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The Implicit Association Test Tested:

Unconscious Bias in Medicine

Assuming unconscious bias exists, there is a glaring lack of evidence that it skews clinical practice.

Unconscious Bias and Clinical Decisions

Tasked by Congress with investigating racial disparities of medical care, the Institute of Medicine documented an entrenched pattern of exactly that in its historic report of 2003, *Unequal Treatment*. But to what was this pattern due? The authors strongly suggest that inferior care of minority patients reflects more than problems of access to treatment: in the final analysis it reflects the bias of those responsible for treatment—doctors themselves.

However, the authors of *Unequal Treatment* well knew that the Jim Crow era was over and most doctors espouse equality and sincerely loathe racism. How then can they practice racist medicine? The answer distinctly implied but not exactly affirmed in *Unequal Treatment* is that they practice it *unconsciously*. Highly expedient, the theory of unconscious bias allowed critics all at once to (a) break the impasse of a literature that could establish the existence of disparities but not determine their cause; (b) explain how it is that well-meaning doctors can

nevertheless harbor bigotry; and (c) soften the condemnation of these parties, precisely because their bigotry is unwitting.

Though the authors of *Unequal Treatment* are convinced that the medical profession is profoundly tainted with unconscious racism, they can point to very little evidence of its influence on clinical decisions. Of the modicum of evidence available to them (including only two studies that actually concern treatment),[1] they attach the greatest value to a study by Schulman et al. which became a sensation owing to the distortion of its findings by the press.[2]

Appearing in the *New England Journal of Medicine* in 1999, the study used four white and four black actors to present an identical videotaped story of chest pain to 720 mostly primary-care doctors. As reported by Schulman et al., blacks and women were less likely to be referred for cardiac catheterization than whites and men; as reported by the press, blacks and women were 40% less likely, a shocking figure. In the ensuing controversy in the pages of the journal, it emerged that black men, white men, and white women were actually referred at an identical rate of 90%, and black women at a rate of 78%.[3] Who has ever heard of a bias against black women but not black men? If we find ourselves bewildered by these results, we ought to be. As the editors of the journal disclosed in a correction, the Schulman findings "depended largely on the response to the 70-year-old black actress and, to a lesser extent, on the response to the 55-year-old black actress." The editors conclude that in the study as printed, "the evidence of racism and sexism was overstated."[4] The episode was a typhoon in a teacup.

Given that clinical vignettes are an accepted method of medical testing, the conception of the Schulman study seems sound enough even if its execution was fatally flawed. In order to investigate bias in clinical medicine, present doctors with vignettes differing only by the race of

the patient and see how they do.[5] If they significantly undertreat the black patients, then their decisions suggest bias,[6] whether or not it qualifies as unconscious.

A year before the Schulman study was published (but after its data was gathered), Greenwald, Banaji and Nosek launched the Implicit Association Test. Designed to be administered online, the test measures the speed with which the taker pairs black and white faces with stereotypical and non-stereotypical attributes; faster stereotypical pairings indicate implicit or unconscious bias. The test caught on quickly; by 2007, it had been taken five million times.[7]

But what does the IAT have to do with medical decisions?

Say we ran a trial in which doctors are (a) given identical vignettes featuring black or white patients (as in the Schulman study, but without actors) and asked to recommend treatments; and (b) given an IAT to determine unconscious bias. If the doctors show bias in their treatments but not on IAT's, their IAT scores will certainly not clear them of the double standard of their clinical decisions. Decisions speak louder than test scores. By the same token, if their treatments show no bias but their scores do, the scores are academic; a test result is not going to convince us that they suffer from a profound bias that inevitably leaks into behavior. *By their deeds we shall know them*.

The IAT does not figure in the Schulman study, though perhaps it would have if it had been in existence when the study protocol was drawn up. That Schulman et al. refer to unconscious bias both in their report and their response to critics[8] suggests they were receptive to the idea that clinical decisions are determined at a level below the threshold of consciousness. They were succeeded by a line of investigators who, for whatever reason, *did*

administer tests for bias in the course of their studies of clinical decision-making. Whether or not the doctrine of unconscious bias has a following in American medicine, it has penetrated the medical literature.

