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Racial Bias in Sport Medical Staff's Perceptions of Others' Pain

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ABSTRACT

Racial disparities in higher education and healthcare have a long history and are well documented. In the present work, the researchers examine racial bias at the intersection of these domains: racial bias in pain-related perceptions among National Collegiate Athletic Association (NCAA) Division 1 sport medical staff. Using experimental vignettes about a student-athlete who injured his/her anterior cruciate ligament (ACL), they find, like prior work, that respondents perceived Black (vs. White) targets as having higher initial pain tolerance. Moreover, this bias was mediated by perceptions of social class. The researchers extend prior work by showing racial bias was not evident on other outcome measures including perception of recovery process pain, likelihood of over-reporting pain, and over-use of drugs to combat pain. This suggests stricter boundary conditions on bias in pain perceptions than had been previously recognized.

Imagine a star athlete, Jordan. Jordan plays NCAA Division 1 basketball and is headed for a professional career in the NBA. Now imagine that, in the middle of a game, Jordan falls and screams in pain. He has torn his ACL. The injury ends his season and could put his career in jeopardy. His recovery depends in large part on the care he receives from his team's medical staff. And that care may depend on his race.

Prior work documents glaring racial disparities in healthcare in general and pain management in particular. Relative to White patients, Black patients are less likely to receive pain medications and, when they do receive pain medications, they receive less of them (Anderson, Green, & Payne, 2009; Bonham, 2001; Hampton, Cavalier, & Langford, 2015). For instance, one retrospective study found that Black patients were significantly less likely than White patients to receive analgesics for extremity fractures in the emergency room (57% vs. 74%), despite having similar self-reports of pain (Todd et al., 2000). In another study, Black children diagnosed with appendicitis were significantly less likely than White children diagnosed with appendicitis to receive any pain medication for moderate pain and were less likely to receive opioids, the appropriate treatment for severe pain (Goyal et al., 2015).

These disparities may be attributable, at least in part, to racial bias. Research suggests that medical staff see Black (vs. White) patients as being more likely to abuse pain medications (van Ryn & Burke, 2000). This concern could make medical staff reluctant to prescribe pain medications. In addition, research suggests that medical staff view Black (vs. White) people as having greater pain tolerance. In a study by Staton and colleagues (2007), for instance, patients were asked to report how much pain they were experiencing, and physicians were asked to rate how much pain they thought the patients were experiencing. Physicians were more likely to underestimate the pain of Black patients (47%) relative to non-Black patients (33.5%). Since this

seminal study, social psychologists have replicated this finding using experimental paradigms (Hollingshead et al., 2016; Mathur et al., 2014; Trawalter, Hoffman, & Waytz, 2012; Wandner et al., 2012). In one set of studies (Trawalter et al., 2012), participants were randomly assigned to rate the pain of a Black or White target person in various scenarios ("Jordan cuts himself with a sheet of paper," "Jordan caught his finger in a car door," "Jordan stapled his finger with an industrial stapler"). These studies have found that participants, including medical staff, rate the pain of a Black (vs. White) target person as less painful. This experimental work is important because it isolates the target person's race as a causal factor; it shows that participants are using race to make assumptions about someone's pain. (In the work by Staton and colleagues, alternative explanations exist; for example, it could be that more awkward/negative patient-doctor interactions—and not patient race per se—led to distrust between Black patients and White doctors, and the discounting of Black patients' pain.)

Of note, follow-up studies suggest that racial bias in pain perception may not be rooted in racial prejudice. Black participants also exhibit the racial bias; they too assume that Black people feel less pain than do White people (Hollingshead et al., 2016; Trawalter et al., 2012). And, racial prejudice does not seem to predict racial bias in pain perception; Whites who have negative racial attitudes are just as likely as Whites who have positive racial attitudes to assume that a Black target person feels less pain (Mathur et al., 2014; Trawalter et al., 2012). Rather, studies suggest that racial bias in pain perception is partly rooted in perceptions of hardship. In two experiments, adult participants received information about a Black and/or White target person's life hardship. Of note, hardship information was directly tied to socioeconomic and not physical hardship. Then, participants were asked to rate the pain of the target person. Participants reported that the target individual would feel less pain if s/he had experienced greater hardship.

