

## **Multiracial Faces: How Categorization Affects Memory at the Boundaries of Race**

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*Monoracial and multiracial individuals are likely to have different conceptualizations of race and subsequently different approaches toward racial ambiguity. In particular, monoracial individuals may be more likely to rely on categories when processing ambiguous faces, whereas multiracial individuals may tend to ignore such categorizations due to a reduced tendency to essentialize race. We compared monoracial (White and Asian) and biracial (Asian/White) individuals' memory patterns. Specifically, we examined participants' memory for White, Asian, and biracial faces labelled as either White or Asian. Both White and Asian participants relied on the labels, remembering faces labeled as the in-group better than faces labeled as the out-group. Biracial participants relied less on the labels, exhibiting better recognition memory overall. Biracial participants' memory performance was also highly correlated with a less essentialist view of human traits. This cognitive flexibility may serve an adaptive function for biracial individuals and contribute to enhanced facial recognition.*

"What would it be like to shake someone's hand and not know what they are?" (See, 1998, p.137).

The categorization of multiracial individuals is often difficult because of the ambiguity in their racial appearance. Precisely because of this ambiguity, multiracial individuals are frequently bombarded with the question, "What are you?" often coupled with responses such as, "Really? You don't look it," or "Are you sure?" (Root, 2003). This pattern of suspended disbelief points toward social perceivers'

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discomfort with this ambiguity, which may stem from a persistent overreliance on discrete categories in organizing their world. How social perceivers' classify a multiracial individual is likely to differ from the multiracial individual's self-identification. This mismatch between self-identification and perception may lead to a feeling that their identity is not validated by society (Rockquemore & Brunnsma, 2002). But this mismatch may also contribute to cognitive flexibility that could possibly enhance multiracial individuals' social processing skills.

Dealing with challenges to their racial identity may require multiracial individuals to frequently reconceptualize their identity across situations. Regardless of the outcome a multiracial individual chooses, such challenges require adaptation—either cognitive flexibility in enacting different identities or in maintaining a particular personal identity despite incongruence with others' perceptions (Chiao, Heck, Nakayama, & Ambady, 2006). Thus, we propose that monoracial and multiracial individuals may approach racial ambiguity with divergent strategies. Monoracial individuals may concentrate on categorizations, whereas multiracial individuals may develop a more fluid notion of race, less dependent on external categorizations (Hitlin, Brown, & Elder, 2006; Root, 1996; Spickard, 1992).

A plethora of research has explored racial categorization and its consequences (e.g., Allport, 1954; Brewer, 1988; Fiske & Taylor, 1991; Macrae & Bodenhausen, 2000). Considerably less research has explored how racial categorization operates at the boundaries of race: that is, when the target to be categorized is ambiguous. We do know that perceiver characteristics, such as level of prejudice or strength of racial identification, influence the speed at which perceivers classify racially ambiguous targets and the likelihood they are classified as in-group members (Blascovich, Wyer, Swart, & Kibler, 1997; Castano, Yzerbyt, Bourguignon, & Seron, 2002; Pettigrew, Allport, & Barnett, 1958). Additionally, target characteristics, such as emotional expression (Hugenberg & Bodenhausen, 2004), stereotypical hairstyles (MacLin & Malpass, 2001), or the amount of racial ambiguity in a face (Locke, Macrae, & Eaton, 2005) may affect how that face is attended to and categorized. Despite the fact that social perceivers ultimately distinguish ambiguous faces from in-group or out-group faces, they initially visually process them much like they process in-group members' faces (Dickter & Bartholow, 2007; Willadsen-Jenson & Ito, 2006). However, visual perception and memory of ambiguous faces can be distorted toward either monoracial category that constitutes their racial background, under certain circumstances (Corneille, Huart, Becquart, & Bredart, 2004; Eberhardt, Dasgupta, & Banaszyński, 2003; Pauker et al., in press), highlighting the variability with which social perceivers perceive ambiguous faces.

Fluidity in the perception of ambiguous, multiracial individuals is mirrored by fluidity in multiracial individuals' identifications, which can change with context or time (Harris & Sim, 2002; Hitlin et al., 2006). Situated within a society that overemphasizes race and confronted by constant queries about their racial background, multiracial individuals often become cognizant of the arbitrary, socially

constructed nature of race (Spickard, 1992). In response to this conflict between their self-identification and others' classifications of their identity (Nakashima, 1992), their racial identity may become less reliant on societal constructions (Root, 1990; Williams, 1999). In support of this assertion, multiracial individuals report less endorsement of the concept that race biologically determines personality or ability compared to monoracial individuals (Shih, Bonam, Sanchez, & Peck, 2007). Changes in identification can even affect multiracial individuals' visual perception of faces, suggesting that cognitive flexibility may emerge as a potential coping mechanism for multiracial individuals who need to deal with the environmental pressure to define their identity according to varying social norms (Chiao et al., 2006).

Although much attention has been devoted to understanding how multiracial individuals define their racial identity and how their identity affects their psychological well-being and adjustment, considerably less research has focused on multiracial individuals as a nonpathologized population. Much of this past research rests on the assumption that the challenges that multiracial individuals face in developing a racial identity ultimately culminate in negative outcomes; however, support for this assumption is mixed (Shih & Sanchez, 2005). Multiracial individuals are likely to develop certain strategies that buffer them from such racial identity challenges. For example, Shih and colleagues (2007) found that Asian/White and Black/White multiracial individuals were less susceptible to racial stereotypes about their performance than were their monoracial counterparts. Multiracial individuals' tendency to reject the notion that race biologically determines ability may buffer the self from racial stereotypes. This diminished belief that race predicts stable biological differences may also play a role in multiracial individuals' perceptions of race and their social memory for both multiracial and monoracial individuals.

