Race and recession:

The effect of economic scarcity and egalitarian motivation on racial discrimination

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Abstract

When the economy declines, existing racial disparities typically expand, suggesting that economic scarcity may promote racial discrimination. To understand this pattern, we examined the effect of perceived scarcity on resource allocations to Black and White American recipients, and tested whether this effect depends on a decision maker's motivation to respond without prejudice. We proposed that scarcity would lead to increased discrimination among those with relatively low internal motivation, but not those high in internal motivation. Indeed, we found that when resources were framed as scarce (vs. abundant or a control condition), low-motivation participants allocated less to Black than White recipients, whereas high-motivation participants allocated *more* to Black than White recipients (Studies 1 and 2). This pattern was strongest when decisions could be made deliberatively (Study 3), and anti-black allocation bias emerged even in a non-zero-sum context (Studies 4 and 5), suggesting a strategic bias directed against Black recipients rather than in favor of White recipients. These findings indicate that the psychological perception of scarcity can produce racial bias in the distribution of economic resources, depending on the motivations of the decision maker—an effect that may contribute to the increase in racial disparities observed during economic stress.

197 words

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The Effect of Perceived Scarcity on Racial Discrimination

Vast socioeconomic and health disparities exist between Whites and racial minorities in America (see Brulle & Pellow, 2006; Cooper, 1993; Williams, Yu, Jackson, & Anderson, 1997), and these tend to expand when the economy declines. For example, during the recent recession of 2008-2009, inflation-adjusted median wealth fell by 66% and 53% among Hispanic and Black households, while White household median wealth fell by only 16%. At the same time, Hispanic and Black unemployment grew by 6.7 and 7 percentage-points, while White unemployment increased by only 4.3 percentage points. Furthermore, twice as many Black and Latino Americans were forced to cut their working hours as compared with White Americans (Taylor, Kochhar, & Fry, 2011).

To some extent, this pattern of inequality reflects existing structural and institutional factors that oppress minorities (Applied Research Center, 2009). For example, the greater impact of the recession on minority employment likely reflects institutional discrimination in hiring and promotion practices that are magnified when there are fewer jobs. Racial minorities are also more likely to hold jobs that are especially vulnerable to economic duress (e.g., blue-collar manufacturing and service jobs; Fronczek & Johnson, 2003; Klemmer, 2010). Indeed, after the recession of the early 1980s, Black men experienced greater job displacement than White men, due in part to their greater concentration in the less skilled jobs that experienced greater cuts (Fairlie & Kletzer, 1998).

Although the amplification of inequality caused by economic recession may reflect existing structural and institutional factors, classic and contemporary theories in social psychology suggest that psychological factors also contribute to this effect (Cottrell & Neuberg, 2005; LeVine & Campbell, 1972; Sherif, 1966; Sherif & Sherif, 1953; Stephan & Stephan,

1999). Indeed, perceived resource scarcity alters attitudes and perceptions in ways that could indirectly enhance discrimination (e.g., scarcity increases negative attitudes toward Black Americans and changes representations of Black faces to be darker and more stereotypically Black; Krosch & Amodio, 2014; Riek, Mania, & Gaertner, 2006). However, research has not yet examined the impact of perceived scarcity on the kinds of economic decisions that may most directly contribute to the individual-level propagation of discrimination. Thus, in the present research, we examined the effect of perceived economic scarcity on individuals' decisions to allocate resources between White and Black American recipients, and tested the extent to which this effect is potentially strategic, relying on an individual's personal (i.e., internal) motivations to respond without prejudice and the processing resources available to them during a decision.

Scarcity and Intergroup Bias in the Allocation of Resources

Intergroup bias—the preference for ingroup members over outgroup members—is known to play a significant role in the allocation of resources (for reviews see Dovidio & Gaertner, 2010; Hewstone, Rubin, & Willis, 2002). Even when group distinctions are minimal or arbitrary, decision makers typically give more resources to ingroup members than to outgroup members in allocation tasks (Tajfel, Billig, Bundy, & Flament, 1971; Billig & Tajfel, 1973; see Diehl, 1990 for a review). Importantly, this pattern of intergroup bias is theorized to emerge most clearly under conditions of scarcity (e.g., Realistic Group Conflict Theory; LeVine & Campbell, 1972; Sherif, 1966; Sherif & Sherif, 1953). Although existing research has not directly examined the effects of scarcity on intergroup allocation responses, several studies have shown perceived scarcity to increase negative attitudes toward minority group members (e.g., Esses, Jackson, & Armstrong, 1998; King, Knight, & Hebl, 2010; Stephan, Ybarra, & Bachman, 1999; Stephan, Renfro, Esses, Stephan, & Martin, 2005; Stephan et al., 2002; Butz & Yogeeswaran, 2011;

Quillan, 1995; for a meta-analysis see Riek et al., 2006). Similar effects have been found regarding participants' attitudes toward policies that influence outgroup members: scarcity increases support for anti-outgroup policies and decreases support for pro-outgroup policies (e.g., Esses et al., 1998; McLaren, 2003). These findings reveal that perceptions of scarcity enhance prejudice toward minority group members, and they point toward our proposed effect of scarcity on behavioral discrimination.

In a related literature, competition over resources has been argued to provoke intergroup discrimination in novel group contexts (LeVine & Campbell, 1972; Sherif & Sherif, 1953). For example, Brewer and Silver (1978) examined this effect among groups that were artificially formed in the laboratory using the minimal groups paradigm. Participants in this study chose among several different allocation structures (i.e., Tajfel-style allocation matrices), some of which indicated preferences for the ingroup, preferences against the outgroup, or a combination of both (e.g., Billig & Tajfel, 1973; Tajfel & Billig, 1974; Tajfel et al., 1971; Tajfel, 1970). When the choice structure was competitive, participants more frequently chose options that maximized ingroup members' gains (at the expense of the outgroup). This bias was not observed when the choice structure was cooperative. Although the effect of scarcity was not examined directly in this work, results suggest that competitive contexts, such as those created by economic scarcity, lead to increased discrimination in behavior (Brewer & Silver, 1978).

Taken together, these findings provide a strong basis for the hypothesis that perceptions of scarcity should enhance explicit racial discrimination in the allocation of resources. These findings also suggest that discrimination in the allocation of resources is unlikely to emerge in the absence of scarcity-induced group competition and strong motives to discriminate (see Hewstone et al., 2002 for a review). Indeed, the expression of intergroup bias in the context of

race and ethnicity has been mixed (e.g., Burns, 2012; Dovidio & Gaertner, 2000; Fershtman & Gneezy, 2001; Murphy-Berman, Berman, & Campbell, 1998; Rathore et al., 2000; Van Der Merwe & Gerhard, 2008; Lenton, Blair, & Hastie, 2006; Fong & Luttmer, 2011), suggesting the role of moderating factors such as perceived scarcity and individual differences in likelihood to discriminate.

The Moderating Role of Prejudice and Egalitarian Motivation

In contrast to discrimination between members of artificially-created groups (e.g., in minimal groups studies), discrimination between existing *racial* groups often reflects the influence of entrenched intergroup attitudes and motivations, beyond mere group membership (Amodio & Devine, 2005; Duckitt, Wagner, du Plessis, & Birum, 2002). In some economic decision making contexts, White individuals with highly-prejudiced attitudes may actively seek to harm or otherwise disadvantage Black people in monetary allocation tasks (Stanley, Sokol-Hessner, Banaji, & Phelps, 2011; Stepanikova, Triplett, & Simpson, 2011).

Similarly, many Americans are strongly motivated by their personal beliefs to respond without prejudice (Devine, 1989; Dunton & Fazio, 1997; Plant & Devine, 1998)—an "internal motivation" that is strongly associated with egalitarianism (Plant, Devine, & Peruche, 2010). A theoretical focus on motivational orientation has been useful for understanding when individuals respond with or without racial prejudice, especially on explicit expressions of racial bias (e.g., Devine, Plant, Amodio, Harmon-Jones, & Vance, 2002; Plant et al., 2010). Thus, a consideration of internal motivation to respond without prejudice is crucial when examining discrimination against Black Americans under scarcity.

Whereas individuals low in internal motivation typically respond with prejudice in intergroup contexts (e.g., Devine et al., 2002; Plant & Devine, 1998; Plant 2004), these same

contexts may trigger intentions to regulate prejudiced responses for highly internally-motivated individuals (Amodio, Harmon-Jones, & Devine, 2003; Devine et al, 2002; Plant & Devine, 2009; see also, Amodio, 2010; Monteith, Ashburn-Nardo, Voils, & Czopp, 2002). In some cases, internal motivation may prompt efforts to deliberately correct for societal disparities by favoring a Black person over a White person, even when they are similarly qualified (Mendes & Koslov, 2012). Indeed, prior research found that the motivation to control prejudice, assessed using Dunton and Fazio's (1997) scale, was positively related to support for reparatory policies (e.g., Affirmative Action) thought to reflect a deliberate effort to correct for structural and historical discrimination against Black Americans (Mack, Johnson, Green, Parisi, & Thomas, 2002). Similarly, in other work, highly-internally motivated participants allocated more resources to a hypothetical "other" when primed with a Black vs. White face, relative to low-internally motivated participants (Johns, Cullum, Smith & Freng, 2008). This body of research shows that highly-internally motivated individuals tend to correct for perceived bias, often by over-compensating for the perceived harm to a minority group member. Contexts in which scarce resources are allocated between recipients of different races might signal a strong opportunity for bias, and egalitarian decision makers may be particularly likely to overcompensate for minorities who are historical targets of disparities and discrimination.

Thus, in the context of intentional allocation decisions, we would expect individuals low in internal motivation to discriminate more against a Black recipient when resources are scarce, as compared with a resource abundant context. By contrast, individuals with high internal motivation would not be expected to discriminate when resources are scarce, but instead may attempt to correct for perceived racial biases by *over*-allocating resources to a Black recipient when triggered by resource scarcity.

Furthermore, because these proposed effects are driven by individuals' consciously-held motivations, they should be strongest when participants have the opportunity to respond more deliberately (Devine, 1989; Fazio, 1990; Gilbert & Hixon, 1991). Past research on allocation decisions shows that when responses are made heuristically (e.g., when under time pressure), respondents often adhere to a simple equity rule; by contrast, individual differences in personal motivations and beliefs typically emerge in decisions only when sufficient time and cognitive resources are available for deliberation (Roch, Lane, Samuelson, Allison, & Dent, 2000; Schulz, Fishbacher, Thöni, & Uitikal, 2014). Therefore, if the hypothesized effects of scarcity on allocation behavior are guided by people's internal motivations, then these effects should emerge more strongly in decisions are made deliberatively. Based on prior research, responses made without deliberation should follow more closely to an equity heuristic, and thus any effects of scarcity on allocations should be muted.

Overview of Studies

Our goal in the present research was to test the effect of perceived economic scarcity on the allocation of resources between Black and White recipients, as a function of participants' internal motivation to respond without prejudice. In five studies, we manipulated participants' perception of economic resources as scarce (vs. abundant or neutral) and measured the amount of money participants allocated to Black compared to White recipients. Given our objective of examining *perceived* resource scarcity on discrimination, we held absolute resource levels constant and only manipulated the description or framing of resources as relatively scarce as compared with abundant or neutral framings. We specifically focused on the allocation decisions of non-Black, majority White American samples toward Black and White recipients. We predicted that when resources were scarce (vs. abundant or neutral), participants with a low

motivation to respond without prejudice would allocate fewer resources to Black recipients, whereas participants with a high motivation to respond without prejudice would allocate equitably or would allocate more resources to Black recipients. Furthermore, because bias in explicit behaviors is proposed to reflect individuals' consciously-held internal motives, we expected this pattern to be strongest when decisions could be made deliberately—a hypothesis tested in Study 3. Finally, to determine whether scarcity induces anti-Black discrimination independently of pro-White preference, Studies 4 and 5 tested whether the joint effects of scarcity and egalitarian motivation on race-based resource allocation held even when Black and White recipients have independent resource pools (i.e., when decisions are "non-zero-sum").

Study 1

In Study 1, we tested the effect of scarcity on race-biased resource allocation as a function of decision maker's internal motivation to respond without prejudice.[1] Participants were asked to provide feedback to the art school at their university regarding applications for a prestigious fellowship. This involved judging student artwork samples and making recommendations for fellowship funding. We hypothesized that when fellowship funding was described as scarce, as opposed to abundant, participants would allocate less fellowship money to Black applicants, and that this effect would depend on the decision makers' internal motivation. Given prior theory and research showing that bias is less likely to be expressed in the absence of scarcity or competition (e.g., Hewstone et al., 2002), we did not expect to observe discriminatory allocation in the abundant condition. Additionally, because all responses were made privately, with confidentiality explicitly ensured, we did not expect participants' concerns

[1] Study one originally consisted of two studies, run in sequential semesters in the laboratory, identical except the first was administered via pen and paper, and the second was administered via computer. All results remain when studies are analyzed separately, see supplement.

about appearing prejudiced (i.e., their external motivation to respond without prejudice) to influence responses.

Method

Participants. One hundred and twenty-nine undergraduate psychology students (mean age = 19.50, *SD* = 1.48; 93 female, 36 male) at a large private university participated in exchange for partial course credit. Most participants self-identified as White (85 White, 35 Asian, 7 Latino, and 2 as mixed-race) and none self-identified as Black.[2] Participants were randomly assigned to either the scarce or abundant resource condition.

Procedure. Upon entering the lab, participants were told the study was being conducted in collaboration with the university's School of the Arts and was designed to examine students' subjective perceptions of art. Participants learned they would be reviewing and rating the art portfolios of four applicants for a prestigious fellowship. Three applicants were White and one was Black, a proportion reflecting the student body demographics to reduce suspicion regarding our interest in race. After providing informed consent, participants were given copies of each artist's portfolio (including a photo of the artist, a brief artist statement, and images of their artwork), and an accompanying evaluation form. To ensure confidentiality, participants were instructed not to make any identifying marks on the forms and to place their completed evaluations in an envelope. The experimenter waited outside the room while participants examined the materials and rated the quality of each portfolio. Following these ratings, participants were given information about a university fellowship award, which included the

[2] Sample size for our university samples (Studies 1,2,3,5) was determined as the maximum number of participants we were able to recruit until the end of the semester; MTurk sample size (Study 4) was determined as the minimum N to achieve 90% power to detect our effects of interest. Power to test a medium effect of $f^2 = .15$ at $\alpha = .05$ for the interaction between our continuous and binary variable was 95%, 99%, 93%, 90%, 99% for Studies 1-5. Achieved power was calculated with G*Power 3.1, according to Faul, Erdfelder, Buchner, & Lang, 2009.

scarcity manipulation. Next, participants indicated the portion of the total amount of funds to allocate to each applicant. Upon task completion, participants were probed for suspicion, debriefed on the nature of the study, and awarded course credit.