Importantly, racial bias emerged but only when hardship information was consistent with expectations about race and life hardship; that is, participants reported that the Black (vs. White) target individual would feel less pain only if s/he had experienced greater hardship (Hoffman & Trawalter, 2016, Experiments 1 & 2). In another experiment, participants reported that the Black (vs. White) target individual would feel less pain, but only if they endorsed the belief that hardship leads to toughness; in other words, if they endorsed the notion that "that which does not kill us makes us stronger" (Hoffman & Trawalter, 2016, Experiment 3).

The Present Work

Previous work on racial bias in pain perception has been informative but leaves open a number of questions:

First, previous work has not distinguished between perceptions of pain and perceptions of coping or dealing with that pain. Because participants have never been asked to distinguish between a target person's initial pain experience and a target person's ability to recover or "deal with" the pain subsequently, it is unclear what participants are reporting when asked "how much pain does this person feel?" It is feasible that they are reporting the latter; that is, the extent to which Black vs. White target persons can deal with the pain and recover. This is important for practical reasons, for designing interventions, but also for theoretical reasons. People's beliefs about racial differences in initial pain likely reflect beliefs about racial differences in biology and physiology (see Hoffman et al., 2016) whereas beliefs about racial differences in recovery pain may reflect beliefs about racial differences in biology and physiology, but also self-regulation and adherence to a treatment regimen.

Second, previous work has not shown whether trained medical staff with extensive experience show this racial bias in pain perception. Trawalter and colleagues documented the

bias in a small sample of nurses and nursing students (Trawalter et al., 2012), and in another, larger sample of medical students and residents (Hoffman et al., 2016). Whether medical staff with more extensive experience with treating patients (e.g., not earlier career medical staff)—and Black patients in particular—show this bias remains unclear.

In the present work, we fill these two gaps. We ask participants about (and therefore distinguish between) a target patient's initial pain and their subsequent pain as they recover, and we recruited a large sample of experienced medical staff; specifically, National Collegiate Athletic Association (NCAA) Division 1 sport medical staff. The average respondent in our sample had worked in the field of athletic medicine for 11-12 years (see Supplementary Appendix A). Moreover, this is an intriguing population to study because they tend to have relatively high levels of contact with Black patients, and there are well-known ongoing national debates about inequities in college sports (e.g., Harper, Williams, & Blackman, 2013; Simon, 2005).

Third, previous work has not systematically examined how race interacts with gender and context; it has not taken an intersectional approach. In the present work, we manipulate not only target race (Black vs. White) but target gender (male, female) and sport domain (basketball, soccer). We are then able to examine whether racial bias in perceptions of others' pain disproportionately affects men or women, and whether context—in our case, sport domain—can mitigate the bias. We consider gender based on previous work suggesting that gender and race intersect in important ways to produce inequity (e.g., Crenshaw, 1991; Purdie-Vaughns & Eibach, 2008). We also consider sport domain because it can convey social class. Specifically, in the United States, soccer is typically associated with privilege (e.g., Ortiz 2014) whereas basketball is not. This is, of course, confounded with race. As Otioko (2015) notes, "[p]ut

simply, in America soccer is seen as a sport played by white kids, while the NFL and NBA are predominantly black."

Lastly, we examine two other potential sources of racial bias in pain management: perceptions that the patient (athlete) will abuse pain medications and perceptions that the patient (athlete) is over-reporting pain. By so doing, we are able to compare and contrast potential sources of racial bias in pain assessment and treatment. We are further able to examine the extent to which racial bias in pain perception might matter relative to other plausible biases.

Method

Participants. Our population is individuals on sport medical staffs of NCAA Division 1 schools. Details on our sampling approach, power analysis (sensitivity analysis), attrition and random assignment checks, and sample characteristics appear in Supplementary Appendix A. The sample we analyzed included 651 individual respondents, most of whom had considerable experience in athletic medicine. We collected data in the Spring of 2015.

Procedure. Our procedure involved providing each respondent with a vignette that described a student-athlete who just underwent surgery for an ACL injury. We used an ACL injury because it is relatively common in the two sports on which we focus: basketball and soccer (Hootman, Dick, & Agel, 2007). We randomly assigned respondents to one of eight vignette conditions that varied (1) race (Black/White), (2) gender (male/female), and (3) sport (basketball/soccer). We followed prior work by varying race and gender by using demographically diagnostic names (e.g., Pager, 2007). We opted to use basketball and soccer because basketball is often stereotyped as a Black sport and soccer is stereotyped as a White

sport, and in fact, soccer is not just seen as a White sport but one of privilege.[1] These differences may lead individuals to assume that basketball players feel less pain than do soccer players if perceptions of pain are, indeed, driven by perceptions of hardship (e.g., Fiske & Neuberg, 1990; Johnston & Hewstone, 1992). Further details on the vignettes as well as how we determined descriptive names appear in Supplementary Appendix B.

