and instructions. However, upon closer examination of the data, it appeared that the false-biological belief scale yielded very little variability (see figure 3 for a histogram of the biological belief scale composite scores) making it statistically inappropriate to include in our main analyses. Therefore, we were not able to evaluate these relationships.

Main Analyses

Pain perception.

There was a significant positive correlation between White and Black pain ratings, suggesting a positive relationship between pain ratings within each subject, $r=.512$, $p=.012$. Higher Black pain ratings was therefore associated with higher White pain ratings. The main effect of patient race on pain-perception was evaluated using a paired samples t-test. Overall,

participants rated Black pain ($M=7.61$, $SE=.233$) as equal to White pain ($M=7.43$, $SE=.280$), $t(22)=.678$, $p=.505$ (see Figure 3). Therefore, participants did not differentially report patient pain by race.

The main effect of instruction condition on pain perception was evaluated using a repeated measures ANOVA. Participants receiving control instructions ($M=7.786$, $SE=.278$) rated patient pain equally to participants receiving perspective-taking instructions ($M=7.111$, $SE=.347$), $F(1, 22)=4.986$, $p=.144$. There was no significant interaction between patient race and instruction condition on pain perception, $F(1,22)=.022$, $p=.884$ (see Figure 4).

Treatment Recommendation.

The main effect of race on treatment recommendations was examined using a chi square test of independence. For both the White and Black patients, participants prescribed opiates at an equal rate (47.2% of the time). 11 participants prescribed opiates while 12 participants did not prescribe opiates. The results of the chi square test showed that the treatment recommendation was not dependent on patient race, $\chi^2(1)=.088$, $p=.767$. See Figure 5 for a graph of the treatment recommendations by patient race.

The main effect of instruction condition on treatment recommendation was also examined using a chi square test of independence. For the Black patient, participants receiving the control instructions prescribed opiates 57% of the time while participants receiving the perspective-taking instructions prescribed opiates only 33% of the time. This difference was not significant, $\chi^2(1, N=23)=.1.245$, $p=.265$. For the White patient, participants receiving the control instructions prescribed opiates 50% of the time while participants receiving the perspective-taking instructions

prescribed opiates 44% of the time. This difference was not significant, $\chi^2(1, N=23)=.068, p=.795$. See Figures 6 and 7 for graphical representations of these relationships. *Exploratory Analyses*

Trust Scale

A paired samples t-test was conducted to examine the effect of race on trust. No effects of race on trust were found, $t(22)=<.001, p=1.000$.

Discussion

Overview of Hypotheses

Informed by the literature (Hoffman et al., 2016) suggesting that higher endorsement of false-biological beliefs, as measured by the biological belief scale, was associated with disparate pain perception and treatment recommendations by race, we hypothesized that the current study would find that participants rated Black pain as lower in intensity than White pain and provide opiates less often to Blacks than to Whites. Furthermore, participants receiving perspective-taking instructions were expected to generate fewer pain perception and treatment disparities than those receiving control instructions. Given the evidence (Drwecki et al., 2011; Wandner et al., 2015) supporting the use of a perspective-taking exercise to reduce the pain-perception gap, we hypothesized that the effect of false-biological belief endorsement on pain perception and treatment decisions would depend on the instructions given to participants. Participants endorsing more false-biological beliefs and receiving the control instructions were expected to generate greater patient pain and treatment disparities between White and Black patients. However, we expected these gaps to be reduced among participants that endorsed more false-biological beliefs and also received the perspective-taking instructions. The failure of the biological belief scale to provide variability limited the conclusions that could be drawn from the

results. In future studies, the scale should be refined to improve its ability to capture differences in beliefs. One strategy would be to change the questions and answers to reflect personal beliefs rather than truths. For example, rephrasing the question as “To what extent do you agree with the following statement” may allow more bias to emerge than asking the original question, “To what extent do you believe the following statements to be true?” This would create more variability within and across participants, thus enabling the researchers to include the measure in the main analyses as originally planned.

Given this limitation, the results of the current study focused on the main effects of race and instructions, as well as their interaction, on pain perception and treatment recommendations. We then developed main effect and interaction hypotheses based on the remaining variables, predicting that that participants would rate Black pain as lower than White pain, and that Black patients would receive opiates less often than White patients. Contrary to these hypotheses, we found that participants rated Black as equal to White pain. Similarly, we found that participants prescribed opiates as frequently to Blacks as to Whites, which contradicts our initial hypotheses. These findings suggest that patient race has no effect on the perception and subsequent treatment of patient pain by medical students, though a larger sample size is needed to make this conclusion.

Limitations and Alternative Explanations

Methodological

There are several potential explanations for finding results that contradict the existing literature. One possibility is the potential failure of the race manipulation as demonstrated by the failed manipulation checks, particularly for the White patient condition. If participants truly were

unaware of the race of White patients as the manipulation check suggested, it is unsurprising that we did not detect effects by race. It is possible that the stereotypically Black name was more recognizably “Black” than the stereotypically White name was “White”, thus explaining the observed success of the Black manipulation check and the observed failure of the White manipulation check. Additionally, participants may have been rushing to get through the survey as quickly as possible, and therefore did not read the cases carefully enough to process the race of the patient they were considering. A stronger race manipulation in future studies that increases the saliency of patient race by providing a picture or more thorough physical description could help to determine whether the race manipulation failure was partially responsible for these null results. It is also possible that providing participants with both levels of the race independent variable provided too strong a cue as to the nature of the hypotheses. These demand characteristics could lead to response bias, resulting in equal pain ratings and prescriptions for both patient races.

Theoretical

Another explanation for low rates of opiate prescriptions regardless of race is that the landscape of pain medication has been under the microscope as drug overdoses have skyrocketed in many parts of the country. With respect to opiate prescriptions, there has recently been heightened awareness and discussion about changing prescribing practices since the US Surgeon General sent letters to millions of doctors and departments imploring them to help combat excessive prescriptions (Murthy, 2016) particularly in Massachusetts. One consequence of this positive action is that medical centers are encouraging their physicians and medical students to limit the use of opiates in accordance with the Surgeon General’s suggestions (US Department of Health and Human Services, 2016). While even just months ago a broken ankle may have

elicited an opiate prescription, physicians may now be inclined to try alternative treatments and suggest nonsteroidal anti-inflammatory drugs such as Advil and Tylenol before progressing to opiates. Thus we may be seeing an overall decrease in prescriptions, resulting in a ceiling effect. As hospitals encourage their physicians to avoid prescribing opiates unless absolutely necessary, medical professionals may just be prescribing opiates at a lower rate than ever before. This may have manifested itself in the present research as an overall reduction in opiate prescriptions across both races. A much larger sample size would be needed to create enough variability to detect any possible differences. The question that remains and should be explored is whether this reduction will be uniform and perpetuate existing treatment disparities, or if prescribing rates will decrease differentially with a greater reduction among prescriptions to Whites. Moreover, if the demand characteristics of the study convey to participants that we are asking them to make a choice between prescribing opiates and alternative treatments, participants may have been more likely to err on the side of caution and resist prescribing opiates.

Instructions

We predicted that participants receiving perspective-taking instructions would exhibit a smaller gap in pain perception between the White and the Black patient than participants receiving control instructions. Furthermore, perspective-taking would lead to a smaller opiate treatment gap, with Blacks receiving opiates more often than in the control condition. Instead, our results showed that pain perception was statistically equal between participants in the control condition and participants in the perspective-taking condition. Interestingly, our findings began to trend in the opposite direction of our hypothesis. Though asking participants to imagine the patient they were examining and visualize how the pain might be affecting them was expected to increase the sensitivity of participants to the patient's perceived pain, our findings suggest that

perspective-taking may have actually hindered the ability of physicians to effectively evaluate pain. This effect is mirrored by treatment recommendation accuracy, with a greater percentage of incorrect recommendations occurring in the perspective-taking group than in the control group. It is possible that including additional instructions distracted the participants from the task at hand. Extra instructions and information that do not directly pertain to a case create competing demands for participants and increasing their cognitive load. Instead of focusing on interpreting the patient's condition and subsequent experience of pain, the participants may have foregone best practice while empathizing with the patient. Thus, even if participants did take the patients' perspectives more often, this shift in attention may take away from the ability of medical personnel to effectively evaluation the patient's condition.