Materials and measures.

Internal and External Motivation to Respond Without Prejudice Scales (IMS/EMS). Prior to their participation, in a mass testing session held at the beginning of the semester, participants completed the *Internal and External Motivation to Respond Without Prejudice Scales* (IMS and EMS; Plant & Devine, 1998). The IMS assesses participants' personal motivation to respond without prejudice (i.e., their egalitarian motivation), which was hypothesized to moderate the effect of scarcity on resource allocation. The IMS includes five items (with one reverse-coded item; $\alpha = .89$), such as, "I am personally motivated by my beliefs to be non-prejudiced toward Black people." Although all responses in the current study were made in private in order to minimize external concerns, we also assessed external motivation (EMS) and included it as a covariate in supplemental analyses to adjust for participants' potential sensitivity to external pressures. The EMS consists of five items ($\alpha = .85$), such as, "If I acted prejudiced toward Black people, I would be concerned that others would be angry with me." Responses to both scales were given on a 9-point Likert-type scale and averaged, respectively, to produce composite IMS and EMS scores (see the supplement for IMS/EMS descriptives).

Art portfolios. As per the cover story, we created portfolios for a set of art school fellowship applicants. Materials were selected on the basis of pretesting.

Portfolio pretesting. In an independent pilot study, 11 undergraduate in-lab pilot participants viewed large pools of artwork samples and headshot photographs of Black and White males. These headshots were all male in order to keep gender constant and because

research has demonstrated clearer patterns of racial bias toward males (Sidanius & Veniegas, 2000). Participants rated the portfolios of artwork on a set of dimensions (the extent to which the artwork was interesting, pleasing, and skilled, and the extent to which the artist was talented, creative and able) and indicated how much fellowship funding the artist should receive. They rated headshots on their attractiveness. No mention was made of race or scarcity/abundance, and no connection was made between the artwork and faces. We selected four artwork portfolios that did not significantly differ on the composite of dimensions, $F(3,30) = .25$, $p = .86$, or in the amount of fellowship funding they should receive, $F(3,30) = .04$, $p = .99$. We also selected four headshot faces that did not differ from one another on ratings of attractiveness, $F(3,30) = .06$, $p = .98$, to represent the artists (3 White, 1 Black). Each portfolio contained the artist's name, photograph, age, GPA, along with an artist statement about his work and four samples of his artwork (described as "reproduced photographs").

Pre-manipulation evaluation questionnaires. Prior to the manipulation, participants in Study 1 rated each applicant on the dimensions of competence (i.e., 'How intelligent/skilled/thoughtful was the applicant?') and creativity (i.e., 'How creative/provocative/visionary was the artwork?') by placing a mark on a 15 cm line representing a scale anchored by 'Not at all' and 'Very.' These two dimensions were chosen because Black Americans are simultaneously associated with the negative stereotype of low competence and the positive stereotype of creativity (Devine & Elliot, 1995). These ratings were made before the scarcity manipulation and their average was used as a covariate in supplemental analyses to ensure effects were driven by our manipulation rather than individual differences in preexisting stereotypes or idiosyncratic responses to the artists and portfolios. Mean ratings by race are included in the supplement.

Scarcity manipulation. Participants then read that the university would be awarding approximately $100,000 in fellowship funding this year (the study started in the spring of 2009, at the height of the recent financial crisis). The description of this fellowship was identical in the scarcity and abundance conditions except for one critical sentence. Participants assigned to the scarcity condition read that the fellowship resources were "more limited than in previous years, on account of the financial crisis" and those in the abundance condition read that the fellowship resources were "more abundant than in previous years, despite the financial crisis." See supplement for tests of manipulation efficacy.

Allocation task. Participants were asked how much of the $100,000 pool they recommended be allocated to each applicant. They were told they could give as much or as little to each applicant as they wished, but the total allocation must equal $100,000 (in line with the zero-sum nature of our task). The dependent variable was the amount allocated to the Black applicant, which will be subsequently reported in thousands. Because the amount allocated to the Black applicant is taken from a fixed pool of resources, it represents the relative amount given to the Black applicant compared with the average allocation to White applicants.

Results

Our main hypothesis was that scarcity would influence the allocation of fellowship money to Black applicants, depending on participants' internal motivation. Specifically, under the condition of scarcity, low-IMS participants were expected to allocate fewer resources to Black applicants, whereas high-IMS participants were, if anything, expected to allocate greater resources to Black applicants. Given prior research showing that prejudice is less likely to occur in the context of abundance or the lack of competition, we did not expect to observe discrimination in the abundant condition.

Effects of scarcity condition and IMS on allocation. To test our prediction, the dollar amount allocated to the Black applicant was regressed onto condition, IMS, and their interaction. This analysis produced a main effect of IMS, $B = 2.56$, $SE = 0.94$, $\beta = .24$, $t = 2.73$, $p = .007$, 95% CI [0.70, 4.42], such that low-IMS participants allocated less to the Black applicant than high-IMS participants. Importantly, this effect was qualified by a significant Condition x IMS interaction, $B = -2.80$, $SE = 0.94$, $\beta = -.26$, $t = 2.98$, $p = .003$, 95% CI [-4.66, -0.94] (see Figure 1A; Table 1).[3] Simple slope analyses indicated that in the scarcity condition, participants' allocation to the Black applicant varied as a function of their IMS score, $B = 5.36$, $SE = 1.44$, $\beta = .50$, $t = 3.73$, $p < .001$, 95% CI [2.52, 8.20] such that low-IMS participants gave less than high-IMS participants. That is, each one-point decrease on the IMS scale corresponded with a $5,359 decrease in funding among participants in the scarce condition. In contrast, when fellowship funding was described as abundant, the amount allocated to the Black applicant was not associated with participants' IMS score, $B = -0.24$, $SE = 1.21$, $\beta = -.02$, $t = 0.20$, $p = .842$, 95% CI [-2.64, 2.15].

Effects of scarcity condition and IMS on deviations from equity[4]. To obtain a more direct test of our hypothesis, we determined whether participants' allocation to the Black applicant differed from $25,000—the value expected under equity (i.e., the result of splitting

[3] All effects remained significant when the EMS and Black artist/artwork rating covariates were added in each of the studies presented here. This suggests that scarcity and internal motivation to respond without prejudice operate on allocation *beyond* subjective perceptions of artwork and the external motivation to appear unbiased. For the sake of completeness, we have included all of these analyses in the supplement.

[4] We used the term "equity" to mean equal outcomes for equal inputs. Since the artwork/artists were pretested to be of equal merit (equal input), this suggests the equitable choice is for each of them to receive $25,000 (equal outcomes).

$100,000 evenly among the four applicants of equivalent merit). To this end, we centered the amount allocated to the Black recipient on $25,000 and regressed it onto dummy-coded scarcity condition, IMS (one standard deviation above and below the mean), and their interaction.

Predicted values were computed for each of the four groups determined by the Scarcity x IMS design, with the predicted values reflecting IMS scores set to 1 SD either above or below the mean. These values were then compared to $25,000 by examining the intercept coefficient of these four regression analyses. As expected, the predicted allocation for low-IMS participants in the scarce condition was significantly less than $25,000 to the Black applicant (~$18,730), B = -6.27, SE = 2.18, t = 2.88, p = .005, 95% CI [-10.58, -1.96, whereas the predicted allocation for high-IMS in the scarce condition was significantly more than $25,000 to the Black applicant (~$29,448), B = 4.45, SE = 1.77, t = 2.52, p = .013, 95% CI [0.95, 7.95]. Neither the high- nor low-IMS participants in the abundant condition differed significantly in their predicted allocations from $25,000 ($B$s < -1.60, ts < 0.85; ps > .396, 95% CIs contained 0).

Discussion

Study 1 provided an initial test of our hypothesis that the perception of scarcity can induce discrimination in economic allocations toward Black recipients, relative to White recipients, depending on a decision maker's degree of internal motivation to respond without prejudice. Consistent with our hypothesis and prior research, we found that when resources were described as scarce, low-motivation participants allocated fewer resources to Black than White recipients. By contrast, high-motivation participants allocated more to Black than White recipients, suggesting that the perception of scarcity may cue the motivation to counter the typical pattern of racial bias with overcompensation. In the abundance condition, participants did

not show bias in their allocations to Black and White recipients, in line with much previous theorizing.

Study 1 provided the first direct evidence for the hypothesis that perceived scarcity can induce racial discrimination in the allocation of resources—an effect that depended on the decision maker's internal motivation. A notable feature of this experimental was its realism: participants engaged in a realistic task in which they examined real artworks and portfolios, and they provided scholarship recommendations toward candidates believed to be real students. Moreover, their funding recommendations reflected a behavioral intention that represents an advance from prior research that had focused on self-reported attitudes and policy agreements. Nevertheless, given our broader research goals to examine scarcity effects on discriminatory behaviors, it was important to replicate this effect using a more direct assessment of behavior.

In addition, a single set of faces were used for all participants in Study 1. Although these faces were chosen because they were neutral and without any unusual features, it is possible that the particular face used to represent the Black candidate could be a factor in the pattern of observed results.

To address these two potential limitations, we conducted a replication in which the outcome measure involved a more direct behavioral allocation and the scholarship applicants were represented by a variety of different faces.

Study 2

Method

Participants. One-hundred eighty-nine undergraduate psychology students (mean age: 19.41, SD = 1.15; 146 female, 43 male) were recruited from the subject pool of the psychology department of a large private university and participated in return for partial course credit. Most

participants self-identified as White (82 White, 69 Asian, and 15 Latino, 21 mixed-race, 1 American Indian, and 1 Pacific Islander); none self-identified as Black.

Materials and procedure. The materials used in Study 2 were identical to those used in Study 1, such that participants judged four art portfolios—from one Black applicant and three White applicants—and then provided recommendations for how the $100,000 of fellowship funds (described as either scarce or abundant) should be allocated among the applicants. However, to rule out the possibility that previous effects were driven by specific Black and White faces, three different sets of unique Black and White faces were used in this study. Furthermore, to address concerns that responses on the allocation task reflected hypothetical intentions rather than consequential behaviors, participants' responses were placed into a digital letter addressed to the School of the Arts, and participants were asked to press a button to submit their recommendations. Participants were given the option to complete the study without submitting this recommendation, such that a decision was not forced. Participants provided their IMS/EMS responses (embedded in a larger demographic questionnaire) after the main task (see supplement for descriptives). Additionally, reaction time measures were collected (see exploratory analyses in the supplement).

Results

Effects of scarcity condition and IMS on allocation. To replicate the findings of Study 1, we first regressed the dollar amount allocated to the Black applicant onto condition, IMS, and their interaction. This analysis produced a marginal effect of IMS, $B = 1.33$, $SE = 0.78$, $\beta = .12$, $t = 1.72$, $p = .087$, 95% CI [-0.20, 2.87], such that low-IMS participants allocated less to the Black applicant than high-IMS participants. Importantly, this effect was again qualified by a significant Condition x IMS interaction, $B = -2.12$, $SE = 0.78$, $\beta = -.20$, $t = 2.73$, $p = .007$, 95% CI [-3.72, -

0.59] (Figure 1B; Table 2). Simple slope analyses indicated that in the scarcity condition, participants' allocation to the Black applicant varied as a function of their IMS score, $B = 3.46$, $SE = 1.10$, $\beta = 0.32$, $t = 3.08$, $p = .002$, 95% CI [1.25, 5.67, such that low-IMS participants gave less than high-IMS participants. In contrast, when fellowship funding was described as abundant, the amount allocated to the Black applicant was not associated with participants' IMS score, $B = -0.79$, $SE = 1.08$, $\beta = -.07$, $t = 0.72$, $p = .465$, 95% CI [-2.91, 1.34].[5]

Effects of scarcity condition and IMS on deviations from equity. We next examined whether participants' allocation to the Black applicant differed from $25,000, as in Study 1. Although no group differed significantly from $25,000, only the predicted allocation for low-IMS participants in the scarce condition was negative (i.e., lower than $25,000 to the Black applicant, ~$22,260), $B = -2.74$, $SE = 2.48$, $t = 1.10$, $p = .271$, 95% CI [-7.64, 2.16]. The predicted allocation for high-IMS in the scarce condition was marginally more than $25,000 to the Black applicant (~$29,179), $B = 4.17$, $SE = 2.46$, $t = 1.70$, $p = .091$, 95% CI [-0.68, 9.02]. Neither of the predicted allocations for the high- and low-IMS participants in the abundant condition differed significantly from $25,000 ($B$s < 2.87, ts < 1.17; ps > .241).

Discussion

[5] Because this sample had larger samples of White (n = 82) and Asian (n = 69) participants, we tested the moderating role of participant race. The Condition x IMS x Race interaction was not significant ($B = 2.17$, $SE = 1.94$, $\beta = .50$, $t = 1.11$, $p = .276$), suggesting the Condition x IMS pattern did not differ between White and Asian participants. However, because this analysis was unplanned and likely underpowered, the result should be considered tentative. Although we used multiple stimuli sets in the experiment, there were too few to conduct mixed-effect analyses (Judd, Westfall, & Kenny, 2012). However, we examined the potential moderating effect of stimulus set, and found that this factor was not a significant predictor of allocation ($B = 1.26$, $SE = 1.14$, $\beta = .09$, $t = 1.11$, $p = .268$), nor did it moderate any other effects (βs < 1.01, ts < 0.20, ps > .373.

The results of Study 2 replicated the primary finding of Study 1. Again, the manipulation of scarce resources influenced disparities in the allocation of scholarship funds, such that scarcity led low internal motivation participants to give comparatively less to Black recipients, and high internal motivation participants to give more, relative to White recipients. Moreover, by utilizing a richer set of faces and more direct behavioral allocation, we ruled out the possibility that this effect could be due to the specific faces of applicants or a hypothetical outcome measure.