After reading the randomly assigned vignette, we asked respondents to make various judgments; here, we focus on all judgments related to the target student-athlete's pain experience (as well as questions respondents answered about their demographic and background characteristics). There were four main pain outcome variables: perception of initial injury pain, perception of recovery process pain, likelihood of over-reporting pain, and use of drugs to combat pain. Exact question wording for our outcome variables and demographic/background variables appears in Supplementary Appendix C. We present results for all respondents; as shown in Supplementary Appendix D, the results were similar when only White respondents were included.

Results

Primary Analyses

We conducted a 2 (target race: Black vs. White) X 2 (target gender: male vs. female) X 2 (target sport: basketball vs. soccer) ANOVA on each of our 4 pain variables: initial pain ratings, recovery pain ratings, over-reporting of pain, and drug abuse. For initial pain ratings and recovery pain ratings, we also controlled for participants' ratings of the pain they would

[1] See https://www.theguardian.com/football/blog/2016/jun/01/us-soccer-diversity-problem-world-football, http://blavity.com/soccer-has-a-diversity-problem-in-the-u-s-heres-why. There also are sharp racial differences in participation rates, with Blacks making up a majority of student-athletes in the basketball and being a clear minority in soccer. For example, NCAA data from 2014-15 show that 9.8% and 6.4% of Division 1 soccer players are Black males and Black females, respectively. For basketball, the analogous figures are 58.3% and 51.0% (NCAA, 2016).

experience if they had been injured, consistent with previous work (Hoffman & Trawalter, 2016; Trawalter et al., 2012). Results hold when not controlling for self-ratings. In addition, results hold when controlling for participant demographics (e.g., race/ethnicity, gender, age). Degrees of freedom differ slightly between analyses due to missing data.

Initial pain ratings. Results revealed a main effect of target sport, F (1, 631) = 9.80, p = .002, η^2= .015, reflecting the fact that participants believed that basketball players would experience less pain than soccer players. There was also a main effect of target race, F (1, 631) = 7.44, p = .007, η^2= .012, reflecting the fact that participants believed that Black athletes would experience less pain than White athletes. See Table 1 Panel A for all raw cell means and standard deviations.

Recovery pain ratings. Results revealed no significant effects of target race, gender, and/or sport and no interactions, all Fs ≤ 1.74, all ps ≥ .187. See Table 1 Panel B for all raw cell means and standard deviations.

Over-reporting pain. Results revealed no significant effects of target race, gender, and/or sport and no interactions, all Fs ≤ 2.49, all ps ≥ .115. See Table 1 Panel C for all raw cell means and standard deviations.

Drug abuse. Results revealed no significant effects of target race, gender, and/or sport and no interactions, all Fs ≤ .90, all ps ≥ .342. See Table 1 Panel D for all raw cell means and standard deviations.

Secondary Analyses: Mediation

Previous work has shown that laypeople often assume that Blacks feel less pain than do Whites because they assume that Blacks have lower socioeconomic status, have experienced greater hardship, and assume that those who have faced greater hardship feel less pain, consistent

with the adage "what does not kill you makes you stronger" (Hoffman & Trawalter, 2016). Based on this previous work, we tested whether perceived target status mediated the relationship between target race, sport, and initial pain ratings using a bootstrapping analysis. We operationalized perceived target status as perceptions of the target's social class. To conduct the bootstrapping analysis, we drew 10,000 random samples with replacement to estimate the size of the indirect effect of target race on initial pain ratings through perceived social class. The bootstrap analysis yielded a 95% confidence interval that did not include 0 (95% CI [.003, .022], p = .013), suggesting that perceived social class (i.e., status) mediated the relationship between target race and initial pain ratings. A similar bootstrap analysis revealed that perceived social class also mediated the effects of target sport on initial pain ratings (95% CI [.006, .035], p = .005). In other words, it seems that participants assumed that Black athletes and basketball players (who are disproportionately Black) feel less pain than do White athletes and soccer players (who are disproportionately White) because they assume that Black athletes and basketball players have lower socioeconomic status, that they have experienced greater hardship and less privilege. This is consistent with our aforementioned expectation regarding what the different sports signal in terms of class (e.g., basketball is played by those from the lower class).