Another explanation could be that the control instructions served as a manipulation of participants' framework for evaluating the cases. Since participants were not only told to evaluate each case and treat accordingly, the control instructions may not have actually served their purpose of simulating the typical decision-making framework that physicians use when evaluating patients in pain. Highlighting that participants should make the best treatment decision available may have raised suspicion that the usual treatment may not be the best treatment. This may have led participants to carefully consider all treatment options and more than they normally do, therefore influencing the ultimate treatment recommendation. Meanwhile, participants receiving the perspective-taking instructions were under increased extraneous cognitive load from the additional instructions (Van Merriënboer & Sweller, 2010). Similarly to the way in which individuals are more likely to fall back on stereotyping when under high cognitive load (Banaji & Greenwald, 1994), these participants may have been more likely to rely on their training and treat accordingly. Thus, participants receiving the perspective-taking

instructions would have been influenced by the additional instructions, though in a completely different way than intended.

However, a closer look at the manipulation of instructions shows that the perspective-taking instructions did not actually increase the extent to which participants took the patient's perspective. Both questions included to measure perspective-taking showed that participants took the patient's perspective equally, regardless of the type of instructions they received. If anything, there was a trend developing suggesting that participants receiving control instructions took the patient's perspective to a greater extent than patients receiving the perspective-taking instructions. Without a successful manipulation, it is difficult to draw conclusions from the present results. However, these findings are consistent with the main dependent variables of pain perception and treatment recommendation, necessitating a re-evaluation of the effectiveness of the perspective-taking intervention used in the present research. Going forward, a stronger manipulation of perspective-taking should be used to determine the true effect of this kind of intervention. A stronger manipulation would allow us to examine whether additional perspective-taking can act as an inhibitor to effective pain evaluation during a clinical interaction. It is also possible that the manipulation itself was successful, but the measures used to assess the manipulation did not adequately capture perspective-taking. It is difficult to make a determination with so few participants. The two perspective-taking manipulation checks were also used to explore the relationship between perspective-taking and race since the questions were asked after each case presented. The results suggest that there is a trend toward more perspective-taking when participants are presented with the Black patient. Moreover, the patient's experience of pain seems to be stronger when the patient is Black versus when the patient is White.

Future studies should explore this possibility with larger sample sizes to see if this trend becomes significant with adequate power. If so, it could have implications for the strategies medical students are taught to use when encountering a patient dealing with pain, especially when time is limited and attention to detail is vital. It would be interesting to explore the relationship between pain perception rating and treatment recommendation, with the hypothesis that participants would be more likely to provide opiate pain treatment when patient pain is perceived as higher. It is possible that treatment recommendations may not actually be a direct reflection of the extent to which the participant took the patient's perspective; rather, participants could be basing their treatment recommendation on their perception of patient pain, thus placing further importance on ensuring an adequate communication and understanding of pain during a clinical interaction.

Exploratory Analyses:

No effect of race on trust in the patient was found which is unsurprising given the failed race manipulation. Future studies should still include race as a variable of interest to see whether medical personnel differentially trust their patients based on their racial identity. The existing literature would suggest that race is a determination in one's trust of an individual, though the limited number of studies employing scales examining physician trust in patients leaves the variable of trust understudied in the medical domain.

Future Directions and Conclusions

Overall, there were several challenges that the researchers encountered that threaten the internal and external validity of the present research. As previously explained, there was a great amount of attrition that left only half of the participants that began the survey eligible to be

included in the analyses. Furthermore, this attrition was unequal, leading to different numbers of participants in each condition. The small sample size in each group leaves open the possibility that individual differences between the groups could be responsible for the observed findings. Additionally, the entire sample was comprised of medical students at one Boston medical school, an area known as a major center of healthcare research and innovation.

As previously mentioned, the recent focus on the opioid crisis in Massachusetts poses a threat to the validity of our results. This increased attention on opiates created a rather unique data collection period. It is unknown if the education surrounding pain treatment has been tweaked to reflect the rhetoric coming from the surgeon general. The medical students we surveyed may have been hyper-aware of anything possibly relating to opiates, and therefore responded differently than they would have otherwise.

Despite these challenges, the present research achieved its main goal of acting as a pretest for our measures before surveying physicians. Based on the challenges and feedback on our methods, we are now able to make changes and take into account some variables we had not considered when surveying the medical students. Going forward, we are considering changing the instructions manipulation to ensure it is strong enough to induce the desired effect. We are also planning to strengthen the race manipulation by providing a picture of the “patient” alongside the case. Furthermore, we are adjusting the biological belief scale to reflect individual opinions rather than seemingly objective truths to increase the response variation across the sample. We believe that these changes will address the main threats to validity and improve the quality of the data we collect.

Overall, the issue of opioid prescribing practices and the associated racial disparities illustrated in the literature remain a topic necessary of additional research. While there has been

increased scrutiny on prescribing practices, it is unknown how this will affect these disparities. It is possible that overprescribing to Whites will decrease leading to a closing of the opiate prescribing gap; though it is also possible that under-prescribing to Blacks will be exacerbated. A combination of cross-sectional studies examining prevalence and experimental studies evaluating the factors that influence pain perception and treatment are necessary provide a better understanding of both the observed disparities and the potential impact of interventions targeting overall opioid use reduction.

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Table 1. Demographics

Total N who began the survey = 44		Total N who completed at least both cases = 23		Instructions level breakdown	
Male	18	Male	13	Male Control	6
Female	26	Female	10	Female Control	8
		White Participants	17	Male Intervention	7
		non-White Participants	6	Female intervention	2

Table 2. Reliability Analysis

Scale	# of Items	Cronbach's Alpha
Physician Trust in the Patient Scale: Black Patient	12	.929
Physician Trust in the Patient Scale: White Patient	12	.914
Adjusted PT Scale	7	.861
Empathic Concern Scale	7	.909
Biological Belief Scale	8	.771

Figure 1. Extent to Which Participants Took the Perspective of the Patient While Evaluating Each Case