Although the pattern of Study 2 effects closely replicated those of Study 1 (compare Figures 1 and 2), it is notable that the equity effects were somewhat diminished in this sample. Three possibilities explain this difference: First, Study 1 was conducted in the fall/spring semesters of the 2009-2010 academic year at the height of the economic collapse, whereas Study 2 was conducted in the spring of 2014, during a period of relative recovery from the economic crisis. Thus, it is possible that our manipulation (which referred to "the recent recession") was stronger in Study 1 than Study 2. Second, participants in Study 2 had higher IMS scores (M = 75.40, SD = 19.01) compared with Study 1 (M = 70.09, SD = 9.35, adjusted to a 100 point scale for comparison), $F(1,315) = 8.61$, $p = .004$, which could account for the general rise in allocation amounts to Black recipients. Finally, it is possible that the behavioral outcome in Study 2 (submitting fellowship recommendations directly to the art school) may have increased participants' feelings of accountability for their actions and thus participants were more reluctant to discriminate in this explicit manner (although our results remained unchanged when we included EMS as a covariate; see supplement). We address these issues, in part, by testing our hypothesis using alternative manipulations of resource availability and measures of allocations in Studies 4 and 5.

Together, the findings from Studies 1 and 2 suggest that scarcity induces some to discriminate against Black recipients while cuing others to favor Black recipients, presumably in response to existing inequalities. Although we might expect people with strong egalitarian motivations to make fair choices (i.e., equal allocation to Black and White recipients), previous research suggests that highly internally-motivated individuals may be triggered by certain situations to overcompensate members of historically-disadvantaged groups (Johns et al., 2008; Mack et al., 2002). Our findings suggest that resource scarcity may be one such situation—a possibility we examined more directly in Study 3.

Study 3

Studies 1 and 2 supported our central hypothesis that scarcity influences racial discrimination in the allocation of resources, depending on decision makers' explicit internal motivation to respond without prejudice. In Study 3, we sought to probe the sociocognitive processes underlying this effect. Specifically, the pattern of overcompensation on the part of high-IMS participants suggests the use of a deliberative strategy, perhaps to correct for societal disparities as in previous research (e.g., Mendes & Koslov, 2012). At the same time, the opportunity for deliberation may make it easier for low-motivation participants to express their explicit prejudices in the context resource allocations. By contrast, when decision makers must respond quickly, prior research shows that they typically make fair responses in line with an equity heuristic; indeed, this research shows that intentional shifts away from a fair response require additional cognitive resources (Roch et al., 2000; Schulz et al., 2014).

These past findings led us to propose that the pattern of scarcity-related biases observed in the first two studies may have reflected a strategic (i.e., deliberative) response, suggesting that scarcity encourages decision makers to respond in line with their personally-held intergroup

motivations. If the effects in Studies 1 and 2 reflected a deliberative process, we would only expect them to emerge from responses made more slowly. However, if these biases reflected reflexive responses, we would expect to see the effects of scarcity on allocation on decisions regardless of decision time (i.e., for both fast and slow decisions). To test these predictions in Study 3, we directly manipulated participants' decision time during their resource allocations.

Method

Participants. One-hundred eleven undergraduate psychology students (mean age: 19.57, SD = 1.24; 88 female, 23 male) participated in return for partial course credit. White participants made up the largest group of participants (52 White, 42 Asian, 8 mixed-race, 7 Latino, and 2 Native Hawaiian identified-participants).

Materials and procedure. The materials used in Study 3 were nearly identical to those used in Study 2. Again, participants completed the main task, then provided their IMS/EMS responses embedded in a demographic questionnaire after the main task (see supplement for descriptives). However, because our theoretical interests focused on the role of deliberation in the allocation of scarce resources, and given our limited subject pool, all participants completed the allocation task in a scarcity condition and were randomly assigned to do so within a fast or slow timeframe. In the fast condition, participants were instructed to make their decisions as quickly as possible. In the slow condition, participants were instructed to take as much time as they needed to make their decisions. In both conditions, participants saw a small clock timer at the bottom of their screen that ticked off seconds, either down from 30 seconds (fast condition) or up from 0 seconds (slow condition), as a reminder of their limited or unlimited decision time, respectively. Although our intention was to force participants in the fast condition to register

their decisions before the 30 second clock countdown finished, responses were still registered following completion of the countdown.

Results

Preliminary analysis of relationship between variables. On average, participants spent 61.38 seconds (*SD* = 39.37) making their four allocation decisions. Confirming our manipulation, a one-way ANOVA revealed that response latency differed significantly between conditions (fast: $M = 49.55$, $SD = 25.82$; slow: $M = 73.86$, $SD = 46.93$), $F(1,109) = 11.59$, $p < .001$. IMS scores did not differ as a function of speed condition, $F(1,109) = 0.17$, $p = .680$.

Effects of speed condition and IMS on allocation of scarce resources. As mentioned, there was no actual time limit in either condition, which created substantial variability in response latency within conditions (despite group level speed differences). In order to adjust for this variability and more precisely assess the effects of speed condition, we investigated the role of IMS on allocation separately for the fast and slow conditions, which allowed us to adjust for speed variability within conditions (to avoid confounding the manipulation and adjustment variable).[6]

Thus, we regressed the amount of money allocated to the Black applicant (relative to White applicants) onto IMS, adjusting for their log transformed response latencies (standardized), separately for each condition. Again, resources were presented to all participants as scarce in this study. As predicted, IMS was positively related to allocation amount in the slow condition, $B = 4.16$, $SE = 1.13$, $\beta = .46$, $t = 3.69$, $p = .001$, 95% CI [1.90, 6.42], but was

[6] We also examined the full model regressing allocation onto Speed x IMS without adjusting for response latency, and results were virtually identical though somewhat weaker, due to large within-condition variability in speed (see the supplement for alternative analyses). Adjustment for this variability in the full model was precluded by strong multicollinearity between speed condition and response latency. Thus, we chose to separate analyses by speed condition to appropriately account for the influence of response latency.

unrelated to allocation amount in the fast condition, $B = 0.10$, $SE = 1.82$, $\beta = .01$, $t = 0.06$, $p = .956$, 95% CI [-3.55, 3.75] (see Figure 2; see Table 3). Furthermore, we can infer that the slow and fast condition IMS coefficients differed significantly ($p < .05$), given their bootstrapped 95% CIs ([1.56, 5.82] and [-2.63, 2.57], respectively) did not overlap by more than 50% (Finch & Cumming, 2009).

Additional analyses indicated that, in the slow condition, low-IMS participants allocated significantly less than $25,000 to the Black applicant (M = $21,760), $B = -3.24$, $SE = 1.56$, $t = 2.08$, $p = .042$, 95% CI [-6.36, -.12]. By contrast, the allocation for high-IMS was significantly more than $25,000 to the Black applicant (M = $27,373), $B = 5.08$, $SE = 1.63$, $t = 3.12$, $p = .003$, 95% CI [1.82, 8.35]. In the fast condition, neither of the predicted allocations for the high- and low-IMS participants differed significantly from $25,000 ($B$s < 2.37, ts < 0.96; ps > .347, 95% CIs contained 0).

Discussion

Study 3 directly manipulated participants' response time to explore the possibility that differences between high- and low-motivation participants' allocations to Black vs. White recipients reflected a deliberative response. When participants were induced to make decisions slowly, low-IMS participants allocated fewer scarce resources to the Black applicant, whereas high-IMS participants allocated more scarce resources to the Black applicant. When participants were pressured to make decisions quickly, internal motivation did not influence the allocation of scarce resources. This finding reinforces the notion that participants' immediate response is to respond fairly, but that their deliberative decisions are guided by their motivations to either deprive or promote the outgroup. Importantly, these results suggest that the effects of scarcity on

racial biases in resource allocation reflects a deliberative, belief-based response that is guided by one's internal motivation to response without prejudice.

It is notable that in this study, as in Studies 1 and 2, the allocation of resources was "zero-sum." That is, greater allocations to White recipients always resulted in fewer resources distributed to Black recipients. Although this allocation structure revealed a racial bias, the nature of such zero-sum choice makes it difficult to determine whether this bias reflects a preference for White or against Black recipients. This distinction is important because it has implications for interventions (Gaertner, Dovidio, Anastasio, Bahman, & Rust, 1993). For example, if our effects are driven primarily by pro-ingroup biases, interventions that emphasize a common identity between members of different racial groups and place more racial outgroup members within the decision makers' ingroup may decrease the effect of scarcity on discrimination (e.g., The Common Ingroup Identity Model; Gaertner et. al., 1993; Gaertner & Dovidio, 2000). However, research suggests that such techniques often fail to reduce *out-group bias* (Vescio, Judd, & Kwan, 2004), and that other strategies may be needed to reduce scarcity-driven discrimination reflecting anti-outgroup bias. In Studies 4 and 5, we examined the effect of scarcity and IMS on non-zero-sum allocations in order to tease apart anti-Black from pro-White biases.

Study 4

Having found support for our primary hypothesis in Studies 1-3, we next sought to clarify whether the observed effects represented anti-Black or pro-White biases. To this end, Study 4 employed a *non*-zero-sum decision context, which allowed us to determine the joint influence of scarcity and IMS on independent allocations to Black and White recipients. Importantly, in this study, Black and White recipients did not share a pool of resources, and thus fewer resources for

the Black recipient did not correspond to more resources for the White recipients. Although discrimination sometimes reflects ingroup favoritism rather than outgroup derogation (Allport, 1954; Brewer, 1999; Bettencourt & Dorr, 1998; Brewer, Manzi, & Shaw, 1993), two lines of research suggest the effect of scarcity and internal motivation on discrimination is driven by anti-Black derogation rather than pro-White favoritism.

First, anti-outgroup (vs. pro-ingroup) biases are more prevalent when resources are scarce. For example, violence against immigrant minorities (which provides no tangible resource gain for ingroup members) increases when the number of immigrants in a population is high and the economy is in decline (Quillian, 1995). Furthermore, resource scarcity and exposure to social competition increases Social Dominance Orientation (SDO; Guimond, Dambrun, Michinov, & Duarte, 2003; Sibley, Wilson, & Duckitt, 2007) and high SDO has been associated more directly with anti-outgroup than pro-ingroup attitudes (Stangor & Leary, 2006). Indeed, the experience of threat from an outgroup (e.g., due to competition over scarce resources) has been identified as a key determinant of when ingroup favoritism transforms into outgroup derogation (Hewstone et al., 2002; Chang, Krosch & Cikara, 2016).

A second line of research suggests that anti-outgroup bias (vs. pro-ingroup bias) is prevalent in racial contexts. Although subtler forms of racial discrimination seem to be driven by pro-White rather than anti-Black biases (e.g., aversive racism), overt forms of racial discrimination, such as less money allocated to Black than White recipients, are more likely driven by anti-Black biases (Dovidio & Gaertner, 2004; Gaertner & Dovidio, 1986). Together, these findings suggest that when resources are scarce and groups are divided along racial lines, discrimination is more likely to be driven by anti-Black (rather than pro-White) biases. Study 4 tested this hypothesis directly.

A secondary goal of Study 4 was to examine whether resource scarcity has the same effect on race-biased allocation decisions when it is more subtly conveyed. Although the communication of economic scarcity is often explicit (e.g., 2009 headline declaring "Economy Shrinks at Fastest Rate Since 1950s"; Uchitelle & Andrews, 2009), evidence for economic scarcity is also often conveyed and experienced more subtly. For example, simply shifting the scale on which people report the amount of money in their bank account (from hundreds to thousands of dollars) alters the experience of scarcity (Nelson & Morrison, 2005). Whereas Studies 1-3 examined the effect of a very explicit manipulation of resource scarcity using a rather elaborate cover story, Study 4 employed a subtler framing manipulation of scarcity with a simpler cover story.

Finally, to rule out the possibility that our scarcity condition reflects status quo decision making, and that our effects are driven by movement in the abundance condition, in Studies 4 and 5, we compared a scarcity condition to a true control condition rather than an abundant condition.

Method

Participants. Ninety-six online respondents (mean age: 37.07, SD = 13.26; 49 female, 47 male) participated in return for $0.20 via Amazon Mechanical Turk. Most participants self-identified as White (86 White, 3 Asian, 3 Latino, 2 American Indian, and 2 mixed-race) and none self-identified as Black.

Procedure and materials. Participants learned they would be playing a money allocation game in which they would be randomly assigned to either allocate funds ("allocator") or receive funds ("recipient"). To ensure that participants believed the game was authentic, with real financial consequences, participants were further told that if they were assigned the role of

allocator, they would distribute money to past players who had been assigned the role of recipient, and if assigned the role of recipient, they would enter our participant database and be eligible to receive funds distributed by future players. In practice, all participants were assigned the role of allocator. Participants were then randomly assigned to a scarce or control condition.

Scarcity manipulation. Participants in the scarcity condition were informed that they could have up to $100 to distribute to each recipient, and that the computer would randomly assign them an amount to distribute. Participants then saw an animated pie chart that depicted changing portions of money and ultimately, and ostensibly randomly, assigned them a portion of up to $10 to distribute. Participants in the control condition, by contrast, were informed that the computer would randomly assign them a proportion of up to $10 to distribute, and then saw the animated pie chart assign them up to $10 to distribute (see Supplemental Figure S1). Importantly, participants in both conditions were assigned $10 (i.e., the actual amount to be allocated never varied between conditions; only the amount participants *could* have been assigned varied). We previously established the validity of this manipulation, finding that $10 of a possible $100 was perceived as relatively scarce compared to $10 out of a possible $10, which was perceived as neither scarce nor abundant (see Krosch & Amodio, 2014).

Resource allocation task. Following the scarcity manipulation, participants performed a resource allocation task in which they could allocate as much as $10 to *each* of five recipients, in a series of independent choices. Only the recipients' race changed systematically from one trial to the next. Participants were told that people make judgments everyday based on very little information, and that they should base their decisions on subtle perceptions of a recipients' deservingness. This important departure from Studies 1-3 ensured that decisions would be based on race, and that allocation to one recipient would not affect allocation to any other recipients,

such that the distribution of resources was "non-zero-sum." With this design, pro-White bias and anti-Black bias could be assessed independently. Importantly, participants were told they could not keep any money for themselves to remove the potential influence of self-interest.

Recipients were represented by one Black and four White faces. Faces were selected from a larger stimulus set based on their racial typicality and attractiveness. The Black and White faces were rated as being typical of their race, and all faces were of similar attractiveness (Williams & Eberhardt, 2008), preventing these factors from affecting our results.

Participants viewed recipients sequentially and were randomly assigned to see the Black face as either the first or second recipient. Participants responded to the question of "How much money would you like to give this person?" using a sliding scale item ranging from $0 to $10. The dependent variables of interest were the amounts allocated to the Black recipient and the average amount allocated to the White recipients (see supplement for allocation distributions).

Upon completing the experimental task, participants began a funneled questionnaire to probe for suspicion and awareness of the hypotheses. They then filled out a demographic survey that included the IMS and EMS and received a full debriefing (see supplement for descriptives).

