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INTERACTIVE EFFECTS

THE POWER OF IDENTITY TO MOTIVATE FACE MEMORY IN BIRACIAL INDIVIDUALS

Kristin Pauker
University of Hawaii

Nalini Ambady†
Stanford University

Jonathan B. Freeman
Dartmouth College

The authors examined whether biracial (Black/White) individuals, who have access to multiple racial identities and experience with both Black and White faces, would be able to adopt the perceptual lens of a contextually salient racial identity. Biracial and monoracial perceivers wrote an essay about a time they connected with their mother's or father's ethnic identity before completing a face recognition task. The authors hypothesized that this essay prime would influence biracial perceivers' racial identification and that their memory for Black, White, and racially ambiguous faces would reflect the motivational relevance of the target face to their salient racial identity. Results indicated that biracial individuals adopted different racial identifications to guide preferential memory relevant to their salient racial identity, exhibiting memory patterns comparable to monoracial individuals' typical own-race bias. These findings suggest that ingroup memory effects depend on integration of bottom-up perceptual experience and top-down factors, such as the social relevance of faces.

More than 100 studies spanning four decades have demonstrated that people have difficulty recognizing faces of a race that is not their own, a tendency referred to as the own-race bias (ORB) or cross-race effect (e.g., Meissner & Brigham, 2001). Despite being one of the most widely replicated and robust biases in face per-

†deceased.

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Address correspondence concerning this article to Kristin Pauker, University of Hawaii, Department of Psychology, 2530 Dole Street, Sakamaki Hall C400, Honolulu, HI 96822; E-mail: kpauker@hawaii.edu

ception (Young, Hugenberg, Bernstein, & Sacco, 2012), a clear and parsimonious explanation for this effect has been the topic of much theoretical debate (Meissner & Brigham, 2001; Young et al., 2012). Here we utilize a unique population—biracial individuals—to test predictions put forth by a recently proposed integrative model, the *Categorization-Individuation Model* (CIM; Hugenberg, Young, Bernstein, & Sacco, 2010), which uniquely predicts that perceiver experience and motivation interact to create the ORB.

INTEGRATING BOTTOM-UP AND HIGHER-ORDER FACTORS

Mirroring recent evolution in theory arguing that both bottom-up perceptual inputs and higher-order social factors can shape visual perception (Adams, Ambady, Nakayama, & Shimojo, 2011; Balcetis & Lassiter, 2010), explanations for the ORB have progressed from purely perceptual experience–driven arguments toward more integrative frameworks combining both bottom-up and social factors. According to perceptual experience accounts, greater experience with own-race faces compared to other-race faces bolsters perceptual expertise in encoding and recognizing own-race faces and results in a deficiency in processing other-race faces (e.g., Hancock & Rhodes, 2008; Sangrigoli & de Schonen, 2004; Tanaka, Kiefer, & Bukach, 2004). While there has been substantial research support for this account (see Young et al., 2012), meta-analytic evidence found that the variance accounted for by interracial contact in the ORB was surprisingly small and negligible (Meissner & Brigham, 2001).

As an alternative to a purely bottom-up perceptual account, social-cognitive accounts have also been proposed (e.g., Levin, 1996; Sporer, 2001). From a social-cognitive perspective, the ORB does not result from differences in perceptual learning, but rather stems from differential processing dedicated to ingroup and outgroup members (i.e., the tendency to individuate the ingroup and think categorically about the outgroup; Young et al., 2012). In fact, merely categorizing faces into ingroup and outgroup can create an ingroup memory bias, even when perceivers' perceptual experiences with the faces are held constant (e.g., Bernstein, Young, & Hugenberg, 2007; Hehman, Mania, & Gaertner, 2010; Pauker et al., 2009; Rule, Garrett, & Ambady, 2010; Van Bavel, Swencionis, O'Connor, & Cunningham, 2012).