This research aims to explore White, Asian, and Asian/White biracial individuals' memory for White, Asian, and Asian/White biracial faces. Research has established that multiracial individuals vary in how they choose to identify, and that their racial identification can change in different contexts or over time (Rockquemore, Brunsma, & Delgado, 2009). Additionally, multiracial individuals may altogether refuse to apply a racial designation to themselves (Rockquemore & Brunsma, 2001). Thus, multiracial individuals are likely to develop a flexible racial identity. Chiao and colleagues (2006) found that priming racial identity in biracial (Black/White) participants influenced how they performed on a visual search task. If primed with their Black identity, biracial participants performed the task much like Black participants and vice versa if they were primed with their White identity. Participants exhibited flexibility in their identity, as well as a change in visual perception based on the top-down influence of identity orientation. Given this top-down influence in visual perception, we wondered whether the potential ability to call on multiple social identities or even a single multiracial identity could influence face processing in a recognition task. This work suggests

that biracial individuals might be able to better process multiple types of faces that could potentially belong to their in-group compared to monoracial individuals.

Work on the own-race bias has shown that individuals have difficulty recognizing and remembering faces of a race besides their own (e.g., Malpass & Kravitz, 1969; Meissner & Brigham, 2001). Although there is much debate over the mechanisms underlying the own-race bias (see Meissner & Brigham, 2001; Sporer, 2001), determining whether someone is or is not of one's own race would appear to be an essential aspect of such a memory bias (Levin, 2000; MacLin & Malpass, 2001). Categorization plays a significant role in the perception of others (Allport, 1954; Brewer, 1988; Macrae & Bodenhausen, 2000), and subsequently attention may be devoted to different dimensions depending on whether or not someone is categorized as belonging to the in-group or out-group (Sporer, 2001).

A social perceivers' reliance on categorization, however, may depend on a variety of factors, including their beliefs about how race is associated with abilities and personality. For instance, Eberhardt et al. (2003) demonstrated that racial labels could influence how individuals perceived a racially ambiguous face, such that entity theorists (i.e., those that believed human traits are stable) assimilated a racially ambiguous face to a given label. For entity theorists, an ambiguous face labeled Black was subsequently mistaken for a "more Black" foil and was drawn with more prototypically Black features, even when the example face was still available for visual inspection. On the other hand, incremental theorists (i.e., those that believed human traits were malleable) tended not to apply the label in an assimilating fashion. Thus, beliefs regarding the nature of race and its association with human traits may also shape social memory.

### *Present Research*

In this research, we explored how monoracial (White and Asian) group members' memory compared to multiracial (Asian/White biracial) group members' memory for White, Asian, and ambiguous, biracial faces. In order to explore each group's reliance on categorization and its effect on memory, participants viewed White, Asian, White-labeled ambiguous, and Asian-labeled ambiguous faces. We predicted that both White and Asian individuals would rely on the given categorization and remember in-group-labeled ambiguous faces and in-group faces better than out-group-labeled ambiguous faces and out-group faces. Multiracial individuals, on the other hand, should rely less on racial labels and should not exhibit a difference in memory based on the given categorizations. Because they have no true out-group in the study, multiracial individuals should remember all groups better than either White or Asian individuals. Finally, given our argument that multiracial individuals' beliefs about race—as less biologically determined and more contextually relative—buttress their cognitive flexibility, multiracial individuals' implicit theories about human traits should be associated with better

memory for faces. That is, those multiracial individuals who possess an incremental or malleable view of human traits should exhibit better memory for faces overall.

## Method

### *Participants and Design*

Ninety-eight undergraduates were recruited in exchange for partial course credit or payment. All participants were either born in the United States or lived in the United States for a minimum of 5 years. We had an a priori exclusion criterion based on the belief that those who thought that the photographs were morphed or edited would perform differently on the task. Participants were probed for suspicion of the stimuli in debriefing and only those who did not express such suspicion were included in analyses. Additionally, any participants who indicated that they actively ignored the labels (our manipulation) were not included. Thus, data from 10 participants (for suspicion of stimuli) and 1 participant (for ignoring the labels) were eliminated. The final sample included 33 White (23 females), 32 Asian-American (20 females), and 22 biracial Asian/White (14 females) participants. All biracial Asian/White participants self-reported having one Asian parent (of East-Asian decent) and one White parent, and self-identified as biracial.

This study had a 4 (perceived race of target: ambiguous face labeled Asian, ambiguous face labeled White, Asian, or White)  $\times$  3 (participant race: White, Asian, or biracial)  $\times$  2 (implicit theory of human traits: incremental or entity) mixed-model design with repeated measures on the first factor. The primary dependent measure was face recognition memory (as measured by  $d'$ ).

### *Materials and Measures*

*Stimuli.* The stimulus materials were selected from several years of a Hawaiian high school's yearbook. All photographs were scanned at a resolution of 150 pixels/inch, as grayscale images. The initial set of pictures consisted of 39 White students (19 females), 43 Asian students (21 females), and 44 Asian/White biracial students (24 females). The first author personally knew these students and confirmed they self-identified as either White, Asian, or biracial. Due to the lack of availability of enough biracial photos of one particular Asian ethnicity (i.e., all biracial Chinese/White) the photos represented people of varying Asian ethnicities, although they were all Asian/White biracial. To match the variety of Asian ethnicities represented in our biracial photos, Asian ethnicities in our Asian photos were also varied, but were all of East-Asian descent. All 126 photographs were edited using Adobe Photoshop and cropped to display only the head region. Further, all photographs were adjusted to uniform size (200  $\times$  270 pixels/inch;

1.3 × 1.8 inches). Because these were yearbook portraits, a majority of individuals available were smiling, so all individuals chosen for the set were smiling.