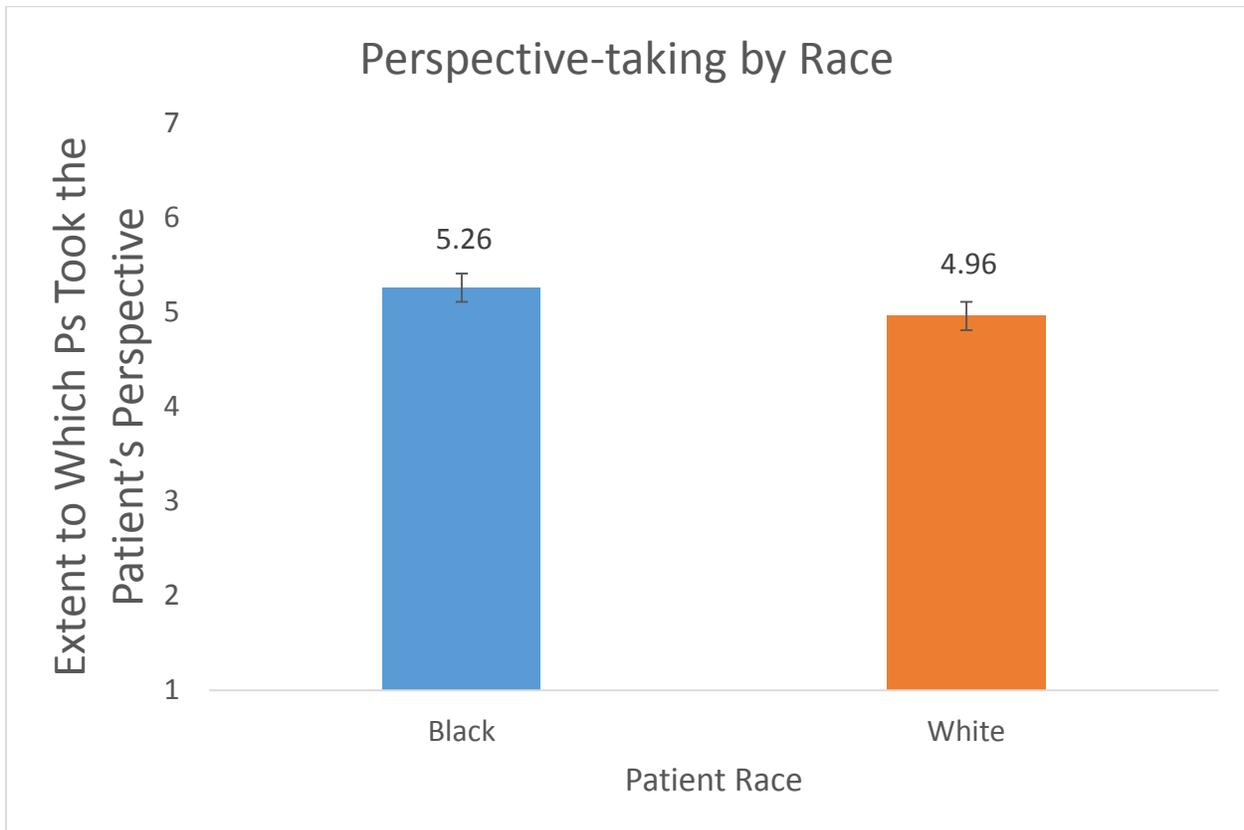


Figure 1. A graph of the average reported extent to which the participants took the patient's perspective while making treatment recommendations. This difference was not significant.

Figure 2. Extent to Which the Patient's Experience of Pain Influenced Treatment Recommendations

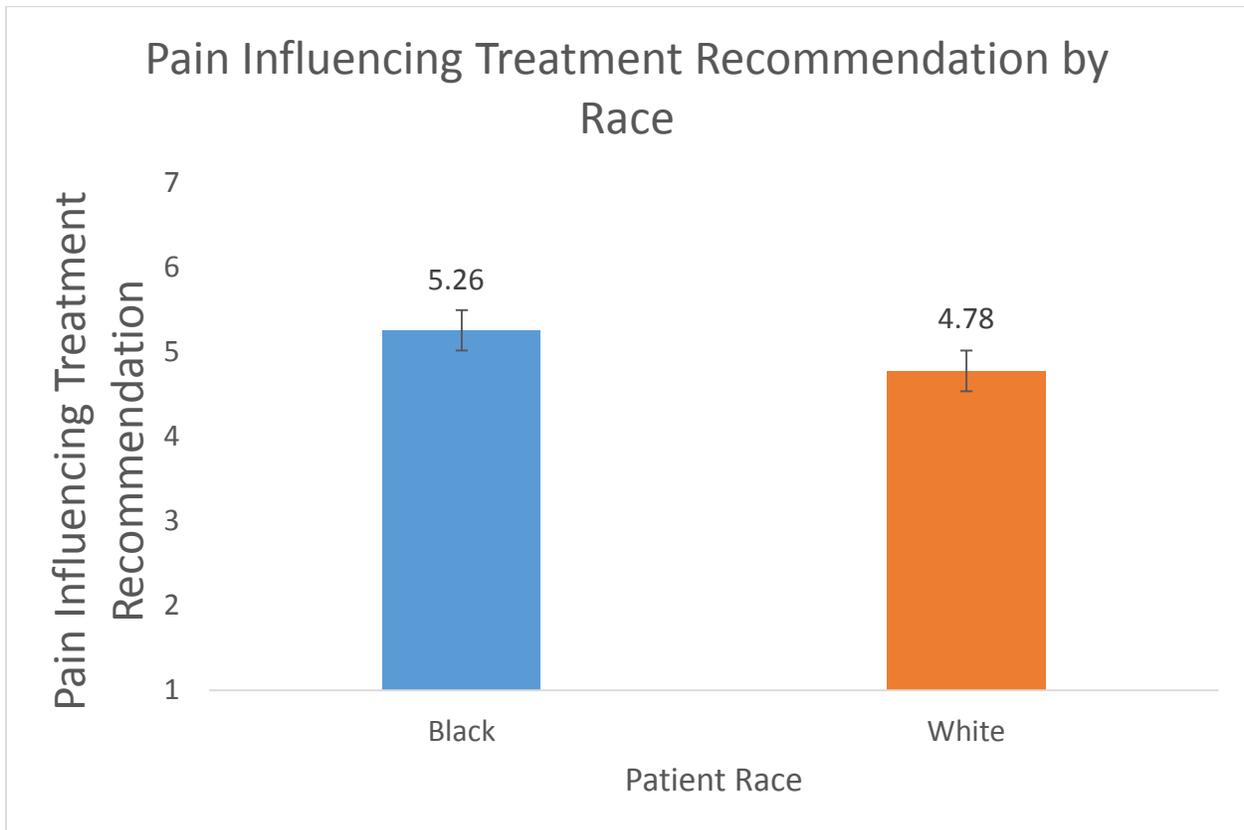


Figure 2. A graph of the average reported extent to which the patient's experience of pain influenced treatment recommendations. This difference was not significant, though it is interesting to see a higher mean among Black patients than White patients.

Figure 3.

