Malleability in Biracial Categorizations: The Impact of Geographic Context and Targets' Racial Heritage

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Abstract

The growing multiracial population and the emergent body of research examining how we categorize this population highlights the complexity and malleability inherent in racial categorization. Few studies, however, have examined how categorization of multiracial targets as *biracial* (rather than a presumed monoracial category) differs across different geographic contexts or how perceivers categorize multiracial minority targets (i.e., those who are *not part White*). Here, we examined malleability in racial categorizations of Black-White, Asian-White, and Asian-Black faces across two geographic contexts: Hawai‘i and California. We found that perceivers (in Hawai‘i in Study 1; in both contexts in Study 2) categorized Black-White faces most often as Biracial, followed by Asian-Black faces, and then Asian-White faces. Moreover, those who lived in a geographic context with a large biracial population (Hawai‘i) categorized multiracial targets as biracial more often than those who lived in a majority White context (California).

Keywords: racial categorization, malleability in person perception, racially ambiguous, multiracial

Malleability in Biracial Categorizations: The Impact of Geographic Context and Targets' Racial Heritage

People efficiently place others into social categories, such as race, in part because these categories help to organize and simplify person perception (Macrae & Bodenhausen, 2000). However, recent demographic changes in the U.S., such as the rapidly growing multiracial population (Humes, Jones, & Ramirez, 2011), have raised awareness of the complexities inherent in racial categorization, including how social category representations are both dynamic and intersectional (e.g., Chen & Hamilton, 2012; Freeman, Pauker, Apfelbaum, & Ambady, 2010). In the past 10 years, there has been a surge in research focused on the categorization of multiracial and racially ambiguous targets (e.g., Chen & Hamilton, 2012; Ho, Sidanius, Levin, & Banaji, 2011; Peery & Bodenhausen, 2008) and on the downstream consequences of such categorizations (e.g., Pauker et al., 2009; Sanchez, Good, & Chavez, 2011; Skinner & Nicolas, 2015; see Kang & Bodenhausen, 2015 for a review). While this research provides a more comprehensive understanding of the circumstances under which we categorize multiracial individuals into *monoracial* categories (e.g., categorizing a Black/White biracial person as Black), we know considerably less about the psychological processes involved in *biracial* categorizations. Here we explore two factors that are likely to influence categorizing a target as biracial: the accessibility of the biracial category and a targets' racial heritage (i.e., Black-White, Asian-White, Asian-Black). We also examine the extent to which these factors influence participants' monoracial categorizations, particularly their use of hypodescent, defined as the tendency to categorize multiracial individuals according to their "socially subordinate" identity (e.g., Ho et al., 2011; Peery & Bodenhausen, 2008).

The process of racial categorization involves the dynamic interaction of lower-level perceptual features (e.g., skin tone, eye shape) and higher-level social cognitive factors (e.g., stereotype knowledge; Freeman & Ambady, 2011). Research on racially ambiguous targets highlights the malleability of race perceptions, because different racial categorizations can occur absent of any changes to perceptual or visible cues. In other words, the same racially ambiguous Black-White target may be categorized as either Black or White depending on accessible stereotypes (Freeman, Penner, Saperstein, Scheutz, & Ambady, 2011), other faces surrounding a target (Ito, Willadsen-Jenson, Kaye, & Park, 2011), or category labels provided by experimenters (Tshkay & Rule, 2015). Research has concentrated on either the motivational *or* cognitive mechanisms that determine how racially ambiguous targets are categorized (although theoretical models do highlight the ultimate interactive nature of these factors; Freeman & Ambady, 2011). Multiple social motivations have been shown to influence the racial categorization of racially ambiguous or multiracial targets, including physical and social belonging threats (Gaither, Pauker, Slepian, & Sommers, 2016; Miller, Maner, & Becker, 2010), economic scarcity (Krosch & Amodio, 2014; Rodeheffer, Hill, & Lord, 2012), essentialist beliefs (Chao, Hong, & Chiu, 2013; Ho, Roberts, & Gelman, 2015), and social dominance orientation (Ho, Sidanius, Cuddy, & Banaji, 2013; Kteily, Cotterill, Sidanius, Sheehy-Skeffington, & Bergh, 2014). While there are exceptions, most work finds that the activation of these motivations increases the likelihood that a racially ambiguous or multiracial target is categorized into a monoracial, non-White group.