Rather than proposing that the ORB results from either perceptual expertise *or* social-cognitive factors, recent theoretical frameworks, such as Hugenberg and colleagues' (2010) CIM, have integrated these accounts under a broader, more parsimonious explanation. Such ingroup memory effects appear to—at their core—be driven by whether the target is motivationally relevant to the self (Adams, Pauker, & Weisbuch, 2010; Hugenberg et al., 2010; Pauker et al., 2009). But importantly, both perceptual and social factors can work in tandem to determine motivational relevance. Social categories serve as one such cue to motivational relevance, whereby ingroup members are automatically seen as more relevant than outgroup members, but other fundamental cues to motivational relevance (e.g., power or potential threat to safety) can override social category cues (Hugenberg et al., 2010). Thus, even outgroup members can be remembered as well as ingroup members when deemed important (e.g., Ackerman et al., 2006; Shriver & Hugenberg, 2010). Moreover, motivational relevance is in part shaped by perceptual exposure. High exposure to a particular type of face in an environment, particularly if the

faces comprise the majority, serves as a signal of the motivational relevance of that type of face. On the flip side, visual experience with a face does not guarantee improvements in recognition without engaging motivation to individuate the face (Tanaka & Pierce, 2009). Thus, building perceptual expertise is intricately intertwined with motivated processing (Hugenberg et al., 2010). Moreover, the CIM makes an explicit prediction that even sufficient individuation experience will not automatically translate into superior face encoding and memory unless the faces are also motivationally relevant (Hugenberg et al., 2010).

A UNIQUE POPULATION

Most individuals have differential amounts of experience with own- and other-race faces, but multiracial individuals—projected to reach 21% of the U.S. population by 2050 (Smith & Edmonston, 1997)—have substantial, meaningful experience with multiple racial groups. As such, they are an ideal population to test predictions set forth by the CIM. This population is also unique in that they have multiple salient racial identities and demonstrate fluidity in their racial identity—their racial identification can shift across contexts and time (Harris & Sim, 2002; Hitlin, Brown, & Elder, 2006). Such changes in self-categorization should affect the lenses through which multiracial individuals see the world (Turner, Hogg, Oaks, Reicher, & Wetherell, 1987) and the groups they find motivationally relevant. Indeed, in one study the salient racial identity of biracial individuals affected their search for different-race faces in a visual array (Chiao, Heck, Nakayama, & Ambady, 2006).

The current study examines whether manipulating biracial individuals' self-categorization could shift the motivational relevance of target faces and shape facial recognition memory. Specifically, we directly examine the role of motivational relevance as proposed by the CIM, testing the specific prediction that individuation experience with faces affords recognition benefits only when those faces are also motivationally relevant. Using biracial individuals allows us to test this prediction in a population that not only has individuation experience with two racial groups, but that also has fluidity in their racial identity. Thus, we can directly manipulate what faces should be considered motivationally relevant through priming their racial identity and quantify this motivational relevance via a fundamental social motivation: social identification. If recognition biases stem from motivated aspects of social identification, then those who identify more strongly with their contextually activated racial identity should exhibit the greatest shifts in memory.

OVERVIEW

We compared the memory of biracial individuals primed to think of themselves as Black or White to the memory of monoracial Black and White participants. Specifically, we tested whether contextual cues to social identity could direct biracial individuals' racial identification and subsequent memory for Black, White, and racially ambiguous faces and compared their memory to control, monoracial participants.

METHOD

PARTICIPANTS AND DESIGN

Thirty-eight Black-White biracial (17 females), 12 Black (7 females), and 17 White (5 females) individuals were recruited from the community for payment. Participants were 18 to 40 years old (M = 23.31, SD = 7.11). Biracial participants self-identified as having a monoracial Black parent and a monoracial White parent, and were recruited through a national mixed-race organization and university organizations. Two biracial individuals expressed suspicion about the procedure; they were excluded from analyses, leaving a total of 36 biracial individuals in the analyses reported here.

MATERIALS

Face Stimuli. A total of 20 Black, 20 White, and 20 racially ambiguous photographs of males and females displaying a neutral facial expression were used in this study. Photos of Black and White individuals were obtained from the NIMSTIM face set (Tottenham et al., 2009), the Productive Aging Laboratory face database (Minear & Park, 2004), and a set in our lab. Racially ambiguous photos were created by morphing photos of Black and White individuals using Morpheus (Version 3.10). All pictures were adjusted to uniform size and resolution (275 × 360 pixels; 3.8 × 5.0 inches; 72 pixels/inch).

PROCEDURE

After giving informed consent, participants were told they would complete several short tasks, including the main face memory task. Participants first wrote an essay, completed measures of racial identification, and then completed a face recognition task. Participants also completed a multiple-choice item as a manipulation check where they confirmed the type of essay they initially wrote. Finally, participants completed an open-ended identification questionnaire and a demographic form, were fully debriefed, and thanked.[1] The demographic form asked participants to indicate cities where they had grown up, gone to college, and currently lived. Exposure to Black, White, and Black/White biracial individuals was calculated based on demographic information for these cities. During debriefing, participants were probed as to whether they thought the tasks were related and specifically if they thought the essay they wrote affected their face memory. Only two participants (both biracial) expressed direct suspicion that the essay was meant to prime their identity and affect their face memory. Their data were excluded from the analyses. All other participants could not make a clear connection between the tasks and passed the manipulation check regarding the type of essay they wrote.

