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Natural ambiguities: Racial categorization of multiracial individuals

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ABSTRACT

Understanding the perception of multiracial persons is increasingly important in today's diverse society. The present research investigated the process of categorizing multiracial persons as "Multiracial." We hypothesized that perceivers would make fewer Multiracial categorizations of multiracials and that these categorizations would take longer than monoracial categorizations. We found support for these hypotheses across six experiments. Experiment 1 demonstrated that perceivers did not categorize morphed Black–White faces as Multiracial with the same frequency with which they categorized Black and White faces as Black and White (respectively), and that categorizations of multiracials as Multiracial took longer than monoracial categorizations. Experiment 2 replicated and extended these effects to real Black–White faces. Experiment 3 showed that these findings generalized to Asian–White faces. We used pixel variance analysis to show that these effects were not due to increased variance among Multiracial faces. The image analysis showed that the Black–White morphs and real biracials were actually less varied than either the Black or White sets of faces. Experiments 4 and 5 demonstrated that cognitive load and time constraints detrimentally affected multiracial, but not monoracial, categorizations. Experiment 6 showed that imbuing monoracial categories with importance decreases the use of the Multiracial category. Implications of these findings for understanding perceptions of multiracial persons are discussed.

Introduction

Halle Berry is credited with being the first Black woman to win the Academy Award for Best Actress, though she is the child of a White mother and Black father. Tiger Woods, acknowledged to be the greatest Black golfer of all time, has a diverse ancestry, leading Woods to coin the term *Cablinasian* to reflect the Caucasian, Black, American Indian, and Asian aspects of his heritage. Such multiracial backgrounds have become increasingly commonplace in American society, reflecting the elimination of miscegenation laws and the increasing frequency of interracial marriages in recent decades (Shih & Sanchez, 2005). Our research examined the perceivers' ability to recognize this growing diversity by making categorizations of multiracial people as "Multiracial."

The differentiation between races has been central in American history and has been pervasive in the experiences of most people, whether they are prejudiced or not (Devine, 1989). Several theories in social psychology (Brewer, 1988; Devine, 1989; Fiske & Neuberg, 1990) highlight the pre-eminence of race in automatic categorization. New methodologies, such as fMRI and ERP, have provided converging evidence that race perception occurs quickly and automatically (Cunningham et al., 2004; Wheeler & Fiske, 2005; Willadsen-Jensen & Ito, 2006). However, the definition of "race" has shifted over the years, and the salient or meaningful group distinctions have changed in the course of U.S. history.

The social meaning of "race" is not rooted in any meaningful biological differences between the groups (Goodman, 2000) but rather is a flexible concept that is amenable to change in usage. Today, the race label "White" includes Italians and Eastern Europeans, who were once actively discriminated against in U.S. immigration legislation (refer to the U.S. Immigration Act of 1924; Office of the Clerk of the U.S. House of Representatives, n.d.; Powell, 2006). Until the mid-20th century, Irish and Italians were viewed as different "races" by the Anglo-Saxon majority. Today, the distinctions between White, Black, Latino, and Asian peoples are becoming blurred by the increasing frequency and salience of multiracial people. With the changing demographics of today's society, will the racial landscape of American culture change to incorporate a Multiracial category in ways not currently extant? Our research sought to examine the multiracial categorization process and how it currently differs from monoracial categorization processes.

The literature addressing multiracial issues is small and recent, but growing rapidly in size and diversity. For example, research has investigated the implications of multiracial heritage for social identity, peer relations, academic performance, self-esteem, and adjustment (Shih & Sanchez, 2005). Among people with multiracial backgrounds, those who identify as Multiracial have equivalent or more positive experiences than those who identify with a monoracial group,

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regardless of that group's status in society (Binning, Unzueta, Huo, & Molina, 2009; Townsend, Markus, & Bergsieker, 2009).

In contrast, our research contributes to the growing body of research investigating the *perception* of multiracial persons. Intergroup perception rests on the categorization of persons into groups. Such categorization is a precursor to impression formation and several intergroup phenomena, such as stereotyping, perceptions of out-group homogeneity, and prejudice (Brewer, 1988; Fiske & Neuberg, 1990; Macrae & Bodenhausen, 2000). Therefore, understanding multiracial categorization is an important first step in understanding multiracial person perception. Our research investigated perceivers' ability to recognize this growing diversity by making categorizations of multiracial people as Multiracial. Whereas previous research has focused on how perceivers use their existing monoracial categories to categorize multiracials (e.g., Halberstadt, Sherman, & Sherman, 2011; Ho, Sidanius, Levin, & Banaji, 2011; Peery & Bodenhausen, 2008), the current research seeks to determine the antecedents to categorizing multiracials as Multiracial.

Many of us have had the experience of seeing a multiracial person and wondering, "Is he Black or White?" The question itself suggests that many people think of racial categorization as dichotomous, as an "either/or" question. This judgment is then made difficult by the ambiguity of a multiracial person confronting them. Indeed, several papers refer specifically to the "ambiguity" of multiracial faces (e.g., Corneille, Huart, Becquart, & Bredart, 2004; Eberhardt, Dasgupta, & Banaszynski, 2003; MacLin & Malpass, 2001; Pauker et al., 2009; Willadsen-Jensen & Ito, 2006, 2008). But *why* are multiracial people ambiguous for the monoracial observer? Why, in the title of this paper, do we refer to multiracial faces as "natural ambiguities"?

In our view, multiracial faces are ambiguous only to the extent that monoracial categories are construed as important and non-arbitrary, such that what is obviously a continuum (race) is treated as a set of distinct, meaningful categories. In fact, the very notion of "monoracial" treats race as fundamentally categorical when we are all genetically multiracial (Bodenhausen, 2010; Chakravarti, 2009). In the simplest case, the perceiver treats the race continuum as a dichotomy (e.g., Black or White). The fact that American perceivers learn to essentialize race as early as the preschool years (Gelman, 2003; Hirschfeld, 1996) demonstrates that the conceptualization of race as *either* Black *or* White is ingrained at a very young age. In this case, target persons who represent a "mixture" of those categories will be seen as ambiguous, and categorization of them will present a perceptual challenge not experienced in categorizing persons who more clearly "fit" into the commonly-used existing categories "Asian," "Black," "Latino," and "White." Furthermore, we would argue that the tendency for perceivers to imbue these existing categories with meaning and significance decreases the likelihood of using a new "Multiracial" category.

American perceivers are incredibly adept at making monoracial categorizations (Willadsen-Jensen & Ito, 2006). The distinctions between monoracial groups are well-practiced, routine, and highly accessible for perceiving others. On the other hand, most perceivers do not encounter as many multiracial people as monoracial people in their social environments, and are therefore less adept at recognizing multiracial group membership. As such, multiracial targets are ambiguous in that they are relatively unfamiliar stimuli and challenge the perceiver's well-practiced monoracial classification system.

The difference in the accessibility of the multiracial and monoracial categories is self-perpetuating. That is, more accessible categories (i.e., monoracial ones) are more frequently used, and more frequently used categories become more accessible. A perceiver may categorize a multiracial person as "White," and not as "Multiracial," thereby increasing the accessibility of the "White" category and diminishing the likelihood of using the "Multiracial" category in the future. All of these facets of the Multiracial category (relative infrequency, lack of accessibility, and incompatibility with preexisting racial schemas) contribute to the multiracial categorization process being more difficult or demanding than the monoracial one.

Several studies have investigated the racial categorization of multiracial persons (e.g., Blascovich, Wyer, Swart, & Kibler, 1997; Castano, Yzerbyt, Bourguignon, & Seron, 2002; Halberstadt et al., 2011; Ho et al., 2011; Pauker et al., 2009; Peery & Bodenhausen, 2008; Sanchez, Good, & Chavez, 2010; Willadsen-Jensen & Ito, 2006). Previous research on multiracial person perception has typically focused on the types of *monoracial* categorizations that are made for *multiracial* target persons, that is, how perceivers apply their classic categorization systems to these ambiguous stimuli. This work has shown that Black–White biracials are more frequently categorized as Black than as White (Halberstadt et al., 2011; Ho et al., 2011; Peery & Bodenhausen, 2008). One mechanism explaining this tendency is hypodescent, which holds that a multiracial person will be perceived as belonging to the racial category of the socially subordinate parent (Harris, 1964). Categorization using the hypodescent rule would lead perceivers to categorize multiracial individuals having any proportion of Black heritage as Black. An example of institutionalized hypodescent is the "one drop rule" – the belief that one drop of Negro blood was sufficient for classifying a person as Black – which has a historical and legal legacy in America. Several studies have found evidence for hypodescent in the categorization of multiracials.

Another explanation for the tendency for White perceivers to categorize Black–White biracials more often as Black than as White is the in-group overexclusion effect (Castano et al., 2002). Because people's identities and esteem derive in part from the groups to which they belong (Tajfel & Turner, 1986), people are cautious when making judgments about who is an in-group member, resulting in a bias toward excluding ambiguous cases. Previous studies have supported this hypothesis, particularly for those high in prejudice and in-group identity (Blascovich et al., 1997; Castano et al., 2002).