Results

As an initial assessment of racial discrimination in our task and to replicate the previous studies, we first computed a difference score in which subjects' Black allocation was subtracted from their White allocation (i.e., greater values represented more pro-White/anti-Black allocations). This score was regressed onto condition, IMS, and their interaction. This analysis revealed only a significant Condition x IMS interaction, $B = 0.30$, $SE = .14$, $\beta = .23$, $t = 2.17$, $p = .032$, 95% CI [-.57, -.03]. Simple slope analyses indicated that in the scarce condition, difference scores were negatively associated with IMS score, $B = -0.39$, $SE = .17$, $\beta = -.30$, $t =$

2.37, p = .020, 95% CI [.06, .72], such that low-IMS participants were more pro-White/anti-Black than high-IMS participants. In contrast, in the abundant condition, IMS was not significantly related to the racial differences in allocation, B = -0.20, SE = .22, β = -.16, t = 0.93, p = .357, 95% CI [-.63, .23]. Furthermore, only low-IMS participants in the scarce condition had a difference score significantly less than zero, B = 0.79, SE = .25, t = 3.10, p = .003, 95% CI [-1.29, -.28], suggesting that low-IMS participants were the only ones to give less to the Black than White recipients. No other group allocated significantly less to the Black than White recipients, Bs < 2.18, ts < 0.83; ps > .407, 95% CIs contained 0.

Next, we tested our primary hypothesis that the racial disparity in resource allocation caused by scarcity reflects outgroup discrimination against Black recipients rather than ingroup favoritism toward White recipients. Specifically, we examined the interactive effect of scarcity and IMS on allocations to Black and White recipients in separate regressions.

First, to test for outgroup derogation, the dollar amount allocated to the Black recipient was regressed onto condition, IMS, and their interaction[7]. This analysis yielded no main effects of condition, or IMS (ps > .594). However, the expected Condition x IMS interaction was significant, B = - 1.04, SE = .38, β = -.28, t = 2.74, p = .007, 95% CI [-1.78, -.28]. Simple slope analyses revealed that in the scarce condition, allocations to the Black recipient were positively associated with IMS score, B = 1.24, SE = .46, β = .34, t = 2.70, p = .008, 95% CI [.33, 2.13, such that low-IMS participants gave less than high-IMS participants. In contrast, in the control condition, IMS was not significantly related to the amount allocated to the Black recipient, B = -0.83, SE = .60, β = -.23, t = 1.38, p = .169, 95% CI [-2.03, 0.36] (see Figure 3A; Table 4). This pattern replicated the results of Studies 1-3.

[7] None of our effects changed when face presentation order was entered as a covariate

Next, to test for ingroup favoritism, the average dollar amount allocated to White recipients was regressed onto the same predictors. This analysis yielded only an unpredicted marginal interaction of Condition x IMS, B = -0.74, SE = .37, β = -.21, t = 2.01, p =.052, 95% CI [-1.46, -.01]. Importantly, IMS was not significantly related to the average amount allocated to White recipients in either condition, Bs < 0.60, ts < 1.40; ps > .165, 95% CIs contained 0. Contrary to an ingroup favoritism account, the White allocation interaction pattern weakly mirrored Black allocation, such that higher IMS scores were (non-significantly) related to greater *White* allocations as well as Black allocations in the scarcity condition. However, because this pattern was not predicted, and because the simple effects were not significant, we did not view this interaction as interpretable.

Finally, as an alternative approach to these separate regression analyses, we also conducted a single covariate analysis in which we regressed the dollar amount allocated to the Black recipient onto condition, IMS, and their interaction, covarying average allocation to the White recipients. Results of this analysis produced the same pattern of results as above: the Condition x IMS interaction was significant, B = -0.32, SE = .14, β = -.09, t = 2.32, p = .022, 95% CI [-.60, -.05] and simple slope analyses revealed that participants' allocation to the Black recipient was positively associated with IMS in the scarce condition, B = 0.43, SE = .17, β = .12, t = 2.51, p = .014, 95% CI [.09, .76], but not in the control condition, B = -0.23, SE = .22, β = -.06, t = 1.03, p = .307, 95% CI contains 0. The finding that the interaction of scarcity condition and IMS predicted allocation to Black recipients above and beyond allocation to White recipients provides additional evidence that the effect is driven by racial bias toward the Black recipient.

Discussion

Study 4 was designed to determine whether the effects of scarcity and internal motivation are driven by anti-Black (rather than pro-White) biases—a pattern that differs from the more typical demonstration of ingroup favoritism in minimal group situations. Indeed, we found that when resources were scarce, participants with low internal motivation discriminated against Black outgroup members, even when it no longer aided White ingroup members. By contrast, scarcity had little effect on allocations to White ingroup recipients.

Interestingly, among participants with stronger internal motivation, we did not observe the over-correction pattern of allocating above the point of equity to Black recipients as seen in Studies 1-3. This result strengthens the notion that participants with strong egalitarian motives allocate more to Black recipients in a zero-sum context to adjust for traditional imbalances between White and Black recipient. When allocation to White and Black applications is uncoupled, as in the non-zero-sum decisions of Study 4, highly egalitarian participants distributed equitably between groups.

A secondary goal of Study 4 was to test the effect of a subtler economic scarcity manipulation. Whereas Studies 1-3 employed a very explicit manipulation of economic scarcity, in combination with a rather elaborate cover story, Study 4 used manipulation in which a $10 allocation fund was presented in the context of either $10 or $100 maximum allocation, and scarcity was never mentioned. The replication of the significant Scarcity x IMS interaction effect on allocation suggests that the effect of scarcity on discriminatory allocation is robust and persists even when the scarcity is conveyed more subtly.

Finally, Study 4 allowed us to rule out the possible alternative interpretations that our earlier effects were driven by movement in an abundance condition (i.e., that scarcity represents status quo decision making). Finding significant effects of IMS in the scarcity condition and null

effects in the control condition that mirrored the abundance condition of Studies 1-3 suggests that rather than resource scarcity reflecting a status quo and abundance ameliorating these effect, abundance more closely resembles status quo decision making.

Although Study 4 answered a number of questions, it still left open a number of alternative interpretations of our findings: First, it is possible that our findings are limited to the one Black and four White faces we chose for this study, despite the deliberate choice of these faces based on their equivalence on racial typicality and attractiveness measures. Second, we used a sample of one Black and four White recipients in order to more closely reflect general population demographics. However, this leaves open the possibility that our findings are restricted to racially unequal recipient pools. Finally, we used an online sample in this study rather than a university undergraduate sample as in Studies 1-3. Thus, it is possible our results reflect features of a sample that, while more diverse in many respects, may nonetheless be unique to the Mechanical Turk community.

To address these potential limitations, we next conducted a replication in which we increased the number of allocation decisions to twenty, equalized the number of Black and White recipients (10 each), and used a university undergraduate sample (i.e., from the same subject pool used in Studies 1-3).

Study 5

Method

Participants. Two-hundred and seventy-nine university undergraduate students (mean age: 19.65, SD = 1.24; 179 female, 100 male) participated in return for course credit. Most participants self-identified as White (101 White, 115 Asian, 25 Latino, 21 non-Black mixed-race, 16 non-Black “other”, and 1 native Hawaiian). The 13 Black identified and 3 mixed-race Black

identified participants were excluded from analyses to maintain consistency with Studies 1-4, though our results do not change if they are included.

Materials and procedure. The materials and procedure were identical to Study 4, except that this study was run online with a university sample, and twenty allocations were made to ten Black and ten White recipients.[8] Again, participants completed the main task, then provided their IMS/EMS responses embedded in the demographic questionnaire after the main task (see supplement for descriptives).

Results

As a preliminary analysis, we tested the effects of scarcity and IMS on the Black/White allocation difference score, in order to directly replicate Study 1-4 findings. This analysis revealed only a significant Condition x IMS interaction, $B = 0.10$, $SE = 0.04$, $\beta = 0.17$, $t = 2.89$, $p = .004$, 95% CI [-.17, -.03]. Simple slope analyses indicated that in the scarce condition, the difference score was negatively associated with IMS score, $B =- 0.14$, $SE = 0.06$, $\beta = -.23$, $t = -2.27$, $p = .023$, 95% CI [-.22, -.01, such that low-IMS participants gave relatively less to Black recipients than high-IMS participants. By contrast, in the control condition, there was a marginal trend in the opposite direction, $B = 0.09$, $SE = 0.05$, $\beta = .16$, $t = 2.01$, $p = .060$, 95% CI [-.19, .002], such that low-IMS participants showed a slight preference for Black over White recipients. These results replicated the general pattern observed in Studies 1-4 (see supplement for allocation distributions).

[8] Results for mixed-effects models that treat the face stimuli as a random effect are nearly identical to the main results presented and can be found in the supplement.

Next, to test specifically for derogation of Black recipients, the dollar amount allocated to the Black recipient was regressed onto condition, IMS, and their interaction. Replicating Study 4, this analysis yielded only a main effect of IMS, $B = 0.49$, $SE = 0.18$, $\beta = 0.17$, $t = 2.79$, $p = .006$, 95% CI [.14, .84], such that IMS scores were positively associated with allocation to Black recipients. Importantly, these effects were qualified by the predicted Condition x IMS interaction, $B = -0.39$, $SE = .18$, $\beta = -.13$, $t = -2.21$, $p = .028$, 95% CI [-.74, -.04]. Simple slope analyses revealed that in the scarce condition, allocations to the Black recipient were positively associated with IMS score, $B = 0.88$, $SE = .26$, $\beta = .30$, $t = 3.35$, $p = .001$, 95% CI [.36, 1.40, such that low-IMS participants gave less than high-IMS participants. In contrast, in the control condition, IMS was not significantly related to the amount allocated to the Black recipient, $B = 0.10$, $SE = .24$, $\beta = .03$, $t = 0.43$, $p = .665$, 95% CI contains 0 (see Figure 3B; Table 5).

Next, to test for favoritism toward White participants, the average dollar amount allocated to White recipients was regressed onto the same predictors. Only the main effect of IMS was significant, $B = 0.48$, $SE = .18$, $\beta = 0.16$, $t = 2.73$, $p = .007$, 95% CI [.14, .83] indicating that participants with higher IMS scores allocated more to White recipients, other $Bs < 0.14$, $\beta s < -.10$, $ts < 1.61$, ps $> .108$, 95% CIs contained 0.

Finally, when White recipients' average allocation was included as a covariate, the Condition x IMS effect on Black allocation remained significant, $B = -0.11$, $SE = .04$ $\beta = -.04$, $t = 3.09$, $p = .002$, 95% CI [-.18, -.04]: again, participants' allocation to the Black recipient in the scarcity condition was positively associated with their IMS score, $B = 0.13$, $SE = .05$, $\beta = .04$, $t = 2.41$, $p = .017$, 95% CI [.02, .24], but that this effect was only marginal in the control condition, $B = -0.09$, $SE = 0.05$, $\beta = -0.03$, $t = 1.92$, $p = .056$, 95% CI [-.18, .002]. The finding that perceived resource scarcity and IMS predict allocation to Black recipients above and beyond

allocation to White recipients further supports the interpretation that the effect is driven by racial bias against the Black recipients.

Discussion

Study 5 was designed to replicate the findings of Study 4 while addressing potential limitations. To this end, the number of allocation decisions were increased to twenty, the number of Black and White recipients was equalized, and a university undergraduate sample was used. As expected, we replicated the pattern of Studies 1-4 with these changes, such that when resources were scarce, participants with weak internal motivation discriminated against Black outgroup members.

General Discussion

Economic conditions can have a profound impact on social relations, especially between social groups that differ in their relative power and status, as illustrated by the widening of racial disparities between White and Black Americans during the 2008 economic recession (Taylor, et al., 2011). The present research was designed to directly test the effect of perceived economic scarcity on discrimination against racial minorities. Specifically, we hypothesized that racial discrimination in the allocation of financial resources would increase in the context of perceived economic scarcity, particularly for decision makers with low internal motivation to respond without prejudice. This research yielded four major findings:

First, we found support for our main hypothesis across five studies. Specifically, we found that when participants perceived economic resources to be scarce, as opposed to abundant, participants with weak egalitarian motives gave less money to Black than White recipients. By contrast, participants with strong egalitarian motives gave more money to Black than White

recipients under scarcity—except when resources were non-zero sum, in Studies 4 and 5, in which case they allocated equally to Black and White recipients.

Second, perceived scarcity influenced racial discrimination even when resource availability was expressed subtly. In Studies 4 and 5, resource levels were communicated using a framing manipulation that did not mention terms associated with scarcity or abundance. This subtle manipulation produced a similar pattern of race-biased resource allocation as the explicit manipulation used in Studies 1-3.

Third, Study 4 and 5 revealed that scarcity influences race-biased resource allocation even in a non-zero-sum context. That is, the effect of scarcity on race-biased resource allocation emerged even though fewer resources for Black recipients did *not* mean more resources for White recipients. This finding suggests that the effect of scarcity reflects anti-Black rather than pro-White bias. Interestingly, scarcity led participants with low internal motivation to allocate less to Black recipients in this non-zero-sum context, but it did not lead highly internally motivated participants to allocate more to Black recipients as it did in the zero-sum contexts of Studies 1-3. It is possible that the competitive context of a zero-sum decision in Studies 1-3 may have triggered egalitarian concerns among these participants, leading them to "over-compensate" in their allocation to the Black recipient for perceived societal inequities. In the non-zero-sum context, in which there was no direct competition for resources, this concern may not have been activated.

Finally, our findings suggest that perceptions of economic scarcity increase discrimination in resource allocation through relatively deliberate and potentially strategic processes. In Study 3, we found that the effect of scarcity on race-biased resource allocation was enhanced when decision makers made their allocation decisions slowly, suggesting this effect on

allocations requires deliberation. When allocation decisions were made relatively quickly, we did not observe discrimination as a function of scarcity, egalitarian motivation, or their interaction. This finding helps to explain why, in Studies 1-3, highly motivated participants allocated more to Black recipients under scarcity, such that it appears to reflect an intentional effort to correct for potential bias.

