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Abstract

Existing research suggests that White individuals are more likely to categorise biracial faces as Black in conditions of resource scarcity. It has been theorised that this effect is due to in-group boundaries becoming more exclusive in scarce conditions. An alternative explanation refers to implicit socio-economic association between Black individuals and lower level of resources. These two approaches entail different predictions for Black participants performing the categorisation task. If scarcity prompts greater in-group exclusivity, Black participants should, ceteris paribus, categorise more biracial faces as White. If, however, scarcity invokes socio-economic status associations, Black participants should categories biracial faces in the same way as White participants. Experiment 1, explored the effects of priming on White and Black groups. It provided support for the implicit socio-economic association theory. Furthermore, experiment 2 on Asian sample, provided additional support as Asian participants showed the same pattern of response. The paper discusses implications of these findings.

Keywords: intergroup bias; perception of race; boundary formation; resource scarcity; scarcity priming

Introduction

Substantial evidence suggests that the perception of race can be influenced by environmental factors (e.g. Davis, 1991; Peery & Bodenhausen, 2008; MacLin & Malpass, 2001). This effect was examined by Rodeheffer, Hill and Lord (2012), who primed participants with the concepts of resource scarcity, abundance and neutral control. The priming stimuli included slides with captioned pictures showing relevant concepts. Participants were then presented with twenty composite images of biracial faces generated using 50% content of White and 50% content of Black individuals' photographs. The task was to categorise faces as either Black or White. Results showed that participants in the scarcity condition were more likely to categorise faces as Black, relative to the abundance or neutral conditions. There was no significant difference between neutral and abundance conditions. Rodeheffer *et al*. theorised that, in times of economic crisis, boundaries of in-group categorisation become more exclusive where less people are classified as in-group members.

Results from Krosch and Amodio (2014) support these conclusions. Participants were primed with scarcity, negativity, and neutral conditions. Priming consisted of subliminal presentation of relevant word primes for 20ms prior to each trial. Participants subsequently categorised faces as either Black or White. Facial stimuli included morphed pictures of mixed race individuals generated using different proportions of original faces of Black and White people at 10% increments. The dependent variable was the point of subjective equality, defined as the proportion of original Black face content required for the morphed image to be equally likely to be categorised as either Black or White. Results showed that in the scarcity condition, a given image may have significantly lower proportion of Black content to reach the point of subjective equality. In other words, a higher number of images were identified as Black in the scarcity condition. Consistently with previous explanations of Rodeheffer *et al.* (2012), authors of the study concluded that in the conditions of resource scarcity the boundaries of in-group categorisation become more exclusive, as participants tended to exclude biracial individuals from the White group in the scarcity condition. However, the study had a certain limitation as a quarter of the sample consisted of Asian participants. The facial stimuli included only images of Black and White individuals and no Asian individuals. The experiment was therefore unable to examine any effect of change of in-group boundaries since there were no in-group images in the stimuli from the point of view of Asian participants. This may indicate that the effect was driven by other factor. The present study explores this possibility.

The paper thus postulates an alternative theoretical explanation relating to the effect of implicit racial bias, based on presumption that Black people constitute a disadvantaged group with lower level of resources (Gilens, 2003). That is, people's semantic network may include an association between scarcity (or lower socio-economic status) and Black individuals. Activation of the concept of scarcity may therefore result in higher cognitive accessibility of the concept of Black individuals. This in turn increases the probability of a given face to be classified as Black following scarcity priming. Extensive previous literature demonstrated a wide range of similar implicit racial biases, which, more importantly, are exhibited by individuals across different ethnicities, including Black people themselves (e.g. Payne, 2006; Correll, Park, Judd & Wittenbrink, 2002).

We might therefore reconsider the above evidence from Rodeheffer et al. (2012) and Krosch and Amodio (2014). It is possible that the results were driven not by a change in in-group exclusivity, but by implicit association between lower level of resources and Black individuals. The present study investigates these two theoretical explanations by testing different ethnic groups. According to the initial account, scarcity yields an increase in exclusivity of the in-group categorisation. If this theory is correct, White participants will show a tendency to exclude biracial individuals from the White in-group, increasing the number of faces being judged as Black. Conversely, Black participants should show the opposite pattern of response. According to the alternative explanation, scarcity priming activates the concept of lower level of resources and increases cognitive accessibility of the associated concept of Black individuals. Similar to other implicit race-related biases, this effect can be expected to occur irrespective of the ethnicity of the participant. Therefore, both Black and White participants will show the same pattern of responses, with increased probability of judging ambiguous faces as Black in the scarcity condition, relative to the neutral condition. As neither of the original studies included Black participants, new data is required to decide between the two hypotheses. Experiment 1 directly tests these predictions by analysing responses from Black and White participants. Experiment 2 further tests the hypotheses by analysing responses from Asian participants. Asian people are out-group members to *both* Black and White faces included in the stimuli. According to the in-group exclusivity theory, they should be unaffected by scarcity priming, as no change in in-group exclusivity can be observed. According to the socio-economic account, however, they should exhibit similar response patterns, as the White and Black participants from experiment 1.