"Predictive Validity"

Although the authors of *Unequal Treatment* refer freely to unconscious bias, and although the IAT was up and running by the time their report appeared, the test is not mentioned. Nevertheless, the founders of the IAT seem to have felt it could fill gaps in the evidence which are painfully apparent, and duly acknowledged, in the text of *Unequal Treatment*. Over the years, each of the founders took part in a study clearly intended to provide direct evidence of the influence of bias on clinical decisions, and in each case they occupy the honorary last position on the author list. While such trials did not have to include an IAT—they could simply have presented doctors with vignettes featuring black and white patients and analyzed the results—the investigators evidently thought their findings would be much stronger if the doctor-subjects *both* revealed themselves as unconsciously biased on the IAT *and* acted out the bias in making a medical decision. In that case, the trial would deliver an unmistakable message, and the IAT scores and the pattern of warped decision-making would reinforce and substantiate one another. After all, the theory of unconscious bias holds not only that people averse to racism can and do retain racist attitudes, but that they act on them. (Indeed, "advances in social psychology find that implicit racial biases are more related to racially

prejudiced behaviors than are attitudinal measures assessed by self-report.")[9] In principle, IAT's and skewed decisions could be expected to mirror each other.

In 2007 Green and colleagues, including Banaji, reported a study in which internal-medicine and emergency-medicine doctors first reviewed vignettes of black and white patients with symptoms of acute coronary syndrome and afterward took IAT's.[10] While the authors could have omitted the second step and simply tabulated the subjects' treatment recommendations (as in the Schulman study), they were looking for more than disparities of treatment. They were looking for the mutual-confirmation effect, and found it. In the event, "as physicians' prowhite implicit bias increased, so did their likelihood of treating white patients and not treating black patients with thrombolysis." It's as if the IAT and the behavioral findings of the study confirmed one another in a virtuous circle. If *Unequal Treatment* strongly suggested but could not actually establish that patterns of racially disparate treatment reflect the unconscious biases of doctors themselves, here finally was evidence of that provenance. Announce Green and co-authors, "This study represents the first evidence of unconscious (implicit) race bias among physicians, its dissociation from conscious (explicit) bias, and its predictive validity."

Readers of this study, with its triumphal self-description, might have thought they were witnessing the birth of a literature. It was not to be. To this day, the Green study remains the only unequivocally successful correlation of the IAT and clinical decisions.

<u>Non-Replication</u>

The following year, Sabin and colleagues, including Greenwald, reported a study similar in conception, now involving pediatricians. Before being given IAT's, the subjects reviewed case vignettes, with two black and two white patients, and made recommendations for pain control, urinary tract infection, ADHD and asthma. On the IAT's they showed bias, though less than the norm. In the end the authors found "no significant relationship" between measures of implicit bias and any of the treatment recommendations except in the case of UTI, for which black but not white children received the ideal option. They conclude:

> Inconsistent with our speculation and with research by Green et al., we did not find a relationship between implicit measures and quality of care. Future research will need to study a nationally representative sample of pediatricians to determine whether pediatricians, generally, hold less implicit race bias than other MDs and others in society and if so why, and whether and under what conditions implicit racial bias may influence quality of care.[11]

The authors appear to be floating the concept of an unconscious bias mild enough not to act at all. But if the whole point of an unconscious bias is that it influences your behavior in ways you are unaware of, just what is an unconscious bias that lies dormant?

If I hold a bias or putative bias that does not influence my clinical decisions, so what? Unconscious bias was supposed to represent the underlying cause of disparities of treatment and outcome, but in the study before us it is not connected to "quality of care." If anything, it

expresses itself in reverse, resulting in optimal UTI recommendations for a higher percentage of black children.[12]

Presumably because of these unanticipated findings, Sabin and Greenwald re-analyzed their data and published the results a few years later, though the second report is so closely tied to the first that the two are sometimes discussed as one. "On the basis of previous research," they note, "we expected that physicians' implicit pro-White biases might be related to poorer quality of care for an African American patient than for a White patient."[13] Why they retained this expectation after the findings of their own previous research remains unclear.

In his famous paper titled "Why Most Published Research Findings Are False," Ioannidis flags flexible analyses, small studies and hot fields as risk factors for false findings.[14] All three are at work in the re-run of the 2008 study, which appears to have been undertaken in the hope of converting its disappointing findings into something more favorable. What then was the result?

Though sometimes cited as positive, the study actually yielded predominantly negative findings:

> There were no significant associations between implicit attitudes and stereotypes about race and any of the treatment recommendation options for UTI, ADHD, and asthma. For pain, participants with greater implicit pro-White bias were more likely to agree with prescribing a narcotic medication for postsurgical pain for the White patient but more likely to disagree with prescribing it for the African American patient.[15]

Because control of pain, especially among children, seems like a first responsibility, the one positive finding seems more significant than the negative ones. Nevertheless, much as with the original analysis of the study data, we wonder why a bias that is supposed to operate automatically, beyond the party's awareness and volition, produces such uneven results. Moreover, the retake adds two new paradoxes to the original finding of an unconscious bias associated with better treatment of UTI in black patients. This time pro-white bias was associated with poor pain treatment for white children[16] and better treatment of ADHD in children of both races.