Scarcity Effects on Racially-Biased Behavior

The present research demonstrated that economic scarcity can affect behavioral forms of discrimination toward Black minority group members. By connecting the effects of scarcity to discriminatory behavior, these findings provide an important advance beyond prior work, which focused on scarcity effects on intergroup attitudes and intentions (e.g., Esses et al., 1998; Stephan et al., 1999; Stephan et al., 2002; Stephan et al., 2005; Butz & Yogeeswaran, 2011; Quillan, 1995; Riek et al., 2006). These results also provide a more direct link to real-world instances of discrimination, such as the expansion of racial disparities that have been observed during times of economic crisis. Although greater racial disparities during economic crisis are likely driven in part by discriminatory institutional responses to true features of the economy (Applied Research Center, 2009), our research suggests the mere perception of resource scarcity is sufficient to increase (or decrease) discrimination, depending on the motives of the decision maker.

Our findings challenge the notion that intergroup biases arising from resource scarcity necessarily reflect the zero-sum nature of resource scarce situations. According to Realistic Group Conflict Theory (RGCT; LeVine & Campbell, 1972; Sherif, 1966; Sherif & Sherif, 1953), intergroup bias arises in the presence of conflicting goals (i.e., competition). Indeed, previous empirical research suggests that anti-outgroup allocation biases increase when intergroup

competition is perceived (Sidanius, Haley, Molina & Pratto, 2007). However, we found greater anti-Black bias under perceived resource scarcity in a non-zero-sum, and thus a non-competitive, context. An interesting explanation might be that scarcity induces zero-sum thinking, even if a zero-sum nature is not reflected in the choice structure of the experiment. However, the finding that egalitarian participants, when under scarcity, exhibited overcompensation allocations to Black recipients in zero-sum contexts (Studies 1-3) but not in the non-zero-sum context (Studies 4-5) appears to rule out the possibility that scarcity alone could trigger zero-sum thinking for all decision makers, regardless of their egalitarian motivations.

Group Composition

In these studies, we chose to focus on racial discrimination because of the real world observation that racial disparities grow during economic downturns, given our interest in psychological mechanisms that explain real world social justice issues. However, it is worth considering whether we might find similar results toward minimal groups and other groups not historically discriminated against. Although previous research suggests that scarcity elicits more negative attitudes toward a variety of outgroup members (e.g., members of other racial groups, citizens of other countries, immigrants), the relationship between scarcity and negative attitudes against outgroup members is strongest when the outgroup is lower in status (Riek et al., 2006). Extended to behavioral discrimination, this suggests the relatively low status of Black Americans coupled with historically accepted discrimination against them would lead to the strongest effects of scarcity, though discrimination under scarce conditions is likely not limited to members of this particular group.

In our focus on the implications of scarcity for discrimination against Black Americans, we made an effort to include multiple different recipient individuals (e.g., using a variety of faces

to represent recipients) in order to enhance the generalizability of our findings. However, because we focused on allocations to male recipients, given clearer patterns of racial bias toward males shown in prior research (Sidanius & Veniegas, 2000), we cannot be certain the same pattern would emerge if resource recipients were female. Additional research will be needed to determine whether these effects differ on the basis of recipient gender. Finally, for the historical reasons outlined in the previous paragraph, we chose to focus on non-Black perceivers. Although White and other non-Black participants did not differ in their behavior toward Black recipients in Study 2, future research should examine whether different patterns emerge for White-identified, non-White/non-Black identified, and Black-identified participants. Given the finding that high-internal motivation participants allocated more to Black recipients under scarcity in Studies 1-3, it is possible that Black American allocators and members of other groups associated with lower socioeconomic status in the United States would also favor Black recipients in response to scarcity.

Sociocognitive Mechanisms

An understanding of the social cognitive mechanisms underlying the effects of scarcity and egalitarian motivation on discrimination is critical for informing when such effects are most likely to occur and how they may be mitigated. We found that the effects of scarcity and motivation were strongest when decisions were made relatively slowly. This pattern suggests the influence of deliberation, which may permit a strategic consideration of the context, one's motivations, and the identity of the recipient. As such, scarcity effects on resource allocations, as examined here, should be most pronounced in situations that allow for, or require, deliberative decision-making. For example, more deliberate decisions about a job candidate or the allocation of resources in a budget may be especially vulnerable to biases caused by perceptions of scarcity,

along with social motivations associated with prejudice or egalitarianism. By contrast, rapid judgments and behaviors in interpersonal situations may be much less vulnerable to the influence of scarcity and motivation. Indeed, there is evidence that when allocating scarce resources, people tend to anchor on equity by default (i.e., use heuristic of fairness) and then, with the opportunity, adjust their allocation decisions to be more self-serving given sufficient cognitive capacity (Roch et al., 2000; Schulz et al., 2014). Our results showed that this effect extends beyond self-serving interests to *group*-serving interests. The finding that our effects reflect deliberate motivation has important implications for interventions, as it suggests that economic discrimination might be modified by self-regulation and appeals to respond fairly, even under conditions of scarcity and economic competition.

However, it is also possible that during periods of prolonged scarcity, decision makers develop a more heuristic anti-Black (or anti-outgroup, anti-poor, anti-low status group) response, especially for decisions that do not include a very obviously fair choice. A better understanding of these processes will require future research.

Although Study 3 suggests that scarcity-driven bias in allocation involves deliberation, it remains unclear what, exactly, participants might have deliberated about when responding more slowly. Perhaps the most plausible hypothesis is that when resources are scarce, participants spent more time to consider the needs of the recipients in order to justify their adjustment from fairness. Indeed, when resources are scarce (vs. abundant), decision makers are more likely to engage in the use of need principles over equity principles (Deutsch, 1975). Furthermore, they will perform an attributional analysis as to why claimants need the resource, and recipients who are considered internally responsible for a controllable need are usually the first to be denied resources (Skitka & Tetlock, 1992). In the context of race, participants with weak egalitarian

motives may consider Black recipients more internally responsible for their need, which in turn may justify a smaller allocation. Indeed, greater prejudice is associated with internal attributions of Black failure (Pettigrew, 1979; Greenberg & Rosenfield, 1979). This suggests that people with low internal motivation may be more likely to attribute behaviors of Black recipients to internal, dispositional rather than situational explanations. Conversely, participants with strong internal motivation may consider Black recipients to be *less* internally responsible, which may justify a greater allocation. If this were the case, we would expect the effects of scarcity and egalitarian motivation to be strongest when a perceiver deliberatively considers the needs of a minority-group recipient and the reasons behind those needs.

A complementary possibility is that scarcity triggers different comparisons regarding historical progress toward equality (e.g., between where we are now and where we need to go or where we have already been; Eibach & Ehrlinger, 2006), depending on decisions makers' egalitarian motivation. For example, when reminded of resource scarcity, decision makers with high egalitarian motivation might deliberate about historical inequality perpetrated against minorities in the US, conclude that we have further to go to achieve equality, and justify giving minorities more. Decision makers with low egalitarian motivation might deliberate about how far the US has already come in terms of where it used to be on issues of inequality, conclude that we've gone too far with reparatory policies (e.g., Affirmative Action), and justify giving minorities less to avoid perpetuating "reverse racism" (e.g., Norton & Sommers, 2011). Along these lines, it is possible that participants in Studies 1-3 differed in the extent to which they believe minorities already receive financial aid; more egalitarian (i.e., high internally motivated) participants may have believed more aid is needed, whereas non-egalitarian participants may

have believed too much aid is already given. Future research on these possibilities will shed further light on points of intervention.

Conclusion

Economic crises have especially negative consequences for racial minorities. Rather than solely reflecting structural and institutional factors that oppress minorities, our research suggests this relationship is also be driven by psychological factors related to the perception of resource scarcity. We demonstrated that scarcity exacerbated racial inequality in the allocation of resources, especially among decision makers who lack internal motivation to respond without prejudice, and that this effect reflects a deliberate response. By illuminating the psychological factors that influence behavioral discrimination, these findings can help to inform interventions aimed at achieving distributive justice in the allocation of resources between racial groups.

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Table 1

Study 1 Descriptives

Scarcity Condition (N = 59)

	IMS	EMS	Black allocation	Black Ratings	White Ratings
Mean (SD)	6.47(.79)	5.36(1.07)	25.14(11.69)	7.18(2.26)	7.96(2.13)
Correlations					
IMS		.04	.43***	.11	-.10
EMS			-.09	.18	.14
Black Allocation				.44***	-.06
Black Ratings					.71***

Abundance Condition (N = 70)

	IMS	EMS	Black allocation	Black Ratings	White Ratings
Mean (SD)	6.17(.86)	4.92(1.33)	23.69(9.93)	6.68(2.25)	7.21(2.51)
Correlations					
IMS		.18	-.03	.12	.12
EMS			-.09	.02	.11
Black Allocation				.43***	.01
Black Ratings					.71***

Note. † $p < .10$, *$p < .05$, ** $p < .01$, *** $p < .001$
IMS, EMS, and Black and White ratings were made on a 0 to 15cm line in this study.

Table 2

Study 2 Descriptives

Scarcity Condition (N = 91)

	IMS	EMS	Black allocation	Black Ratings	White Ratings
Mean (SD)	77.10 (18.89)	42.46 (1.07)	28.33 (10.74)	63.82 (16.86)	60.74 (15.08)
Correlations					
IMS		-.02	.33**	.23*	-.04
EMS			-.06	.06	.07
Black Allocation				.42***	-.11
Black Ratings					.65***

Abundance Condition (N = 98)

	IMS	EMS	Black allocation	Black Ratings	White Ratings
Mean (SD)	73.86 (18.89)	42.40 (22.40)	29.46 (10.93)	64.82 (18.79)	60.42 (18.94)
Correlations					
IMS		-.22*	-.08	.04	.05
EMS			.06	-.04	-.13
Black Allocation				.19†	-.18†
Black Ratings					.78***

Note. † $p < .10$, *$p < .05$, ** $p < .01$, *** $p < .001$
IMS, EMS, and Black and White ratings were made on a scale from 0 to 100 in this study. IMS nor EMS scores differed between conditions, $F(1,188)$s < 1.38, ps > .242.

Table 3

Study 3 Descriptives

Slow Condition (N = 54)

	IMS	EMS	Black allocation	Black Ratings	White Ratings	Log Timing
Mean (SD)	74.65 (17.54)	38.09 (21.14)	25.77 (9.20)	62.11 (20.09)	58.34 (16.11)	
Correlations						
IMS		.07	.42***	.22	.25†	.14
EMS			.05	.18	.27†	-.12
Black Allocation				.18	-.03	-.14
Black Ratings					.71***	-.02
White Ratings						.13

Fast Condition (N = 57)

	IMS	EMS	Black allocation	Black Ratings	White Ratings	Log Timing
Mean (SD)	76.01 (17.19)	38.82 (21.14)	27.28 (13.22)	68.37 (17.62)	65.62 (14.55)	
Correlations						
IMS		-.25†	-.01	.11	-.01	.16
EMS			-.04	-.11	-.01	-.23†
Black Allocation				.41***	-.02	-.11
Black Ratings					.68***	-.12
White Ratings						-.12

Note. † $p < .10$, *p <i8 .05, ** $p < .01$, *** $p < .001$
IMS, EMS, and Black and White ratings were made on a scale from 0 to 100 in this study.
IMS nor EMS scores differed between conditions, $F(1,110)$s < 0.17, ps > .680.

Table 4

Study 4 Descriptives

Scarcity Condition (N = 57)

	IMS	EMS	Black allocation	White allocation
Mean (SD)	77.48 (18.98)	32.83 (27.17)	5.80 (3.59)	6.13 (3.31)
Correlations				
IMS		-.20	.35**	.26†
EMS			-.25†	-.24†
Black Allocation				.93***

Control Condition (N = 39)

	IMS	EMS	Black allocation	White allocation
Mean (SD)	70.68 (16.63)	36.76 (24.97)	5.82 (3.60)	5.76 (3.54)
Correlations				
IMS		.04	-.22	-.17
EMS			-.48**	-.50**
Black Allocation				.95***

Note. † $p < .10$, *$p < .05$, ** $p < .01$, *** $p < .001$
IMS and EMS ratings were made on a scale from 0 to 100 in this study; Black and White allocation decisions were made between $0 and $10. EMS scores did not differ between conditions, $F(1,95) = 0.52$, $p = .474$. IMS scores were marginally higher in the scarcity condition than control condition, $F(1,95) = 3.52$, $p = .064$. This suggests that scarce conditions might lead to greater internal motivation to respond without prejudice. However, we tested for this effect in a higher-powered replication (Study 5), and found no evidence (see below).

Table 5

Study 5 Descriptives

Scarcity Condition (N = 138)

	IMS	EMS	Black allocation	White allocation
Mean (SD)	56.06 (10.10)	42.96 (17.38)	6.20 (2.92)	5.93 (2.92)
Correlations				
IMS		.60***	.28***	.28***
EMS			.09	.09
Black Allocation				.94**

Control Condition (N = 144)

	IMS	EMS	Black allocation	White allocation
Mean (SD)	56.69 (10.89)	43.53 (16.44)	6.43 (3.02)	6.28 (3.03)
Correlations				
IMS		.52***	.04	.07
EMS			.04	.06
Black Allocation				.98**

Note. † $p < .10$, *$p < .05$, ** $p < .01$, *** $p < .001$
IMS and EMS ratings were made on a scale from 0 to 100 in this study; Black and White allocation decisions were made between $0 and $10. EMS scores did not differ between conditions, $F(1,294) = 0.08$, $p = .782$, nor did IMS scores, $F(1,294) = 0.09$, $p = .759$.