Experiment 1: Black and White participants

In the original studies, participants were White. Given the competing hypotheses (in-group/out-group versus implicit biases), we recruited both Black and White participants. If the group hypothesis is correct, we should expect Black participants to exhibit the opposite in-group behaviour as White participants. If, however, the implicit bias hypothesis is right, we should expect both groups of participants to have the same response patterns.

Participants

Sixty-four people participated in the experiment (N = 64); 40 female, 23 male and 1 person classified their gender as "other". The amount of participants was chosen prior to recruiting the participants, and consequently no direct stopping rule was in place. The age of participants ranged from 18 to 55 (mean = 29.84, *SD* = 8.69). Participants were recruited opportunistically from Birkbeck, University of London.

Design

The experiment included two independent variables: priming (two levels: scarcity and neutral), and group (two levels: Black or White). The experimental design was 2x2 mixed with group as the between subject variable and priming as the within subject variable. The dependent variable measured the mean response rate across all trials in both conditions (scarcity or neutral) for each group (Black or White). The scope of possible values ranged from 1.0 indicating that 100% of 45 images presented were identified as Black to 2.0 indicating that 100% of images were identified as White. The mean score of 1.5 represents that 50% of the images were classified as White and 50% as Black.

Materials

The experiment used Qualtrics survey software and could be conducted online. The priming stimuli for the scarcity condition were obtained from the Rodeheffer *et al.* (2012) study, as they were proven to be of sufficient quality to produce priming effects. They consisted of captioned pictures showing economic recession, poverty and scarce resources. The stimuli for the neutral condition included three slides showing pictures of clocks, as there is no reason to assume that images of clocks should prime participants in terms of economic scarcity or abundance. Similarly, in order to replicate and test previous findings, the facial stimuli were obtained from the Krosch and Amodio (2014) study. They included morphed pictures generated from photographs of Black and White individuals at 10% increments from 10% Black to 90% Black[1].

Procedure

In accordance with ethical approval requirements, participants consented to their involvement and that they could terminate the experiment at any time if they so desired. First, participants saw slides with neutral priming (images of old-fashioned clocks). Having seen the images, participants were presented with 45 morphed facial images (from Krosch & Amadio, 2014), one picture per slide. Following Rodeheffer *et al.* (2012), the instruction read: "If you had to choose, would you describe this person as [Black/White]". Participants indicated their response by clicking one of two radio buttons. Following the first set of pictures, participants were presented with the scarcity priming (caption and images of economic scarcity), and then the second set of 45 pictures. The experiment ended with a page requesting the demographic information, including ethnicity, gender and age. The last page included debriefing. The entire procedure lasted for about 15 minutes.

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[1] The authors wish to express their gratitude to both sets of authors for supplying the stimuli that allows for a direct test of the hypotheses.

Experiment 1: Results

Only data of participants who classified themselves as Black or White were analysed. The means and standard deviations are presented in Table 1. The lower the mean response rate, the higher is the bias towards categorising faces as Black (cf. the above description of the design). The descriptive statistics show that in neutral conditions the results were close to the expected value of 1.5. The results in the experimental conditions were lower, which means that more images were classified as Black.

	Black	White
Neutral priming	1.51 (.06)	1.47 (.13)
Scarcity priming	1.42 (.07)	1.43 (.14)