1. In the open-ended identification measure, all biracial participants self-identified as biracial, mixed race, or a combination of identities (e.g., Black and White).

Essay Prime. Using a method similar to that of Chiao et al. (2006), participants were first asked to write an essay for 7 min about "a time that you particularly connected with your mother's/father's ethnic identity." Each person was randomly assigned to write one type of essay. This essay served as the main manipulation: Black identity prime or White identity prime.

Racial Identification. Participants completed a one-item measure asking them to pick which identity they felt closest to at that moment, ranging from 1 (*Black*) to 4 (*Biracial*) to 7 (*White*). While this measure of racial identification may be slightly odd for a monoracial person, we needed a scale that would accurately access variation in self-categorization for both monoracial and multiracial participants. To validate this measure, participants also completed Tropp and Wright's (2001) measure of group identification, which uses a visual scale of overlapping circles of the self and group membership. Participants completed this measure for each of the three groups separately (i.e., Black, Biracial, White).

Face Recognition Task. The face recognition task comprises two parts: the learning and the recognition phases. In the learning phase, participants saw 10 Black (5 female), 10 White (5 female), and 10 ambiguous (5 female) faces. Each face was presented for a total of 5 s, preceded by a fixation point with an intertrial interval of 1010 ms.

Following the learning phase, participants did a short filler task (a crossword puzzle) for 5 minutes and then progressed to the recognition phase. In the recognition phase, participants were presented with the original 30 faces from the learning phase plus 30 foils. The faces used in learning and as foils were counterbalanced across participants. Faces were presented in a randomized order and remained on the screen until the participant pressed a key to indicate whether they had seen the face before.

RESULTS

EXPOSURE

To establish that our sample of biracial individuals had meaningful experience with multiple racial groups, we averaged each participant's percentage exposure to White, Black, and biracial Black/White individuals across all contexts. Exposure scores were entered into a 3 (exposure race: White, Black, biracial) × 3 (participant race: White, Black, biracial) mixed-model ANOVA with repeated-measures on the first factor. A main effect for exposure race was reliable: Participants were exposed to more White (M = 63.34%, SD = 15.65) than Black (M = 18.30%, SD = 16.73) or biracial (M = .42%, SD = .33) faces, $F(2, 120) = 211.18$, $p < .0001$, $\eta^2 = .78$. Importantly, this interacted with participant race, $F(4, 120) = 7.83$, $p < .0001$, $\eta^2 = .21$. Follow-up one-way ANOVAs compared differences in exposure to each type of face across participant race. White individuals had more White exposure (M = 77.41%, SD = 15.24) than did biracial (M = 60.49%, SD = 15.65) or Black (M = 54.37%, SD = 24.33) individuals, $F(2, 62) = 7.61$, $p = .001$, $\eta^2 = .20$. Black individuals had more Black exposure (M = 32.28%, SD = 25.86) than did biracial (M = 8.26%, SD = 12.17) or White (M = 8.03%, SD = 7.88) individuals, $F(2, 62) = 9.48$, $p < .001$, $\eta^2 = .23$. All three groups had negligible exposure to biracial faces (Ms = 0.34%–0.48%), $F(2, 62)$ =

TABLE 1. Mean Recognition Memory, Hit Rates, False Alarm Rates, And Criterion Scores for Black, Ambiguous (Amb), and White Faces as a Function of Prime and Participant Identity (Biracial or Monoracial)

	Black-primed biracial			White-primed biracial			Black			White		
	Black	**Amb**	**White**	**Black**	**Amb**	**White**	**Black**	**Amb**	**White**	**Black**	**Amb**	**White**
d′	1.32	0.87	1.31	1.07	0.74	1.45	1.43	0.74	1.10	0.85	0.70	1.33
Hits	0.74	0.73	0.78	0.75	0.70	0.85	0.88	0.65	0.75	0.66	0.63	0.76
False alarms	0.11	0.28	0.15	0.22	0.33	0.14	0.18	0.28	0.18	0.25	0.28	0.13
c (criterion)	0.18	−0.03	0.11	0.04	−0.03	0.01	−0.09	0.09	0.11	0.12	0.11	0.16

.74, $p = .48$, $\eta^2 = .02$. Overall, White participants had the highest exposure to White faces and Black participants had the highest exposure to Black faces, whereas biracial individuals had moderate exposure to both White ($M = 60.49\%$) and Black ($M = 18.26\%$) faces. No group, however, including biracial individuals, had considerable exposure to biracial faces in their context.