Cognitive factors that determine how perceivers categorize racially ambiguous or multiracial targets emphasize the role of the perceiver's context and the faces they are exposed to in that context. Routine exposure to predominantly one racial group (normally one's ingroup) can selectively bias attention toward features that differentiate other racial groups from that

group (e.g., Halberstadt, Sherman, & Sherman, 2011; Levin, 2000). Thus, the tendency for White participants who live in predominantly White contexts to more frequently categorize racially ambiguous or multiracial targets into a monoracial, non-White group can be explained by perceptual adaptation and cognitive processes that support learning and categorization. Consistent with this, racial minority participants who grow up exposed primarily to their own group's features often display the opposite pattern of White participants—they disproportionately categorize Black-White or Asian-White targets as monoracially White (Benton & Skinner, 2015; Lewis, 2016; Webster, Kaping, Mizokami, & Duhamel, 2004).

Current Research

Despite the growing body of research examining the racial categorization of racially ambiguous and multiracial targets, past work suffers from two limitations: a focus on the use of monoracial categories and a focus on multiracial targets who are part White. Recent work (Chen & Hamilton, 2012) has highlighted how not including a biracial or multiracial option when examining multiracial targets may artificially constrain perceivers' categorizations, yet only a few studies since have included such a category option (e.g., Chen, Moons, Gaither, Hamilton, & Sherman, 2014; Ho et al., 2015; Slepian, Weisbuch, Pauker, Bastian, & Ambady, 2014). Chen and Hamilton (2012) argue that biracial as a category is relatively inaccessible for most Americans because they do not regularly encounter as many multiracial as monoracial people in their social environments. To date, much of the research on the perception of multiracial individuals has taken place in the continental U.S. in majority White environments, where this is indeed the case. Here, we test whether people who live in a geographic context with the highest proportion of multiracial individuals in the U.S. (i.e., Hawai‘i at 23.6%) use the biracial category more readily when categorizing racially ambiguous targets compared to people who live in a

context with a lower percentage of multiracial individuals (i.e., California at 4.9%; U.S. Census, 2010).

Prior work has also focused on those with one majority and one minority identity (e.g., Black-White). Only a handful of studies have examined multiracial minority targets (MacLin & Malpass, 2001; Tshkay & Rule, 2015), and biracial categorizations of individuals with multiple minority identities have not been studied empirically. Thus, the current work includes Asian-Black targets in addition to the more frequently studied Black-White and Asian-White targets. We examine whether some individuals (e.g., those with phenotypic traits of two minority groups) are more likely to be categorized as biracial than others (e.g., those with phenotypic traits of one minority and one majority group). Based on cognitive explanations of categorization, those exposed to a primarily White environment should have attentional biases toward Black and Asian features. Thus, they should categorize Black-White and Asian-White targets as Black and Asian, respectively. When categorizing Asian-Black targets, they may view these faces as equally Black and Asian, leading to a biracial categorization. The prediction for those in Hawai‘i is unclear, since they are exposed to an environment with no clear racial majority (Asian = 38.6%, multiracial = 23.6%, White = 24.7%).

Finally, consistent with previous work on the categorization of racially ambiguous targets, we also examine the extent to which participants display response patterns consistent with hypodescent. Hawai‘i provides an interesting test case of several theories used to explain categorization patterns consistent with hypodescent. Notably, Hawai‘i differs in both its racial hierarchy and the level of interracial exposure residents experience compared to most states in the continental U.S., including California. Thus, we explore how hypodescent differs across geographic contexts for the three types of target mixes (Black-White, Asian-White, Asian-Black)

in line with predictions made by motivational (Ho et al., 2011) and cognitive (Halberstadt et al., 2011) explanations of hypodescent. We predict that California participants will be more likely to use hypodescent when making racial category judgments compared to Hawai‘i participants, and that the use of hypodescent in categorizing biracial targets will be more pronounced for Black-White targets but less pronounced (though still present) for Asian-White targets. While such a pattern would be consistent with both motivational and cognitive explanations in California, specific deviations from this pattern in Hawai‘i could provide evidence for cognitive explanations. Since those in Hawai‘i see both White and Asian faces early in development, a cognitive explanation would predict they may not apply hypodescent to Asian-White faces, but instead see them as equally Asian and White.