Secondary Analyses: Moderation

We tested whether racial attitudes and/or contact moderated the effects of target sport and target race on initial pain ratings, to see whether racial bias in perception of the target's initial pain is driven primarily by individuals high in prejudice and/or low on contact. We created a composite for racial attitudes by averaging the 4 symbolic racism items, reverse-coding when appropriate (α = .68). We operationalized contact as self-reported % time working with Black

male student-athletes for participants in the Black male target conditions, self-reported % time working with Black female student-athletes for participants in the Black female target conditions, self-reported % time working with White male student-athletes for participants in the White male target conditions and self-reported % time working with White female student-athletes for participants in the White female target conditions. In other words, we operationalized contact as the amount of contact participants had with the relevant target population in their work. Results are similar using a relative contact score (subtracting amount of contact with Black athletes from the amount of contact with White athletes). We reran the primary analyses with racial attitudes and contact in the model, allowing for main effects and interactions. Below, we report only statistically significant effects. Of note, racial attitudes and contact were not correlated, $r = .02$, $p = .833$, perhaps because we measured general racial attitudes toward Blacks and contact with Black versus White male and female *athletes*, more specifically.

Racial attitudes. There was no main effect of racial attitudes, $F(1, 527) = 1.06$, $p = .303$, and no significant interactions of target race, gender, and/or sport with racial attitudes, all Fs $\leq$ 3.67, all ps $\geq .056$. This marginally significant interaction was driven by participants in the Black male soccer condition and White male soccer condition. In the Black male soccer condition, more negative racial attitudes were associated with higher initial pain ratings, $F(1, 80) = 4.17$, $p = .045$, $\eta^2 = .050$. In the White male soccer condition, more negative racial attitudes were marginally associated with lower initial pain ratings. $F(1, 64) = 3.80$, $p = .056$, $\eta^2 = .056$. But again, the interaction is only marginally significant and our sample is reasonably large. We are therefore cautious interpreting these relationships. Moreover, the direction of the results run counter to the idea that prejudice underlies pain judgments, consistent with previous work.

Contact. There was no main effect of contact, F (1, 525) = .18, p = .670, and no significant interactions of target race, gender, and/or sport with contact, all Fs ≤ 1.42, all ps ≥ .233.

General Discussion

The present study replicates and extends previous work in important ways. It replicates previous work showing a racial bias in pain perception whereby people—here college athletic medical staff—assume Blacks feel less pain than do Whites. It also replicates previous work showing that this bias is mediated by socioeconomic status; people seem to assume that Blacks feel less pain but only if and when they assume Blacks have lower socioeconomic status.

In addition, it extends previous work in four important ways:

First, the present work clarifies previous work. Previous work had not distinguished between perceptions of pain and perceptions of coping with or recovering from that pain. In the present work, we asked participants about (and therefore distinguished between) a target patient's initial pain and subsequent pain. Our findings suggest that bias in pain perception is about perceptions of initial pain and not recovery pain; in other words, it appears people assume that Blacks feel less pain, *not* that they cope with their pain and recover better. This suggests that interventions should challenge people's beliefs that Black people feel less pain per se.

Second, previous work had not shown whether trained medical staff with extensive experience show racial bias in pain perception. Previous work documented the bias in a small sample of nurses and nursing students, and in another, larger sample of medical students and residents (Hoffman et al., 2016; Trawalter et al., 2012). In the present work, we studied a large sample of National Collegiate Athletic Association (NCAA) Division 1 sport medical staff—

medical staff with *extensive* experience and experience with Black patients. Our findings suggest that, at least relative to other populations, this population may be *relatively* unbiased. Our results revealed only a small bias in perceptions of initial pain (η^2= .012). On the one hand, these are comforting results in light of research showing widespread racial bias in among other medically-trained populations (Anderson et al., 2009; Bonham, 2001; Hampton et al., 2015; Williams et al., 2015). On the other hand, even small effects can have a large impact across populations and time.