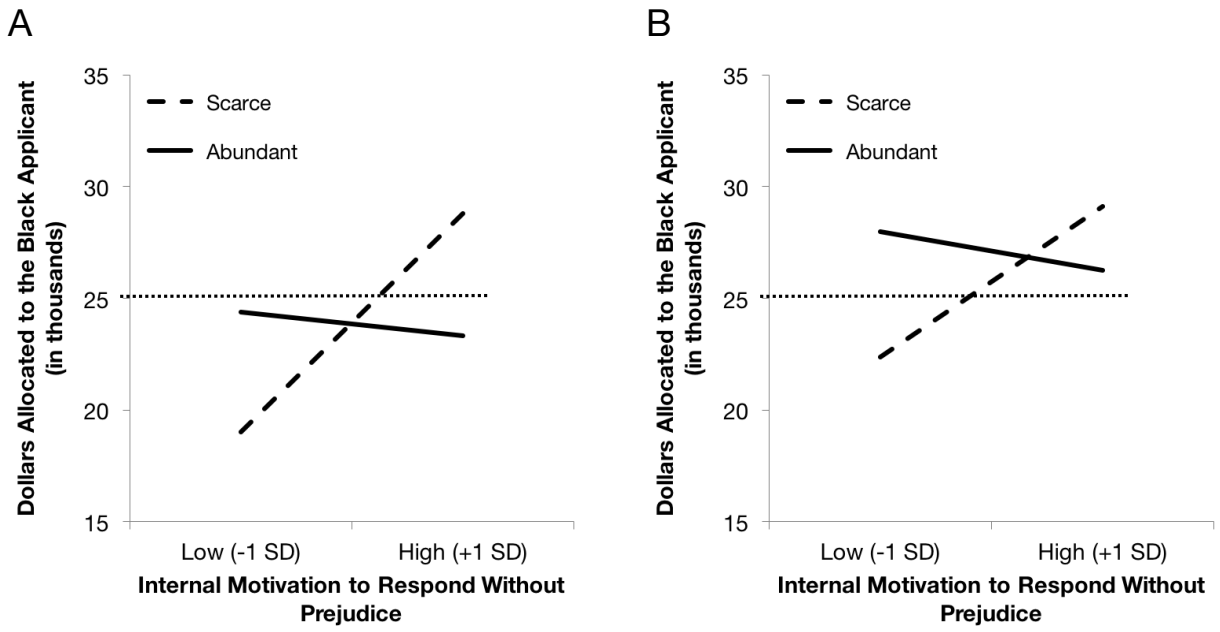


Figure 1. Amount of money allocated to the Black applicant (in thousands of dollars) as a function of condition (scarce or abundant) and internal motivation in Study 1 (A) and Study 2 (B). Dotted line reflects the equitable division of $25,000 ($100,000 divided evenly by four recipients of equal merit).

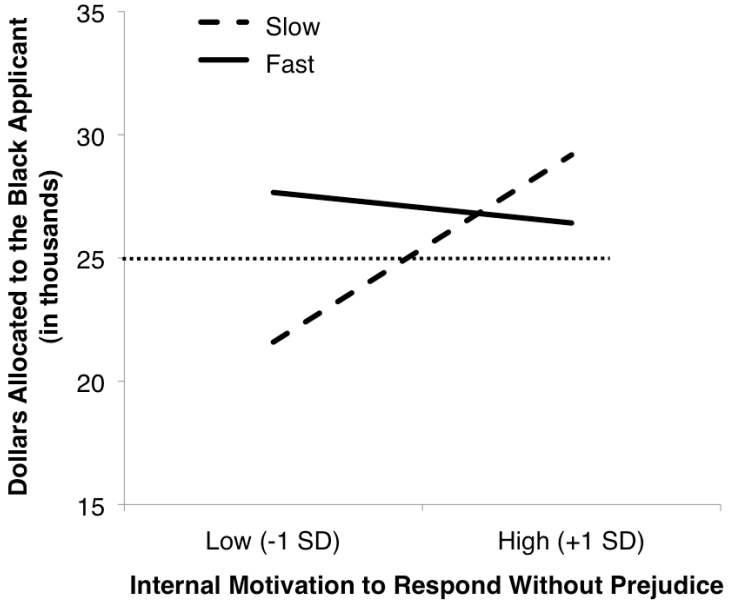


Figure 2. Amount of scarce money allocated to the Black applicant (in thousands of dollars) as a function of condition (slow or fast) and internal motivation, in Study 3.

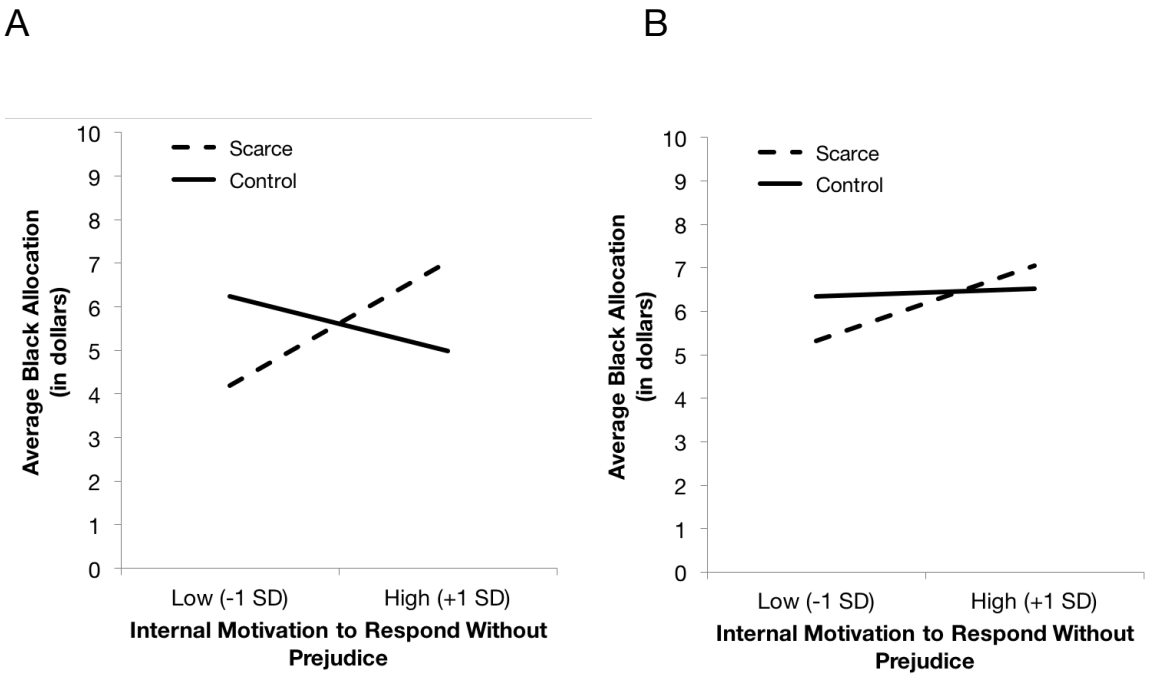


Figure 3. Amount of money allocated to the Black recipient (s) as a function of condition (scarce or control) and internal motivation in Study 4 (A) and Study 5 (B).

Supplemental Figures

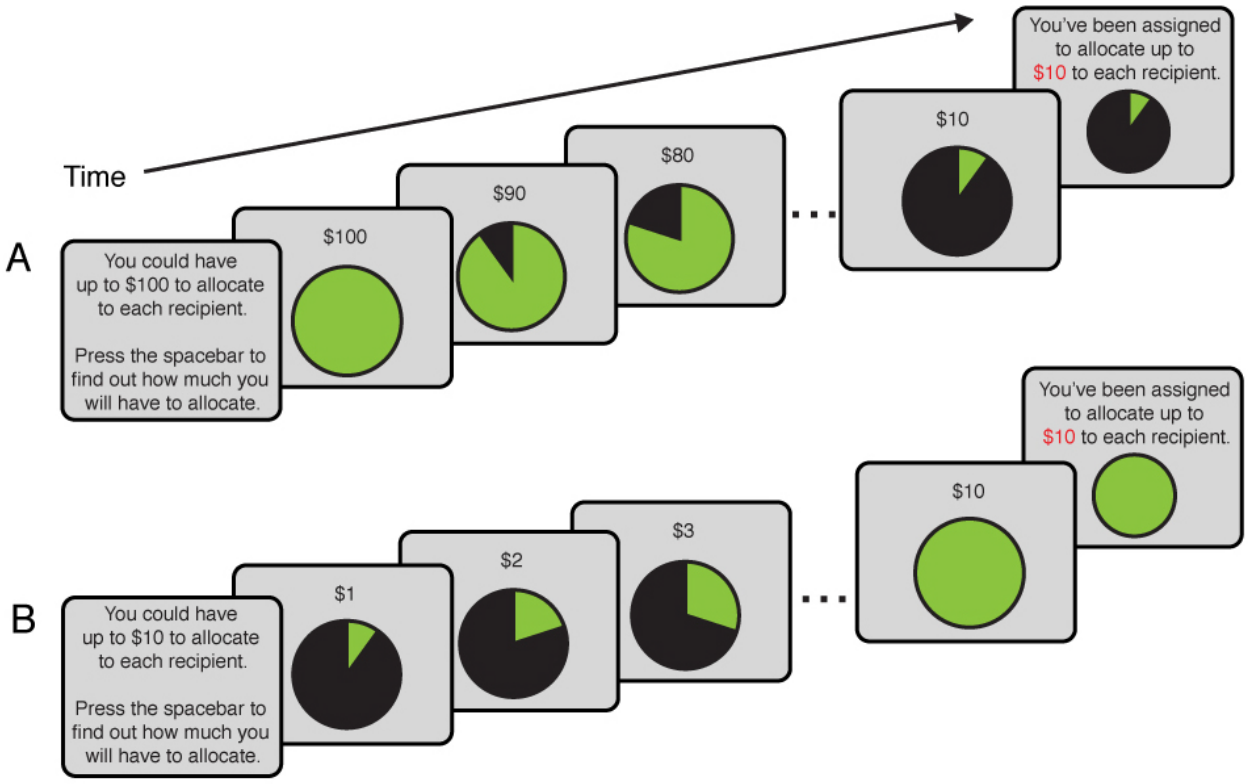
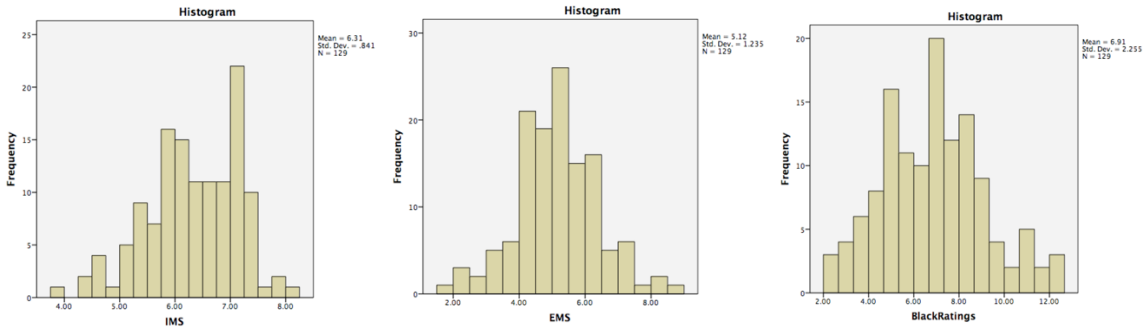


Figure S1. Scarcity manipulation used in Studies 4 and 5. Participants believed they could have up to $100 to allocate to each recipient in the scarcity condition (A) or up to $10 to allocate to each recipient in the control condition (B). Every participant was ostensibly randomly chosen to allocate up to $10 to allocate to each recipient – only the total possible amount changed between conditions.

Supplemental Analyses

DESCRIPTIVES and RATINGS

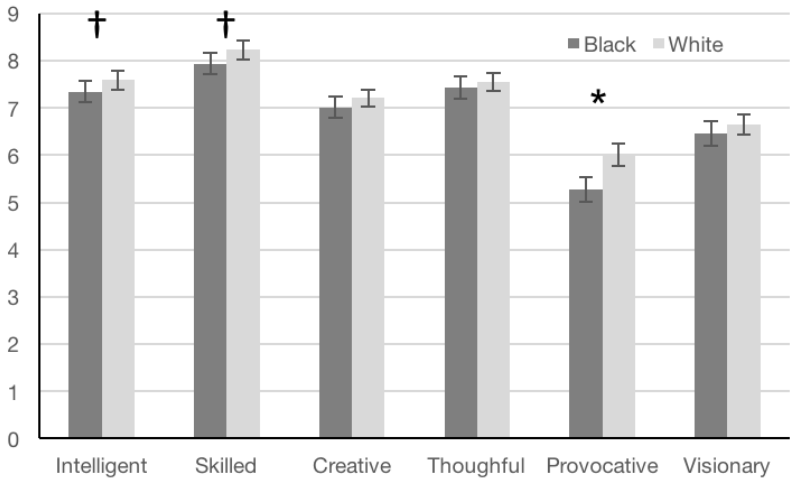
Study 1. IMS, EMS, Ratings distributions



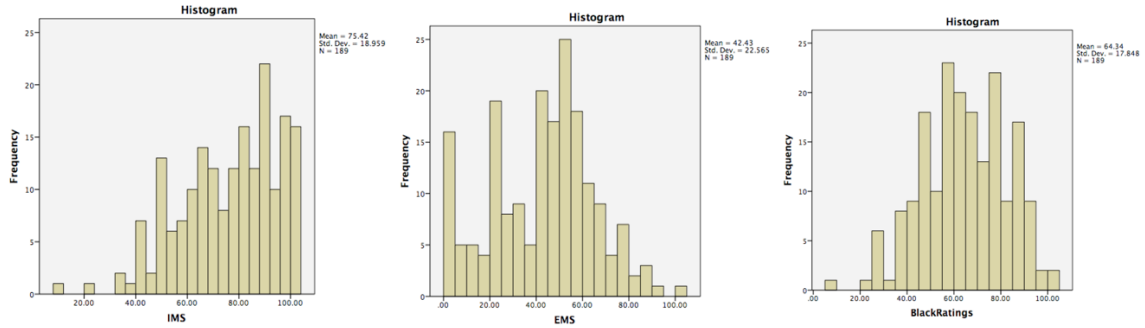
Patterns of results and significance remain when we correct for the negative skew of IMS by taking the square root of the reflected values.

Study 1. Ratings of Black and White applicants

Participants rated each applicant on the dimensions of competence (i.e., 'How intelligent/skilled/thoughtful was the applicant?') and creativity (i.e., 'How creative/provocative/visionary was the artwork?') by placing a mark on a 15 cm line representing a scale anchored by 'Not at all' and 'Very.' Despite selecting artwork and artist descriptions that had been pretested to be nearly identical, participants gave higher average ratings to the White artists than the Black artist on all dimensions. This difference was marginally significant on the intelligence (p = .14) and skilled dimension (p = .06) and was significantly different on the provocative dimension (p = .001). Given the only differences here were the race of artists, this suggest a racial bias in favor of the White artist. Interestingly, creativity, visionary, and thoughtfulness did not differ by race (p's > .33).