If this had been a study of treatment recommendations alone (like the Schulman study), the results would not really have supported a conclusion of racial bias, and neither, of course, would the authors have had to reconcile them with the findings of a theoretically revealing psychological test. As it is, they can only conclude that "Implicit attitudes and stereotypes may not influence care for many chronic and acute pediatric conditions."[17] We are left to puzzle out why an unconscious motive acts so erratically, what remains of it after large deductions are taken, and why the authors seem so committed to the theory that this elusive something warps clinical decisions in the first place.

The third of the founders of the IAT, Nosek, also took part in a trial of the effect of unconscious bias on clinical decision—in this case, one whose findings could not be stretched or juggled into the positive category. Over 500 family and internal medicine physicians (a figure more than five times higher that the population of the two Sabin studies) were given both a vignette describing either a black or white patient in need of total knee replacement and IAT's to determine their level of racial bias; the order of the two was random. In the event, while the

subjects showed a strong bias in favor of white patients on the IAT, "there was no significant difference in the rate of recommendations for TKR when the patient was black (47%) vs. white (38%) (P = .439)."[18] (In case we inferred from the Sabin study or studies that strong biases influence practice but weak ones don't, here were strong biases with no effect.) Oliver and colleagues conclude, accordingly, that biases "did not predict treatment recommendations."[19] Thus, seven years after investigators including Banaji proclaimed a direct correlation of bias and practice (as if they had discovered the evidence all but entirely missing in *Unequal Treatment*), the Oliver study completed the non-replication of this finding by the other founders of the IAT itself. Theirs were not the only negative trials of the influence of unconscious bias on clinical practice.

In the same year (2014), Blair and colleagues found that "implicit bias did not affect clinicians' provision of care to their minority [hypertensive] patients, nor did it affect the patients' outcomes."[20] More or less as in the Oliver study, the biases that failed to influence practice or compromise outcomes were judged moderate to strong in IAT's. The following year Haider and colleagues found that "unconscious social class and race biases were not significantly associated with clinical decision making among acute care surgical clinicians."[21]

If evidence that unconscious bias drives clinical decisions is lacking, the reason may be that clinical decisions are not automatic acts at all. In *Unequal Treatment* and elsewhere, critics in their search for evidence of unconscious bias point to telltale behavioral tics, such as blinking too much in the presence of black patients, as signals of bias. These are indeed subtleties the subject might be unaware of. Decisions, however, are not behavioral tics. Consider the single positive finding of the post-Green literature: the finding in the 2012 reanalysis of the Sabin

study that pediatricians were less willing to prescribe oxycodone for black patients. The authors report that they chose to test the subjects on pain management "because this is an area with reported disparities, a high level of clinical subjectivity, and reports of clinicians' associations of African Americans with perceptions of opioid misuse."[22] But there is nothing unconscious about the "associations" in question. Opioid abuse was and remains a topic of urgent public concern, and under such conditions we cannot assume that pediatricians in the study were under the influence of an unconscious motive when they made their recommendations for pain control.

Though the term "unconscious bias" has established itself in the medical literature, the idea of actually making clinical decisions unconsciously, as if practicing medicine in a trance, is challenging, to say the least. While Schulman et al. seem to have been the first to attribute specific clinical decisions to unconscious bias, in a subsequent study of cardiac catheterization (also in the *New England Journal of Medicine*) black and white doctors used the procedure at the same rate, and less often for black patients than white.[23] Were the black doctors in thrall to the same unconscious bias as their white colleagues? In the Green study—the one and only study to find a correlation between IAT scores and clinical decisions—"black physicians had mean scores on all three IAT's near zero, whereas all other groups had scores in the positive, prowhite range."[24]

Review

At this point it seems fitting to look back over the history of attempts to validate the theory that disparities of medical treatment reflect the unconscious racism of doctors. The first

attempt, that of Schulman and colleagues, appeared successful until it emerged that its findings were both misleadingly reported and tainted by the bad acting of one of the videotaped "patients." The authors of *Unequal Treatment* strongly insinuate that the ultimate explanation of disparities of treatment and outcome lies in the unconscious bias of doctors, but lack, and know they lack, anything like the evidence necessary to prove such an extreme accusation. The best they can do is to emphasize the Schulman study while passing in silence over its correction by the editors of the journal.