To our knowledge, only a few studies have examined the process of categorizing multiracial people as Multiracial (e.g., Herman, 2010; Peery & Bodenhausen, 2008, Study 2). For example, Peery and Bodenhausen (Study 2) presented multiracial faces and had participants categorize the faces by selecting among the following response options: *White*, *Black*, *Multiracial*, and *None of the Above*. Multiracial faces were most frequently categorized as Multiracial. These findings show that perceivers can and do categorize multiracial persons as Multiracial when given the option to do so. It is important to note that participants in these studies had unlimited time to make racial categorizations. Hence these judgments are the product of deliberative thought processes and, as such, can be influenced by any number of perceiver motivations (e.g., self-presentation motives, demand characteristics). It cannot be assumed that spontaneous and deliberative processes triggered by the same stimulus have the same characteristics or outcomes (Gawronski & Bodenhausen, 2006; Smith & DeCoster, 2000).

Importantly, previous studies examining spontaneous categorization of multiracial have never given participants a "Multiracial" response option (e.g., Blascovich et al., 1997; Halberstadt et al., 2011; Ho et al., 2011; Peery & Bodenhausen, 2008, Study 1; Willadsen-Jensen & Ito, 2006). Typically, participants have been shown a series of faces differing in racial composition and asked to identify the target person (Black, White, or Multiracial) as: Black or White, Black or not Black, or White or not White. In these studies judging the same face as belonging to different categories on different trials is interpreted as perceiving the person as Multiracial.

We believe that operationalizing "Multiracial" categorization as categorizing the same face as "Black" and "White" on separate occasions is problematic. Categorizing the same face differently on different trials may reflect stimulus ambiguity and/or perceiver uncertainty, but it does not by itself constitute evidence of categorizing the person as Multiracial. We conceptualize "Multiracial" categorization as distinct from double-membership in two monoracial groups.

In order to understand spontaneous multiracial categorization processes, we developed a speeded categorization task that provided a "Multiracial" response option in addition to the "Black" and "White" response options. We investigated both categorization judgments and speed of categorization for monoracial and multiracial faces. Our goal in this research was to compare spontaneous multiracial categorization processes with spontaneous monoracial ones.

Overview of Studies

Our research tested several hypotheses derived from the reasoning developed above. First, we view Multiracial categorization as a newer, less established cognitive response, one that poses a challenge to the perceiver's traditional monoracial categorization system. Therefore we predicted that participants would have greater difficulty in categorizing multiracial targets as Multiracial than they would have for categorizing monoracial targets as monoracial. By "difficulty" we mean that perceivers will categorize multiracials as Multiracial less frequently than categorizing monoracials into their respective racial categories. Second, we have argued that, while racial categorization using the traditional monoracial categories is quite spontaneous and has many of the properties of an automatic response (Cunningham et al., 2004; Ito & Urland, 2003, 2005; Wheeler & Fiske, 2005), Multiracial categorization is less automatized and less accessible. Therefore, we predicted that Multiracial categorization would take longer than monoracial categorizations. Experiments 1–3 tested these hypotheses.

Next, we used an image analysis technique from psychophysical research to test an alternative explanation for our results; specifically, that the Multiracial faces were more variable and therefore harder to categorize than the White or Black faces. We used pixel variance analysis to determine whether the differences between monoracial and multiracial categorizations could be attributed to properties of the stimulus (i.e., greater variation within the Multiracial category) rather than to properties of the perceiver (e.g., holding traditional dichotomous views of race).

Experiments 4 and 5 were designed to further test processing differences between monoracial and multiracial categorizations. We reasoned that, if monoracial and Multiracial categorizations differ in their degree of automaticity, then manipulations that affect controlled, but not automatic, processing should only influence multiracial categorizations. In Experiments 4 and 5, we tested the effects of two such manipulations – cognitive load and time constraints – on the categorization of multiracial and monoracial persons. We hypothesized that Multiracial categorization would be disrupted by cognitive load and by placing time constraints on making judgments, whereas monoracial categorization would not be disrupted by these factors.

Finally, in Experiment 6, we tested whether the perceived legitimacy of monoracial categories further impeded Multiracial categorizations. Specifically, we predicted that an induction emphasizing the biological foundation of racial categories would inhibit the use of a Multiracial category.

Experiment 1: Categorization of Multiracials

Experiment 1 tested our hypotheses about the frequency and response latencies of Multiracial categorizations. We presented photos of Black, White, and Multiracial persons to participants, whose task was to indicate whether each person was Black, White, or Multiracial as quickly as possible. We created a novel categorization task to measure speeded categorization that included a Multiracial category as well as Black and White options. Participants' responses and their response latencies were recorded. Responses were coded as "concordant" if the participant's responses were consistent with our categories (i.e., "Black" categorizations for faces in the Black category, "White" for the White category faces, and "Multiracial" for the morphs), and "discordant" if they were inconsistent with our categories (e.g., categorizing a multiracial face as "Black" or "White" or a White face as "Multiracial"). These categories were determined by previous research; the multiracial faces were created by Peery and Bodenhausen (2008) and were pretested for racial ambiguity. The monoracial faces, Black and White, were collected by Minear and Park (2004) and used by Peery and Bodenhausen (2008).

Why use the terms concordant and discordant? Previous studies have typically referred to such categorization judgments in terms of "accuracy" and "error." However, issues of accuracy and error in race perception, particularly of multiracials, are both complex and sensitive. As researchers, we do not wish to define "accurate" racial categorization as either consensus among perceivers or as the racial identity of the person. Therefore, we refer to participants' responses as *concordant* or *discordant* based on their correspondence to the categories that we and previous researchers have assigned to the face stimuli.

We predicted that (a) participants would make fewer concordant categorizations of multiracial persons than monoracial persons, and (b) participants' response times would be slower for concordant Multiracial categorizations than for concordant Black or White ones.

Method

Participants

One hundred and thirty four female undergraduates (17% Asian, 1.5% Black, 27% Hispanic, 11% Multiracial, and 42% White) at the University of California, Santa Barbara (UCSB) participated in this study for course credit. The average age of the participants was 18.66 years ($SD = 0.81$).

Materials

For stimulus materials we used the same faces as Peery and Bodenhausen (2008), who obtained photos of Black and White faces from Minear and Park (2004). Some of these photos served as the monoracial stimuli. Others were used to create multiracial faces by morphing Black and White faces (50%:50%). All of the faces had neutral expressions and were matched for age (18–29). Pretesting confirmed that the morphed face photos were racially ambiguous.[1] The photos were designed to show only the face, eliminating cues from hair and clothing, and were displayed against a black background on the computer screen. We presented four faces per racial category (Black, Multiracial, and White), with two male and two female stimuli in each category.

Procedure

Participants were informed that the study was about face perception. They were told that they would view a series of faces one at a time and were asked to categorize these faces by race as quickly as possible. Participants were then instructed how to place their hands on the keyboard (with index fingers on "L" and "S" and both thumbs on the spacebar) and learned the keys that they would use to assign race. For example, in one condition, participants would press the "L" key for *White*, the "S" key for *Black*, and the spacebar for *Multiracial*. Three between-subjects conditions counterbalancing the key positions for the three response options were included. Assignment of race categories to response keys was varied such that, across the three conditions, each race categorization was assigned to each key in one of these conditions.

Participants were given practice trials to learn the assignments. In the practice trials, participants saw the words "Black", "White", or "Multiracial" four times each, in random order, and they pressed the key corresponding to the given category. Participants could only move to the next practice trial by pressing the correct key, ensuring that they learned the correct key positions. After the practice trials,

[1] See Peery and Bodenhausen (2008) for details.

Table 1
No effect of key replication on categorization concordance or latencies in Study 1.

	Racial categorization concordance			Categorization latencies (ms)		
	Black	Multiracial	White	Black	Multiracial	White
Key replication 1	0.77	0.56	0.92	907	1230	921
Key replication 2	0.79	0.57	0.94	952	1382	938
Key replication 3	0.81	0.62	0.89	967	1312	925

Table 2
Mean categorization concordance by target race in Experiment 1.

Faces	Categorization type		
	Black	Multiracial	White
Black faces	0.79(0.08)	0.20(0.07)	0.01(0.02)
Multiracial faces	0.09(0.06)	0.58(0.10)	0.33(0.10)
White faces	0.02(0.02)	0.07(0.05)	0.91(0.06)

Note: Proportions of concordant categorizations and standard error.

participants were reminded that their task was to categorize the faces as quickly as possible. They then viewed 12 faces (4 Black, 4 White, and 4 Multiracial) one at a time in random order, and their categorizations and response times for each face were recorded. Upon completion of this task the participants completed a questionnaire assessing demographic information and then were thanked and debriefed.

Results

There were three response options for every target photo: Black, Multiracial, or White. For each participant, we calculated the proportion of Black, White and Multiracial categorizations made for each type of target (Black, Multiracial, White). Then, for each participant, the proportion of concordant categorizations was calculated for each target type. Finally, the mean response latency of each participant for his or her concordant categorizations was determined.