The attractiveness of each potential target was rated on a 7-point Likert-type scale by 14 naïve participants (7 White, 7 Asian); the scale had high reliability ( $\alpha = .98$ ). These raters were also asked to identify the race of the person in the photograph by selecting among three choices: *White*, *Asian*, or *Mixed*. This measure was included in order to make sure that the biracial targets were perceived as being hard to categorize by race, and that the White or Asian targets were seen as prototypically White and Asian, respectively. Targets for the final stimulus set were selected using these attractiveness and racial categorization data. First, photographs depicting individuals with extreme ratings of attractiveness were eliminated. Similarly, White or Asian targets that were not categorized accurately, as well as biracial targets that were overwhelmingly categorized as either White or Asian, were removed from consideration. The racial categorization data were dummy coded with (Asian = 1, mixed = 0.5, and White = 0), and responses were averaged across participants. The chosen Asian faces did not differ on average more than 2% away from being categorized as Asian. Similarly, White faces did not differ on average more than 0.2% from being categorized as White, and biracial faces did not differ on average more than 2% from being categorized as mixed. The final set comprised 80 faces: 20 White faces (attractiveness,  $M = 3.8$ ), 20 Asian faces ( $M = 3.8$ ), and 40 Asian/White biracial faces ( $M = 3.9$ ). The final set included 40 Asian/White biracial faces, opposed to 20, because these faces were further separated into two groups: 20 labeled White and 20 labeled Asian.

*Implicit theories.* Participants' implicit theories of human traits were measured using an 8-item scale developed by Levy and Dweck (1997) and reported in Levy, Stroessner, and Dweck (1998). Some items are designed such that entity theorists are more likely to agree (e.g., "Everyone is a certain kind of person, and there is not much that they can do to really change that"). Whereas other items are designed such that incremental theorists are more likely to agree (e.g., "Everyone, no matter who they are, can significantly change their basic characteristics"). Participants indicated their response on a 6-point scale, ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). The scale was reliable,  $\alpha = .88$ .

### *Procedure*

Following informed consent, participants completed a face recognition task programmed in DirectRT. Participants were told that we were interested in how memory for verbal and numerical information interacts with memory for faces (see Eberhardt et al., 2003, for use of similar cover story). Instructions presented on a computer screen informed participants that they would see a series of slides. Each slide contained information about a single individual alongside a picture of the individual.

The face recognition task included a learning phase and a recognition phase. In the learning phase, participants were instructed to try to memorize each face and its accompanying demographic information (sex, race, and age). The demographic information allowed us to manipulate the racial label for the ambiguous, biracial faces. Half of the ambiguous faces were labeled White and half were labeled Asian, which was counterbalanced across participants. Prototypical Asian faces were always paired with an Asian label and vice versa for prototypical White faces. Participants saw 40 faces paired with demographic information presented in a randomized order, including 10 ambiguous faces labeled White (5 females) and 10 ambiguous faces labeled Asian (5 females), 10 clearly White faces (5 females), and 10 clearly Asian faces (5 females). Each pair was presented for a total of 5 seconds and was preceded by a fixation point. The intertrial interval was 1,010 ms.

Upon completion of the learning phase, individuals worked on an unrelated filler task (a word-search puzzle) for 5 minutes before moving on to the recognition phase. In the recognition phase, they were presented with the original 40 faces they had been exposed to plus 40 foils. The foils included additional faces (from the original set of 80 faces) that they had not seen previously: 20 ambiguous faces (10 females), 10 Asian faces (5 females), and 10 White faces (5 females). Faces were displayed one at a time and participants indicated via a keyboard press, whether they had seen the face previously in the learning phase. Keys associated with “seen before” and “not seen before” were counterbalanced across participants. Each stimulus remained on the screen until the participant made his or her response. No demographic information appeared on the screen during this phase; participants only saw faces and indicated whether they had seen the face before. Participants were not tested on any of the other information they were asked to memorize. The set of 40 faces used in learning and the set of 40 faces used as foils were also counterbalanced across participants. After completing the recognition phase, participants completed the implicit theories scale and a demographic form, and were debriefed and thanked.

Biracial participants also completed a survey probing various aspects of their identity (i.e., whether they identified as biracial, with one of their component “races,” or as something entirely different) and how people commonly perceived their racial identity.

## Results

### *Data Transformation*

Hits and false alarms from the face recognition task were combined into  $d'$  scores, where  $d'$  is equivalent to  $z$ -score (hits)– $z$ -score (false-alarms). In cases where the proportion of hits or false alarms equals one or zero,  $d'$  cannot be

calculated due to an inability to calculate a  $z$ -score. In order to correct for this we transformed proportions of hits and false alarms into Bayesian proportions.<sup>1</sup> Performance on all ambiguous foils were used to form an overall false alarm score for ambiguous faces; this proxy score was used in calculating  $d'$  for both White-labeled and Asian-labeled ambiguous faces. No differences were obtained as a function of participant gender or gender of the photograph, thus analyses were collapsed across these variables.