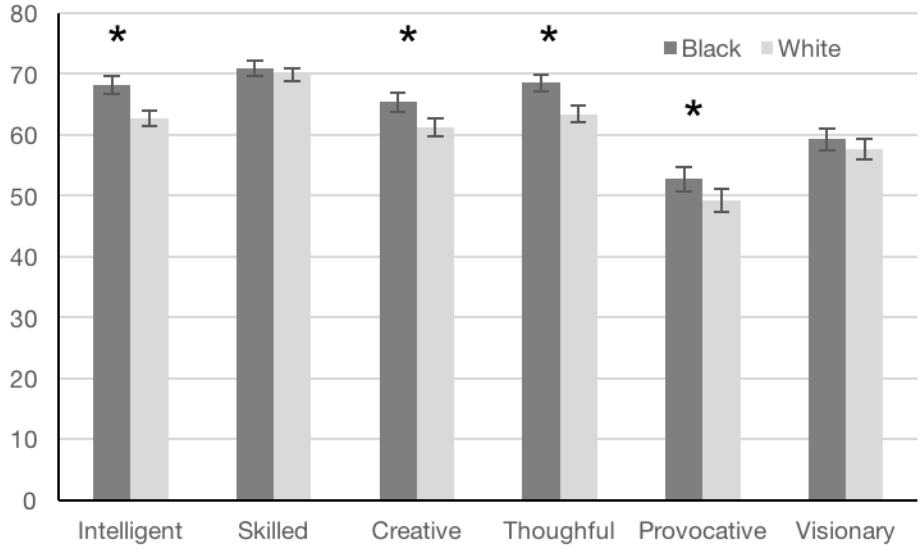
Study 2. IMS, EMS, Ratings distribution



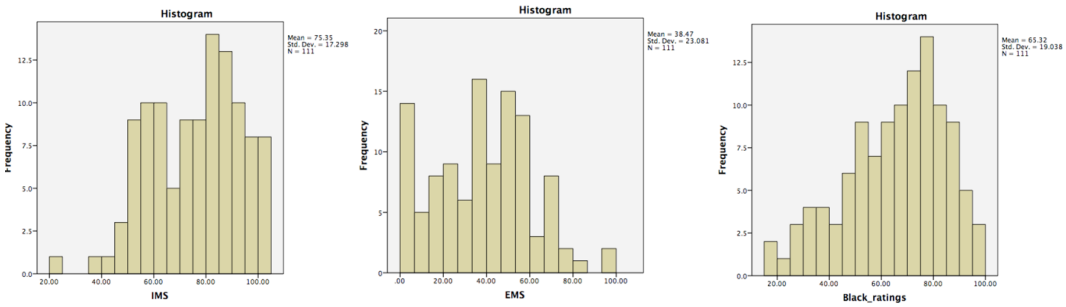
Patterns of results and significance remain when we correct for the negative skew of IMS by taking the square root of the reflected values.

Study 2. Ratings of Black and White applicants

Participants rated each applicant on the dimensions of competence (i.e., 'How intelligent/skilled/thoughtful was the applicant?') and creativity (i.e., 'How creative/provocative/visionary was the artwork?') on a 0-100 slider anchored by 'Not at all' and 'Very.' In this dataset Black artist were rated significantly better than the White artists on the creativity, thoughtful, provocative, and intelligent measures.



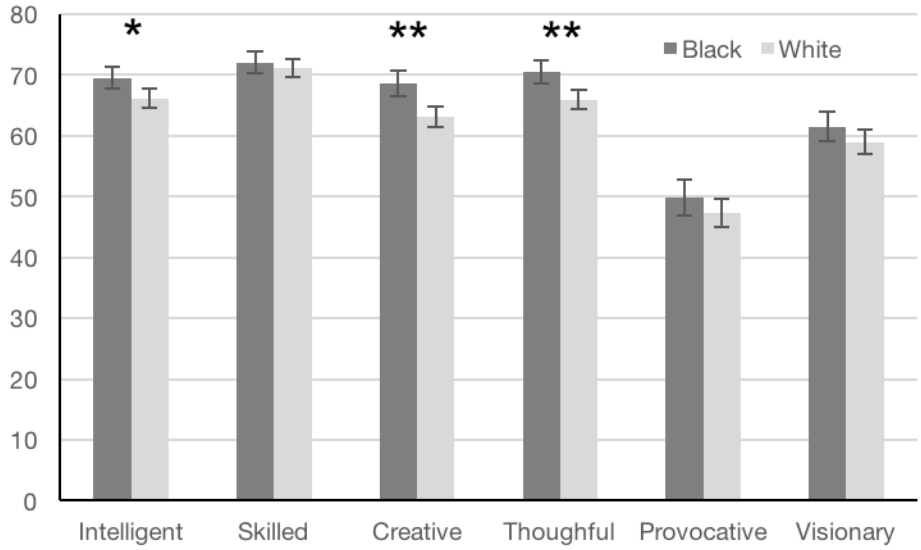
Study 3. IMS, EMS, Ratings distributions



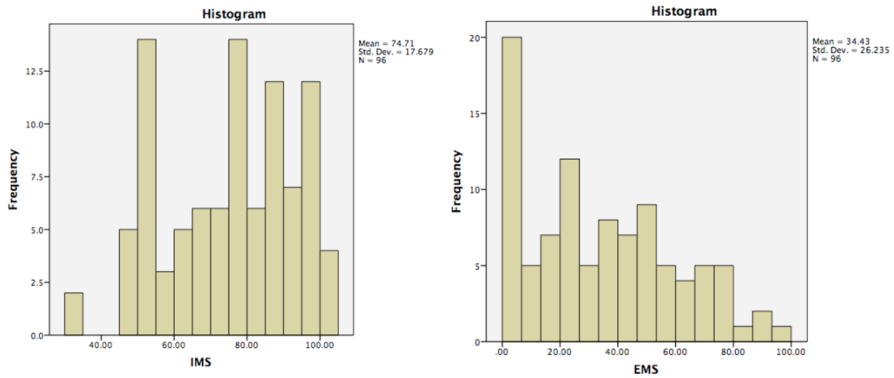
Patterns of results and significance remain when we correct for the negative skew of IMS by taking the square root of the reflected values.

Study 3. Ratings of Black and White applicants

Participants rated each applicant on the dimensions of competence (i.e., 'How intelligent/skilled/thoughtful was the applicant?') and creativity (i.e., 'How creative/provocative/visionary was the artwork?') on a 0-100 slider anchored by 'Not at all' and 'Very.' In this dataset Black artist were rated significantly better than the White artists on the creativity, thoughtful, and intelligent measures.



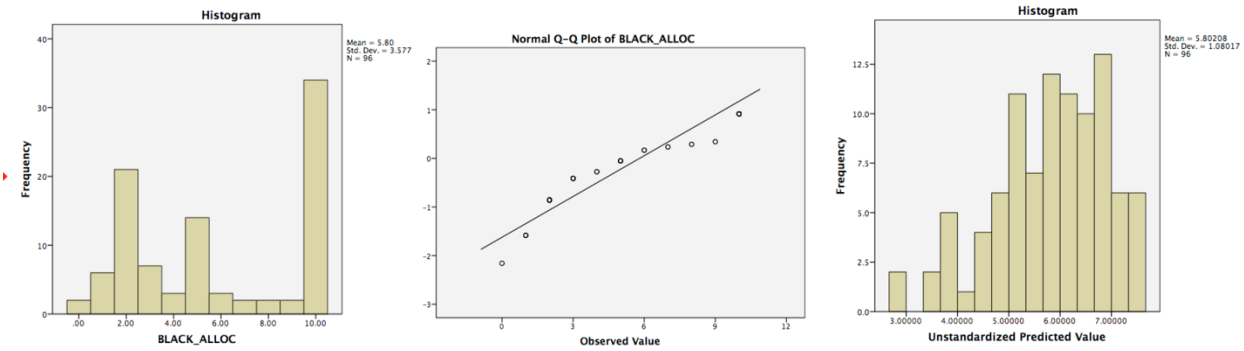
Study 4. IMS, EMS, Ratings distributions



IMS was not skewed in this study, but EMS was. Transforming EMS before was entered as a covariate in our supplemental analyses did not change the patterns nor significance of results.

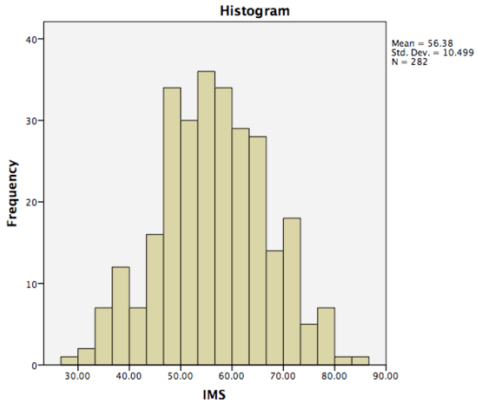
Study 4. Allocation distributions

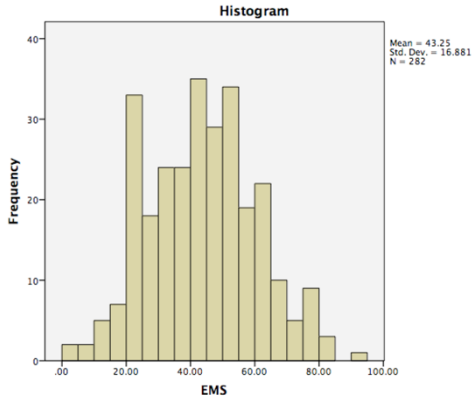
A number of participants assigned the maximum value of $10 to every recipient (33 participants). A chi-square test suggests that there was no difference between the proportion of participants in the scarcity condition (33%) and participants in the control condition (36%) who made this choice, condition $x^2 = .07$, $p = .80$, and a logistic regression suggests IMS scores did not predict this choice, $B = 0.007$, $p = .59$. However, scarcity condition and IMS did interact to predict this choice, $B = -0.51$, $p = .04$; such that low IMS participants in the scarcity condition showed the *least* likelihood of making this decision. Removal of participants who gave the maximal amount to everyone yielded identical results, i.e., Condition x IMS on Allocation t = -1.51, $p = .14$, though it did not reach significance with the reduced N = 63.



Because of these participants, our Black allocation variable was not perfectly normal. However, a Q-Q plot reveals it is not severely deviant, and a plot of the residuals of our model reveal a distribution approaching normality, with skew = -.67, se = .25; kurtosis = -.01, se = .49. Given non-normality of outcome variables is not an assumption of regression, the residuals of our regression approximate normal, and the results do not change if we remove participants who gave the maximal amount to everyone, we did not correct for non-normality of our DV.

Study 5. IMS, EMS, Ratings distributions

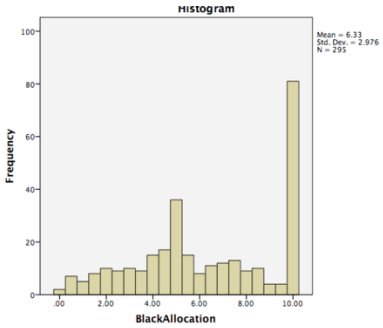


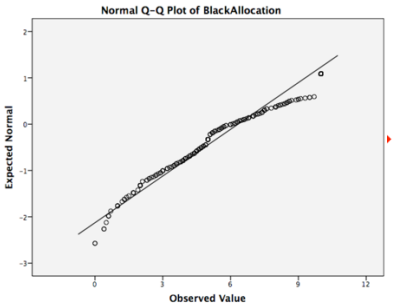


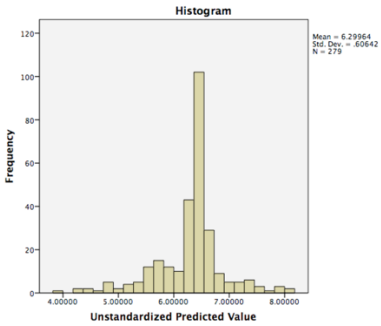
IMS nor EMS were skewed in this sample.

Study 5. Allocation distributions

Again, a number of participants assigned the maximum value of $10 to every recipient (73 participants). A chi-square test suggests that there was no difference between the proportion of participants in the scarcity condition (29%) and participants in the control condition (27%) who made this choice, condition $x^2 = .84$, $p = .36$, and a logistic regression suggests IMS scores did not predict this choice, $B = 0.01$, $p = .25$. Again, scarcity condition and IMS interacted to predict this choice, $B = -0.33$, $p = .03$; such that low IMS participants in the scarcity condition showed the *lowest* likelihood of making this decision. Removal of participants who made this choice yielded identical results, i.e., Condition x IMS on Allocation $t = -3.47$, $p < .001$.







Again, our Black allocation variable was not perfectly normal due to a number of participants who chose to give the maximal amount to everyone. However, as in Study 4, a Q-Q plot reveals it is not severely deviant, and a plot of the residuals of our model reveal a distribution approaching normal, with skew = -.65, se = .15 and kurtosis = 2.51, se = .29. Again, given non-normality of outcome variables is not an assumption of regression, the residuals of our regression approximate normal, and the results remain identical if we remove these participants, we did not correct for non-normality of our DV.

MANIPULATION CHECKS

Studies 1-3 used the identical scarcity manipulation, with a scarce and abundant condition. We did not collect a manipulation check in Study 1. In Study 2, we asked participants to indicate how limited the funding was compared to previous years, from "more abundant" (0) to "more scarce" (100) during debriefing. Three participants did not complete this measure, leaving 186 for analysis. As expected, participants in the scarce condition rated the fellowship as significantly more scarce (M = 75.49, SD = 26.79, N = 89) than participants in the abundant condition (M = 21.94, SD = 26.39, N = 97), $F(1,185) = 188.40$, $p < .001$. Furthermore, participants in the scarcity condition were significantly above the neutral midpoint, $t(88) = 8.98$, $p < .001$, while participants in the abundant condition were significantly below the neutral midpoint, $t(96) = -10.47$, $p < .001$. In Study 3, all participants were in the scarcity condition, and reported the funding was significantly more scarce than the midpoint, using the same scale as in Study 2 (M = 78.89, SD = 21.63), $t(110) = 14.07$, $p < .001$. Studies 4-5 used an extensively tested pie manipulation; Participants in the scarcity condition report resources as scarce, whereas participants in the control condition report resources as neither scarce, nor abundant (see Krosch & Amodio, 2014).

MAIN ANALYSES WITH COVARIATES

Study 1 (adjusting for EMS and pre-manipulation average ratings of the Black applicant's creativity and competence. Note: we chose to adjust the average Black ratings, though results remain the same with a Black-White rating covariate).

