Research Report

Psychological Science
22(1) 29–33
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DOI: 10.1177/0956797610390383
http://pss.sagepub.com

Why Barack Obama Is Black: A Cognitive Account of Hypodescent

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Abstract

We propose that *hypodescent*—the assignment of mixed-race individuals to a minority group—is an emergent feature of basic cognitive processes of learning and categorization. According to attention theory, minority groups are learned by attending to the features that distinguish them from previously learned majority groups. Selective attention creates a strong association between minority groups and their distinctive features, producing a tendency to see individuals who possess a mixture of majority- and minority-group traits as minority-group members. Two experiments on face categorization, using both naturally occurring and manipulated minority groups, support this view, suggesting that hypodescent need not be the product of racist or political motivations, but can be sufficiently explained by an individual's learning history.

Keywords

hypodescent, stereotypes, minorities, category learning, attention, face perception

Received 1/21/10; Revision accepted 8/23/10

The election of an African American to the U.S. presidency has prompted much discussion about the history and politics of race. From a social psychological perspective, however, the event raises an even more fundamental question: Why is Barack Obama—the child of a Midwestern mother "white as milk" and a Kenyan father "black as pitch" (Obama, 2004, p. 10)—considered an African American, but never White?

The question of Obama's race is a salient example of the more general principle of *hypodescent*, the association of individuals of mixed-race ancestry with the minority or socially subordinate group (Banks & Eberhardt, 1998). Historically, in the United States (and elsewhere), hypodescent, sometimes informally called the "one-drop" principle, has been used to distinguish Blacks and Whites, often in order to define and maintain slave status or to discourage interracial marriage (Hickman, 1997). Today, minority status continues to be defined, often for sociopolitical purposes (e.g., government entitlements, college financial aid), as the possession of an arbitrarily small proportion of minority blood.

Although individuals disagree about the legitimacy and use of such definitions, research suggests that, psychologically speaking, the principle of hypodescent is alive and well. Peery and Bodenhausen (2008), for example, found that a majority of participants classified racially ambiguous targets as Black, even though the individuals exhibited biological traits and cultural backgrounds consistent with both Black and White stereotypes, and even though ethnic base rates in the population would have favored classification of the targets as White. The researchers argued that social categorization is driven by salient information—in this case, the existence of minority traits.

But *why* is information about minority traits salient? Although a variety of motivational, cultural, and political factors are likely involved, we propose that the weight given to minority traits can be parsimoniously explained with reference to basic cognitive mechanisms of learning and categorization. Using Kruschke's (1996, 2003) attention model of categorization, we argue that a bias toward minority classification emerges as a natural consequence of the order in which the features of majority- and minority-group members are learned, which in turn has implications for the weight given to distinctive features of the minority.

Attention theory assumes that people learn about frequent categories before they learn about infrequent ones, for the simple reason that, by definition, members of a frequent category are more numerous and more likely to be encountered. Once the features of the frequent category are learned, an efficient strategy for learning the infrequent (or any subsequently encountered) category is to focus attention on the features that best

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distinguish the new category from the previously learned one. Features that have already been learned as characterizing the majority category, even if these features are shared by the minority category, are ignored as attention is strongly turned toward the features that best distinguish between the majority and minority categories. This attention-shifting mechanism causes a stronger association between the minority category and its features than between the majority category and its features, and increases the weight given to minority features in judgment (e.g., Kruschke, 1992; Nosofsky, 1986). Because of this strong association, individuals exhibiting a combination of those distinctive features and features of the frequent group will tend to be seen as part of the infrequent group (Sherman et al., 2009).

We propose that this process underlies hypodescent. Racial majorities, being more numerous, should be learned before racial minorities. In turn, associations between distinctive features and minority groups will be stronger than those between distinctive features and majority groups. As a result, when individuals encounter racially ambiguous individuals who exhibit distinctive features of both groups, the features of minority groups should be overweighted and therefore bias classification toward the minority.

Study 1

In our first study, we asked native Chinese and native (Caucasian) New Zealanders to quickly classify photos of racially ambiguous individuals (see Fig. 1 for examples), created by morphing pairs of Chinese and Caucasian faces to 24 different extents. Because the two participant groups had different learning histories—participants raised in New Zealand were initially exposed to Caucasian faces more often than to Chinese faces, and the reverse was true for participants raised in China—attention theory predicted that Caucasian participants would be more likely than Chinese participants to classify ambiguous blends as Chinese.