Effect of response key assignments

Three conditions were included in which the response key options for the three response categories were counterbalanced. This counterbalancing was important because there could be some motoric contribution to the response time measures. Therefore, a 3 (key assignment replications) × 3 (target race) mixed model ANOVA was conducted on both categorization and the response latency data.[2] Key assignments had no main effect on categorizations, $F(2,131)=0.32$, $p=0.73$, $\eta_p^2=0.01$, or on response latencies, $F(2,120)=0.55$, $p=0.58$, $\eta_p^2=0.01$, and did not interact with target race for the categorization concordance, $F(2,131)=1.39$, $p=0.25$, $\eta_p^2=0.02$, or response latencies, $F(2,120)=0.69$, $p=0.50$, $\eta_p^2=0.01$. Means for each replication are displayed in Table 1. Thus, the results of Experiment 1 were invariant across counterbalancing of response options, and we collapsed across the three replications in all other analyses.

Categorization responses

We hypothesized that participants would make more discordant categorizations of multiracial targets than of Black targets or White targets. To test this hypothesis, we conducted a one-way repeated measures ANOVA with target race as the three-level factor and proportion of concordant responses as the dependent variable. The ANOVA revealed a significant effect of target race, $F(2,132)=66.82$, $p<0.001$, $\eta_p^2=0.50$. Participants had the highest number of concordant categorizations for White targets ($M=0.92$, $SD=0.17$), somewhat fewer for Black targets ($M=0.79$, $SD=0.22$), and fewest concordant categorizations for Multiracial targets ($M=0.58$, $SD=0.29$). Each pair of means differed significantly at the 0.001 level.[3] Table 2 presents the mean proportion of responses, where mean proportions of concordant categorization occur on the main diagonal. The results support our hypothesis that people would make fewer concordant categorizations for multiracial than for monoracial target persons.

We also tested whether participants' racial group membership affected their categorizations of the targets. We conducted a 3 (participant race: Asian, Latino, or White) × 3 (target race: Black, White, and Multiracial) mixed model ANOVA on categorization concordance.[4] The main effect of target race was significant, $F(4,224)=67.26$, $p<0.001$, $\eta_p^2=0.38$. There was no main effect of participant race nor did participant race interact with target race, $Fs<1$. These results demonstrate that Asian, Latino, and White participants exhibited the same patterns of categorization for Black, White, and Multiracial targets.

Do perceivers categorize multiracial targets as "Multiracial" at all? To test whether the multiracial faces were categorized as multiracials at a rate greater than chance, we conducted a one-sample t-test comparing the average proportion of concordance ($M=0.58$) to chance performance of 33%. The t-test confirmed that participants did categorize multiracials concordantly at a rate significantly greater than chance, $t(133)=10.06$, $p<0.001$.

Despite this above-chance overall performance, there were frequent discordant categorizations of multiracial targets. To further analyze these discordant responses, we first recoded participants' categorizations of the multiracial targets as Black = 1 and White = 0. We then averaged across these responses and stimuli to determine a ratio of Black to White categorizations of the multiracial target persons; an average exceeding 0.50 would indicate a tendency to categorize multiracials as Black more often than White. A two-tailed z approximation test was used to determine whether the proportion of discordant categorizations (Black vs. White categorizations of multiracials) differed from 0.50. Participants were significantly more likely to categorize multiracial faces as White than as Black (ratio = 0.20), $t(111)=-8.69$, $p<0.001$.[5]

Response times for concordant categorization

Response times faster than 300 ms and slower than 3000 ms were replaced with those values, respectively (1.7% of trials). We hypothesized that participants would take longer in making categorization judgments for multiracial targets than for monoracial targets. A one-way repeated measures ANOVA was conducted on response times, with target race as a within-subjects factor. As predicted, target race had a significant effect on response times for concordant categorization, $F(2,122)=87.26$, $p<0.001$, $\eta_p^2=0.42$. Follow-up comparisons revealed that concordant categorizations of Multiracial targets ($M=1310$ ms, $SD=456$) took significantly longer than concordant categorizations of Black ($M=905$ ms, $SD=357$) or White targets ($M=939$ ms, $SD=328$), $ps<0.001$. There was no difference in time for concordant categorizations of Black or White targets.

[2] Every analysis of response latency data in this paper was performed on log-transformed response times. We report response latency data in milliseconds for ease of interpretation.

[3] Participants' discordant categorizations of Black targets were predominantly to categorize them as Multiracial (as opposed to White). Although participants made fewer concordant categorizations of Blacks than Whites, they still made significantly more concordant categorizations of Black targets than Multiracial ones.

[4] Given the low frequency of Black and Multiracial participants in our sample, we did not include either group in our test of participant race on categorization concordance or response latencies.

[5] We conducted a one-way ANOVA to examine the effect of participant race (Asian, Latino, or White) on the ratio of White to Black discordant categorizations of multiracials. There was no effect of participant race on the type of discordant categorizations of multiracials, $F<1$.

Discussion

Our results provided support for both of our hypotheses. Perceivers had more difficulty in categorizing multiracial persons, as reflected in significantly more discordant categorizations for multiracial target persons, and concordant multiracial categorizations took longer than concordant monoracial ones. These findings are consistent with the view that the category Multiracial is a less well-developed, a less frequently used, and therefore a less accessible category than the Black and White categories.

It is important to note that participants were able to apply the “Multiracial” category with above-chance concordance. This finding may reflect the beginning of perceiver adjustment to an increasingly mixed society. Nevertheless, this study provided clear evidence that perceivers are not as adept at making Multiracial categorizations as Black or White categorizations.

The distribution of discordant categorizations of multiracial targets was unexpected; in particular, we did not expect perceivers to categorize multiracials as White more often than Black. These results are inconsistent with the hypodescent and in-group overexclusion accounts of multiracial categorization discussed earlier. Experiment 2 tested the replicability of our findings in a different context. We defer discussion of these results to the subsequent discussion section.

Experiment 2: Real vs. Morphed Faces

Experiment 2 was conducted to replicate and extend the previous findings by using face photos of actual Black–White biracials as well as photos of morphed Black–White faces. We manipulated the type of multiracial faces presented (morphed versus real) in order to accomplish this goal.

Morphing is a useful and effective procedure for blending the features of parent photos. There are, however, several potential concerns about the use of this technique in studying multiracial faces. Real-life multiracial faces are not created by a process that blends, by the same constant (say, 50:50) proportion, *each and every* feature of the two parent faces, as morphing does. Genetics doesn't work that way. Moreover, 50:50 morphs of two different race faces (Black, White) can sometimes generate a face that could be construed as reflecting a third racial group (such as Latino; see MacLin & Malpass, 2001). The question naturally arises, then, whether the data obtained from our multiracial faces (50:50 blends of parent faces) corresponds to data that would be obtained when using faces of real multiracial persons. Experiment 2 investigated that question. We hypothesized that participants' categorization data would reflect the same patterns observed in Experiment 1, regardless of the type of multiracial face.

Method

Participants

Thirty-eight undergraduates (40% male) from UCSB participated for partial course credit. They ranged in age from 18 to 24, with an average age of 19.6 years. According to their self-reports, the participants were 21% Asian, 3% Black, 16% Latino, 3% Pacific Islander, and 58% White.

Materials

Participants viewed a total of 24 faces (eight Black, eight White, and eight Multiracial faces). The multiracial faces were either 50:50 morphs or were photos of faces of real persons with one Black and one White parent. The morphed faces included those from Study 1, plus four additional morphs from those used by Peery and Bodenhausen (2008). The real Black–White faces were collected and originally used by Pauker et al. (2009).

Procedure

Participants were randomly assigned to see one of two sets of 24 faces. Both sets presented the same eight Black faces and eight White faces. The sets differed only in whether the eight multiracial faces were real persons or 50:50 morphs of Black and White parent faces. As in the previous study, the faces were presented one at a time, in random order, on the computer screen and participants categorized them as Black, White, or Multiracial. Because there were no observed effects of the different response key positions in Experiment 1, we used only one key assignment pattern (Black = “S,” White = “L,” and Multiracial = spacebar) in this study and all subsequent studies. Categorization concordance and response latencies were recorded.

Results

Categorization responses

As in Experiment 1, for each participant, the proportion of concordant categorizations was calculated for each target race. We conducted a 2 (multiracial condition: morph vs. real) × 3(target race: Black, Multiracial, and White) mixed model ANOVA on categorization responses. There was a significant main effect of target race, $F(2,72) = 27.23$, $p < 0.001$, $\eta_p^2 = 0.43$. Follow-up pairwise comparisons revealed that participants made more concordant categorizations of White ($M = 0.93$, $SD = 0.13$) than Black faces ($M = 0.87$, $SD = 0.17$), $p < 0.001$. Also, participants made more concordant categorizations for Black and White faces than for Multiracial faces ($M = 0.65$, $SD = 0.22$), $ps < 0.01$. This pattern of results replicates the findings from Experiment 1. There was also a main effect of multiracial condition, $F(1,36) = 2.02$, $p = 0.01$, $\eta_p^2 = 0.16$. Participants made fewer discordant categorizations when the multiracial faces were morphs ($M = 0.68$, $SD = 0.22$) than when they were the faces of real multiracials ($M = 0.62$, $SD = 0.21$), $p = 0.01$. The interaction was not significant, $F < 1$. Thus, the pattern of results was the same for morphed faces and real multiracial faces.

Next, we conducted two two-tailed z approximation tests to determine if the proportion of concordant categorizations was significantly above chance (33%) for morphs and for real multiracials. In both conditions participants categorized multiracials as Multiracial at a rate significantly above chance (morphs, $t(18) = 7.08$, $p < 0.001$; real, $t(18) = 5.86$, $p < 0.001$).