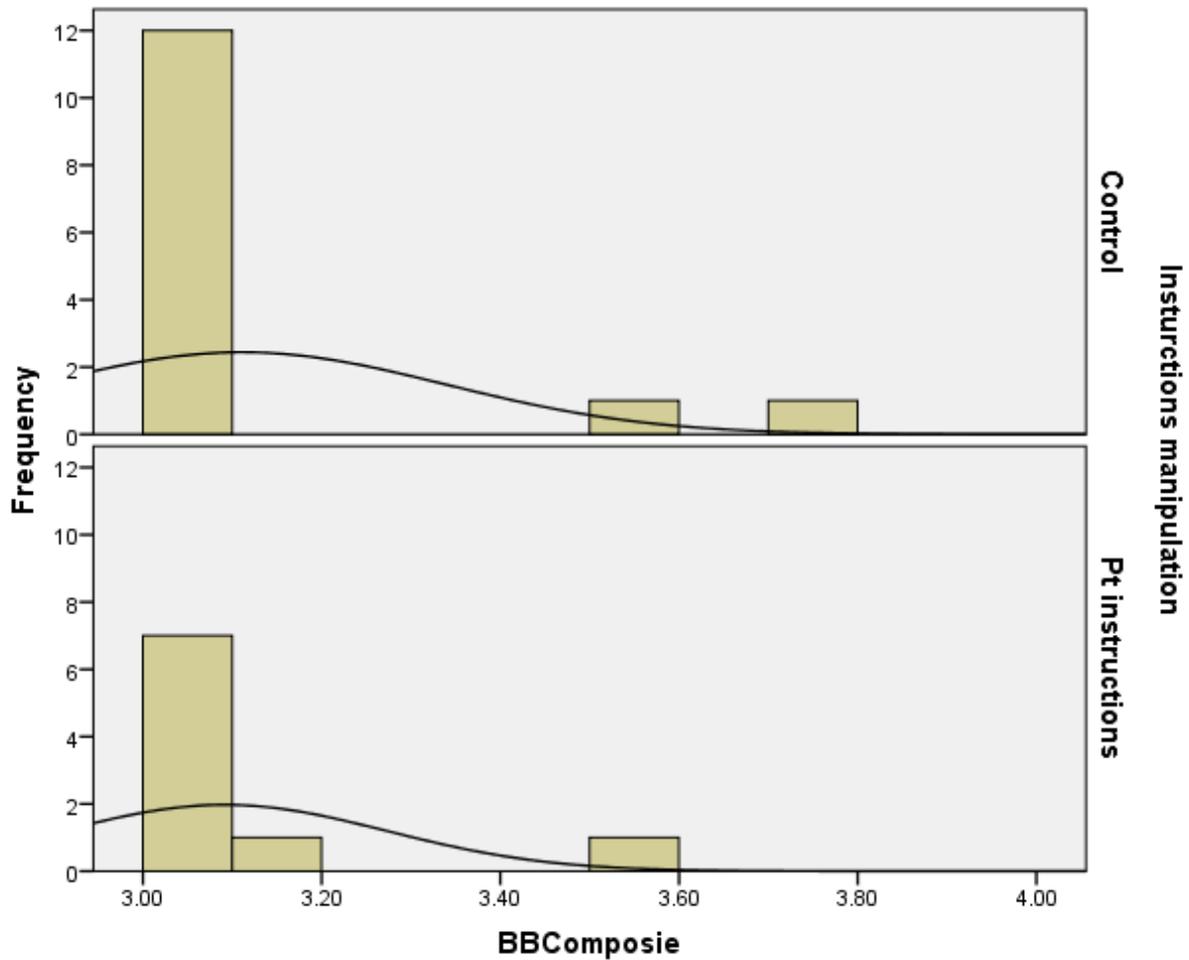


Figure 3. A histogram, by race, of the distribution of biological belief scale composite measures. Given the low variability as shown by a high concentration of data points clustered around 3.00 for both instruction conditions, we were not able to use the Biological belief scale in our analyses.

Figure 4. Main Effect of Patient Race on Pain Perception

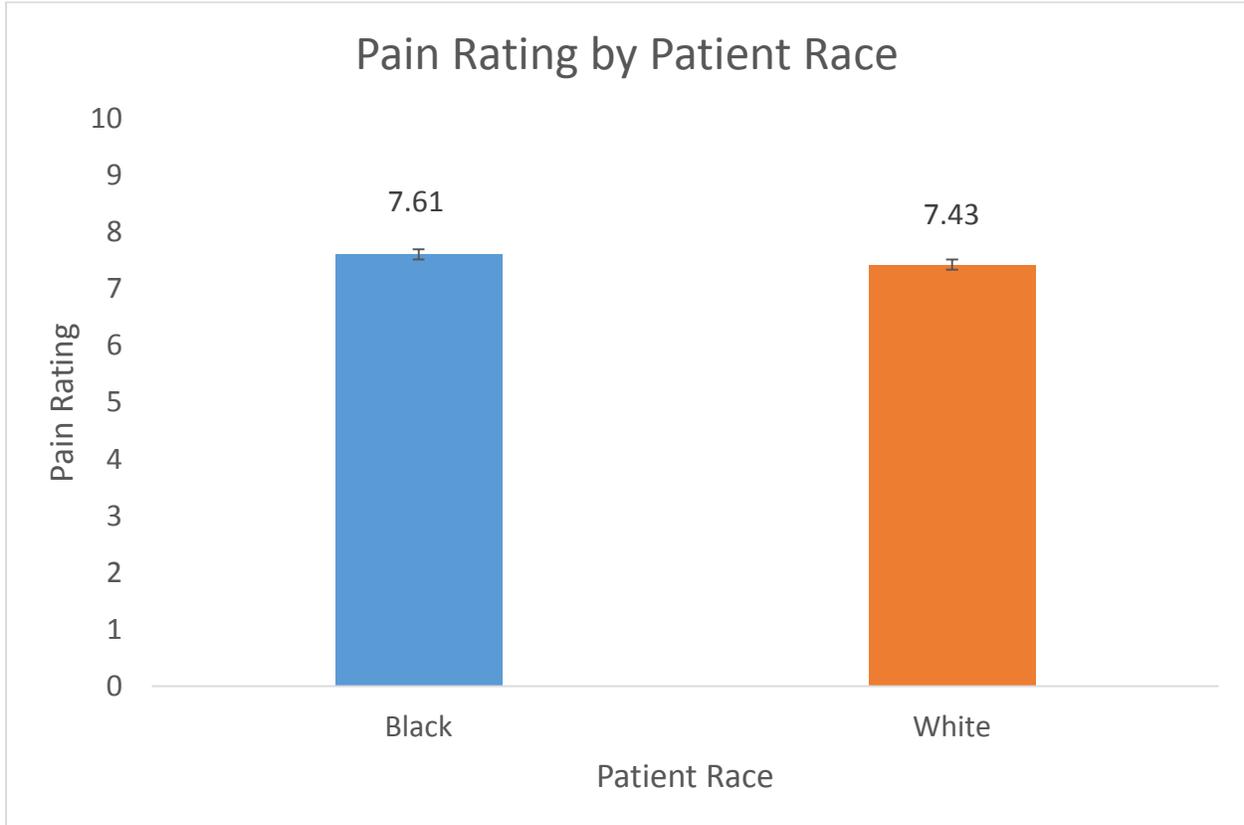


Figure 4. A graph of the average pain rating by patient race. This difference was not significant, though it is interesting to see a higher mean among Black patients than White patients since this is in the opposite direction of our hypothesis.

Figure 5. Main Effect of Instruction Manipulation on Pain Perception

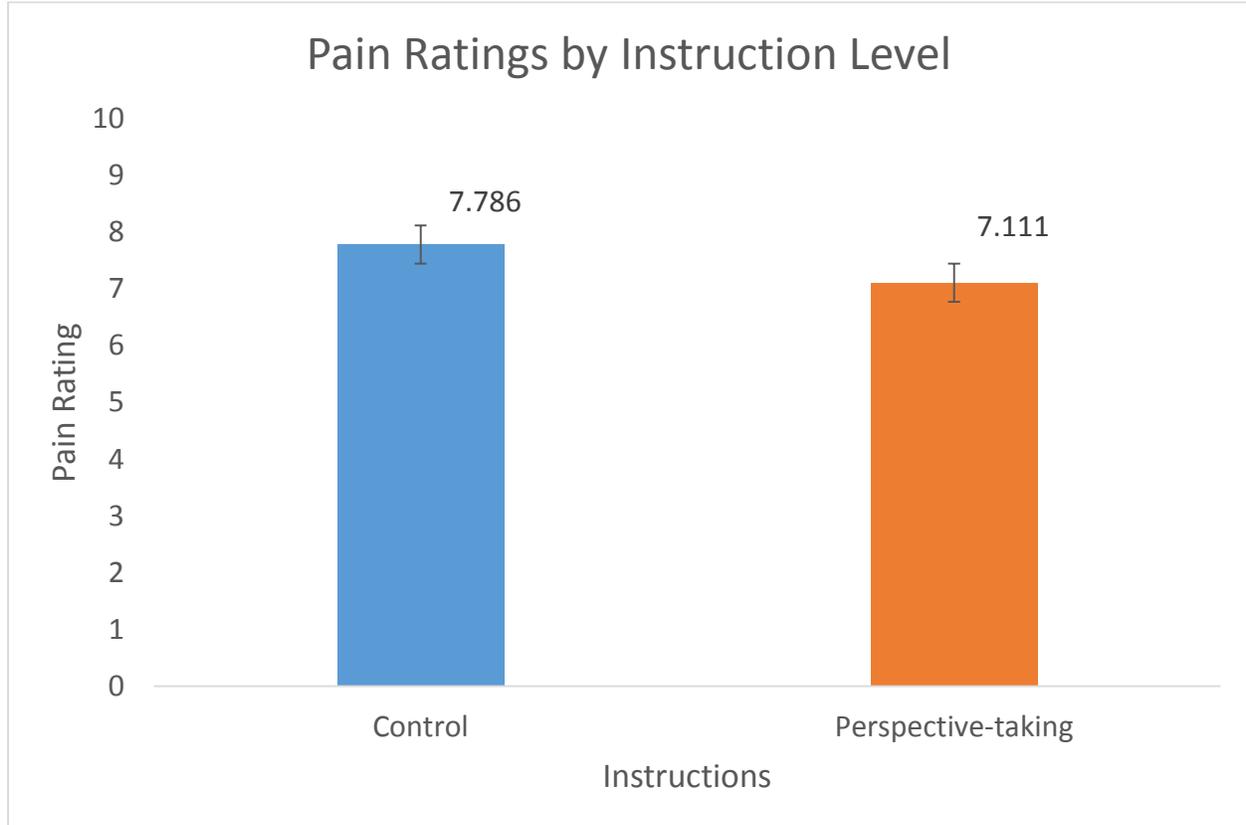


Figure 5. A graph of the average pain rating by instruction condition. This difference was not significant, though it is interesting to see a higher mean among the participants in the control condition since this is in the opposite direction of our hypothesis.