Method

Participants. Eighty-two students at the University of Otago (43 female, 36 male, 3 whose gender was unspecified) were recruited from a job-placement service and participated in exchange for $12 New Zealand (approximately U.S.$9). Thirty-six of the participants self-identified as Chinese and indicated that they were raised in Chinese communities in China, Malaysia, or one of several other Asian Pacific nations (including New Zealand). Their mean age was 21.4 years, and they had been living in New Zealand, on average, since age 13. The remaining 46 participants self-identified as Caucasians of European descent; nearly all had been born and raised in New Zealand (the 3 exceptions indicated that they grew up in Australia, England, and Scotland). Their average age was 20.6 years.

The minority status of Chinese New Zealanders was confirmed in two independent pretests. In the first, an independent group of 83 participants, drawn from the same population as in the main study, completed a five-block Chinese-Caucasian Implicit Association Test (IAT) that used 24 unmorphed Chinese and Caucasian faces (gender balanced) and 24 positive and negative attributes. Excluding 1 participant with an error rate above 20%, we found anti-Chinese implicit attitudes using both the raw IAT measure (M = 78.3) and IAT-D (M = 0.30; Greenwald, Nosek, & Banaji, 2003), which differed significantly from zero, $t(81)$s = 3.33 and 5.38, ps < .001. In the second pretest, 27 participants were asked to rank-order 10 ethnic groups in terms of their "community standing" in New Zealand society (Adler, Epel, Castellazzo, & Ickovics, 2000). All but 1 participant ranked Caucasian New Zealanders as having the highest status (1); Maori (mean ranking = 3.6) and then Chinese (mean ranking = 4.8) followed far behind.

Stimuli. The gray-scale images of four pairs of Caucasian and Chinese individuals were digitally blended using a morphing computer program (Morph Version 2.5; Gryphon Software Corp., San Diego, CA) that mathematically averages the gray-scale levels of corresponding, user-defined landmark points on two faces to produce an arbitrarily blended version of the pair (see Rhodes, Sumich, & Byatt, 1999, for more details). Using this process, we created four sets of 26 images, each including an unmodified Asian face, an unmodified Caucasian face, and 24 equally spaced morphs between them that varied systematically in their racial ambiguity. All images were approximately

Fig. 1. Example of a Chinese-Caucasian face pair used in Study 1 and 4 of its 24 morphed blends. "Ambiguous" faces were defined as those in the middle third of the Asian-Caucasian continuum, which included the middle 2 images in the figure.

100 mm square and were displayed on a white background; examples appear in Figure 1.

Procedure. Instructions and stimuli were presented and data were recorded via Java software running on Macintosh iMac computers located in private, light- and sound-attenuated experimental cubicles; participants wore noise-canceling headphones. The single task was to make speeded classifications of two replications of the 104 stimulus faces; in each of two consecutive blocks, the complete set was presented once, in an independent order randomized by participant. Participants reported whether each stimulus, presented in the center of a blank white screen, was a "Chinese face" or a "Caucasian face," using the "z" and "/" keys on the computer keyboard. The screen cleared once a participant had responded, and the next face appeared after a randomly varying intertrial interval of 500 to 1,500 ms.

Results and discussion

The effect of learning order on classification of ambiguous group members was tested by computing the likelihood that a racially ambiguous face—conservatively defined as one of the middle 8 of the 26 stimuli in the continuum of each Chinese-Caucasian pair—would be classified as Chinese. Responses made faster than 200 ms or slower than 2 standard deviations above a participant's own mean latency (5% of all responses) were not analyzed. A planned contrast confirmed that ambiguous faces were classified as Chinese more often by Caucasian than by Chinese participants (*M*s = .49 vs. .44, *SE*s = .02), $t(80) = 1.80$, $p < .05$, $\eta_p^2 = .04$. (An apparent overall tendency toward Caucasian classification was due to idiosyncratic features of the morphed images and is irrelevant to the hypotheses tested.) The effect did not reflect general cross-race classification differences, as the same analysis conducted on unambiguous faces revealed no effects: The 9 "most Chinese" faces (i.e., those closest to the Chinese end of the morph continua) were almost always classified as Chinese (*M*s = .96), and the 9 least Chinese faces almost never were (*M*s = .02). A planned contrast testing the interaction between race of participant and ambiguity of face (unambiguously Chinese or Caucasian vs. ambiguous) was significant, $t(80) = 1.92$, $p < .05$.