RACIAL IDENTIFICATION

Participants' essay topics were recoded into whether the essay primed their White or Black identity (according to the race of the parent about which they wrote). For monoracial participants, both parents belonged to the same racial group; thus, White participants wrote about their White identity and Black participants wrote about their Black identity. For biracial participants, each parent belonged to a different racial group; thus, they either wrote about their White or Black identity.

The one-item racial identification measure was correlated highly with Tropp and Wright's (2001) measure of Black identification, $r = -.85$, $p < .001$, White identification $r = .82$, $p < .001$, and moderately with Biracial identification, $r = -.34$, $p = .006$, validating the use of this measure. Racial identification scores were entered into a 2 (identity prime: Black, White) × 2 (participant identity: biracial, monoracial) between-subjects ANOVA. Recall that higher numbers were associated with closeness to a White identity and lower numbers were associated with closeness to a Black identity. Participants primed to think about their White identity felt closer to their White identity ($M = 5.27$, $SD = 1.59$), while those primed to think about their Black identity felt closer to their Black identity ($M = 2.58$, $SD = 1.26$), $F(1, 61) = 183.97$, $p < .0001$, $\eta^2 = .75$. This effect was qualified by an interaction with participant identity such that this effect was more pronounced for monoracial participants who identified as feeling closer to their White identity ($M = 6.76$, $SD = .44$) and Black identity ($M = 1.83$, $SD = 1.27$), respectively, than biracial individuals primed with their White identity ($M = 3.78$, $SD = .55$) or Black identity ($M = 3.33$, $SD = 84$), $F(1, 61) = 128.16$, $p < .0001$, $\eta^2 = .68$. This difference was reliable for both monoracial, $t(27) = 14.93$, $p < .0001$, $r = .94$, and biracial, $t(34) = 1.88$, $p = .035$, $r = .31$, participants. Although the change in racial identification was small for biracial participants, both monoracial and biracial participants reported feeling closer to an identity consistent with the prime they received.

MEMORY

Hits and false alarms from the face recognition task were combined into d' scores.[2] No differences were obtained as a function of participant or target gender, so analyses collapsed across these variables. Although we performed analyses only on d' scores, all values used to calculate d' (i.e., hits and false alarms) and criterion scores appear in Table 1.

The mean d' data were subjected to a 3 (target race: Black, White, ambiguous) × 2 (identity prime: Black, White) × 2 (participant identity: biracial, monoracial)

2. When the proportion of hits or false alarms equals one or zero, d- cannot be calculated. To correct for this, we transformed hits and false alarms into Bayesian proportions.

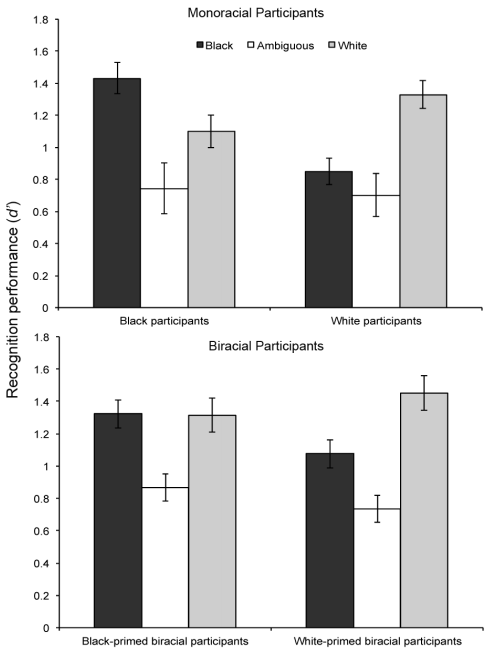

FIGURE 1. Black and White participants' (top panel) and Biracial participants' (bottom panel) mean recognition performance (*d'*) for Black, Ambiguous, and White faces when exposed to a Black or a White identity prime. Error bars denote standard errors.