Figure 6. Main Effect of Race on Treatment Recommendation Accuracy

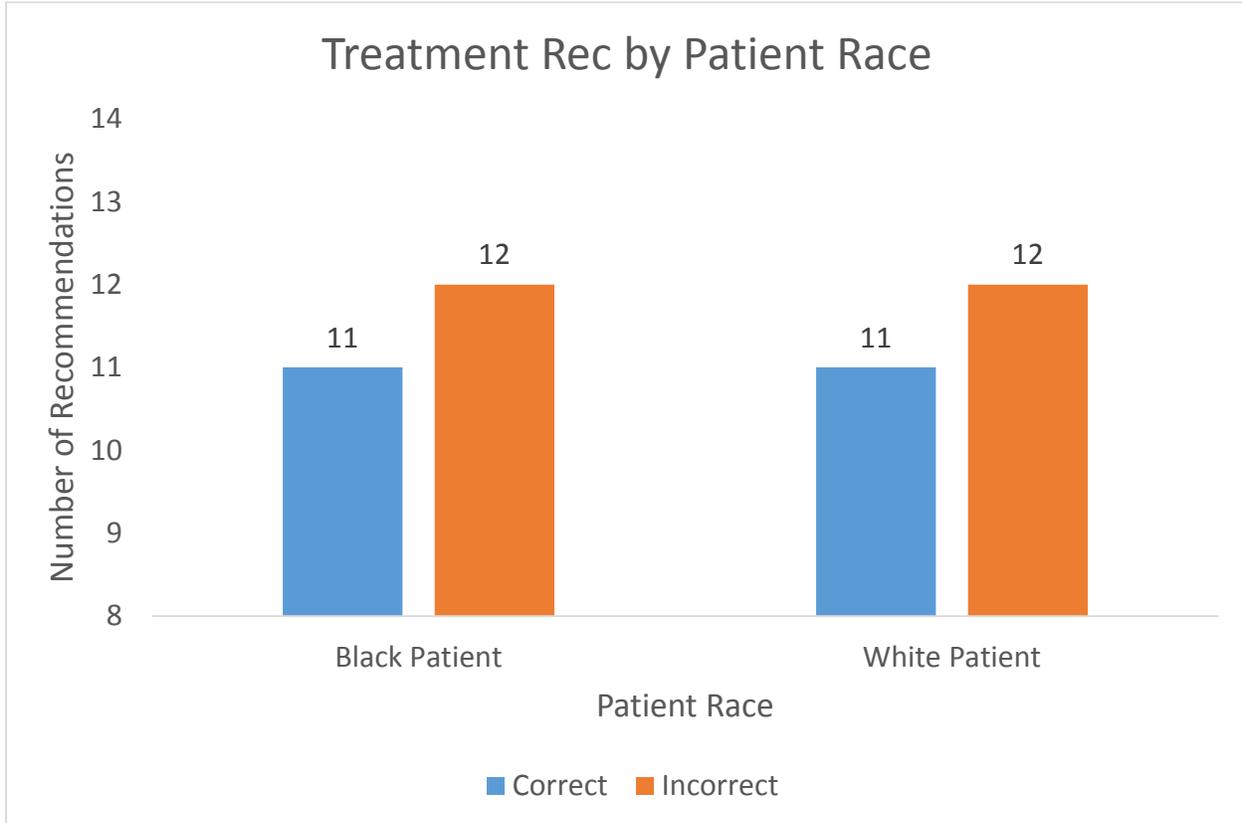


Figure 6. A graph of the treatment recommendations by patient race. Recommendations were coded as correct if participants reported prescribing an opiate. All other recommendations were coded as incorrect.

Figure 7. Main Effect of Instructions on Treatment Recommendation Accuracy: Black Patient

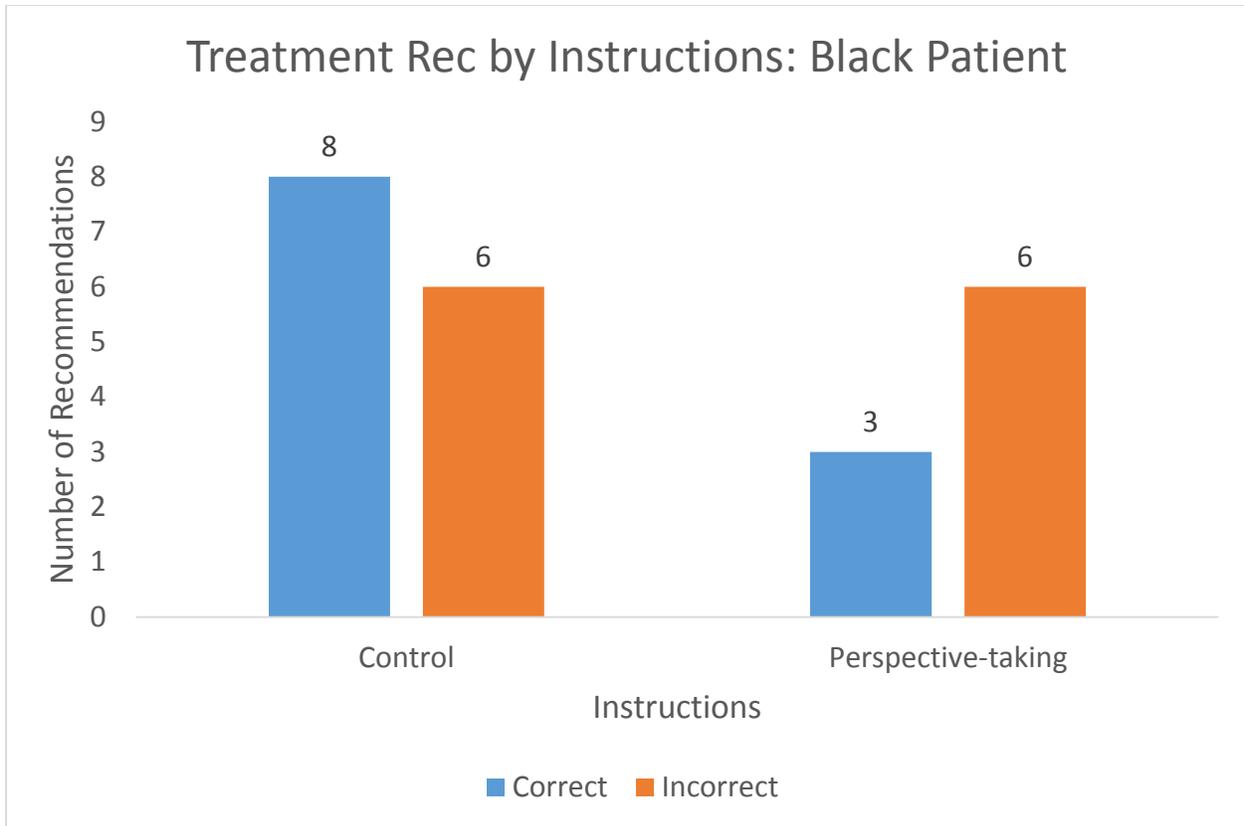


Figure 7. A graph of the treatment recommendations for the Black patient by instructions level. Recommendations were coded as correct if participants reported prescribing an opiate. All other recommendations were coded as incorrect.