### *Recognition Performance*

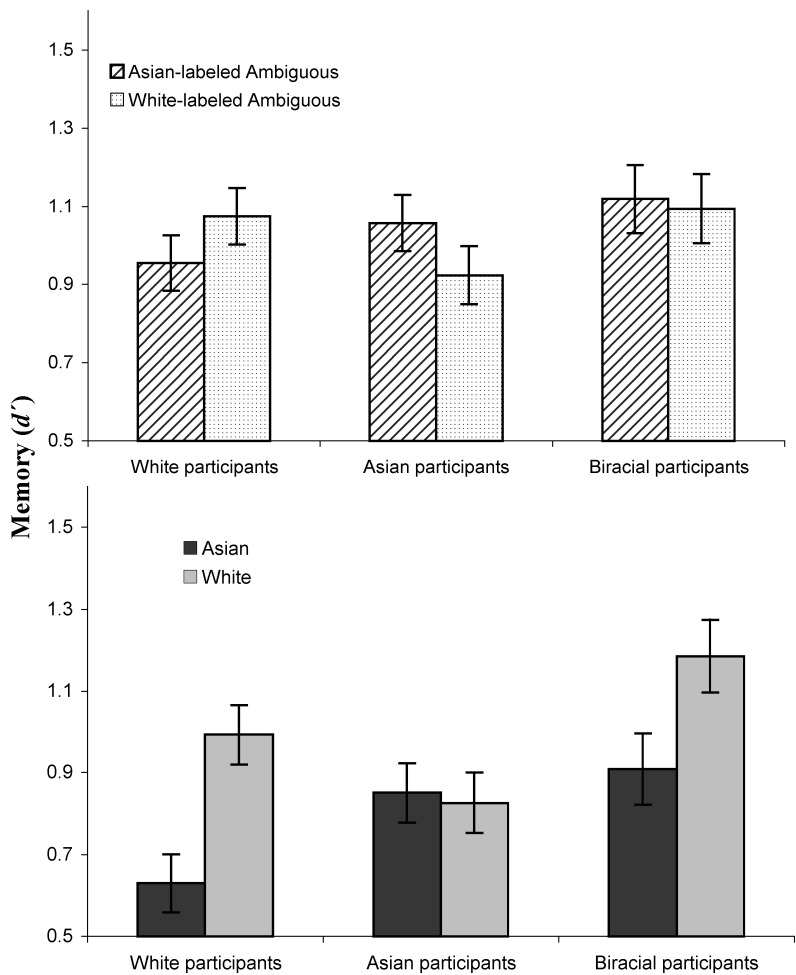
We categorized participants as incremental or entity theorists by applying a median split to their average scores. The mean  $d'$  data were subjected to a 4 (perceived race of target: ambiguous face labeled Asian, ambiguous face labeled White, Asian, or White)  $\times$  3 (participant race: White, Asian, or biracial)  $\times$  2 (implicit theory: incremental or entity) mixed-model ANOVA with repeated measures on the first factor. Overall, participants displayed better memory for White ( $M = 1.00$ ,  $SD = .39$ ) and biracial faces (regardless of the label;  $M_s = 1.03$  and  $1.04$ ,  $SD_s = .42$ ) compared to Asian faces ( $M = .80$ ,  $SD = .43$ ),  $F(3, 243) = 8.26$ ,  $p < .0001$ . More important, the predicted interaction of perceived target race  $\times$  participant race emerged:  $F(6, 243) = 2.59$ ,  $p < .02$ . To explore this interaction, we examined performance separately for White participants, Asian participants, and biracial participants via planned contrasts.

Both White participants and Asian participants used the labels to organize their social memory, remembering faces labeled as the in-group better than faces labeled as the out-group. White participants remembered ambiguous faces labeled White ( $M = 1.07$ ,  $SD = .47$ ) better than ambiguous faces labeled Asian ( $M = .95$ ,  $SD = .47$ ),  $t(32) = 1.91$ ,  $p < .05$ ,  $r = .32$ . Asian participants also remembered faces labeled Asian ( $M = 1.06$ ,  $SD = .29$ ) better than faces labeled White ( $M = .92$ ,  $SD = .36$ ),  $t(31) = 1.76$ ,  $p < .05$ ,  $r = .30$ . However, biracial individuals were less reliant on the labels, showing no difference in memory between those faces labeled Asian ( $M = 1.12$ ,  $SD = .48$ ) or White ( $M = 1.09$ ,  $SD = .41$ ),  $t < 1$  (see Figure 1, top panel).

For monoracial faces, White participants exhibited better memory for their in-group, White faces ( $M = 1.00$ ,  $SD = .38$ ) than out-group, Asian faces ( $M = .63$ ,  $SD = .42$ ),  $t(32) = 4.00$ ,  $p < .001$ ,  $r = .58$ , consistent with the own-race bias. However, Asian participants did not exhibit better memory for in-group, Asian

<sup>1</sup>Where  $s$  = successes and  $f$  = failures,  $P(s) = (s + 1)/(s + f + 2)$ . Here,  $s$  is either equal to the number of hits or false alarms and  $s + f$  is equal to the total number of possible trials for that type of face.





**Fig. 1.** Participants' mean  $d'$  performance for Asian-labeled and White-labeled ambiguous faces (top panel) and mean  $d'$  performance for Asian and White faces (bottom panel). Error bars in all graphs represent standard error.

faces, but rather equal memory for Asian ( $M = .85$ ,  $SD = .40$ ) and White faces ( $M = .83$ ,  $SD = .36$ ),  $t < 1$ . Finally, biracial participants remembered White faces ( $M = 1.19$ ,  $SD = .36$ ) better than Asian faces ( $M = .91$ ,  $SD = .42$ ),  $t(21) = 2.34$ ,  $p < .02$ ,  $r = .46$  (see Figure 1, bottom panel).