Third, previous work had not systematically examined how race interacts with gender and context; it had not taken an intersectional approach. In the present work, we manipulated not only target race (Black vs. White) but target gender (male, female) and sport domain (basketball, soccer). Of note, sport domain, at least in this case, can serve as a proxy for social class. We did not find evidence of intersectionality; the target race effect was not moderated by gender of sport domain. However, we did find that sport domain mattered. Participants assumed that basketball players (who are disproportionately Black) feel less pain than do soccer players (who are disproportionately White). This effect, like the target race effect, was mediated by perceptions of social class. In other words, participants assumed that basketball players feel less pain than do soccer players because they assumed basketball players have lower socioeconomic status; that is, more hardship and less privilege.

Lastly, we examined two other potential sources of racial bias in pain management: perceptions that the patient (athlete) will abuse pain medications and perceptions that the patient (athlete) is over-reporting pain. By so doing, we were able to compare and contrast potential sources of racial bias in pain assessment and treatment. We were able to examine the extent to which racial bias in pain perception might matter relative to other plausible biases. Again, our

findings suggest that this population of medical staff is relatively unbiased. Not only did they show only a small albeit reliable racial bias in perceptions of pain, they showed no evidence of bias in perceptions of pain during recovery, probability of drug abuse, or over-reporting pain.

In sum, the present work suggests that medical staff perceive Black athletes as feeling less pain than do White athletes. They also perceive basketball players as feeling less pain than soccer player. We further found that perceptions of socioeconomic status can explain these biases in perceptions of pain in this population, similar to lay populations (Hoffman & Trawalter, 2016). This finding might serve as a starting place for thinking about interventions—interventions grounded in recognizing that hardship does not make one impervious to physical pain. Future work will need to develop and test interventions. In time, such work could help reduce disparities in college athletics and serve as a model for reducing disparities beyond college athletics. Finally, future work can build on our approach by incorporating other injuries, sports, racial groups and populations.

Table 1

Raw Means and Standard Deviations for Ratings of Pain Variables (Panel A=Initial Pain, Panel B=Recovery Pain, Panel C=Over-reporting Pain, Panel D=Drub Abuse).

	Target Race	Target Gender	Target Sport	N	M	SD
(A)	Black	Female	Basketball	93	3.097	0.723
	Black	Female	Soccer	70	3.386	0.597
	Black	Male	Basketball	54	3.074	0.610
	Black	Male	Soccer	94	3.277	0.594
	White	Female	Basketball	88	3.352	0.662
	White	Female	Soccer	81	3.383	0.538
	White	Male	Basketball	79	3.269	0.674
	White	Male	Soccer	81	3.370	0.641
(B)	Black	Female	Basketball	93	3.075	0.494
	Black	Female	Soccer	70	3.086	0.631
	Black	Male	Basketball	54	3.056	0.452
	Black	Male	Soccer	92	3.011	0.545
	White	Female	Basketball	87	3.011	0.581
	White	Female	Soccer	80	3.088	0.532
	White	Male	Basketball	79	3.038	0.609
	White	Male	Soccer	80	3.100	0.542
(C)	Black	Female	Basketball	94	3.362	.853
	Black	Female	Soccer	73	3.493	.801
	Black	Male	Basketball	54	3.500	.818
	Black	Male	Soccer	93	3.301	.777
	White	Female	Basketball	90	3.300	.800
	White	Female	Soccer	82	3.244	.825
	White	Male	Basketball	81	3.506	.868
	White	Male	Soccer	82	3.366	.854
(D)	Black	Female	Basketball	95	3.937	.649
	Black	Female	Soccer	73	3.904	.670
	Black	Male	Basketball	54	3.889	.604
	Black	Male	Soccer	93	3.860	.636
	White	Female	Basketball	90	3.922	.674
	White	Female	Soccer	82	3.890	.685
	White	Male	Basketball	81	3.864	.628
	White	Male	Soccer	82	3.841	.693

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Supplementary Appendix A: Sample