To further analyze participants' discordant categorizations of multiracials, we again coded participant responses as 0 for White and 1 for Black. Then we averaged across the multiracial faces. (As in the previous study, a proportion of discordant categorizations equal to 0.50 indicates equally categorizing multiracial faces as White and Black.) There was a significant difference in ratio of discordant categorizations for morphs versus real multiracial faces, $F(1,34) = 6.28$, $p = 0.02$, $\eta_p^2 = 0.16$. Participants were more likely to categorize real multiracials as Black ($M = 0.63$, $SD = 0.38$) than they were to categorize morphs as Black ($M = 0.32$, $SD = 0.37$). Next, in order to determine whether these proportions differed from chance (0.50), we conducted two two-tailed z approximation tests. For morphs, the proportion was significantly different from chance, $t(17) = -2.11$, $p = 0.05$, such that participants were more likely to categorize them as White than as Black, replicating the findings in Experiment 1. For real faces, the proportion did not differ significantly from chance, $t(17) = 1.44$, $p = 0.17$. The real multiracials were equally likely to be categorized as White and Black.

Response times for concordant categorizations

Response times less than 300 ms and greater than 3000 ms were again replaced with those values, respectively (0.4% of responses). We conducted a 2 (multiracial condition: morph vs. real) × 3 (target race: Black, Multiracial, and White) mixed model ANOVA on the concordant categorization latencies. There was a main effect of target race, $F(2,72) = 59.37$, $p < 0.001$, $\eta_p^2 = 0.62$. Follow-up pairwise comparisons revealed that concordant categorizations of Multiracials took significantly longer ($M = 1341$ ms, $SD = 1342$) than did concordant categorizations of White ($M = 876$, $SD = 296$) and of Black faces ($M = 870$, $SD = 249$), $ps < 0.001$. These results replicate our findings in Experiment 1. There was no main effect of multiracial condition, $F<1$, and the interaction was not significant, $F(2,72)=1.49$, $p=0.23$. Thus, the categorization latency data did not differ depending on the type of multiracial stimuli viewed.

Discussion

In this experiment we replicated Experiment 1 and extended our key findings from morphed multiracial faces to real multiracial faces. The results provide further support for our contention that, compared with monoracial categorization, categorization as Multiracial is a less automatized, more deliberative process. As such, perceivers are less adept at applying it, making more discordant categorizations of multiracial than of monoracial targets, and taking longer to make concordant categorizations of multiracials.

The same general pattern of results was obtained using both real multiracial faces and morphed faces. There were, however, a couple of differences. Perceivers were slightly better at categorizing morphed multiracial faces as Multiracial, perhaps figuring out that the morphed faces were all multiracial and using the perceptual “averageness” achieved through morphing as an additional cue to multiracialism. In addition, the morphed multiracial faces were categorized more often as White than as Black, whereas the real multiracial faces were equally likely to be categorized as Black and White.

The small differences between morphed and real multiracial faces raise the possibility that morphed faces may not always be the optimal alternative to using real multiracial photos when studying multiracial person perception, particularly for research on hypodescent or discordant categorizations of multiracials. Future research should take care when generalizing results based on morphed face stimuli to more ecologically valid stimuli. The present experiment has, however, demonstrated that morphs and real multiracial targets produced equivalent effects of multiracial versus monoracial categorizations on both of our dependent variables (categorization type and response time).

It may seem surprising that neither type of multiracial stimuli generated support for hypodescent or in-group overexclusion (categorizing multiracial faces as Black more often than White). However, this result is not as surprising when one looks carefully at the findings from Peery and Bodenhausen's (2008) Study 2, in which they provided participants with a Multiracial response option in a deliberative, non-speeded task. In the condition in which faces were presented without biographical information (most comparable to the current research), Peery and Bodenhausen found that perceivers categorized multiracials predominantly as Multiracial (79% of the time). Importantly, the proportion of discordant categorizations of multiracials in their data mirrors our own findings; 16% of the categorizations were White compared to only 4% Black. It is possible that introducing “Multiracial” as a response option somehow changes the ingroup–outgroup equilibrium that is presupposed by the hypodescent and in-group overexclusion mechanisms. Because previous research reporting hypodescent and in-group overexclusion effects used categorization tasks with only two category options (usually “White” and “Black”), it is not clear that they generalize to the three-choice decision context. The differing outcomes for the distribution of discordant categorizations of multiracial faces in our data and those reported by others are interesting and warrant future research.

However, the likelihood of categorizing multiracials as monoracials (and differentially as Black or White) is not the main focus of the current research. Rather, for the present purpose, the important point is that the results of Experiment 2 replicate those of Experiment 1, showing that multiracial categorizations are not applied as readily or as quickly as monoracial categorizations. We interpret these results as reflecting the lack of accessibility of the Multiracial category.

Experiment 3: Testing Generalization

The results of Experiments 1 and 2 lend strong support to our hypotheses. However, both of these studies used Black and White racial groups as the basis for testing our theoretical ideas. The question arises as to whether these outcomes are specific to Black–White biracials or, alternatively, if these results would generalize to Multiracial categorizations of targets with different racial mixtures. In this experiment, we sought to replicate our findings using Asian–White stimulus persons. We considered it important to generalize our findings for both conceptual and methodological reasons.

First, perceivers' difficulty with categorization of Black–White biracials could be attributed to the unique history of Black and White race relations in the United States. Mixing Black and White racial backgrounds was institutionally prohibited by anti-miscegenation laws until 1967 (Sanchez & Shih, 2009), and Black–White biracialism was forbidden by institutionalized hypodescent (Harris, 1964). By determining if our effects generalize to another type of multiracials, we will be able to determine if Multiracial categorization is generally more difficult or only difficult for the Black–White biracial case.

Second, the research was conducted at a west coast university with a low representation of Black people in the student body, thereby limiting our participants' exposure to and interaction with Black–White biracial individuals. Asian and Latino people are more prevalent racial minorities in this population and, consequently, the “Multiracial” concept may be more commonly associated with Asian–White or Latino–White multiracial persons in this participant pool.

Third, it is possible that, in the previous experiments, perceivers may have been relying on skin phenotype as a cue to race group membership rather than using category-based representations in making their decisions. Our results could simply represent the fact that Black–White biracial morphs tend to have lighter skin than monoracial Black individuals and darker skin than monoracial White individuals. Asian and White phenotype distributions overlap more substantially than do White and Black phenotypes (Sturm, Box, & Ramsay, 1998; Szaro, Gerald, Pathak, & Fitzpatrick, 1969). To further control for the phenotype effect, the current experiment used stimulus photos in grayscale. Using grayscale Asian–White biracials enabled us to determine if categorization as Multiracial captures simple phenotype variation or whether it tracks the blending of multiple facial features from monoracial groups.

For these reasons, an experimental test of our hypotheses using Asian, White and Asian–White biracial faces would provide a useful context for evaluation the specificity or generalizability of the results of Experiments 1 and 2. Our expectation was that none of these alternative mechanisms (the unique history of Black–White race relations in the US, the relative infrequency of Black–White biracials, nor the sole use of phenotype as a cue to race) account for the findings of Experiments 1 and 2. We argue, instead, that Multiracial categorization is difficult because it is a relatively new and complex cognitive process. Therefore, in this experiment, we tested the same hypotheses about categorization of multiracial targets and the ease (latencies) of doing so for White, Asian, and Asian–White biracial faces. We hypothesized that participants would make fewer concordant categorizations of multiracial than monoracial faces and that Multiracial categorizations would take longer than Asian and White categorizations.

Method

Participants

Fifty-four undergraduates (74% female) at UCSB participated in this experiment in exchange for partial course credit or were paid $5. The average age of the participants was 19.5 years. According to the participants' self-reported demographics, the sample was 28% Asian, 2% Black, 13% Latino/a, 13% Multiracial, 35% White, and 9% other.

Materials

Each participant responded to 24 faces: eight monoracial Asian females, eight White females, and eight Multiracial females. Four Asian–White, neutral expression, grayscale morphs were created from Asian and White female faces using Fantamorph software. In addition, we obtained permission to use neutral expression face photos of four half-Asian, half-White females. All of the stimulus photos depicted young adult females. All photos were cropped to show only the face against a Black background.

Procedure

The procedure was identical to that of Experiments 1 and 2, but with the new set of Asian, White, and Asian–White faces. Participants categorized the faces (Asian = "S," White = "L," and Multiracial = spacebar), and their responses and response latencies were recorded.

Results

Categorization responses

For each participant the proportion of concordant responses was calculated for each target race. To assess the effect of target race on categorization concordance, we conducted a one-way repeated measures ANOVA. There was a significant main effect of target race, $F(2,106) = 35.04$, $p < 0.001$, $\eta_p^2 = 0.40$. Pairwise comparisons revealed that participants categorized Multiracial ($M = 0.49$, $SD = 0.18$) targets significantly less concordantly than Asian ($M = 0.80$, $SD = 0.31$) or White ($M = 0.83$, $SD = 0.13$) targets, $ps < 0.001$. Participants' concordance for Asian and White faces did not differ, $p = 0.58$.