Perhaps most interesting, biracial individuals remembered all types of faces (regardless of race or label;  $M = 1.08$ ,  $SD = .25$ ) better than Asian ( $M = .91$ ,

$SD = .18$ ) or White ( $M = .91$ ,  $SD = .30$ ) individuals,  $F(2, 81) = 3.65$ ,  $p < .05$ . Additionally, incremental theorists ( $M = 1.00$ ,  $SD = .27$ ) displayed better memory overall compared to entity theorists ( $M = .91$ ,  $SD = .23$ ),  $F(1, 81) = 4.34$ ,  $p < .05$ . Because a median split is arguably somewhat arbitrary, we also correlated participants' overall memory with their implicit theory score. As would be expected, overall memory (regardless of what racial group they belonged to) was negatively correlated with implicit theory scores,  $r(86) = -.18$ ,  $p < .05$ . That is, those participants who think of human traits in a more essentialist fashion (higher implicit theory score), fared worse when it came to remembering faces of differing races. When broken down by participant race, this association was driven by biracial participants, who exhibited a strong association between their memory performance and implicit theory scores,  $r(21) = -.59$ ,  $p < .005$ . Thus, the more a biracial participant had an incremental theory about human traits (i.e., thought of human traits as malleable), the better they were able to remember faces of varying races.

In order to explore whether the type of implicit theory a participant held accounted for the exhibited differences in memory across the three racial groups, we first needed to establish that there were differences in implicit theory scores among our three racial groups. Indeed, the three racial groups differed in the amount they endorsed each type of theory,  $F(2, 84) = 3.24$ ,  $p < .05$ . Biracial ( $M = 3.34$ ,  $SD = .80$ ) and Asian ( $M = 3.25$ ,  $SD = .63$ ) individuals had lower implicit theory scores than White participants ( $M = 3.68$ ,  $SD = .75$ ). Thus, both biracial and Asian individuals tended to endorse more of an incremental theory. However, recall that only biracial individuals displayed superior memory performance. Consequently, it makes theoretical sense to restrict our analysis of whether implicit theory scores account for memory differences to only White and biracial participants—those who actually differed in both memory performance and the type of implicit theory they endorsed.

If the effects of White or biracial group membership on memory performance are mediated by the type of implicit theory a participant endorses, then regressing memory performance onto implicit theory scores and the dummy-coded group membership variable (0 = White) should display (a) implicit scores significantly predict memory scores and (b) a reduction in the effect of group membership on overall memory. The regression analyses did reveal that implicit scores significantly predicted memory scores,  $\beta = -.26$ ,  $p = .05$ . Additionally, when implicit scores were added into the regression equation, the effect of group membership (on memory) dropped from  $\beta = .28$ ,  $p = .04$  to  $\beta = .22$ ,  $p = .1$ . Thus, biracial individuals' tendency to rely on an incremental theory could account for their better memory performance compared to White individuals, as the Beta weight dropped from significant to nonsignificant.

To formally assess the indirect effect of group membership on memory performance through implicit theory scores, a bias-corrected bootstrap mediation

model was employed. The traditional Sobel test is known to have low power and particularly poses problems for small samples, so we used the recommended bootstrap mediation model (see Efron & Tibshirani, 1993; Preacher & Hayes, 2004; Shrout & Bolger, 2002). This bootstrap utilized 1,000 resamples of the original data set, yielding 1,000 estimates of each path coefficient, including the indirect path. We used a one-sided directional test, which requires that the 5% cutoff value in the lower-tail of the bootstrap distribution be above zero. This yielded a 95% confidence interval that ranged from .0009, to .0925. Because zero is excluded, we can conclude that implicit theory scores mediated the relationship between group membership and memory scores. That is, the tendency for biracial participants in comparison to White participants to endorse a less essentialist implicit theory accounted for their better memory performance on faces of different races.

## Discussion

We examined the role that categorical processing may play in the own-race bias, particularly among multiracial faces that fall outside the bounds of normal category boundaries. We proposed that monoracial individuals may be more reliant on categorizations when processing ambiguous faces, whereas biracial individuals may have developed coping strategies that allow them to pay less attention to such categorizations. Indeed, an arbitrary label influenced memory for ambiguous faces, but only for White and Asian participants. This reflects the societal norm to use and apply labels, in line with the common anecdotal evidence that multiracial individuals are commonly queried about their identity with the notorious “what are you?” question. People want to have a schema to use when dealing with perceived ambiguity. Subsequently, they use this schema to guide their memory, altering the ease with which they recognize faces based merely upon their perception that the face is an in-group or out-group member. Thus, social categorizations appear to be an important antecedent to remembering others (Bernstein, Young, & Hugenberg, 2007; Levin, 2000; MacLin & Malpass, 2001; Rule, Ambady, Adams, & Macrae, 2007; Shriver, Young, Hugenberg, Bernstein, & Lanter, 2008).

On the flipside, our biracial participants were less likely to adhere to the labels given to them. This may reflect both their heightened belief that race is a social construct and a cognitive flexibility gained from dealing with others’ challenges to their identity. In fact, biracial participants exhibited better facial recognition skills than monoracial individuals and their performance was highly correlated with a *less* essentialist view of human traits. Thus, those who appeared to exhibit better memory for faces varying in race maintained a more flexible view of race, which accounted for biracial individuals’ better memory performance compared to White individuals. Recent research has found that the tendency for an individual to rely on categorical processing may cripple their memory for out-group members

(Hugenberg, Miller, & Claypool, 2007). Biracial individuals may exhibit less of a tendency to rely on such categorical processing and may be particularly likely to adopt adaptive strategies in dealing with their environment that may benefit social processing more generally.