Effects of scarcity condition and IMS on allocation. The dollar amount allocated to the Black applicant was regressed onto condition, IMS, and their interaction, entered simultaneously, adjusting for EMS and participants' pre-manipulation ratings of the Black applicant's creativity and competence (all continuous variables were centered at their mean). This analysis produced a main effect of IMS, $B = 2.18$, $SE = 0.85$, $\beta = .20$, $t = 2.57$, $p = .01$, such that low-IMS participants allocated less to the Black applicant than high-IMS participants. Importantly, this effect was qualified by a significant Condition x IMS interaction, $B = -2.70$, $SE = 0.84$, $\beta = -.25$, $t = -3.21$, $p < .002$.. Simple slope analyses indicated that in the scarcity condition, participants' allocation to the Black applicant varied as a function of their IMS score, $B = 5.51$, $SE = 1.76$, $\beta = .47$, $t = 3.12$, $p = .003$, such that low-IMS participants gave less than high-IMS participants. That is, each one-point decrease on the IMS scale corresponded with a $5,500 decrease in funding among participants in the scarce condition. In contrast, when fellowship funding was described as abundant, the amount allocated to the Black applicant was not associated with participants' IMS score, $B = -0.82$, $SE = 1.70$, $\beta = -.07$, $t = -0.48$, $p = .63$.

Effects of scarcity condition and IMS on deviations from equity. To obtain a more direct test of our hypothesis, we determined whether participants' allocation to the Black applicant differed from $25,000—the value expected under equity (i.e., the result of splitting $100,000 evenly among the four applicants of equivalent merit). To this end, we centered the amount allocated to the Black recipient on $25,000 and regressed it onto dummy-coded scarcity condition, IMS (one standard deviation above and below the mean), and their interactions. Adjustment variables (EMS and pre-manipulation ratings of the Black applicant) were included as covariates.

Predicted values were computed for each of the four groups determined by the Scarcity x IMS design, with the predicted values reflecting IMS scores set to 1 SD either above or below the mean. These values were then compared to $25,000 by examining the intercept coefficient of these four regression analyses. As expected, the predicted allocation for low-IMS participants in the scarce condition was significantly less than $25,000 to the Black applicant, whereas the predicted allocation for high-IMS in the scarce condition was significantly more than $25,000 to the Black applicant, $B = 3.78$, $SE = 1.60$, $t = 2.36$, $p = .02$. Neither of the predicted allocations for the high- and low-IMS participants in the abundant condition differed significantly from $25,000 ($p$s > .32).

Study 2 (adjusting for EMS and pre-manipulation average ratings of the Black applicant's creativity and competence).

Effects of scarcity condition and IMS on allocation. We first regressed the dollar amount allocated to the Black applicant onto condition, IMS, and their interaction, entered simultaneously, adjusting for EMS, participants' pre-manipulation ratings of the Black applicant's creativity and competence (all continuous variables were centered at their mean), and face set (we used three different sets of Black and White faces to ensure generalizability of our effects). This analysis produced a significant Condition x IMS interaction, $B = -1.84$, $SE = 0.76$, $\beta = -.18$, $t = -2.43$, $p = .01$. Simple slope analyses indicated that in the scarcity condition, participants' allocation to the Black applicant varied as a function of their IMS score, $B = 2.79$, $SE = 1.10$, $\beta = 0.26$, $t = 2.55$, $p = .01$, such that low-IMS participants gave less than high-IMS participants. In contrast, when fellowship funding was described as abundant, the amount allocated to the Black applicant was not associated with participants' IMS score, $p = .40$

Effects of scarcity condition and IMS on deviations from equity. To determine whether participants' allocation to the Black applicant differed from $25,000—the value expected under equity, we centered the amount allocated to the Black recipient on $25,000 and regressed it onto dummy-coded scarcity condition, IMS (one standard deviation above and below the mean), and their interactions. Predicted values were computed for each of the four groups determined by the Scarcity x IMS design and compared to $25,000, as in Study 1.

Although no groups were significantly different from $25,000, only the predicted allocation for low-IMS participants in the scarce condition was negative (i.e., lower than $25,000 to the Black applicant, $B = -2.54$, $SE = 2.40$, $t = -1.06$, $p = .29$). The predicted allocation for high-IMS in the scarce condition was marginally more than $25,000 to the Black applicant, $B = 3.04$, $p = .21$. Neither of the predicted allocations for the high- and low-IMS participants in the abundant condition differed significantly from $25,000 ($p$s > .34).

Study 3 (adjusting for EMS and pre-manipulation average ratings of the Black applicant's creativity and competence).

Effects of speed condition and IMS on allocation of scarce resources. Our initial analysis tested the interactive effect of speed condition and IMS on the allocation of scarce resources. The

amount of money allocated to the Black applicant (relative to White applicants) was regressed onto speed condition, IMS, and their interaction. This analysis produced a marginal effect of IMS, $B = 1.89$, $SE = 1.07$, $\beta = .17$, $t = 1.77$, $p = .08$, such that low-IMS participants allocated less to the Black applicant than high-IMS participants. Importantly, this effect was qualified by the predicted, albeit marginal, Speed x IMS interaction, $B = -2.02$, $SE = 1.08$, $\beta = -.18$, $t = -1.91$, $p = .06$.

Simple slope analyses indicated that in the slow condition, participants' allocation to the Black applicant varied as a function of their IMS score, $B = 3.91$, $SE = 1.52$, $\beta = .34$, $t = 2.58$, $p = .01$, such that low-IMS participants gave less than high-IMS participants. In contrast, in the fast condition, the amount allocated to the Black applicant was not associated with participants' IMS score, $B = -0.13$, $SE = 1.50$, $\beta = -.01$, $t = -0.85$, $p = .93$. Thus, this pattern replicated the effect of IMS on scarce resource allocation when decisions were made deliberately, but not when decisions were made quickly.

Effects of decision speed and IMS on deviations from equity. Next, we tested whether participants' allocation of funding to the Black applicant differed from $25,000. To this end, we centered the amount allocated to the Black recipient on $25,000 and regressed it onto IMS (one standard deviation above and below the mean).

Predicted values were computed for both IMS 1 SD above and below the mean and compared to $25,000 by examining the intercept coefficient of these regression analyses. As expected, in the slow condition, the predicted allocation for low-IMS participants was marginally less than $25,000 to the Black applicant (~$22,043, $B = -2.96$, $SE = 2.10$, $t = -1.41$, $p = .16$. By contrast, the predicted allocation for high-IMS was significantly more than $25,000 to the Black applicant (~$29,865), $B = 4.86$, $SE = 2.20$, $t = 2.21$, $p = .03$. Neither of the predicted allocations for the high- and low-IMS participants in the fast condition differed significantly from $25,000 ($p$s > .18).

Study 4 (adjusting for EMS).

First, to replicate Studies 1-3, we computed a difference score in which subjects' subjects' Black allocation was subtracted from their White allocation (i.e., greater values represented more pro-White/anti-Black allocations). This score was regressed onto condition, IMS, and their interaction, adjusting for EMS and order. This analysis revealed only a significant Condition x IMS interaction, $B = -.30$, $SE = .14$, $\beta = -.23$, $t = -2.17$, $p = .03$.

Simple slope analyses revealed that in the scarce condition, the difference score was positively associated with IMS score, $B = .40$, $SE = .17$, $\beta = .31$, $t = 2.47$, $p = .02$, such that low-IMS participants had more negative difference scores than high-IMS participants. This effect indicated that low-IMS participants discriminated against Black recipients more strongly than high-IMS participants. In contrast, in the abundant condition, IMS was not significantly related to the racial differences in allocation, $B = -.20$, $SE = .22$, $\beta = -.16$, $t = -0.92$, $p = .36$. Furthermore, only low-IMS participants in the scarce condition had a difference score significantly less than zero, $B = -.85$, $SE = .40$, $t = -2.12$, $p = .04$, suggesting they were the only ones to give less to the Black than White recipients. No other group allocated significantly less to the Black than White recipients, $ps > .59$.

To test for outgroup derogation, the dollar amount allocated to the Black recipient was regressed onto condition, IMS, and their interaction, adjusting for EMS and the order in which they viewed the faces (all continuous variables were centered at their mean). This analysis yielded no main effects of order, condition, or IMS (ps > .78). The expected Condition x IMS interaction was significant, B = - .90, SE = .37, β = -.25, t = - 2.45, p = .02.

Simple slope analyses revealed that in the scarce condition, allocations to the Black recipient were positively associated with IMS score, B = 1.00, SE = .45, β = .28, t = 2.24, p = .03, such that low-IMS participants gave less than high-IMS participants. In contrast, in the control condition, IMS was not significantly related to the amount allocated to the Black recipient, B = -.81, SE = .58, β = -.22, t = -1.39, p = .17. This pattern replicated the results of Studies 1-3.

Next, to test for ingroup favoritism, the average dollar amount allocated to White recipients was regressed onto the same predictors. This analysis yielded no main effects of order, condition, or IMS, p's > .71. Although an unpredicted marginal interaction of Condition x IMS emerged, B = -.60, SE = .35, β = -.17, t = -1.71, p =.09, IMS was not significantly related to the average amount allocated to White recipients in either condition, p's > .17.

As an alternative approach to these separate regression analyses, we also conducted a single covariate analysis in which we regressed the dollar amount allocated to the Black recipient onto condition, IMS, and their interaction, covarying average allocation to the White recipients. Results of this analysis produced the same pattern of results as above.

Study 5 (adjusting for EMS).

First, to directly replicate the previous studies, we computed a difference score in which subjects' White allocation was subtracted from their Black allocation. This score was regressed onto condition, IMS, and their interaction, adjusting for EMS. This analysis revealed only a significant Condition x IMS interaction, B = -0.10, SE = 0.04, β = -0.17, t = - 2.89, p = .004.

Simple slope analyses revealed that in the scarce condition, the difference score was positively associated with IMS score, B = 0.14, SE = 0.06, β = .23, t = 2.27, p = .02, such that low-IMS participants had more negative difference scores than high-IMS participants. This effect indicated that low-IMS participants discriminated against Black recipients more strongly than high-IMS participants. In contrast, in the control condition, IMS was not significantly related to the racial differences in allocation, B = -0.09, SE = 0.05, β = -.14, t = -1.63, p = .11.

To test for outgroup derogation, the dollar amount allocated to the Black recipient was regressed onto condition, IMS, and their interaction, adjusting for EMS (centered at its mean). Replicating Study 4, this analysis yielded no main effect of condition, p = .49. There was a main effect of IMS, B = 0.57, SE = 0.21, β = 0.19, t = 2.68, p < .008, such that greater allocation to Black recipients were positively associated with IMS score. However, this pattern was qualified by the expected Condition x IMS interaction was significant, B = - .40, SE = .18, β = -.13, t = - 2.25, p = .025.

Simple slope analyses revealed that in the scarce condition, allocations to the Black recipient were positively associated with IMS score, B = 0.97, SE = 0.29, β = .33, t = 3.29, p = .001, such

that low-IMS participants gave less than high-IMS participants. In contrast, in the control condition, IMS was not significantly related to the amount allocated to the Black recipient, B = 0.17, SE = 0.26, β = 0.06, t = 0.67, p = .50.

Next, to test for ingroup favoritism, the average dollar amount allocated to White recipients was regressed onto the same predictors. This analysis yielded no main effects of condition, p = .43. Unexpectedly, there was a main effect of IMS, B = 0.56, SE = .0.21, β = 0.19, t = 2.62, p =.009, such that greater allocation to White recipients were positively associated with IMS score. Again, we found an unpredicted marginal interaction of Condition x IMS emerged, B = -.30, SE = 0.18, β = -0.10, t = -1.66, p =.10. This time, IMS was significantly related to the average amount allocated to White recipients in the scarce condition, B = 0.85, SE = 0.30, β = 0.29, t = 2.88, p < .004, but not the control condition, p = .31.

Importantly, however, when we added White recipients' average allocation as a covariate to an analysis regressing the dollar amount allocated to the Black recipient onto condition, IMS, and their interaction, condition and IMS still interacted significantly, B = -0.11, SE = .04, β = -.04, t = - 3.10, p = .002 and simple slope analyses revealed that in the scarce condition, participants' allocation to the Black recipient was positively associated with their IMS score, B = 0.14, SE = 0.06, β = .05, t = 2.27 p = .02, but that this was only marginally the case in the control condition, B = -.09, SE = 0.05, β = -0.03, t = -1.63, p = .10.

ADDITIONAL ANALYSES

Study 5. Mixed-Effects Model Treating Face Stimuli as a Random Factor

Following recommendations by Judd, Westfall, & Kenny (2012), we re-ran our main analyses treating participants *and* stimuli as a random factor in a mixed-effects model using the lme4 and boot R packages to estimate coefficients of interest, their confidence intervals, and simple slopes (10,000 bootstrapped samples). Specifically, our model included participants and face stimuli as random effects, and IMS, Scarcity condition, and Face Race as fixed effects.

We found a main effect of IMS such that greater IMS scores predicted greater allocation (regardless of race), B = 0.48, SE = .17, t = 2.74, p = .006, 95% CI [.44, .52]. Consistent with the results in the main text (which averaged over Black and White stimuli), these results were qualified by a significant 3-way Face Race x IMS x Scarcity Condition interaction: B = -0.10, SE = .03, t = 3.46, p < .001, 95% CI [-.16, -.05].

Bootstrapped estimates of simple slopes revealed that IMS was significantly positively related to allocation across conditions and face races, such that low-IMS participants gave less than high-IMS participants. In the scarce condition, allocation to Black targets was most strongly positively associated with IMS score, B = .88, SE = .03, 95% CI [.83, .93]. Allocation in all other conditions was also associated with IMS score, but to a lesser extent: White-Scarce: B = .66, SE = .08, 95% CI [.52, .80], Black-Control: B = .10, SE = .02, 95% CI [.06, 15], and White-Control: B = .29, SE = .05, 95% CI [.19, .40].

Critically, the simple slope for Black targets in the scarcity condition was significantly steeper than for White targets in the scarcity condition (Difference Estimate = .22, *SE* = .09, 95% CI [05, .39]) and Black targets in the control condition (Difference Estimate = .78, *SE* = .04, 95% CI [.71, .84].

Study 2. Condition x IMS on Response Latency

We hypothesized that both high and low IMS participants would take longer in the scarcity condition, to implictly or explicitly justify diversions from equity in opposite directions. Consistent with this prediction, participants in the scarcity condition took qualitatively longer (M = 29.02, SD = 22.54) than those in the control condition (M = 27.71, SD = 26.36), though this difference was not signficant, $t(186) = 1.00$, $p = .32$. We also examined the interaction of scarcity condition and *absolute* IMS on response latency, reasoning that extreme IMS scores should predict longer response times under scarcity only. Although the interaction was non-significant ($t = 1.17$, $p = .24$), simple slope analyses revealed that, consistent with our theorizing, *extremity* of IMS scores was related to longer response latencies, in the scarcity condtion ($t = -.14$, $p = .096$), but not the abundance condition ($t = -.05$, $p = .96$).