We conducted a paired samples *t*-test to determine if there were differences in categorization concordance between morphed faces and real mixed-race people's faces. There was a marginally significant effect of type of multiracial face, $t(53) = 1.87$, $p = 0.067$. Participants categorized the real multiracial faces ($M = 0.53$, $SD = 0.30$) as Multiracial marginally more than the morphed ones ($M = 0.44$, $SD = 0.21$). Both types of multiracial targets were significantly less concordantly categorized than White or Asian targets, $ps < 0.001$. Two two-tailed *z* approximation tests confirmed that categorization concordance rates were above chance levels (i.e., 33%) for both morphed faces, $t(53) = 3.82$, $p < 0.001$, and real multiracial faces, $t(53) = 4.97$, $p < 0.001$.

To examine the nature of the discordant categorizations of multiracial faces, we recoded participants' categorizations of the multiracial targets as Asian = 1 and White = 0. We then averaged across discordant responses and stimuli to determine a ratio of Asian to White categorizations. An average exceeding 0.50 indicates a tendency to categorize multiracials as Asian more often than White. The two-tailed *z* approximation test was used to determine whether the proportions (Asian vs. White categorizations) differed from 0.50. Participants were more likely to categorize the real multiracial faces as White than Asian ($M = 0.40$, $SD = 0.29$), $t(52) = -2.50$, $p < 0.05$. In contrast, participants were more likely to categorize morphed faces as Asian than White ($M = 0.64$, $SD = 0.43$), $t(46) = 2.23$, $p < 0.05$.

Response times for concordant categorization

As in Experiments 1 and 2, response times faster than 300 ms and slower than 3000 ms were replaced with those values, respectively (4.7% of trials). We conducted a one-way repeated measures ANOVA to determine the effect of target race (again, collapsing across type of multiracial face) on latencies of concordant categorizations. There was a significant main effect of target race, $F(2,104) = 20.21$, $p < 0.001$, $\eta_p^2 = 0.28$. Participants were significantly slower at concordantly categorizing multiracial faces ($M = 1610$ ms, $SD = 512$) than Asian ($M = 1207$ ms, $SD = 495$) or White faces ($M = 1323$ ms, $SD = 440$), $ps < 0.001$. There was a marginal tendency for participants to concordantly categorize Asian faces faster than White faces, $p = 0.08$. An independent samples *t*-test revealed no significant differences in Multiracial categorization latencies between real and morphed mixed-race faces, $t(46) = 0.33$, $p = 0.74$.

Discussion

These results demonstrate that our findings for categorization of Black–White biracials generalize to Multiracial categorization based on another race distinction. As in Experiment 2, there were some differences between the morphed and real Asian–White faces, and this finding reinforces the need for researchers studying multiracial person perception to choose their stimuli carefully. Nonetheless, both the morphed and real Asian–White biracial faces were categorized less concordantly than the monoracial faces, and multiracial categorizations took significantly longer than monoracial ones.

Of course, given that there are many ways of being "Multiracial," this same analysis should be conducted using other definitions of multiracial as a means of further investigating the generalizability of our results. At minimum, we now know that the patterns of data reported in Experiments 1 and 2 are not unique to perceptions of multiracials based on a Black–White distinction. Therefore, in the remaining studies of this paper, we return to using Black, White, and Black–White biracial faces in examining other facets of this process.

Image analysis of stimulus faces: effects of the perceiver or the perceived?

Three studies have provided evidence for our assertion that the multiracial categorization process is qualitatively different from monoracial categorization processes. However there is an alternative explanation for these results that needs to be addressed, an alternative that has not been examined in any previous studies of interracial perception. The issue is whether the obtained results reflect effects due to cognitive categories of the perceiver or to properties of the face stimuli being perceived.

For any set of face stimuli that might be presented to participants, there will be some degree of feature variation among those stimuli. This is true for any given set of monoracial or multiracial faces. It is always possible that the variation among stimuli representing one race group may be greater than that for stimuli representing another race group. Such differences in within-race variation have been shown to influence recognition of in-group and out-group faces (Chiroro, Tredoux, Radaelli, & Meissner, 2008). In the present case, it may be that there is more within-category variation among the Black–White faces than among the Black faces or White faces. If this were true, then the increased heterogeneity among the multiracial faces could diminish the usefulness of the Multiracial category (because the members of it are dissimilar to one another) and thereby lower the perceivers' ability to match exemplars to a category prototype, resulting in lower concordance and slower response times. In other words, the results of our experiments may not be due to psychological qualities of the perceiver, as we have proposed, but rather to actual differences in the properties of the three sets of stimulus faces.

To investigate this alternative explanation, we analyzed the pixel variance of our face stimuli within each racial category (Black, Multiracial, and White). The pixel variance analysis allowed us to determine whether the multiracial stimuli were more different from one another than were the faces in either of the monoracial categories. To conduct this analysis, we standardized the size of the photos so that they all had the same number of pixels (250×350). Using MatLab software, we analyzed the within-category variance for the eight Black, eight White, and sixteen (eight real and eight morphed) Multiracial faces. In other words, for each racial category, we asked MatLab to compare the face images on a pixel by pixel basis. For each photo, MatLab created a 250×350 matrix by assigning a value to each pixel in the photograph based on the color of that pixel. Then MatLab compared the matrices generated by each photo within a category and calculated an index of within-category variability (the degree to which the matrices within a racial category were different from one another), where higher numbers indicated more variability across the faces of that category.

The results (displayed in Table 3) indicated that both the real and morphed Multiracial categories had less within-category variability than faces within the White or Black categories. These results are consistent with the idea that the averaging accomplished through morphing makes morphed faces more similar to one another than faces of the same race naturally are to one another. Importantly, this analysis shows that participants were less adept at categorizing the set of faces that were *more similar* to one another (Multiracials) than the sets of faces that were more dissimilar to each other (Black, White). Therefore, the lack of precision and speed in categorizing multiracial target persons observed in Experiments 1 and 2 are not attributable to the exemplars in the stimulus set being more different from one another than the faces within the monoracial stimulus sets.

It is important to note that our stimulus sets do not necessarily accurately represent the population of Black, Multiracial, and White faces. The pixel variance analysis does not necessarily speak to the within-category variability of all Black, Multiracial, and White faces in the US, but it does rule out the interpretation of our results as exclusively stimulus-driven. These findings provide additional support for our assertion that Multiracial categorization is difficult for perceivers because the process is less accessible, less spontaneous, and perhaps inhibited by their existing beliefs about race. In the next three studies, we sought to test these assertions directly.

Experiment 4: Effects of Cognitive Load

We have argued that, whereas monoracial categories are used spontaneously by the average American perceiver, applying the Multiracial category is a more deliberative, less spontaneous process. Experiments 4 and 5 were designed to provide additional evidence for the processing differences between multiracial and monoracial categorizations. If multiracial categorization is a less spontaneous process, then it should be more vulnerable to disruption compared to monoracial categorizations. We tested this hypothesis using two manipulations that have been shown to differentially affect automatic and controlled processing: cognitive load (Experiment 5) and time constraints (Experiment 6).

Differentiation between race groups develops early in life (Hirschfeld, 1996), is well ingrained, and occurs automatically (Cunningham et al., 2004; Ito & Urland, 2003). However, our data suggest that these findings are limited to the application of traditional monoracial categories and do not generalize to use of a Multiracial category. We know from past research that conscious, controlled, deliberative processing is more resource consuming and is disrupted by external factors, whereas this interference occurs much less for automatic, spontaneous processes. This reasoning suggests that the multiracial, but not the monoracial, categorization process should suffer when perceivers are cognitively depleted.

In this experiment we manipulated the cognitive resources available to participants during the categorization task. We hypothesized that cognitive load would disrupt the use of the Multiracial category, but not the use of Black or White categories.

Table 3
Pixel variance analysis results.

Category	Pixel variance
Black	945.4586
Multiracial (morphs)	354.6739
Multiracial (real)	837.8324
White	957.6246

Method

Participants

Ninety-five undergraduates (14.7% Asian, 3%Black, 18.9% Hispanic, 12.6% Multiracial, 46.3% White, and 4% other; 28 males) at UCSB participated in the study for partial course credit. Their average age was 19.2 years.

Design and procedure

The experiment had a 2 (cognitive load or no load) × 3 (target: Black, Multiracial, and White) design, with the second factor being within-subjects. The stimuli were the same as those used in Experiment 1. Participants categorized 4 Black, 4 White, and 4 Multiracial (morphed) faces, one at a time, in random order.

Participants were randomly assigned to a cognitive load or a no load condition. In the no load condition the procedure was identical to that of Experiment 1. In the cognitive load condition, after learning and practicing the key positions, participants were instructed to memorize a 9-digit number that they would be asked for at the end of the experiment. After studying it for 15 seconds, they began the face categorization task. Upon completion of the categorization task, demographic information was collected and participants were thanked and debriefed.