To obtain our sample, we first used a Wikipedia list of all Division 1 schools. For each school, we went to the athletic department website to obtain the names of all the sport medical staff (thus, we identified multiple people from each school). We obtained their e-mails either on the site or, if not, we searched for e-mails in the given university directory. We identified 3,303 potential respondents; however, we were unable to locate e-mails for 486 individuals because either they were not listed on the site or in the directory, or the school in question did not have a publically accessible directory. For the remaining 2,817 individuals, we sent a personalized e-mail invitation, with the subject line "Survey of NCAA Athletic Departments," to participate in our survey. We described the survey as studying "the opinions and perceptions of medical staffs [so as]… "to understand how those involved in care for student-athletes view and care for student-athletes who have ACL injuries." Potential respondents were provided with a secure and encrypted link on which to take the survey. We additionally offered a $5 Amazon gift card for those who completed the survey, and emphasized that the project team included students (see Groves, Cialdini, & Couper, 1992). We sent two reminder e-mails. Data were collected from March 13, 2015, to April 3, 2015. Roughly, 77 e-mails bounced back which means, to the best of our knowledge, 2,740 individuals received an invitation. A total of 752 responded (at least in part), leading to a response rate (based on those who received the invite) of 27.5%. This is higher than most web-based survey response rates (Couper, 2008). As noted below, our sample also was relatively heterogeneous and thus, for experimental inference, was sufficient; there is sufficient variance on key variables that could potentially moderate experimental effects (Druckman & Kam, 2011).

Sample Profile

752 participants accessed the survey. Of those, 35 participants asked to have their data excluded for a sample of 717 participants. That is, at the end of the survey, we provided the following information about the study, after which we asked if the respondent would like to have his or her responses excluded: "Thank you for your participation. As was mentioned in the consent information, you received one out of several possible vignettes about an ACL injury. The purpose of our study was to assess how varying characteristics of a student-athlete affects perceptions and treatment expectations. Thank you very much your participation. At this point, if you would prefer that your answers be excluded from our study, please click yes below. Otherwise you are free to close out the survey." 35 responded affirmatively.

Of the 717 remaining participants, 651 responded to at least one question about the target's pain experience. This sample was 48% male, 44% female (9% did not report gender), 80% White, 2% Black, 2% Asian, 3% Hispanic, 2% multiracial, and 2% other (9% did not report race/ethnicity). 7% of participants were between 18 and 24 years of age, 47% between 24 and 34, 29% between 35 and 50, 8% between 51 and 65, 1% were over 65 years of age (9% did not report age). 21% of participants were the director/head of their department and 14% were still students (76% of them had a Master's degree). On average, participants had held their current position for 6-7 years and had worked in athletic medicine for 11-12 years. In other words, on average, they were quite experienced. And indeed, they reported working with student-athletes on average over 50 hours a week (although the standard deviation was quite high; $M = 50.41$, $SD = 62.16$). (The full sample (N=717) was 44% male, 40% female (16% did not report gender), 72% White, 2% Asian, 2% Black, 3% Hispanic, 2% multiracial, and 2% other (17% did not

report race/ethnicity). 6% of participants were between 18 and 24 years of age, 43% between 24 and 34, 27% between 35 and 50, 7% between 51 and 65, 1% were over 65 years of age, and 17% did not report age.)

Ideologically, participants ranged from very liberal to very conservative (M = 3.95 where 4 = moderate, SD = 1.37). And more to the point, their racial attitudes and contact with Black (vs. White) athletes varied quite substantially as well. Racial attitudes ranged from 1 to 5 (M = 3.14 where 3 = neither disagree nor agree with statements reflecting symbolic racism, SD = .72) and percent time working with Black and White male and female athletes ranged from 0 to 100 (on average, 36% time working with White male athletes, 30% time working with Black male athletes, 40% time working with White female athletes, and 18% time working with Black female athletes). As noted in the text, racial attitudes and time working with Black athletes were not highly correlated (r = -.0004, p = .99 for working with Black male athletes and r = -.09, p = .038 for working with Black female athletes). This low correlation likely reflects the context-specific nature of our contact measures (e.g., in the work-place) as opposed to more general contact measures that often correlate with racial attitudes.

Sample Attrition and Random Assignment Checks

As noted above, we had some attrition. 35 participants asked to have their data excluded and 66 participants did not respond to our outcome measures. Here, we test whether attrition was systematic, as a function of condition or basic demographic (participant race/ethnicity or gender). We conducted a logistic regression on attrition (0 = participant completed no outcome variables, 1 = participant completed at least one outcome variable) as a function of target race, target gender, and target sport. We found no effects of condition or their interactions on participant

response, all *Wald* $\chi^2(1) < .75$, all *p*s $\geq .386$. We conducted a similar logistic regression on attrition as a function of race (White vs. non-White) and gender. Again, we found no effects of race or gender on attrition, *Wald* $\chi^2(1) = 1.95$, $p = .162$ and *Wald* $\chi^2(1) = .003$, $p = .960$, respectively. Thus, it does not appear that attrition was systematic, suggesting that attrition did not undermine random assignment to condition.