Table 1: Scarcity effect on participant groups

A mixed 2-way ANOVA revealed a significant main effect of priming: $F(1,62) = 31.57$, $p < 0.001$. Thus, results varied significantly between the priming conditions across both groups such that more faces were categorised as Black in the scarcity condition. The main effect of group was not significant: $F(1,62) = .28$, $p = .60$, indicating that both groups had similar response rates across the priming conditions. In addition, there was no significant interaction: $F(1,62) = .135$, $p = .14$. This shows that the effect of priming did not vary as a function of the group variable. In order to further test effects of scarcity within each group separately, two 1-way repeated measures ANOVAs were performed. The test in the Black group confirmed a significant effect of scarcity: $F(1,33) = 9.27$, $p = .003$. Similarly, in the White group, a significant effect was also obtained: $F(1,29) = 23.13$, $p < .001$ (see fig. 1). This confirms that the main effect of priming in the 2-way ANOVA was driven by significant differences in both groups. As illustrated in Figure 1, results of the experiment were consistent with the poverty priming hypotheses.
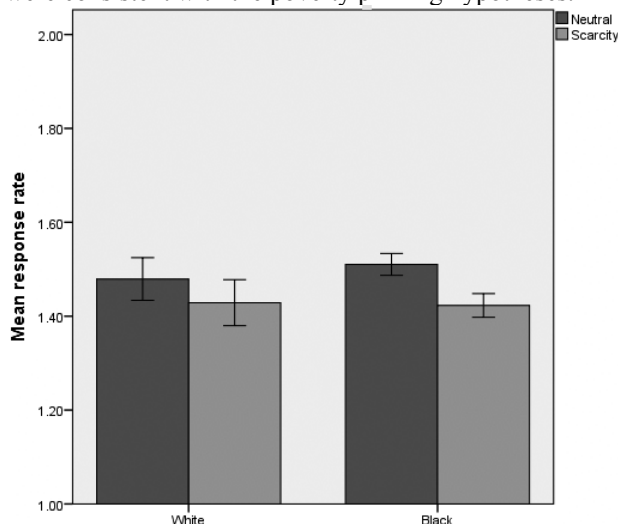

Fig. 1: Main results, experiment 1

Experiment 2: Asian participants

Experiment 1 showed that both Black and White participants rated more faces as Black in scarcity conditions. Experiment 2 pursues this hypothesis by testing Asian participants. As these are out-group members for *both* Black and White faces, they should, according to the in-group/out-group hypothesis, be unaffected by the priming. If, however, the implicit socio-economic association hypothesis is correct, Asian participants should respond in a similar way as the Black and White participants in experiment 1. Given these results, we predict the latter hypothesis.

Participants

Thirty-one people of Asian origin were recruited from Mechanical Turk (8 female, 23 male)[2]. In order to ensure Asian origin without priming the participants to consider this as an issue for selection, a pre-screening including a number of filler questions unrelated to race and ethnicity as well as information to identify the respondent's ethnicity and race was conducted to pick out participants with relevant ethnicity. Only Asian participants would subsequently allowed to continue with the actual experiment. The age of participants ranged from 18 to 60 (mean = 30.00, $SD = 9.55$).

Design, materials, and procedure

As in experiment 1, scarcity and neutral conditions were independent variables. The design was within-subjects, hence all participants were allocated to both conditions. The experiment used the same dependent measure as in the previous experiment.

Experiment 2: Results

Only data of participants who classified themselves as Asian were analysed (two participants who passed the qualification test, subsequently identified themselves as mixed-race). The mean response rate in the neutral condition was 1.48 ($SD = .14$). This result was close to the chance rate of 1.5. The outcome in the scarcity condition was 1.43 ($SD = .13$), revealing that more pictures were classified as Black. A related sample t-test showed that the effect was significant ($t(30) = 2.35$, $p = .013$).[3] The results from experiment 2 are thus in line with findings from experiment 1 and suggest that scarcity priming invoked implicit socio-economic associations rather than increasing in-group/out-group exclusivity.

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[2] Paolacci, Chandler & Ipeirotis (2010) for validation of using Mechanical Turk. Note that Asian origin may also include Bangladeshi, Indian, and Pakistani participants. For the current experiment, however, participants were limited to people with Far Eastern origin.

[3] Further analysis using 2x3 two-way ANOVA with all three groups (Black, White, and Asian) revealed no significant interaction: $F(2, 92) = 1.76$, $p = .18$. This confirms that all three groups had the same pattern of response.

Discussion

The outcomes of the experiments demonstrate that priming the concept of resource scarcity changes the perception of race. Participants in the scarcity condition were more likely to categorise biracial faces as Black, relative to the neutral condition. This effect has been shown to exist across all groups included in both experiments. The results provide empirical support for the theory of implicit association between the concept of poverty and Black individuals, yielding more faces to be categorised as Black. The results challenge the original explanation presented by Rodeheffer *et al.* (2012) and Krosch and Amodio (2014). Here, the shift of perceptual threshold of racial categorisation is based on scarcity-related increase of ingroup exclusivity. This was theorised to facilitate resource allocation towards the ingroup. The present results showed that Black, White, and Asian participants had the same pattern of response, which is contrary to the hypotheses derived from their theory. Thus, the present study confirms that the implicit poverty priming theory has higher explanatory power relative to the reduction of the ingroup inclusivity theory.