Results and Discussion

Categorization responses

Responses were coded as in the previous experiments. A 2 (load condition: load vs. no load) × 3 (target race: Black vs. Multiracial vs. White) mixed-design ANOVA on the proportion of concordant categorizations produced a significant main effect of target race, $F(2,186) = 92.63$, $p < 0.001$, $\eta_p^2 = 0.50$. Across load conditions, the proportion of concordant categorizations per target race condition was 0.56 ($SD = 0.28$) for multiracial target persons, 0.86 ($SD = 0.20$) for Black target persons, and 0.94 ($SD = 0.15$) for White target persons, all pairwise $ps < 0.001$. The main effect of cognitive load was nonsignificant, $F(1,93) = 0.98$, $p = 0.33$. The predicted condition by target interaction was marginally significant, $F(2,186) = 3.11$, $p = 0.056$, $\eta_p^2 = 0.03$. The pattern of means, shown in Fig. 1, was as predicted.

Given our a priori hypothesis about the form of the load × target race interaction – specifically, that the cognitive load manipulation would affect performance in categorizing multiracial persons but would not influence monoracial categorizations – we conducted the appropriate pairwise comparisons. Consistent with our hypothesis, cognitive load participants made significantly fewer concordant categorizations of multiracial targets ($M = 0.51$, $SD = 0.27$) than did the no load participants ($M = 0.62$, $SD = 0.27$), $p = 0.047$. In contrast, and also consistent with predictions, cognitive load had no effect on the concordance of monoracial categorizations, both $ps > 0.47$. These results conform precisely to our predictions. They support the interpretation that Multiracial categorization is less routine or automatic than monoracial categorization, it requires more cognitive effort and resources, and therefore it is more susceptible to the effects of resource depletion imposed by the cognitive load.

In both the load and no load conditions, perceivers made Multiracial categorizations at a rate significantly greater than chance, $t(48) = 7.37$, $p < 0.001$ and $t(45) = 4.32$, $p < 0.001$, for load and no load conditions, respectively. Thus, although participants made fewer concordant Multiracial categorizations in the cognitive load condition, they still did so at above-chance levels of performance.

To determine the nature of the discordant categorizations of multiracials, we recoded participants' discordant responses as in previous studies. There was no effect of cognitive load on the proportion of Black to White categorizations of multiracials, $t(80) = 0.85$, $p = 0.40$. Therefore, although the absolute number of discordant responses

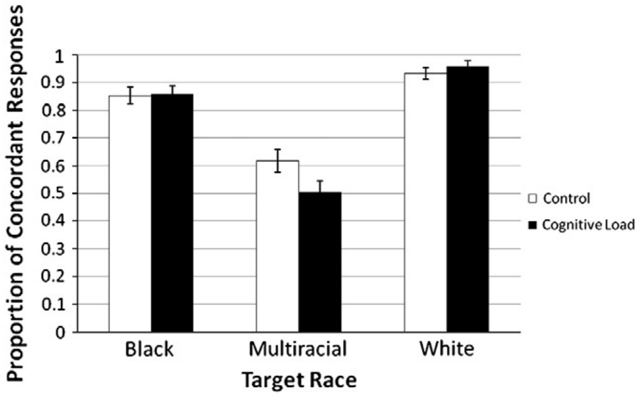

Fig. 1. The effect of cognitive load on categorization concordance in Experiment 4.

differed between conditions, the proportion of White to Black categorizations of multiracials did not differ between conditions. We collapsed across conditions to determine if, overall, participants were more likely to categorize multiracial targets as Black or White. A two-tailed *z* approximation test showed that participants were significantly more likely to categorize multiracial targets as White than as Black (M = .29, SD = .38), $t(81) = -5.04$, $p < 0.001$. These results replicate our previous findings.

Response times for concordant categorizations

Response times faster than 300 ms and slower than 3000 ms were replaced with those values, respectively (0.96% of trials). A 2 (load condition) × 3 (target race) mixed ANOVA was conducted on participants' response times for concordant categorizations. There was a significant main effect for target category, $F(2,174) = 85.24$, $p < 0.001$, $\eta_p^2 = 0.50$. Categorization times for multiracial targets ($M = 1265$ ms, $SD = 412$) were significantly ($ps < 0.001$) slower than those for White and Black categorization latencies ($M = 834$, $SD = 315$ and $M = 822$, $SD = 224$, respectively), which differed marginally from each other, $p = 0.05$. There was no main effect of load condition on latencies of concordant categorizations, $F(1,87) = 1.60$, $p = 0.21$, $\eta_p^2 = 0.02$, nor did cognitive load interact with target race to affect response times, $F(1,174) = 0.27$, $p = 0.77$, $\eta_p^2 = 0.00$.

We conducted follow-up independent t-tests to test our specific a priori predictions that cognitive load would slow the participants' concordant Multiracial categorizations but not their concordant categorizations of Black and White targets. We found a marginal effect of cognitive load on the response latencies for concordant Multiracial categorizations $t(88) = -1.39$, $p = 0.08$, one-tailed, in the predicted direction. Consistent with our hypotheses, the cognitive load manipulation did not affect response latencies for concordant Black, $t(92) = -0.53$, $p = 0.60$, or White categorizations, $t(92) = -0.58$, $p = 0.57$. Thus, the overall pattern of results conforms to our predictions.

These results support our argument that multiracial categorizations require more cognitive capacity than do monoracial categorizations. The purpose of Experiment 5 was to test our hypothesis that Multiracial categorizations require more time than do monoracial categorizations.

Experiment 5: Effects of Time Constraints

In four experiments our results have consistently shown that participants took longer to concordantly categorize multiracials than monoracials. We interpret this effect as due to multiracial categorizations involving more deliberative thinking than do monoracial categorizations. This more thoughtful analysis, prompted by race-ambiguous faces, requires time. If the necessary time were not available, then the process underlying multiracial categorization would be disrupted, further decreasing the number of concordant responses. Therefore, we predicted that imposing time constraints on the racial categorization process would decrease the number of concordant Multiracial categorizations. In contrast, given the routine, automatized nature of monoracial categorizations, we hypothesized that they would not be affected by the imposition of time constraints.

Method

Participants

Participants were 39 undergraduates (64% female) at UCSB who volunteered to participate in the experiment in exchange for partial credit. According to participants' self-reports, 10% were Asian, 10% were Black, 18% were Latino/a, 15% were Multiracial, and 46% were White. The average age of participants was 18.9 years.

Design and procedure

The study had a 2 (response window: 700 ms vs. unlimited) × 3 (target race: Black, Multiracial, and White) mixed design, with the latter factor being within-subjects. We chose a 700 ms response window based on the response latency data from Experiment 4, in which 700 ms was approximately one standard deviation below the average response time needed to concordantly categorize multiracials and monoracials. (We conducted pretests using shorter response windows, but these time frames were too short for even a practiced experimenter to respond.)

Participants entered the lab and were randomly assigned to either the time constraint condition or the control condition. After giving informed consent to participate, the participants learned and practiced the race-to-key assignments as in the previous experiments. The only difference from previous experiments occurred in the time limit condition, in which participants were instructed to respond within 700 ms of the stimulus onset. In order for the participants to gain familiarity with the 700 ms response window, during the practice trials, responses over 700 ms prompted a message requesting that they respond faster. After the practice trials, participants viewed and categorized 24 faces (8 Black, 8 White, and 8 Black–White biracials) one at a time and in random order. At the end of the study, participants answered demographic questions and were debriefed.

Results

Manipulation check

The time limit manipulation instigated a 700 ms response window, meaning that participant responses over 700 ms prompted a message for them to respond faster. However, in order to avoid the loss of data for responses over 700 ms, we did not advance the experimental trials until the participant gave his or her response. Therefore, we needed to make sure that participants in the time constraint condition adhered to the specified response window. Approximately twenty-four percent of the responses by participants in the time limit condition exceeded 700 ms, and we included these responses in our analyses. The average response time for the time limited condition was well within the time limit (615 ms; $SD = 61$) and did not differ by target race, $F(2,36) = 1.68$, $p = 0.21$. An independent samples *t*-test confirmed that participants in the time limited condition responded significantly faster than participants in the control condition ($M = 1295$ ms, $SD = 294$), $t(37) = 12.65$, $p < 0.001$. Thus, the time constraint manipulation was effective.

Response times for concordant categorizations

Again, response times below 300 ms and above 3000 ms were replaced with those values respectively (4.17% of responses). A 2 (response window: 700 ms vs. unlimited) × 3 (target race: Black, Multiracial, and White) mixed model ANOVA was conducted on concordant categorization latencies. Not surprisingly, there was a main effect of condition, $F(1,37)=98.98$, $p<0.001$, $\eta_p^2=0.73$, because the time limited condition participants responded faster than the control condition participants (as noted in the manipulation check). There was also a main effect of target race, $F(2,74)=16.13$, $p<0.001$, $\eta_p^2=0.29$. Overall, categorizing multiracial targets took significantly longer ($M=1164$, $SD=606$) than did categorizing Black ($M=902$, $SD=418$) or White ($M=895$, $SD=386$) targets, $ps<0.001$. Categorization latencies for Black and White targets did not differ, $p>0.99$. The main effects were qualified by a significant target×condition interaction, $F(2,74)=6.9$, $p<0.01$, $\eta_p^2=0.22$. Categorization latencies did not differ by target race in the time constrained condition; however, in the unconstrained condition, concordant categorizations of multiracial targets ($M=1654$, $SD=456$) took significantly longer than concordant categorizations of Black ($M=1178$, $SD=414$) and White targets ($M=1178$, $SD=345$), $ps<0.001$. Within the unconstrained condition, categorization latencies of Black and White targets did not differ from one another, $p=0.82$.