The results support attention theory's prediction that classification of mixed-race individuals depends on the order in which the majority and minority groups are learned, and the consequent weight given to distinctive features of the latter. It is also noteworthy that the results are inconsistent with the characterization of hypodescent as classification based on social status, which would predict no effect of a rater's own learning history because the social status of the minority group was identical for all raters.

The results do not, however, rule out an alternative, motivational account: the *in-group overexclusion* hypothesis (Castano, Yzerbyt, Bourguignon, & Seron, 2002; Leyens & Yzerbyt, 1992). According to this account, individuals are motivated to protect their in-group, particularly when they identify strongly with it, by excluding ambiguous group members, possibly by setting a low threshold for out-group membership. Attention theory and in-group overexclusion could not be distinguished in Study 1 because the use of naturally occurring groups confounded learning history with racial self-concept.

We therefore devised a stronger test of attention theory by manipulating the majority status of novel monoracial faces via their frequency of exposure in a learning phase. In this paradigm, out-group exclusion (as well as social status and preexisting stereotypes) could not play a role. Nevertheless, we expected that majority (i.e., frequently appearing) faces would be learned before minority faces and, if attention theory's account of hypodescent is correct, that ambiguous faces would be judged more often as minority- than as majority-group members.

Study 2

Method

Participants. Eighty-nine participants (51 female, 33 male, 5 whose gender was unspecified) volunteered for Study 2 as part of a research requirement for their first- or second-year psychology course. Participants were 20.9 years old on average; 79% self-identified as Caucasians of European descent, and the remainder were primarily of Asian, Maori, or Pacific Island descent.

Stimuli. All stimuli were color images of female faces. Three pairs of Caucasian female faces were used as the "parent" faces for three groups, arbitrarily designated "Red," "Yellow," and "Blue" (randomized by participants). The faces in each pair, arbitrarily designated "A" and "B," were morphed to create 24 equally spaced blends varying in their similarity to A and B. All faces were approximately 140 mm wide by 190 mm tall and were mounted on black backgrounds; examples appear in Figure 2.

Procedure. There were two parts to the study—learning and classification. In the learning phase, participants were differentially exposed to the six parent faces. In each of 10 blocks, one member of each parent pair (the "majority" member) was presented nine times, and the other, "minority" member was presented three times (360 trials in total). To ensure learning, we asked participants to indicate the groups (Red, Yellow, or Blue) to which the faces belonged, by pressing appropriately colored keys, and provided computer feedback. In the classification phase, participants classified the 26 members of each group in terms of which "type" of group member (A or B) they were. This classification procedure was repeated three times, once for each group, in random order.

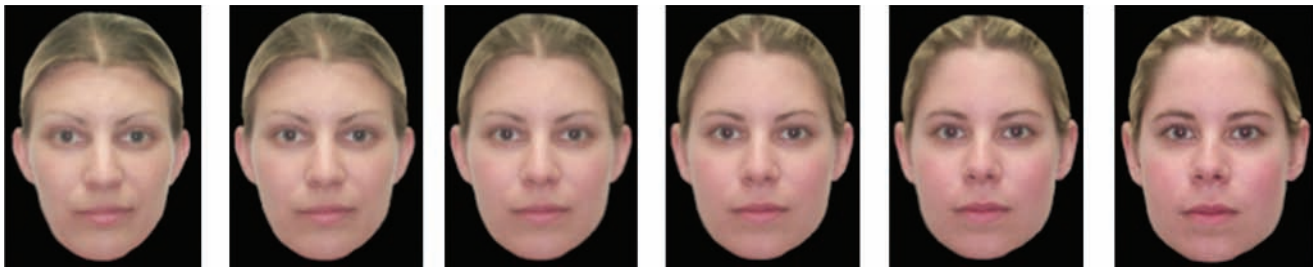

Fig. 2. Example of a Caucasian-Caucasian face pair used in Study 2 and 4 of its 24 morphed blends. Participants were exposed to frequent presentations of the face at one end of the morph continuum and infrequent presentations of the face at the other end. After this learning phase, participants classified the blends in terms of those "parent" faces. "Ambiguous" faces were defined as the middle third of the morph continuum, which included the middle 2 images in the figure.