The results of the study are of high social significance in terms of intergroup relationships, potentially concerning the distribution of wealth and power, and regarding implicit socio-economic associations. The implicit association between poverty and Black individuals may be related to the stereotype of a Black person as poor and chronically welfare dependent. According to Gilens (2003), media portrayal of poverty has become increasingly "racialized" – it shows disproportionately higher number of Black people depicted as poor. He found that almost 60% of images in American articles on poverty present Black individuals, whereas around 27% of the poor are Black. This tendency culminated in articles published in 1962 and 1963 during a broad coverage of welfare system abuses which saw 75% of images representing Black people. This trend reversed in the early 1980s in the times of economic downturn, with the percentage reduced to 33%. These changes indicate that the media increase the overrepresentation in the negative context of welfare system abuse and the "undeserving" poor. Furthermore, they decrease the overrepresentation when poverty can be justified by overall economic decline. Further studies show that attitudes towards the poor are context dependent, e.g. people are more likely to classify poor senior citizens or medical care receivers as deserving public assistance (Smith, 1987; Cook & Barrett, 1992). Consistently with these notions, Gilens (1999) established that the representation of Black people among the poor varies as a function of positivity of the context. No images of Black individuals were found in articles on senior citizens. Consistently, the overrepresentation in articles on underclass, urban problems and criminality ranged between 85% and 100%. It can, therefore, be theorised that the disproportionate representation of Black people among the poor in the media contributes to the establishment of the implicit association. In addition, this effect is magnified by

negative context of the media article, which may bias people's beliefs concerning reasons for Black poverty. Indeed, studies demonstrated that news reports on poor Black children produce more personal attributions relative to news reports on poor White children (Iyengar, 1991). In other words, participants were more likely to attribute Black poverty to alleged negative personal characteristics of Black people, while White poverty is more likely to be explained in terms of structural and social factors rather than personal (e.g. economic crisis, unemployment etc.).

Another socially significant consequence of this implicit association relates to the fact that people tend to behave consistently with the content of activated stereotype. In a classic study, Bargh, Chen and Burrows (1996) examined this notion by priming participants with the concept of elderly people. Results showed that participants walked more slowly following this priming, which is part of the stereotype of senior citizens. In addition, priming participants with the concept of Black individuals resulted in a more aggressive behaviour. These phenomena are consistent with previously outlined theoretical explanations of increased cognitive accessibility of concepts associated with currently activated ideas. The study showed that stereotypes not only affect task performance in laboratory settings but also can affect daily behaviour. Results consistent with this notion were obtained by other studies which used the stereotype threat paradigm. Research showed that priming people with racial or gender stereotypes (e.g. lower mathematic ability of Black people and women, while higher ability of Asians) results in stereotype-congruent behaviour (e.g. Steele, 1997; Steele & Aronson, 1995; Walton & Cohen, 2003; Steen, 1987). Further evidence demonstrates that the effects of stereotype activation are not limited to academic or IQ tests only, but also extend to economic decision making. For example, women primed with gender stereotypes are less likely to engage in risky financial activities (Powell & Ansic, 1997; Schubert, Brown, Gysler & Brachinger, 1999), and they are less likely to pursue careers traditionally regarded as male (Rudman & Phelan, 2010).

Collectively, these studies suggest that stereotypes can have a long-lasting effect on a range of aspects crucial for life success, such as education and career choice, which translates into wealth and social status. It can be therefore argued that negative racial stereotypes hinder the prospects of Black people, since people have a tendency to unwittingly act in accordance with the content of internalised stereotypes. Concurrently, socio-cultural stereotyping may be activated by relevant cues such as economic scarcity (as the current studies explore). Black people, therefore, experience double social jeopardy – effects of implicit racism of White people and damaging effects of the internalised stereotypes. These phenomena contribute to the continuation of Black poverty, which reinforce stereotypes concerning Black people. It can also be hypothesised that biased media portrayal of Black people as poor and dependent on welfare further magnifies this

effect. This means that the media and other organisations, e.g. charities which advertise fundraising campaigns for people in Africa, should be made aware of the negative effects that this continuing bias has. Due to holding social responsibility, the media articles or advertisement should present a balanced and accurate picture of reality. Issues concerning the relationship between socio-cultural stereotypes, group dynamics, socio-economic power, ethnicity, and cognitive function are complex, multi-facetted, and inter-dependent. They relate to very real problems in society, and further studies are warranted to explore these delicate aspects, how they function, and how they relate to one another in much more detail.

Author contributions

D. L. Pilucik developed the idea of the study, rationale and method, conducted data collection and analysis and wrote manuscript draft. J. K. Madsen provided support with developing the study, critical revision, finalised the manuscript, and prepared it for submission. Both authors approved the final version of the manuscript for submission.

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