Categorization responses

The question of primary interest in this experiment was the effect of the time constraint manipulation on participants' performance on the categorization task. We predicted that participants would have greater difficulty categorizing multiracial than monoracial target persons, as in our previous studies, and that this effect would be enhanced under time constraints. To test these hypotheses, we conducted a 2 (response window)×3 (target race) mixed model ANOVA on concordant categorization scores. There was a main effect of target race, $F(2,74)=53.87$, $p<0.001$, $\eta_p^2=0.59$. Participants made more concordant responses in categorizing Black and White faces than they did in categorizing Multiracial faces. There also was a main effect of condition, $F(1,37)=14.72$, $p<0.001$, $\eta_p^2=0.29$; not surprisingly, participants in the control condition made more concordant categorizations ($M=0.81$, $SD=0.19$) than did participants operating under time constraint ($M=0.69$, $SD=0.15$). These main effects were qualified by a significant target×condition interaction, $F(2,74)=9.12$, $p<0.001$, $\eta_p^2=0.20$ (see Fig. 2). Pairwise comparisons revealed that the time limit constraint had no effect on the number of concordant categorizations for Black or White target persons, $ps>0.78$. However, the time constraint significantly decreased concordant categorization for Multiracial targets ($M=0.33$, $SD=0.22$) relative to the control condition ($M=0.66$, $SD=0.25$), $p<0.001$. Two two-tailed z approximation tests confirmed that the time constraint condition reduced the concordance of Multiracial categorizations from above chance in the control condition, $t(19)=5.77$, $p<0.001$, to chance levels, $t(18)=-0.02$, $p=0.98$.

As in the previous studies, the ratio of White to Black discordant categorizations was calculated ($M=0.16$). We conducted a two-tailed z approximation test to determine if this proportion was different from 0.50, $t(36)=-8.23$, $p<0.001$. There was no significant effect of condition on the nature of these discordant categorizations, $t<1$. Participants in both conditions were more likely to categorize multiracial faces as White than Black.

Discussion

The results of this study demonstrated that imposing a time constraint on categorization judgments disrupted the process of making Multiracial categorizations, whereas it had no effect on Black or White categorizations. Thus, Multiracial categorizations require more time and are more easily disrupted. Together with Experiment 4, these results show that the multiracial categorization process qualitatively differs from monoracial categorization processes. The Multiracial category is not as accessible to the average perceiver as are monoracial categories, and therefore Multiracial categorizations are not made as routinely or as quickly as are monoracial categorizations.

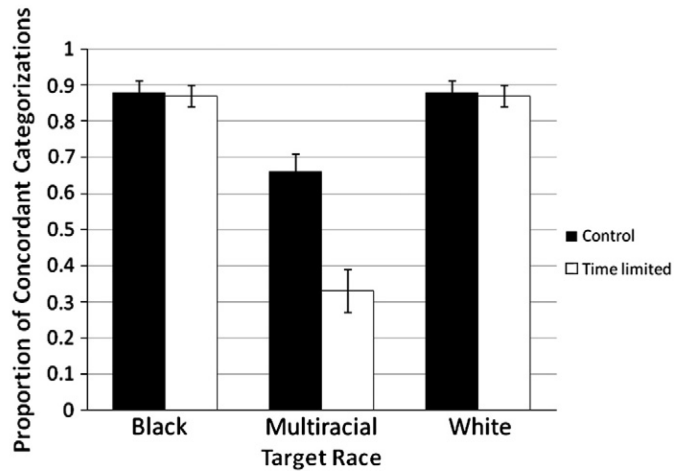

Fig. 2. The effect of time constraints on categorization concordance in Experiment 5.

The question remains: why don't perceivers experience the Multiracial category on par with monoracial ones? There are several potential contributing factors, such as the relatively low frequency with which multiracials occur in our natural stimulus environments. However, given that people of mixed race descent have existed since this country's founding, it may also be that our society has conceptualized race in a way that decreases, or even discourages, the use of a Multiracial category.

We have argued that, throughout American history, perceivers have been adept at recognizing and using the racial and ethnic categories that were important and relevant to that historical period. The emergence of alternate or additional categories is inhibited when a perceiver views the existing categorization system as meaningful and justified. Experiment 6 was designed to test this hypothesis.

Experiment 6: Belief in the Importance of Race Distinctions

In Experiment 6, we aimed to show that imbuing traditional racial categories with legitimacy inhibits use of the Multiracial category. In order to increase the perceived legitimacy and importance of the Black–White distinction, we manipulated participants' belief that race is genetically based.

Believing that race is genetically based and that different races are inherently distinct categories is associated with more prejudice toward Black people (Jayaratne et al., 2006), negative racial stereotyping (Keller, 2005), more acceptance of racial inequalities, and less interest in interacting with out-group members (Williams & Eberhardt, 2008). We reasoned that learning that a person's genetic material reveals whether one is Black or White reinforces the Black–White dichotomy and gives legitimacy and significance to it. Consequently, we induced some participants to think of race as biologically based and assessed its effect on Multiracial categorizations. Prior to performing the speeded categorization task, participants read a newspaper article purportedly reporting scientific findings about a genetic basis of race differences or an article on a non-race-related science topic. We hypothesized that priming participants to think of race as genetically-based would decrease use of the Multiracial category.

Method

Participants

Seventy-five undergraduates at UCSB participated in this study in exchange for partial course credit. Due to computer program error, demographic information was not collected for all of the participants. Age was collected from 39 participants, and the average age was

19.38 years ($SD = 1.16$). Gender was collected from 63 participants, 57% of whom were female. Race was collected from 63 participants and this subsample was 14.7% Asian, 2.7% Black, 4% Latino, 8% Multiracial, 53.3% White, and 1.3% Other.

Design and procedure

The study had a 2 (prime: race as biological vs. unrelated science article) × 3 (target race: Black, Multiracial, and White) mixed design, with the latter factor being within-subjects.

Our paradigm and materials were modeled after those used by Williams and Eberhardt (2008). Participants came into the lab to participate in a study on reading comprehension. Participants reported their attitudes toward reading and reading behavior (frequency, motivations). Next, participants were presented with a list of news article titles and were told that the computer would randomly select one of these articles for them to read. In reality, the participants were randomly assigned to read either an article about scientists finding a genetic basis for race (Williams & Eberhardt, 2008; Appendix B) or a scientific article about space. Participants read the article and then answered questions aimed at assessing their reading comprehension. Participants were told they would participate in a separate study on attention, in which they viewed and categorized faces as in our previous experiments. There were eight faces per racial category (Black, morphed Multiracial, and White), presented one at a time and in random order. Categorizations and latencies were recorded. After the categorization task, participants were thanked and debriefed.

Results

Categorization responses

Categorization responses were calculated as in our previous experiments. To determine the effect of priming a biological view of race differences on our categorization measures, we conducted a 2 (prime: race as biological or science article) × 3 (target race: Black, Multiracial, White) mixed model ANOVA on proportion of concordant categorizations. There was no main effect of priming condition, $F<1$. There was a significant main effect of target race, $F(2,146) = 11.49$, $p<0.001$, $\eta_p^2 = 0.60$. As in previous studies, participants made more concordant categorizations of Black and White faces than of Multiracial ones, $ps<0.001$. Participants made marginally more concordant categorizations for White ($M = 0.93$, $SD = 0.09$) than Black ($M = 0.89$, $SD = 0.15$) monoracials, $p = 0.07$, and significantly fewer concordant responses for Multiracial ($M = 0.56$, $SD = 0.26$) than for either Black or White faces, $ps<0.001$. However, this main effect was qualified by a significant prime × target race interaction, $F(2,146) = 7.19$, $p<0.01$, $\eta_p^2 = 0.09$ (see Fig. 3). Follow-up pairwise comparisons to test our specific predictions revealed that, compared to participants primed with the neutral science article ($M = 0.63$, $SD = 0.24$), those primed with the "race as biologically based" article ($M = 0.49$, $SD = 0.26$) made fewer concordant categorizations for Multiracials, $p = 0.02$. In contrast, the race prime did not significantly decrease concordant categorizations of Black ($p = 0.09$) or White ($p = 0.61$) target persons, relative to the neutral science article. The pattern of results shown in Fig. 3 conforms exactly to our hypotheses.

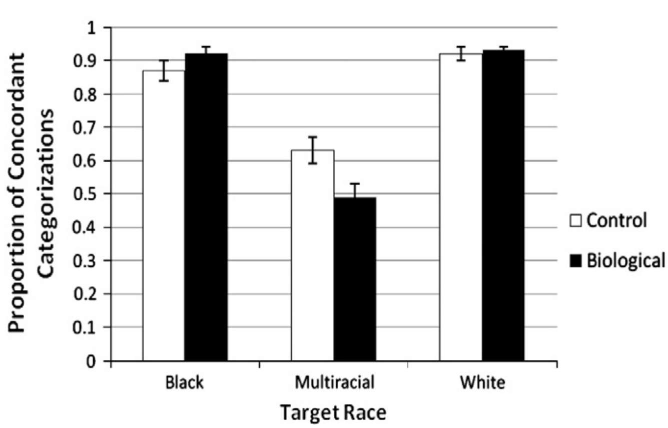

Fig. 3. The effect of race beliefs on racial categorization in Experiment 6.