Ever since that study, the theory of unconscious bias and its malign influence on the practice of medicine has run well ahead of the evidence, but, like the authors of *Unequal Treatment*, believers seem to think that the missing evidence is bound to materialize. With the Green study in 2007 (focused like the Schulman study on cardiac care), the wished-for evidence appeared to do just that, and there is a note of "Eureka!" in its claim to have demonstrated the "predictive validity" of unconscious bias. Not only had an important bias in clinical decision-making been shown, but so had its very source. For those who feel that an explanation has not hit bedrock unless and until it delves into the psyche, Green's vindication of the Implicit Association Test must have provided a heady sense that the real origin of racially disparate treatments and outcomes had finally been demonstrated.

That the Green study has been cited almost 1700 times, more than all successors noted above combined, suggests a strong appetite for confirmation of the theory of unconscious bias. Even as the replication crisis overtook the social sciences, one study after another, using a variety of populations from pediatricians to surgeons, failed to replicate the Green findings. Even doctors with bias assessed as strong on an IAT made clinical decisions unmarked by bias.

To this day, the Green study defies replication. The failure of unconscious bias to manifest itself except on an online test is not what we would have expected of a motive often described as operating like a law of our social nature.

Bias and Belief

The involvement of each of the founders of the IAT in this story of evidentiary failure has not, it seems, eroded the doctrinal belief in unconscious bias, even among many in medicine. Somehow belief in a bias that functions automatically, beyond the holder's knowledge and volition, survives its failure to influence clinical decisions in one trial after another, with subjects in different specialties and with varying degrees of detected bias. Even though one would expect such a powerful and uncontrollable motive as an unconscious racial animus to leave a mark on clinical decisions, its failure to do so does not seem to be held against it. What remains is a bias that for some reason fails to act but poses a threat to medicine all the same; a bias that underwrites disparities of care and outcome even though we cannot prove it, as yet.

In the Oliver study, participants "believed that subconscious biases could influence their clinical decision making" even though their decisions showed no such influence under the close scrutiny of the study itself.[25] It appears the investigators held the same belief; that is, not even their own findings could free them from the notion that unconscious bias threatens medical decisions. Similarly, though Haider led two studies that found no influence of unconscious bias (the first of which specifically noted that it failed to replicate Green), the second study concludes as follows: "Although this study of clinicians from surgical and other related

specialties did not demonstrate any association between implicit race or social class bias and clinical decision making, existing biases might influence the quality of care received by minority patients and those of lower socio-economic status in real-life clinical encounters."[26] If a study cannot detect unconscious bias because it is a study and not real life, then one wonders why Haider and colleagues went to the trouble of conducting their investigation. Belief in the menace of unconscious bias seems hard to kill.

If the very investigators who find that unconscious bias doesn't invade clinical decisions feel that it nevertheless remains a threat to the quality of care, there must be many others who feel the same way. For those who think of unconscious bias as a sort of autonomous mechanism, it would seem to follow inescapably that its action cannot be regulated as long as it remains unconscious; hence the willingness of the authors of *Unequal Treatment* and others at the time to theorize and sermonize about the risks of unconscious bias in medicine despite a virtually complete lack of supporting evidence. Though the evidence has still not come to light, the thinking of many seems to be, "So what if studies have not captured the influence of unconscious bias on clinical practice? In reality, this bias will necessarily influence practice precisely because it is outside the holder's control."

According to this argument, because (a) doctors show unconscious bias on IAT's, and (b) an unconscious mechanism is bound to operate as long as it remains unconscious, therefore (c) the only way to break the hold of unconscious bias over clinical behavior is to make doctors aware of their secret attitudes. The middle link in this chain of inference is pure supposition.

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[1] Brian Smedley, Adrienne Stith, and Alan Nelson, eds., *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care* (Washington, D.C.: National Academies Press, 2003), pp. 164-66.

[2] Kevin Schulman, Jesse Berlin, William Harless et al., "The Effect of Race and Sex on Physicians' Recommendations for Cardiac Catheterization," *New England Journal of Medicine* 340 (1999): 618-626; Sally Satel and Jonathan Klick, "The Institute of Medicine Report: Too Quick to Diagnose Bias," *Perspectives in Biology and Medicine* 48 (2005): S15-S25.

[3] Lisa Schwartz, Steven Woloshin and H. Gilbert Welch, "Misunderstandings About the Effects of Race and Sex on Physicians' Referrals for Cardiac Catheterization," *New England Journal of Medicine* 341 (1999): 279-83.

[4] Letter by Gregory Curfman and Jerome Kassirer, *New England Journal of Medicine* 341 (1999): 287.