We also ran a set of logistic regressions with condition (target race: 1 = Black vs. 0 = White; target gender: 1 = female vs. 0 = male; target sport: 1 = basketball vs. 0 = soccer) as the dependent variables and participant characteristics (i.e., gender, race) as the predictors. These regressions revealed no significant effects, all *Wald's* $\chi^2(1) < .288$, all *p*s > .591, suggesting that random assignment into condition was successful.

Sensitivity Analysis

Given our recruiting and sampling approach, we aimed to collect data from as many medical staff as possible. We thus did not compute an *a priori* power analysis. Given this approach, here, we present a sensitivity analysis; that is, the smallest effect size we can detect given our achieved sample size. For main effects (e.g., racial bias, gender bias), we can detect effects larger than $f = .11$, $\eta^2 = .012$. For the full three-way interaction, we can detect effects larger than $f = .15$, $\eta^2 = .022$. We have the power to detect small main effects and small-to-medium interaction effects, in other words.

Supplementary Appendix B: Vignette Details

We began the study with the following statement: "The purpose of this study is to explore how individuals make decisions about a sport injury. You will first read a vignette about a student-athlete who experienced an injury. We are providing you with one vignette from several we created. While the vignette is hypothetical, it reflects a common scenario that occurs with student-athletes such as the person described. When reading and thinking about it, try to imagine the specific case described. You then will be asked a set of standard survey questions about the case, as well as some more general questions.

The vignette read:

> **NAME** is an NCAA Division 1 **SPORT** player on an athletic scholarship. **He/she** is a sophomore who in a pre-season practice, made a sharp cut and ruptured **his/her** anterior cruciate ligament (ACL) (grade 3). **He/she** just received surgery. It was the first serious injury that **NAME** had experienced. Next we will ask you various questions about your thoughts about the injury and recovery process. In answering these questions, try to think about the specific situation just described.

We referred to the student-athlete as being on athletic scholarship to accentuate the importance of sport, and as a sophomore to ensure there is a potential career (but he/she has proven him/herself a bit by playing a season). We minimized complications that arise with prior injuries (and the nature of such injuries) by mentioning it is the student-athlete's first serious injury. We also portrayed the injury as occurring during a pre-season practice given higher injury rates than during other practice times (Hootman, Dick, & Agel, 2008).

As mentioned, we created 8 possible conditions that varied race (Black/White), gender (male/female), and sport (basketball/soccer). We varied sport by inserting soccer or basketball in the vignette (where "SPORT" appears in the text above). We varied race and gender by male or female names (i.e., the "NAME" in the vignette) that are stereotypically Black or White (see also

Azmat & Petrongolo, 2014; Ewens, Tomlin, & Wang, 2014; Bertrand & Mullainathan, 2004; Pager, 2007; Riach & Rich, 2002). The names used respectively for White male, White female, Black male, and Black female are: Dalton Wood, Shelbi Wood, Jabari Washington, and Eboni Washington. In the next section, we describe how we tested for the suitability of our names.

Choosing Names

Birth records from the state of Florida, from 1994 to 2002, suggest that the first names we employed were given, on average, at least 150 times/year, were at least 95% male or 95% female for the given usage, were at least 90% White or 90% Black for the given usage, and squarely middle class where the typical parent is a high school graduate with some postsecondary education but typically not a 2-year or 4-year degree. Specifically, respectively Eboni: average 12.54 years of maternal education; Jabari: average 12.56 years of maternal education; Shelbi: average 12.52 years of maternal education; Dalton: average 12.53 years of maternal education. The last name Wood is virtually all White, while 88% of those with the last name Washington were Black. (David Figlio, PhD, e-mail communication, November 2014).

We also conducted a pre-test (from 11/20/14-11/22/14) on Amazon's Mechanical Turk where we paid respondents $1.00 (N = 204). We randomly assigned respondents to one of four conditions where each condition used one of our four names. We asked them speculate on the person with the given name's gender (male or female), and race (White, African American, Asian American, Hispanic, Native American or other). As the below table shows, the perceived race/gender are both fairly close to the objective data.