To determine if the proportions of concordant categorizations of multiracials differed from chance (33%), we conducted two two-tailed z approximation tests. Participants categorized multiracials at a rate higher than chance in both the control condition, $t(38) = 7.79$, $p<0.001$, and the race prime condition, $t(35) = 3.65$, $p = 0.001$.

We investigated the nature of participants' discordant categorizations of multiracials by recoding the categorizations as in previous studies. We conducted an independent samples t-test to determine if prime affected the types of discordant categorizations made. However, there was not a significant difference between priming conditions, $t(68) = -0.29$, $p = 0.77$. Next, a two-tailed z approximation test revealed that the ratio of Black to White categorizations ($M = 0.20$, $SD = 0.30$) differed significantly from chance, $t(69) = -8.29$, $p<0.001$. This ratio indicated that participants were more likely to categorize multiracials as White than as Black.

Response latencies for concordant categorizations

Response times faster than 300 ms and slower than 3000 ms were again replaced with those values, respectively (less than 0.1% of trials). We conducted a 2 (prime) × 3 (target race) mixed model ANOVA on categorization latencies. There was a significant main effect of target race, $F(2,140) = 151.08$, $p<0.001$, $\eta_p^2 = 0.68$, replicating our previous findings that participants were slower at making concordant categorizations of Multiracial faces ($M = 1167$, $SD = 364$) than of Black ($M = 776$, $SD = 193$) or White ($M = 780$, $SD = 214$) faces, $p<0.001$. There was no difference in latencies for concordant Black or White categorizations, $p = 0.98$. There was no main effect of prime, $F<1$, and the prime × target race interaction was not significant, $F(2,140) = 1.99$, $p = 0.14$.

Discussion

The belief that race differences reflect differences in genetic material persists in large segments of American society. The results of Experiment 6 demonstrate that believing that race is genetically based decreased the likelihood that people applied a Multiracial category label to multiracial faces. Believing that race is genetically-based justifies the perceivers' existing categorization system and their conceptualization of race as a matter of Black *or* White. People subscribing to this belief view racial groups as distinct, inherently different categories, and are therefore less likely to adopt and use a Multiracial category in person perception.

The present study only investigated one way in which perceivers could attach importance and legitimacy to the existing racial categories or dichotomy. People can believe race is important for many other reasons. For instance, they could believe that race is socially important – predicting how one is treated in social interaction – or sociologically important – predicting outcomes such as health, education level, and salary. Indeed, future research should investigate how these alternative justifications for the existing racial categorization scheme affect categorization of multiracials. We would predict that any way of endowing the existing racial categories with meaning, significance, and legitimacy would inhibit the emergence of new categories.

General discussion

In social perception, categorization of others by race is virtually inevitable. A person's race is usually immediately obvious, one of the first attributes perceived about her, and categorization by race happens quickly and automatically. For most observers, perceiving a person as Black, Asian, or White is not difficult. In fact, it seems quite simple. After all, most people have been doing it all their lives.

As society has progressed and changed, encountering multiracial persons is an increasingly frequent experience. For many of those same observers, their "tried and true" categories seem less adequate, less appropriate. The question "what race is that person?" becomes more difficult to answer; racial categorization poses a challenge that requires more thought and is made with less certainty. To the extent that perceivers treat monoracial categories as mutually exclusive, multiracial persons present a "natural ambiguity" for which many perceivers are less well equipped in their categorical responding.

Our research has contributed several new findings that further our understanding of spontaneous multiracial categorization processes. First, across six studies we have consistently found that perceivers made fewer concordant categorizations of multiracial persons than of monoracial persons. Second, they took more time in judging people as Multiracial, compared with judging people as Black, White, or Asian. Third, parallel findings were obtained for two different interracial distinctions, demonstrating that our results are not unique to Black–White relations. Fourth, we showed that the Multiracial categorization process was significantly disrupted when perceivers were either cognitively depleted or were responding under time pressure. These findings substantiate our interpretation that monoracial categorizations are spontaneous and highly routine whereas Multiracial categorization involves more thought and deliberation. Finally, we showed that priming participants with information that legitimized an existing racial dichotomy decreased use of the Multiracial category.

Racial differences are distributed along a continuum, yet as perceivers we "chunk" those differences into categories. The boundaries of the categories we use are subjectively, often culturally, determined. Research on multiracial person perception is beginning to highlight the fact that this "chunking" of the continuum is arbitrary. If our multiracial stimulus faces (whether morphs or real) had constituted a more heterogeneous set of face stimuli than had either of the monoracial sets, then categorization judgments would be more difficult and would require more thought and time. If this were true, then the two consistent findings of our research – fewer concordant categorizations for multiracial faces and longer response times in making them – could be explained as due to properties of the face stimuli rather than of the perceiver. Our pixel variance analysis, which is unique in this literature, has shown that this is not the case. Specifically, the analysis revealed that the multiracial faces were actually more similar to each other than the faces in either the Black or White category were to one another. These findings provide valuable evidence that aspects of the *perceiver* are driving our observed effects.

We have described multiracial targets as presenting "natural ambiguities" to perceivers. Why are they ambiguous stimuli? Based on our evidence, we argue that average American perceivers have difficulty categorizing multiracials because these persons do not conform to the traditional monoracial categorization system that perceivers have used all of their lives. As a newer process, Multiracial categorization requires more cognitive capacity and time and is easily disrupted. The qualities that distinguish Multiracial categorization from monoracial categorizations make it more difficult to use and decrease its accessibility to the average perceiver. One implication of our findings is that, as the racial composition of society changes and as people have increased experience, multiracial categorization processes may become more comparable to monoracial ones in speed and concordance. Such developments could potentially contribute to some revisions of perceivers' theories about race and racial differences. However, we have also shown that the perception of one's existing categorization scheme as legitimate discourages use of a Multiracial category, suggesting that greater use of this category may be more likely for people who do not endow traditional monoracial categories with meaning and importance.

In our studies, when participants made discordant categorizations of multiracial faces, they were consistently more likely to categorize them as "White" than as "Black." Thus, across all six experiments, our results did not support predictions based on either hypodescent or ingroup overexclusion. Our findings are, however, consistent with previous research that included a Multiracial response option (Peery & Bodenhausen, 2008, Study 2), with neurological data showing that perceivers differentiate Multiracial faces from Black faces more quickly than from White faces (Willadsen-Jensen & Ito, 2006), and with the possibility that participants were relying on local base rates (the UCSB student body is 52% White, 17% Asian, and 3% Black). Thus, although multiracial person perception may sometimes be driven by hypodescent and ingroup-overexclusion, our results indicate that there are constraints on these phenomena and that the opposite effect may also occur. In addition, the results of Experiments 2 and 3 demonstrated that morphed faces do not always yield the same results as real multiracial faces. Understanding the nature of these constraints awaits further research.

Implications and future directions

Our research has several implications for future research. We have argued that our findings result from individuals' inexperience in the development and use of the Multiracial category, which may stem from systemic historical factors, such as institutional prohibition of interracial marriage, and cultural factors, such as the perceived meaningfulness and legitimacy of monoracial categories. These considerations suggest that certain individual difference variables, such as age, beliefs about race, and need for cognitive closure, may influence the degree of discrepancy between monoracial and multiracial categorization processes.

Extending this line of thought, there may be regional differences in the extent to which multicultural categorizations are "naturally ambiguous" or challenging for the monoracial perceiver. Countries (e.g., Brazil, Portugal vs. United States, Sweden), as well as regions within countries (e.g., New York City vs. Minneapolis), differ considerably in the racial demographics of their residents, not simply in the number of racial groups represented but in the relative presence of monoracial vs. multiracial citizens and in the prevalent lay theories of race. It may be, then, that the outcomes in Multiracial categorizations that we have documented can vary as a function of the social environment under consideration.

In addition, future research is needed to determine how American perceivers understand the meaning of the Multiracial category. Some people may understand "Multiracial" as a superordinate category on par with "monoracial" and use more specific categories such as "hapa" to describe specific racial mixtures (hapa is a term used in Hawaii to describe Asian–White biracials). Others may use "Multiracial" only as a last resort when the target does not sufficiently fit into a monoracial category. Future research is needed to clarify how perceivers interpret the Multiracial category and to identify the individual and situational predictors of these interpretations.

The downstream consequences of Multiracial categorization need to be explored as well. Do perceivers develop stereotypes and attitudes associated with this category? If so, then Multiracial categorization may influence perceivers' in interactions with multiracial persons. To date, there is no published research exploring these possibilities.

It seems clear from our data that perceivers are often uncertain, hesitant, and slow in categorizing multiracial individuals. In the real world, this additional time, hesitation, and thought during face-to-face interaction could be interpreted by a multiracial interaction partner as signs of intergroup anxiety or prejudice. Training monoracial perceivers to quickly and accurately categorize multiracials may contribute to greater facility and ease not only of the categorization process but also of the effectiveness of interactions between multiracial and monoracial individuals.

As multiracial people become increasingly prevalent and visible in society, it will be interesting to see if racial categorization comes to rely less on mutually-exclusive categories and whether perceivers begin to use the Multiracial category more spontaneously. Will the shifting demographics of American society instigate cultural changes in the way we understand and perceive race? Only time will tell.

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