[5] Satel and Klick propose studies using matched black and white doctors for control purposes. See "The Institute of Medicine Report: Too Quick to Diagnose Bias."

[6] I say "suggest," rather than something stronger, in deference to another study of cardiac catheterization in the same journal, this one finding that among Medicare patients hospitalized for acute myocardial infarction in 1994 and 1995, black patients underwent the procedure at a lower rate than white regardless of the race of their attending doctor. Indeed, the black and white doctors used the procedure at the same rate. See Jersey Chen, Saif Rathore, Martha Radford et al., "Racial Differences in the Use of Cardiac Catheterization After Acute Myocardial Infarction," *New England Journal of Medicine* 344 (2001): 1443-49.

[7] Alexander Green, Dana Carney, Daniel Pallin et al., "Implicit Bias among Physicians and its Prediction of Thrombolysis Decisions for Black and White Patients," *General Journal of Internal Medicine* 22 (2007): 1232; runs 1231-38.

[8] Kevin Schulman, Jesse Berlin, José Escarce et al., Letter to the Editor, *New England Journal of Medicine* 341 (1999): 286.

[9] Janice Sabin, Frederick Rivara and Anthony Greenwald, "Physician Implicit Attitudes and Stereotypes about Race and Quality of Medical Care," *Medical Care* 46 (2008): 678; runs 678-85.

[10] Green et al., "Implicit Bias among Physicians and its Prediction of Thrombolysis Decisions for Black and White Patients."

[11] Sabin, Rivara and Greenwald, "Physician Implicit Attitudes and Stereotypes about Race and Quality of Medical Care": 684.

[12] "There was no significant difference in recommendation differences by patient race except for management of UTI. For UTI, the ideal care option (home care rather than hospital care) was more often recommended for the African American patient rather than the white patient (71% vs. 55%; *P* = 0.03)" (681).

[13] Janice Sabin and Anthony Greenwald, "The Influence of Implicit Bias on Treatment Recommendations for 4 Common Pediatric Conditions: Pain, Urinary Tract Infection, Attention Deficit Hyperactivity Disorder, and Asthma," *American Journal of Public Health* 102 (2012): 992; runs 988-95.

[14] John Ioannidis, "Why Most Published Research Findings Are False," *PLoS Medicine* 2 (2005): 0696-0701.

[15] Sabin and Greenwald, "The Influence of Implicit Bias on Treatment Recommendations for 4 Common Pediatric Conditions": 991.

[16] "Physicians who demonstrated stronger pro-White bias on the Race IAT were more likely to agree with prescribing ibuprofen for the White patient (not the best option}." Sabin and Greenwald, "The Influence of Implicit Bias on Treatment Recommendations for 4 Common Pediatric Conditions": 991.

[17] Sabin and Greenwald, "The Influence of Implicit Bias on Treatment Recommendations for 4 Common Pediatric Conditions": 992.

[18] M. Norman Oliver, Kristin Wells, Jennifer Joy-Gaba, Carlee Beth Hawkins and Brian Nosek, "Do Physicians' Implicit Views of African Americans Affect Clinical Decision Making?" *Journal of the American Board of Family Medicine* 27 (2014): 177; runs 177-88.

[19] Oliver et al., "Do Physicians' Implicit Views of African Americans Affect Clinical Decision Making?": 177.

[20] Irene Blair, John Steiner, Rebecca Hanratty et al., "An Investigation of Association Between Clinicians' Ethnic or Racial Bias and Hypertension Treatment, Medication Adherence and Blood Pressure Control," *Journal of General Internal Medicine* 29 (2014): 987; runs 987-95.

[21] Adil Haider, Eric Schneider, N. Sriram et al., "Unconscious Race and Social Class Bias Among Acute Care Surgical Clinicians and Clinical Treatment Decisions," *JAMA Surgery* 150 (2015): 457; runs 457-64.

[22] Sabin and Greenwald, "The Influence of Implicit Bias on Treatment Recommendations for 4 Common Pediatric Conditions": 992.

[23] Chen et al., “Racial Differences in the Use of Cardiac Catheterization After Acute Myocardial Infarction.”

[24] Green et al., “Implicit Bias among Physicians and its Prediction of Thrombolysis Decisions for Black and White Patients”: 1233.

[25] Oliver et al., “Do Physicians’ Implicit Views of African Americans Affect Clinical Decision Making?”: 184.

[26] Haider et al., “Unconscious Race and Social Class Bias Among Acute Care Surgical Clinicians and Clinical Treatment Decisions”: 462.