	%White (for Dalton/Shelbi)/ % African American (for Jabari/Eboni)	%Male
Dalton Wood (N = 51)	92%	96%
Jabari Washington (N = 52)	92%	92%
Shelbi Wood (N = 50)	88%	6%
Eboni Washington (N = 51)	94%	8%

Supplementary Appendix C: Question Wording

For the following questions, the **"NAME"** provided was whichever name was used in the given condition (see Supplementary Appendix B).

Main Outcome Variables

How painful do you think the initial ACL injury was for **NAME**?

Not painful	*Slightly painful*	*Moderatly painful*	*Extremely painful*

How painful do you think the recovery process would be for **NAME**?

Not painful	*Slightly painful*	*Moderatly painful*	*Extremely painful*

Overall, how likely is **NAME** to over report (exaggerate) discomfort?

Not at all likely	*A little likely*	*Somewhat likely*	*Very likely*	*Extremey likely*

Overall, how likely is **NAME** to abuse drugs (e.g., pain killers) including alcohol?

Not at all likely	*A little likely*	*Somewhat likely*	*Very likely*	*Extremey likely*

Mediators and Moderator Variables

If you were asked to use one of five names to describe what you think **NAME's** social class is, which would you say: the lower class, the working class, the middle class, the upper middle class, or the upper class?

Lower class	*Working class*	*Middle class*	*Upper middle class*	*Upper class*

Now we'll present you with a few more statements. After each one, we would like you to tell us how strongly you agree or disagree. The first statement is:

"Irish, Italians, Jewish and many other minorities overcame prejudice and worked their way up. Blacks should do the same without any special favors."
Do you…

_____	_____	_____	_____	_____
Disagree strongly	*Disagree somewhat*	*Neither disagree nor agree*	*Agree somewhat*	*Agree strongly*

"Generations of slavery and discrimination have created conditions that make it difficult for blacks to work their way out of the lower class."

Do you…

_____	_____	_____	_____	_____
Agree strongly	*Agree somewhat*	*Neither agree nor disagree*	*Disagree somewhat*	*Disagree strongly*

"Over the past few years, blacks have gotten less than they deserve."

Do you…

_____	_____	_____	_____	_____
Agree strongly	*Agree somewhat*	*Neither agree nor disagree*	*Disagree somewhat*	*Disagree strongly*

"It's really a matter of some people not trying hard enough; if blacks would only try harder they could be just as well off as whites."
Do you…

_____	_____	_____	_____	_____
Agree strongly	*Agree somewhat*	*Neither agree nor disagree*	*Disagree somewhat*	*Disagree strongly*

We interested in the frequency with which student-athletes of different demographic backgrounds work with athletic medical staffs. Of the total time you spend working with student-athletes, what percentage involves working with individuals from each of the below demographic groups. This likely will not sum to 100% since we do not list an exhaustive set of demographic descriptions.

White men_____

Black men_____

White women_____

Black women_____

Sample Profile Variables

If you had experienced the described ACL injury, how painful do you think the initial injury would be?

Not painful	*Slightly painful*	*Moderatly painful*	*Extremely painful*

If you had experienced the described ACL injury, how painful do you think the recovery process would be?

Not painful	*Slightly painful*	*Moderatly painful*	*Extremely painful*

Are you male or female?

Male	*Female*

Which of the following do you consider to be your primary racial or ethnic group (*you may check more than one*)?

White	*African American*	*Asian American*	*Hispanic*	*Native American*	*Other*

What is your age?

Under 18	*18-24*	*25-34*	*35-50*	*51-65*	*Over 65*

Are you the director/head of your department?

No	*Yes*

Are you currently a student (e.g., a graduate or undergraduate)?

No	*Yes*

What is your highest level of education?

Less than	*High school*	*Some college*	*4 year*	*Master's*	*PhD*	*MD*	*PhD and*

high school *college degree* *degree* *MD*

For how long have you held your current position (in years and months)?

_____Years _____Months

For how long have you worked in the field (i.e., athletic medicine)? (This includes your time in your current position; in years and moths)?

_____Years _____Months

In a typical week during the academic year, how many hours a week do you spend working with student-athletes?_____

Which point on this scale best describes your political views?

Very liberal	*Moderately liberal*	*Somewhat liberal*	*Moderate*	*Somewhat conservative*	*Moderately conservative*	*Very conservative*

Do you think you would be very uncomfortable or very comfortable treating **NAME**?

Very uncomfortable	*Somewhat uncomfortable*	*Neither uncomfortable nor*	*Somewhat comfortable*	*Very comfortable*

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