Figure 8. Main Effect of Instructions on Treatment Recommendation Accuracy: White Patient

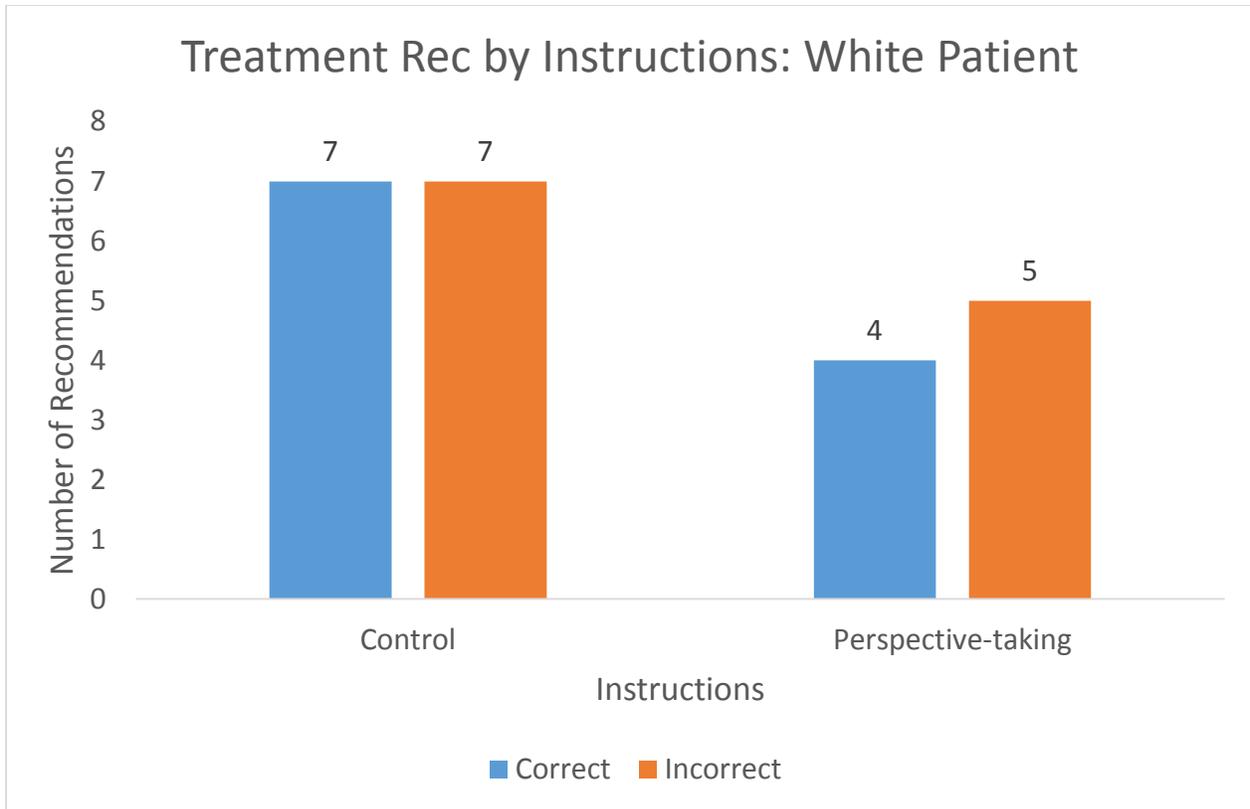


Figure 8. A graph of the treatment recommendations for the White patient by instructions level. Recommendations were coded as correct if participants reported prescribing an opiate. All other recommendations were coded as incorrect.

Appendix 1. Measures

Biological Belief Statements

The following are statements about the biology of human beings. Please indicate the degree to which you agree or disagree with each statement by selecting one of the following:

- Definitely Untrue
- Probably Untrue
- Possibly Untrue
- Possibly True
- Probably True
- Definitely True

READ EACH ITEM CAREFULLY BEFORE RESPONDING. Answer as honestly as you can. Thank you.

1. On average, Blacks age more slowly than Whites.
2. Black people's nerve-endings are less sensitive than White people's nerve-endings

3. Black people's blood coagulates more quickly -- because of that, Blacks have a lower rate of hemophilia than Whites.
4. Whites, on average, have larger brains than Blacks
5. Whites are less susceptible to heart disease like hypertension than Blacks.
6. Blacks are less likely to contract spinal cord diseases like multiple sclerosis.
7. Whites have a better sense of hearing compared to Blacks.
8. Black people's skin has more collagen (i.e, it's thicker) than White people's skin.
9. Blacks, on average, have denser, stronger bones than Whites.
10. Blacks have a more sensitive sense of smell than Whites; they can differentiate odors and detect faint smells better than Whites.
11. Whites have more efficient respiratory systems than Blacks.
12. Black couples are significantly more fertile than White couples.
13. Whites are less likely to have a stroke than Blacks.
14. Blacks are better at detecting movement than Whites.
15. Blacks have stronger immune systems than Whites and are less likely to contract colds.

Empathic Concern Scale

While reading the cases, please indicate the extent to which you felt the following: (On a scale from 1 (not at all) to 7 (extremely))

- Tender
- Softhearted
- Warm
- Compassionate
- Moved
- Concerned
- Sympathetic

Adjusted Perspective Taking Scale

On a scale from 1 (not at all likely) to 7 (very likely), how likely are you to:

1. see things from another person's" point of view
2. look at all sides of an argument before making a decision
3. try to understand your patients better by imagining how things look from their perspective
4. listen to other people's arguments when you are certain you are right
5. believe that there are two sides to every question and try to look at them both
6. Put yourself in someone's shoes for a while when upset at them

7. imagine how you would feel in somebody's position before criticizing them

Physician Trust in the Patient Scale (Thom et al., 2011)

From 1-5 with 1 being not at all confident and 5 being completely confident

How confident are you that this patient will:

1. **Provide all the medical information you need?**
2. **Let you know when there has been a major change in his or her condition?**
3. **Tell you about all medications and treatments he or she is using?**
4. **Understand what you tell him/her?**
5. **Follow the treatment plan you recommend?**
6. **Be actively involved in managing his/her condition/problem?**
7. **Tell you if he/she is not following the treatment plan?**
8. **Respect your time?**
9. **Respect personal boundaries?**
10. **Not make unreasonable demands?**
11. **Not manipulate the office visit for secondary gain (eg, for inappropriate disability certification or prescription of controlled substances)?**
12. **Keep his or her appointments?**

Appendix 2. Instrumentation

CASE: Brett Roberts

History:

Mr. Roberts is a 22 year old male who slipped on a step and felt his ankle “crack” as it turned over on the step approximately 4 hours ago. He has pain, swelling, and bruising in his right ankle. He cannot move his foot or put any weight on the foot. Has experienced a Grade 2 sprain in the same ankle approximately 2 years ago.

Review of Systems

GENERAL Reports pain radiating from his ankle up his tibia. Moderate swelling and discoloration.

Physical Examination:

A healthy Caucasian male in moderate distress.

Vital signs: T 36.3°C, RR 16, HR 78, BP 120/70, Height: 5'11", Weight: 180 lbs

Musculoskeletal: Severely-restricted ROM in right ankle and toes. Moderate swelling.

No bone protrusions.

Skin: Skin warm and dry; bruising around ankle to mid-tibia.

X-Ray

X-ray film shows a nondisplaced fracture of the distal lateral malleolus.

CASE: Darnell Wilson

History:

Mr. Wilson is a 32 year old male presenting with a 2-day history of left flank and groin pain. It is associated with mild nausea and occasional vomiting. Basically, the patient has not been able to keep anything down. He had significant urgency and frequency at the time. He also had noticed some slowing and hesitancy in his urinary stream. No significant past medical history.

Review of Systems

GENERAL Reports flank and abdominal pain; trouble moving normally without bending over; slight fever

GASTROINTESTINAL

No appetite, mild nausea and vomiting; last BM 3 days ago

URINARY

Decreased urinary output; increased frequency; burning on urination; blood in urine

NEUROLOGIC

A couple episodes of dizziness, typically when first standing up

Physical Examination:

A well-nourished African American male in moderate distress hunched in clinic exam chair.