mixed-model ANOVA with repeated measures on the first factor. A main effect for target race was reliable, such that White faces were better recognized (M = 1.32, SD = .42) than Black faces (M = 1.15, SD = .41) and ambiguous faces (M = .76, SD = .45), $F(2, 122) = 41.34$, $p < .0001$, $\eta^2 = .40$. Importantly, a target race by identity prime interaction, $F(2, 122) = 11.82$, $p < .0001$, $\eta^2 = .48$, indicated that the identity prime affected memory for ingroup and outgroup faces for both monoracial and biracial participants. The lack of a significant interaction between target race, identity prime, and participant identity, $F(2, 122) = 2.00$, $p = .14$, $\eta^2 = .03$, lends some support to the claim that the identity prime affected both biracial and monoracial participants in a similar fashion. Because the primary purpose of this study was to examine whether biracial individuals could adopt the perceptual lenses of different racial identities, results for monoracial and biracial participants are depicted in Figure 1 separately to allow for direct comparison.

As would be expected, based on the lack of a three-way interaction noted here, the target race by identity prime interaction was reliable for both monoracial, $F(2, 54) = 8.28$, $p = .001$, $\eta^2 = .23$, and biracial participants, $F(2, 68) = 3.52$, $p = .035$, $\eta^2 = .09$. To explore these interactions, we ran planned contrasts separately on monoracial and biracial participants. For monoracial participants, the typical own-race bias emerged such that Black participants displayed better memory for Black than White faces, $t(54) = 2.13$, $p = .02$, $r = .28$, and White participants displayed better memory for White than Black faces, $t(54) = 3.67$, $p < .001$, $r = .45$. Moreover, Black and White participants recognized ingroup faces better than ambiguous faces, ts(54) > 4.43, $p < .0001$, rs > .52, replicating past work demonstrating that racially ambiguous faces tend to be misrecognized (Pauker et al., 2009). As would be ex-

pected, Black participants recognized Black faces better than did White participants, $t(54) = 4.06$, $p < .0001$, $r = .48$, and White participants recognized White faces marginally better than did Black participants, $t(54) = 1.59$, $p = .06$, $r = .21$. Neither differed in their recognition of ambiguous faces, $t(54) = .29$, $p = .39$, $r = .04$.

Critically for biracial participants, their memory for ingroup and outgroup faces depended on their contextually relevant social identity. Black-primed biracial individuals recognized Black and White faces to the same extent, $t(68) = .08$, $p = .47$, $r = .01$, whereas White-primed biracial individuals displayed a memory advantage for White over Black faces, $t(68) = 3.58$, $p < .001$, $r = .40$. Both Black-primed and White-primed biracial participants recognized ingroup-relevant faces better than racially ambiguous faces, ts$(68) > 3.21$, ps $< .001$, rs $> .36$. Similar to monoracial participants, Black-primed biracials recognized Black faces better than did White-primed biracials, $t(68) = 2.35$, $p = .02$, $r = .27$, and White-primed biracials recognized White faces marginally better than Black-primed biracials, $t(68) = 1.30$, $p = .09$, $r = .16$. Neither differed significantly in their recognition of ambiguous faces, $t(68) = 1.25$, $p = .11$, $r = .15$. Thus, biracial individuals exhibited an ability to adopt the lens of either a Black or a White identity, and recognized faces largely consistent with the motivationally relevant identity.

To explore whether differences in racial identification explained the effect of the racial identity prime on memory performance, mediational analyses were conducted. Because the identity prime did not predict memory changes for racially ambiguous or large changes for White faces (see Figure 1), we only performed the mediational analysis on memory for Black faces (see Baron & Kenny, 1986). Analyses using a bias-corrected bootstrap mediation (Preacher & Hayes, 2004) revealed that the identity prime (White = 1) was a negative predictor of memory for Black faces ($B = -.40$, $p = .0001$), a relationship that was reduced when racial identification was added as a predictor ($B = -.23$, $p = .05$). This indirect effect was statistically significant (95% confidence interval: −.3408, −.0100), indicating that racial identification mediated the relationship between the identity prime and memory for Black faces.[3]

DISCUSSION

Biracial individuals were able to adopt the lenses of their different racial identities based on situational cues and recognized motivationally relevant faces based on changes in self-categorization. Overall, these results provide support for predictions put forth by the CIM. Biracial individuals recognized the same faces differently depending on which racial identity was contextually salient. Thus, motivated processing cued by social categorization can shape ingroup memory. Although there has been extensive research on the contributions of perceptual expertise and social categorization to the ORB, only a handful of studies have quantified the specific motivations that perceivers use to guide their face processing (e.g., Van Bavel et al., 2012). Here we measured one such motivation: strength of social identification. The effect of a salient racial identity on recognition memory was explained by

3. When we ran this mediation on biracial and monoracial participants separately, the indirect effect of identity prime on memory for Black faces remained significant only for biracial participants. This is likely due to a lack of variability in the racial identification measure for monoracial participants within identity prime.

perceiver's level of racial identification. Those who shifted their identity the most showed the greatest shift in memory.