### *Limitations*

We did not replicate the own-race bias among our Asian-American participants; however, due to Asian individuals' exposure to American culture and Asian-Americans' high exposure to the White majority, an in-group bias has not been consistently found in past studies (e.g., Tanaka, Markus, & Bukach, 2004; Valentine & Endo, 1992; Walker & Hewstone, 2006) and can even be reversed among individuals immersed in a new culture (i.e., adoptees from another country; Sangrigoli, Pallier, Argenti, Ventureyra, & de Schonen, 2005). Because the main goal of this study was to explore how biracial individuals may develop strategies that facilitate their memory for faces belonging to multiple racial groups that comprise their identity, how Asian-American individuals process these faces is not central to this question. Thus, their null own-race bias effect does not necessarily detract from the processing advantages that biracial individuals exhibited. Biracial individuals still displayed better memory overall compared to either Asian or White individuals. Interestingly, although both biracial and Asian individuals endorsed more of an incremental implicit theory, only biracial individuals exhibited better memory overall. So it may be the combination of endorsing a less essentialist view of human traits and having an identity that spans multiple groups that allows for this processing advantage.

This study focused on one specific biracial identity: Asian/White. Future research should explore other combinations of multiracial identities, including combinations that do not include White heritage. We would predict that those with a different combination of heritages would display a similar pattern of results, due to their shared ambiguity in appearance and the need to resolve conflicts between their own and others' perceptions of their identity. Thus, multiracial individuals as a group are likely to be less reliant on categorizations when remembering others, and may benefit from a more flexible identity. However, the extent to which both monoracial and multiracial individuals rely on particular categorizations when processing a face may depend on the historical context associated with the racial groups involved. The legacy of the one-drop rule within the United States, which designates anyone with even one drop of Black blood as Black, may constrain perceptions of part-Black individuals. Individuals in the United States may be more likely to recognize a Black/White biracial individual as they do Black individuals, opposed to say an Asian/White biracial individual who—because of the perceived narrowing of the social gap between White and Asian individuals in U.S. society

(see Lee & Bean, 2004)—may be remembered more like White individuals. Additionally, the effect of biracial individuals' greater memory accuracy probably does not extend beyond groups that share part of their racial heritage. While biracial individuals may be less reliant on categorical processing, their memory performance in this study is most likely facilitated by having multiple potential in-groups, or alternatively, no true out-group. Biracial individuals' memory performance is also likely to be shaped by the racial composition of their communities, local environments, and social networks (Rockquemore & Brunsma, 2002). The biracial participants in our study, although they identified as biracial, grew up in largely White environments (67% White). This disproportionate amount of exposure to White individuals could explain why biracial individuals remembered White faces better than Asian faces.

This study does not address possible heterogeneity represented in our Asian-American targets and participants, or possible variation in racial identification or strength of racial identification among our participants. All the participants in this particular study self-identified with a biracial identity. This parallels the trend toward more and more individuals choosing to identify as mixed-race in recent years as multiracial identity has become more visible through increasing political organization, celebrity role models (e.g., Tiger Woods), and movements to increase awareness within the multiracial community (e.g., Mavin Foundation's recent Generation MIX National Awareness tour). However, our sample certainly is not representative of the range of identifications that a multiracial individual may have. Multiracial individuals' racial identification may shift according to social contexts, and multiracial individuals may opt to choose among many racial identifications including identifying with one of their parent's racial groups, a multiracial identity, or no identity at all (Rockquemore et al., 2009). Future research should explore how type of identification and strength of identification among biracial individuals subsequently affects memory. While our sample may be less representative than larger survey or questionnaire studies, this research expands our understanding of multiracial individuals' psychological processes through utilizing an experimental design, revealing the possible social processing benefits that multiracial individuals may reap—a finding that would be harder to document via other methodological approaches.

Finally, these findings may be specific to the United States. The context of race relations and the history of racial classifications within the United States frame which groups are considered distinct and feed into participants' overall reliance on racial categorizations. However, our findings may be applicable beyond the context of the United States, depending on an individual country's historical treatment of race or reliance on ethnic categorizations. Additionally, such social memory processing advantages may more generally apply to anyone who often needs to switch between multiple frames of references (e.g., with regard to identity or culture). For example, bicultural individuals who hold a less essentialist view of

race have an easier time switching their mindset between their different cultures (Chao, Chen, Roisman, & Hong, 2007). Thus, participants' beliefs about human traits in general may moderate possible adaptive strategies that individuals adopt in order to balance multiple competing components of the self.

### *Implications*

Our results highlight the fluidity possible in racial perception and how individuals' reliance on categorizations (or lack thereof) can even affect basic processes such as face recognition. The implications of such cross-race face recognition differences for the criminal justice system have been discussed extensively, particularly with respect to potential ramifications for eye witness identification (e.g., MacLin, MacLin, & Malpass, 2001; Meissner & Brigham, 2001). Our results further highlight the role that perceived group membership can play in this process. For example, the same biracial face was recognized at differing levels based on a label and the perceivers' own group membership. Although using racial labels in formulating a description of a perpetrator can be extremely useful, an overreliance on such racial labels can guide facial recognition in predictable and often biased ways (toward more accurate outcomes for in-group members). As such, care should be taken when utilizing racial labels in a criminal justice setting, particularly when a perpetrator's race may be ambiguous.

Multiracial individuals may have the ability to disregard external categorizations, particularly those who endorse less essentialist views about human traits, enabling certain social processing benefits. Multiracial individuals have typically been ignored as a population because they are hard to define. Moreover, some believe that there is too much diversity among those who fall under the umbrella of multiracial to designate them as a singular, meaningful group (Spencer, 1997). However, their shared experience of dealing with having an ambiguous appearance in a world obsessed with categorization may lead to conceptions of race and compensatory cognitive strategies unique to their experience, and wholly different than that of monoracial individuals.