Vital signs:

T 37.6°C

RR 22, HR 92, BP 118/70, Height: 6'1", Weight: 205 lbs

Abdomen: Flat, soft, and tender, hypoactive bowel sounds

Skin: Skin warm and dry; no rashes or lesions

Labs

Urinalysis shows specific gravity of 1.024, pH of 5.1, trace albumin and 2+ blood. Microscopic shows 0-3 rbc's, 0-4 wbc's and 1+ bacteria. CBC shows WBC of 28,700, hemoglobin of 17.5, hematocrit of 50.7 and platelet count of 232,000. Differential shows 77% neutrophils. Comprehensive metabolic panel shows essentially normal electrolytes, BUN 38 and creatinine 2.8. Liver functions normal. CT scan shows a 6 mm calculus at the left ureterovesical junction causing minimal hydronephrosis and hydroureter.

IVP shows a 6 mm stone with proximal edema obstructing the mid ureter.

Assessment and Management

You conclude that Mr. Wilson has urolithiasis.

CASE: Jermaine Roberts

History:

Mr. Roberts is a 22 year old male who slipped on a step and felt his ankle “crack” as it turned over on the step approximately 4 hours ago. He has pain, swelling, and bruising in his right ankle. He cannot move his foot or put any weight on the foot. Has experienced a Grade 2 sprain in the same ankle approximately 2 years ago.

Review of Systems

GENERAL Reports pain radiating from his ankle up his tibia. Moderate swelling and discoloration.

Physical Examination:

A healthy African American male in moderate distress.

Vital signs: T 36.3°C, RR 16, HR 78, BP 120/70, Height: 5'11", Weight: 180 lbs

Musculoskeletal: Severely-restricted ROM in right ankle and toes. Moderate swelling. No bone protrusions.

Skin: Skin warm and dry; bruising around ankle to mid-tibia.

X-Ray

X-ray film shows a nondisplaced fracture of the distal lateral malleolus.

CASE: Connor Wilson

History:

Mr. Wilson is a 32 year old male presenting with a 2-day history of left flank and groin pain. It is associated with mild nausea and occasional vomiting. Basically, the patient has not been able to keep anything down. He had significant urgency and frequency at the time. He also had noticed some slowing and hesitancy in his urinary stream. No significant past medical history.

Review of Systems

GENERAL Reports flank and abdominal pain; trouble moving normally without bending over; slight fever

GASTROINTESTINAL

No appetite, mild nausea and vomiting; last BM 3 days ago

URINARY

Decreased urinary output; increased frequency; burning on urination; blood in urine

NEUROLOGIC

A couple episodes of dizziness, typically when first standing up

Physical Examination:

A well-nourished Caucasian male in moderate distress hunched in clinic exam chair.

Vital signs: T 37.6°C, RR 22, HR 92, BP 118/70, Height:6'1", Weight: 205 lbs

Abdomen: Flat, soft, and tender, hypoactive bowel sounds

Skin: Skin warm and dry; no rashes or lesions

Labs

Urinalysis shows specific gravity of 1.024, pH of 5.1, trace albumin and 2+ blood. Microscopic shows 0-3 rbc's, 0-4 wbc's and 1+ bacteria. CBC shows WBC of 28,700, hemoglobin of 17.5, hematocrit of 50.7 and platelet count of 232,000. Differential shows 77% neutrophils. Comprehensive metabolic panel shows essentially normal electrolytes, BUN 38 and creatinine 2.8. Liver functions normal. CT scan shows a 6 mm calculus at the left ureterovesical junction causing minimal hydronephrosis and hydroureter.

IVP shows a 6 mm stone with proximal edema obstructing the mid ureter.

Assessment and Management

You conclude that Mr. Wilson has urolithiasis.

CASE: Hannah Roberts

History:

Ms. Roberts is a 22 year old female who slipped on a step and felt her ankle “crack” as it turned over on the step approximately 4 hours ago. She has pain, swelling, and bruising in her right ankle. She cannot move her foot or put any weight on the foot. Has experienced a Grade 2 sprain in the same ankle approximately 2 years ago.

Review of Systems

GENERAL Reports pain radiating from her ankle up her tibia. Moderate swelling and discoloration.

Physical Examination:

A healthy Caucasian female in moderate distress.

Vital signs: T 36.3°C, RR 16, HR 78, BP 120/70, Height: 5’5”, Weight: 115 lbs

Musculoskeletal: Severely-restricted ROM in right ankle and toes. Moderate swelling.

No bone protrusions.

Skin: Skin warm and dry; bruising around ankle to mid-tibia.

X-Ray

X-ray film shows a nondisplaced fracture of the distal lateral malleolus.

History:

Ms. Wilson is a 32 year old female presenting with a 2-day history of left flank and groin pain. It is associated with mild nausea and occasional vomiting. Basically, the patient has not been able to keep anything down. She had significant urgency and frequency at the time. She also had noticed some slowing and hesitancy in her urinary stream. No significant past medical history.

Review of Systems

GENERAL Reports flank and abdominal pain; trouble moving normally without bending over; slight fever

GASTROINTESTINAL No appetite, mild nausea and vomiting; last BM 3 days ago

URINARY Decreased urinary output; increased frequency; burning on urination; blood in urine

NEUROLOGIC A couple episodes of dizziness, typically when first standing up

Physical Examination:

A well-nourished African American female in moderate distress hunched in clinic exam chair.

Vital signs: T 37.6°C, RR 22, HR 92, BP 128/70, Height: 5’7”, Weight: 135 lbs

Abdomen: Flat, soft, and tender, hypoactive bowel sounds

Skin: Skin warm and dry; no rashes or lesions

Labs

Urinalysis shows specific gravity of 1.024, pH of 5.1, trace albumin and 2+ blood. Microscopic shows 0-3 rbc's, 0-4 wbc's and 1+ bacteria. CBC shows WBC of 28,700, hemoglobin of 17.5, hematocrit of 50.7 and platelet count of 232,000. Differential shows 77% neutrophils. Comprehensive metabolic panel shows essentially normal electrolytes, BUN 38 and creatinine 2.8. Liver functions normal. CT scan shows a 6 mm calculus at the left ureterovesical junction causing minimal hydronephrosis and hydroureter.

IVP shows a 6 mm stone with proximal edema obstructing the mid ureter.

Assessment and Management

You conclude that Ms. Wilson has urolithiasis

CASE: Keisha Roberts

History:

Ms. Roberts is a 22 year old female who slipped on a step and felt her ankle “crack” as it turned over on the step approximately 4 hours ago. She has pain, swelling, and bruising in her right ankle. She cannot move her foot or put any weight on the foot. Has experienced a Grade 2 sprain in the same ankle approximately 2 years ago.

Review of Systems

GENERAL Reports pain radiating from her ankle up her tibia. Moderate swelling and discoloration.

Physical Examination:

A healthy African American female in moderate distress.

Vital signs: T 36.3°C, RR 16, HR 78, BP 120/70, Height: 5'5", Weight: 115 lbs

Musculoskeletal: Severely-restricted ROM in right ankle and toes. Moderate swelling.

No bone protrusions.

Skin: Skin warm and dry; bruising around ankle to mid-tibia.

X-Ray

X-ray film shows a nondisplaced fracture of the distal lateral malleolus

CASE: Katelyn WilsonHistory:

Ms. Wilson is a 32 year old female presenting with a 2-day history of left flank and groin pain. It is associated with mild nausea and occasional vomiting. Basically, the patient has not been able to keep anything down. She had significant urgency and frequency at the time. She also had noticed some slowing and hesitancy in her urinary stream. No significant past medical history.