Results

Learning. A 2 (majority vs. minority) × 10 (block) × 2 (A face or B face assigned to majority status) analysis of variance revealed main effects of block, $F(9, 783) = 147.54$, $p < .001$, $\eta_p^2 = .63$, and majority status, $F(1, 87) = 182.97$, $p < .001$, $\eta_p^2 = .68$, reflecting learning over time and overall better learning of majority faces (*M*s = .88 vs. .74, *SE*s = .02). Most critically, the condition for the application of attention theory was met: The analysis revealed a majority-status-by-block interaction, $F(9, 783) = 28.88$, $p = .001$, $\eta_p^2 = .25$. As predicted, majority members were learned (i.e., were assigned to groups with greater than 80% accuracy) before minority members. Mean accuracy was equivalent for majority and minority members by the final block, (*M*s = .94 vs. .93).

Classification of ambiguous exemplars. Responses made faster than 200 ms or slower than 2 standard deviations above a participant's own mean latency (6% of all responses), and the data from 1 outlying participant, were not included in the analysis of the classification phase. Attention theory predicts that classification of ambiguous faces will be biased toward the group that is learned second (in this case, as a result of their experimentally manipulated minority status). To test this prediction, we coded the data in terms of the likelihood that an ambiguous face (i.e., a face in the middle third of the morph continuum between a face pair) would be classified as a B face. Conceptually replicating Study 1, a planned contrast revealed that faces were more likely to be classified as Bs when A faces were the majority than when B faces were the majority (*M*s = .40 vs. .36, *SE*s = .02 and .01), $t(86) = 2.03$, $p < .05$, $\eta_p^2 = .03$. The same analyses conducted on unambiguous faces revealed no effects: The 9 faces most similar to A were rarely classified as Bs, regardless of whether A or B was the majority face (both *M*s = .07); the 9 faces most similar to B were highly likely to be classified as Bs (*M*s = .90 and .89). A planned contrast testing the interaction between ambiguity and majority status was significant, $t(86) = 1.75$, $p < .05$.

General Discussion

Study 1 revealed for the first time that the classification of biracial faces depends on the learning history of the raters, a result inconsistent with an account of hypodescent judgment based solely on the social status of the competing social categories. Study 2 replicated the effects in the laboratory with entirely arbitrary groups, eliminating any motivational or self-presentational factors as explanations of the tendency to classify ambiguous faces as minority-group members.

The results are most parsimoniously explained in terms of attention theory, which assumes that minority groups are learned later than majority groups and that learning minority groups requires attention to their distinctive features (rather than those they have in common with other groups). Selective attention forges a strong cognitive association between minority-group membership and those distinctive features, which are consequently overweighted when they are present in ambiguous group members, leading to a bias toward minority classification. As hypothesized, participants in these two studies tended to classify ambiguous faces as members of the groups participants learned second, whether learning order was due to biased exposure to faces in childhood or, more powerfully, to controlled exposure to arbitrary faces in the laboratory. Note that this effect occurred only for relatively ambiguous faces; participants were not generally biased toward minority classification and assigned unambiguous faces to their corresponding categories.

Although the two manipulations of learning revealed highly consistent findings, we cannot conclude that hypodescent is in all cases due to learning-driven attentional factors. To be sure, hypodescendant decisions may be made out of identity-related, political, or legal necessity (e.g., to administer reparations to historically disadvantaged groups; Blascovich, Wyer, Swart, & Kibler, 1997; U.S. Department of the Interior, 2009), rather than because of cognitive or perceptual differences. However, although motivational, political, sociological, and economic factors may play a role, they are not necessary for hypodescent to occur. Study 2, in particular, eliminated these factors, and thereby

showed that hypodescent can be explained as an emergent feature of how the cognitive system learns categories. Minority categories will cognitively "absorb" ambiguous cases, without any particular motivation or intent on the part of the perceiver.

Acknowledgments

The authors thank Matthias Bluemke, Donna Anderson, Jonathan Jong, Rajshree Gopala Krishnan, Helen Owen, Tristan Philip, and Neville Todd for conceptual and technical assistance.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

Funding

This research was supported by an Otago Research Grant to Jamin Halberstadt.

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