Despite this shared experience, creating yet another racial category may not be the solution to acknowledging and legitimizing the multiracial experience. Continuing to track racial groups with the option to check multiple boxes allows for necessary civil rights compliance monitoring, while simultaneously accommodating those who have multiple racial identities (Root, 1996). The allowance for "checking more than one box," however, should be more widely mandated, in addition to providing training for educators in how to effectively work with and mentor multiracial individuals (Wardle, 2000). Finally, in creating race-related programs or diversity training, the multiracial experience should not be ignored nor should it only be included as an example of pathology. Educators, clinicians, and researchers have started to embrace a move away from the "marginal" mind-set

(Root, 1996; Shih & Sanchez, 2005), and research and ensuing policy should follow suit. However, change also must resonate with the general population and not just reside within the “ivory tower.” Allowing multiracial individuals the opportunity to check off more than one box does not, by default, change people’s attitudes toward or their perception of multiracial individuals. In fact, claiming a multiracial identity may garner negative reactions from others and those who disclose their multiracial identity may be particularly vulnerable to negative feedback (Sanchez & Bonam, 2009). In order to combat these negative reactions, individuals and programs aimed toward promoting diversity should challenge their way of thinking about race, moving away from more rigid thought processes toward understanding the fluid nature of racial boundaries, which are largely determined by the categories that we ourselves create and manage.

### Conclusions

Despite society’s insistence in lumping multiracial individuals into socially defined monoracial categories, multiracial individuals may actually have a uniquely distinct identity that functions independently of these forced categorizations. Monoracial and multiracial individuals may approach racial ambiguity with a very different set of tools, emphasizing the need to explore research questions outside the realm of traditionally defined racial categories in order to understand how multiracial individuals make sense of and fit into our social world.

### References

- Allport, G. W. (1954). *The nature of prejudice*. Reading, MA: Addison-Wesley.
- Bernstein, M. J., Young, S. G., & Hugenberg, K. (2007). The cross-category effect: Mere social categorization is sufficient to elicit an own-group bias in face recognition. *Psychological Science*, 18, 706–712.
- Blascovich, J., Wyer, N. A., Swart, L. A., & Kibler, J. L. (1997). Racism and racial categorization. *Journal of Personality and Social Psychology*, 72, 1364–1372.
- Brewer, M. B. (1988). A dual process model of impression formation. In T. Srull & R. Wyer (Eds.), *Advances in social cognition* (Vol. 1, pp. 1–36). Hillsdale, NJ: Erlbaum.
- Castano, E., Yzerbyt, V. Y., Bourguignon, D., & Seron, E. (2002). Who may enter? The impact of ingroup identification on ingroup-outgroup categorization. *Journal of Experimental Social Psychology*, 38, 315–322.
- Chao, M., Chen, J., Roisman, G. I., & Hong, Y. (2007). Essentializing race: Implications for bicultural individuals’ cognition and physiological reactivity. *Psychological Science*, 18, 341–348.
- Chiao, J. Y., Heck, H. E., Nakayama, K., & Ambady, N. (2006). Priming race in biracial observers affects visual search for Black and White faces. *Psychological Science*, 17, 387–392.
- Corneille, O., Huart, J., Becquart, E., & Brédart, S. (2004). When memory shifts toward more typical category exemplars: Accentuation effects in the recollection of ethnically ambiguous faces. *Journal of Personality and Social Psychology*, 86, 236–250.
- Dickter, C. L., & Bartholow, B. D. (2007). Racial ingroup and outgroup attention biases revealed by event-related brain potentials. *Social, Cognitive, and Affective Neuroscience*, 2, 189–198.

- Eberhardt, J. L., Dasgupta, N., & Banaszyński, T. L. (2003). Believing is seeing: The effects of racial labels and implicit beliefs on face perception. *Personality & Social Psychology Bulletin*, 29, 360–370.
- Efron, B., & Tibshirani, R. J. (1993). *An introduction to the bootstrap*. Boca Raton, FL: Chapman and Hall.
- Fiske, S. T., & Taylor, S. E. (1991). *Social cognition* (2nd ed.). New York: McGraw-Hill.
- Harris, D. R., & Sim, J. J. (2002). Who is multiracial? Assessing the complexity of lived race. *American Sociological Review*, 67, 614–627.
- Hitlin, S., Brown, J. S., & Elder, G. H. Jr. (2006). Racial self-categorization in adolescence: Development and social pathways. *Child Development*, 77, 1298–1308.
- Hugenberg, K., & Bodenhausen, G. V. (2004). Ambiguity in social categorization: The role of prejudice and facial affect in racial categorization. *Psychological Science*, 15, 342–345.
- Hugenberg, K., Miller, J., & Claypool, H. (2007). Categorization and individuation in the cross race recognition deficit: Toward a solution for an insidious problem. *Journal of Experimental Social Psychology*, 43, 334–340.
- Lee, J., & Bean, F. D. (2004). America's changing color lines: Immigration, race/ethnicity, and multiracial identification. *Annual Review of Sociology*, 30, 221–242.
- Levin, D. T. (2000). Race as a visual feature: Using visual search and perceptual discrimination tasks to understand face categories and the cross-race recognition deficit. *Journal of Experimental Psychology: General*, 129, 559–574.
- Levy, S. R., Stroessner, S. J., & Dweck, C. S. (1998). Stereotype formation and endorsement: The role of implicit theories. *Journal of Personality and Social Psychology*, 74, 1421–1436.
- Locke, V., Macrae, C. N., & Eaton, J. L. (2005). Is person categorization modulated by exemplar typicality? *Social Cognition*, 23, 417–428.
- MacLin, O. H., MacLin, M. K., & Malpass, R. S. (2001). Race, arousal, attention, exposure, and delay: An examination of factors moderating face recognition. *Psychology, Public Policy and Law: Special Edition on the Other-Race Effect*, 7, 134–152.
- MacLin, O. H., & Malpass, R. S. (2001). Racial categorization of faces: The ambiguous-race face effect. *Psychology, Public Policy and Law: Special Edition on the Other-Race Effect*, 7, 98–118.
- Macrae, C. N., & Bodenhausen, G. V. (2000). Social cognition: Thinking categorically about others. *Annual Review of Psychology*, 51, 93–120.
- Malpass, R. S., & Kravitz, J. (1969). Recognition for faces of own- and other-race faces. *Journal of Personality and Social Psychology*, 13, 330–334.
- Meissner, C. A., & Brigham, J. C. (2001). Thirty years of investigating the own-race bias in memory for faces: A meta-analytic review. *Psychology, Public Policy and Law*, 7(1), 3–35.
- Nakashima, C. L. (1992). An invisible monster: The creation and denial of racially mixed people in America. In M. P. P. Root (Ed.), *Racially mixed people in America* (pp. 162–180). Newbury Park, CA: Sage.
- Pauker, K., Weisbuch, M., Ambady, N., Sommers, S. R., Adams, R. B., Jr., & Ivcevic, Z. (in press). Not so Black and White: Memory for ambiguous group members. *Journal of Personality and Social Psychology*.
- Pettigrew, T. F., Allport, G. W., & Barnett, E. O. (1958). Binocular resolution perception of race in South Africa. *British Journal of Psychology*, 49, 265–278.
- Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, and Computers*, 36, 717–731.
- Rockquemore, K. A., & Brunsma, D. L. (2001). *Beyond Black: Biracial identity in America*. Thousand Oaks, CA: Sage.
- Rockquemore, K. A., & Brunsma, D. L. (2002). Socially embedded identities: Theories, typologies, and processes of racial identity among Black/White biracials. *Sociological Quarterly*, 43, 335–356.
- Rockquemore, K. A., Brunsma, D. L., & Delgado, D. J. (2009). Racing to theory or re-theorizing race? Understanding the struggle to build a multiracial identity theory. *Journal of Social Issues*, 65(1), 13–34.