Review of Systems

GENERAL Reports flank and abdominal pain; trouble moving normally without bending over; slight fever

GASTROINTESTINAL No appetite, mild nausea and vomiting; last BM 3 days ago

URINARY Decreased urinary output; increased frequency; burning on urination; blood in urine

NEUROLOGIC A couple episodes of dizziness, typically when first standing up

Physical Examination:

A well-nourished Caucasian female in moderate distress hunched in clinic exam chair.

Vital signs: T 37.6°C, RR 22, HR 92, BP 128/70, Height: 5'7", Weight: 135 lbs

Abdomen: Flat, soft, and tender, hypoactive bowel sounds

Skin: Skin warm and dry; no rashes or lesions

Labs

Urinalysis shows specific gravity of 1.024, pH of 5.1, trace albumin and 2+ blood. Microscopic shows 0-3 rbc's, 0-4 wbc's and 1+ bacteria. CBC shows WBC of 28,700, hemoglobin of 17.5, hematocrit of 50.7 and platelet count of 232,000. Differential shows 77% neutrophils. Comprehensive metabolic panel shows essentially normal electrolytes, BUN 38 and creatinine 2.8. Liver functions normal. CT scan shows a 6mm calculus at the left ureterovesical junction causing minimal hydronephrosis and hydroureter.

IVP shows a 6 mm stone with proximal edema obstructing the mid ureter.

Assessment and Management

You conclude that Ms. Wilson has urolithiasis.

Recruitment Email: Tufts University Medical Center

Hello,

My name is Ari Panzer and I am a senior at Tufts University studying Community Health and Psychology. I am pursuing an Honors Thesis focused on pain perception and treatment and am looking for participants to complete a brief online survey. The survey involves reading a few mock clinical cases, providing recommendations, and answering some questions about the case. It should take no more than 15 minutes to complete the whole study. If you would be willing to help me out by participating, please click on the link below for more information:

(link to study)

You do not need to let me know whether or not you decided to participate, but if you have any questions at all, feel free to email me (ari.panzer@tufts.edu).

Thank you for considering this request.

All the best,

Ari Panzer

Appendix 3. Recruitment Materials

Tufts University Department of Psychology Consent to Participate in Research Study

Principal Investigator: Ari Panzer Advisor: Keith B. Maddox, Ph.D.

Contact details: Ari Panzer, Psychology building, 490 Boston Avenue, Medford, MA 02155 Ph: (516) 732-6349, Email: ari.panzer@tufts.edu

Prof. Keith Maddox, Room 228, Psychology, 490 Boston Avenue, Medford, MA 02155 Ph: (617) 627-2563 Email: keith.maddox@tufts.edu

Study Title: Pain Perception and Treatment Practices

Purpose and duration: The purpose of this study is to investigate how clinicians perceive pain and make treatment recommendations. We expect it will take approximately 15 minutes of your time.

Procedures: You will view two mock clinical cases, assess the patient for pain, and provide a treatment recommendation. You will indicate your level of agreement with several statements regarding pain perception and will be asked demographic questions relating to your experience as a health professional.

Risk and discomfort. There are no foreseeable major risks or discomfort associated with participation in this study, however it is possible that some of the situations and questions presented may make participants feel uncomfortable. As such, you may skip any question and end the study at any time with no risk of penalty.

Benefits: The benefit you may expect to gain from participating in this study is an opportunity to contribute to scientific research.

Compensation: You will have the opportunity to enter a raffle for one of two \$25 gift cards. At the end of the study, you will be linked to a separate survey. It will ask if you would like to be entered in the raffle and will have a space to provide an email so we can contact you if you win. Information collected for the raffle will not be associated with the data. We expect approximately 80 people to participate.

Confidentiality: The results of this study may be published in a scholarly book or journal, presented at professional conferences, or used for teaching purposes. Your name and other identifying information will not be used in any publication or teaching material. Individual demographic information that may be identifying will be de-identified through coding. The data will then be used to analyze factors on group levels by aggregating data from many different participants.

Request for more information: You may ask more questions about the study at any time. Please email the Principal Investigator at ari.panzer@tufts.edu or call him at (516) 732-6349 with any concerns about the study. In addition, you may contact Lara Sloboda at the Office of the Institutional Review Board at (617) 6273417.

Withdrawal of participation: Your participation is voluntary. There is no penalty for declining participation. Should you decide at any time during the study that you no longer wish to participate, you may withdraw your consent and discontinue participation without penalty or loss of benefits.

Do you understand and agree with these points and wish to participate in this study?

- Yes, I understand and agree with the points. I wish to participate in this study.
- No, I do not wish to participate in this study.

Debriefing Statement: Pain Perception and Treatment Practices

Thank you for participating in this study! The experiment in which you just participated is in the general area of social psychology and pain perception. More specifically, the purpose of this study was to examine the presence of false biological beliefs about Blacks and their influence on pain perception and treatment recommendations in a clinical setting. Previous research has shown that among medical students and residents, the endorsement of false-biological beliefs about Blacks predicts disparate pain-treatment recommendations when prescribing to Blacks versus Whites. We were interested in examining whether or not these beliefs persist among attending physicians. We also evaluated the efficacy of a perspective-taking strategy as a way of reducing the influence of these false beliefs on treatment recommendations.

In this study you were asked to read two mock clinical cases about a Black and a White patient and recommend a treatment strategy. Some participants were instructed to provide the best care possible while others were instructed to empathize with the patient. You then read through a list of 15 statements relating to the biology of Blacks and asked to indicate the extent to which you believed them to be true. Some of

the statements were true, and some of them were false. We aimed to examine the relationship between the endorsement of false biological beliefs and differences in pain perception and treatment between the Black and White patient.

We note that this study involved mild deception in that the purpose of the research was not disclosed to you at the beginning of the study. You can imagine that if you had known exactly what we were looking for, completing the tasks would have been a very different experience for you. We only use such methods when alternatives will not provide valid results. If you have any concerns about this research process, please feel free to contact the Principal Investigator.

Please refrain from speaking about this experiment with other people until the study has ended. People who know about the study beforehand may not behave in the same way as those who do not, and this would compromise our results.

With your help, we will gain important knowledge about pain perception and pain treatment practices. Thank you once again for participating in this research study!

Contact information

If you have any questions about this research, please feel free to contact the Principal Investigator, Ari Panzer by email at ari.panzer@tufts.edu.

Final Report

If you would like to receive a report of this study (or a summary of the findings) when it is completed, contact the researcher identified above.

Concerns

If you have concerns about this study or your rights as a participant of this experiment, you are encouraged to contact the IRB Administrator, Lara Sloboda, PhD, at (617) 627-3417.

Recruitment Email to Department Heads for Recruiting Medical Students

Hello,

My name is Ari Panzer and I am a senior at Tufts University studying Community Health and Psychology. I am pursuing an Honors Thesis focused on pain perception and treatment and am looking for participants to complete a brief online survey. The survey involves reading a few mock clinical cases, providing recommendations, and answering some questions about the case. It should take no more than

15 minutes to complete the whole study. I am hoping to have department heads disseminate the study, if they feel comfortable, to help improve participation. If you would be willing to help me out, I would be grateful if you could forward this email to any medical students who may be interested in participating. All participants will have the chance to enter a raffle to win one of two \$25 gift cards.

(link to study)

If you have any questions at all, please feel free to email me (ari.panzer@tufts.edu).

Thank you for considering this request.

All the best,

Ari Panzer

Recruitment Email: Tufts University Medical Center and Tufts University Medical School

Hello,

My name is Ari Panzer and I am a senior at Tufts University studying Community Health and Psychology. I am pursuing an Honors Thesis focused on pain perception and treatment and am looking for participants to complete a brief online survey. The survey involves reading a few mock clinical cases, providing recommendations, and answering some questions about the case. It should take no more than 15 minutes to complete the whole study and all participants will have the chance to enter a raffle to win one of two \$25 gift cards. If you would be willing to help me out by participating, please click on the link below for more information:

(link to study)

You do not need to let me know whether or not you decided to participate, but if you have any questions at all, feel free to email me (ari.panzer@tufts.edu).

Thank you for considering this request.

All the best,

Ari Panzer