Even though biracial individuals have substantial individuation experience with both Black and White faces, providing support for the CIM, they exhibit better recognition for those faces only when they are also motivationally relevant (as cued by the contextual identity prime). Two findings, however, merit further discussion. First, biracial participants exhibited poor memory for racially ambiguous faces—why wouldn't biracial participants perceive these faces as ingroup (and motivationally relevant)? Because we specifically primed a "White" or "Black" identity for biracial participants—both identities where racially ambiguous faces are *not* motivationally relevant—biracial participants should not remember these faces. Moreover, like monoracial participants, biracial participants had negligible (<1%) exposure to biracial faces. In concordance with the CIM, a lack of perceptual expertise and motivational relevance may *both* affect biracial (and monoracial) participants' poor memory for these faces.[4] Second, biracial perceivers primed with their Black identity recognized Black and White faces equally, whereas those primed with their White identity displayed the typical ingroup memory advantage. Minority perceivers, particularly when immersed in a cross-race environment, do not consistently display an ingroup advantage (e.g., Chiroro & Valentine, 1995; Meissner & Brigham, 2001). The reduction and sometimes elimination of the ingroup advantage in minority perceivers could be explained by the higher motivational relevance of majority group members (due to their more powerful position in U.S. society; Hugenberg et al., 2010). Minority group members may also not rely on category cues to process majority group members' faces (Levin, 1996), leading to greater individuation and better memory. Here, biracial individuals adjusted their Black face memory but not their White face memory, depending on their salient identity, highlighting how motivational relevance of a group (due to power differentials) and differences in the tendency to categorically process *majority* outgroup faces may interact with situational ingroup identification (Hugenberg et al., 2010). Finally, differences in exposure may interact with the motivational relevance of ingroup identity, which could explain the asymmetric effects we see with biracial compared to monoracial individuals. Black-primed biracial individuals had less exposure (M = 18.26%) than did Black individuals (M = 32.9%) to Black faces in their context, which may explain why Black-primed individuals do not show the same enhanced memory for Black compared to White faces as do Black individuals. In sum, our findings support a more interactive account between motivation and experience, as proposed by the CIM: We do see changes in memory in accordance with the motivational relevance of situationally activated identities, but the effect of this motivation depends on experience with these faces.

In line with recent work on multiracial identity, these results depart from the typical focus on negative outcomes (see Shih & Sanchez, 2005) and highlight potential positive outcomes of adopting a multiracial identity (e.g., Binning, Unzueta, Huo, & Molina, 2009; Pauker & Ambady, 2009; Shih, Bonam, Sanchez, & Peck, 2007). One potential limitation of these results, however, is that in general the bi-

4. Based on evidence from pretesting data and separate study using the same stimuli, we believe the lack of memory for racially ambiguous faces is not due to potential stimuli confounds introduced through morphing. The faces were pretested such that all three groups were equalized in distinctiveness, and in a separate study (Pauker, Weisbuch, & Ambady, in prep) participants recognize these same racially ambiguous faces as well as ingroup faces when sufficiently motivated.

racial sample's identification was skewed toward Black identification. This may be a peculiarity of this sample, but other work has found that even when biracial individuals adopt a fluid biracial identity, they often report feeling closer to Black than White individuals (Rockquemore & Brunsma, 2002). Importantly, we found downstream differences in memory for biracial individuals based on relative differences in identification. This work emphasizes the need to expand research on identity and social categorization beyond examining only distinct, discrete social categories to exploring ambiguous categories and overlapping identities.

Research at the boundaries of categories and at the intersection of identities not only challenges notions of essentialism that become reified through the research we conduct, but also serves to provide advancement for our theoretical understanding of motivated perception. Examining face processing in biracial individuals provides evidence to support an integrative model of the ORB, illustrating the malleable nature of face perception and memory, where both higher-order social-cognition and bottom-up perceptual inputs collaborate to produce our routine sights.

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