- Root, M. P. P. (1990). Resolving "other" status: Biracial identity development. In L. Brown & M. P. Root (Eds.), *Complexity and diversity in feminist theory and therapy* (pp. 191–211). New York: Haworth Press.
- Root, M. P. P. (1996). The multiracial experience: Racial borders as a significant frontier in race relations. In M. P. P. Root (Ed.), *The multiracial experience: Racial borders as the new frontier* (pp. xiii–xxvii). Thousand Oaks, CA: Sage.
- Root, M. P. P. (2003). Racial identity development and persons of mixed race heritage. In M. P. P. Root & M. Kelley (Eds.), *The multiracial child resource book* (pp. 34–41). Seattle, WA: Mavin Foundation.
- Rule, N. O., Ambady, N., Adams, R. B. Jr., & Macrae, C. N. (2007). Us and them: Memory advantages in perceptually ambiguous groups. *Psychonomic Bulletin & Review*, 14, 687–692.
- Sanchez, D. T., & Bonam, C. (2009). To disclose or not to disclose: The effect of biracial disclosure on perceiver evaluations and target responses. *Journal of Social Issues*, 65(1), 129–148.
- Sangrigoli, S., Pallier, C., Argenti, A.-M., Ventureyra, V. A. G., & de Schonen, S. (2005). Reversibility of the other-race effect in face recognition during childhood. *Psychological Science*, 16, 440–444.
- See, L. (1998). The funeral banquet. In C. C. O'Hearn (Ed.), *Half and half: Writers on growing up biracial and bicultural* (pp. 125–138). New York: Pantheon Books.
- Shih, M. J., Bonam, C., Sanchez, D. T., & Peck, C. (2007). Beliefs in the social construction of race: Adaptive strategies for multiracials. *Cultural Diversity and Ethnic Minority Psychology*, 13, 125–133.
- Shih, M. J., & Sanchez, D. T. (2005). Perspectives and research on the positive and negative implications of having multiple racial identities. *Psychological Bulletin*, 131, 569–591.
- Shriver, E. R., Young, S. G., Hugenberg, K., Bernstein, M. J., & Lanter, J. R. (2008). Class, race, and the face: Social context modulates the cross-race effect in face recognition. *Personality and Social Psychology Bulletin*, 34, 260–274.
- Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods*, 11, 87–105.
- Spencer, J. M. (1997). *The new colored people: The mixed-race movement in America*. New York: New York University Press.
- Spickard, P. R. (1992). The illogic of American racial categories. In M. P. P. Root (Ed.), *Racially mixed people in America* (pp. 12–23). Newbury Park, CA: Sage.
- Sporer, S. W. (2001). Recognizing faces of other ethnic groups: An integration of theories. *Psychology, Public Policy, and Law*, 7, 36–97.
- Tanaka, J. W., Markus, K., & Bukach, C. M. (2004). A holistic account of the own-race effect in face recognition: Evidence from a cross-cultural study. *Cognition*, 93, B1–B9.
- Valentine, T., & Endo, M. (1992). Towards an exemplar model of face processing: The effects of race and distinctiveness. *Quarterly Journal of Experimental Psychology: Human and Experimental Psychology*, 44, 671–703.
- Walker, P. M., & Hewstone, M. (2006). A perceptual discrimination investigation of the own-race effect and intergroup experience. *Applied Cognitive Psychology*, 20, 461–475.
- Wardle, F. (2000). Multiracial and multiethnic students: How they must belong. *Multicultural Perspectives*, 2, 11–16.
- Willadsen-Jensen, E. C., & Ito, T. A. (2006). Ambiguity and the timecourse of racial categorization. *Social Cognition*, 24, 580–606.
- Williams, C. B. (1999). Claiming a biracial identity: Resisting social constructions of race and culture. *Journal of Counseling and Development*, 77, 32–35.

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