Study 1

Method

Participants. One hundred thirty-one undergraduates (93 female) at research universities in Hawai‘i and California participated in exchange for course credit. The Hawai‘i sample (n = 60) included 14 White, 22 Asian, 1 Black, and 5 Hispanic participants, as well as 18 participants for whom race was not reported due to a data collection error. None of these participants were biracial, as a recruitment filter was screening for monoracial participants. The California sample (n = 71) included 27 White, 31 Asian, 2 Black, and 11 Hispanic participants. Data collection took place over the course of two weeks at each location and data collection stopped after the two weeks. Sample size was determined based on past research with a similar design (e.g., Chen & Hamilton, 2012; Tskhay & Rule, 2015).

Stimuli. The stimuli included Asian-Black, Asian-White, and Black-White biracial faces, as well as Asian, Black, and White monoracial faces. 48 morphs were created by morphing two

unique photographs from target races of the same sex using Morpheus Photo Morpher. For example, to create an Asian-Black female target, photos of an Asian and a Black female were morphed together. This morphing process resulted in 24 biracial target faces (12 male, 12 female), with 8 faces from each biracial group (Asian-Black, Asian-White, and Black-White). Stimuli also included 24 monoracial target faces (12 male, 12 female), with 8 faces from each racial group (Asian, Black, and White). Importantly, the monoracial target faces were also created with Morpheus Photo Morpher, by morphing two faces from the same racial group and sex category. All images were cropped to depict only the internal facial structure and were standardized in size (400 x 400 pixels).

Pretesting confirmed the images were equated in attractiveness and image quality, and depicted their intended group. Specifically, monoracial targets did not differ significantly from biracial targets in attractiveness ($p = .46$) or image quality ($p = .34$), nor did any of the target groups (i.e., Asian, Asian-White, Black, etc.) differ significantly in either attractiveness ($p = .09$) or image quality ($p = .88$). Additionally, Black, Asian and White targets were consistently categorized into their intended group and were rated more prototypical in appearance than biracial targets ($p < .001$). Asian-Black, Asian-White, and Black-White targets did not differ from each other in their rated prototypicality ($p > .99$).

Procedure. Participants were informed they would be making basic judgments about people depicted in images. Each trial consisted of a single face that appeared in the center of the screen. Stimulus presentation order was randomized for each participant. Participants judged the race of the face that appeared on each trial as quickly as possible via a button press indicating a "White," "Asian," "Black," or "Biracial" categorization. To keep the task manageable, we constrained the category options to those represented in the target faces plus a biracial option.

The order of the keys was counterbalanced across participants. Finally, participants reported their demographic information and were debriefed and thanked for their participation.

Results and Discussion

Analytic strategy. Our focal outcomes were biracial categorization (1 = biracial categorization, 0 = monoracial categorization) and the use of hypodescent which ranged continuously from -8 (low use of hypodescent) to +8 (high use of hypodescent; see below). Since judgments were nested within participant, we analyzed data using generalized estimating equations to account for the hierarchical data structure (Fitzmaurice, Laird, & Ware, 2004), specifying a binomial distribution when the outcome was biracial categorization and a normal distribution when the outcome was hypodescent. We report unstandardized regression coefficients (*B*), which provide a direct index of effect size, and Wald Z values for each parameter. Target Race was coded multi-categorically (1 = Asian, 2 = Asian-Black, 3 = Asian-White, 4 = Black, 5 = Black-White, 6 = White), and Target Gender, Target Morph, and Geographic Context were coded dichotomously (1 = Female, 2 = Male; 1 = Monoracial Morph, 2 = Biracial Morph; 1 = California, 2 = Hawai‘i). All analyses were run in a step-wise fashion, first testing the effect of Target Race and subsequently adding Geographic Context and predicted interactions to the model. Participant Gender and Participant Race (White/non-White) were initially included as factors in all analyses. None of these variables qualified the focal effects, so they were dropped from the analyses reported below.[1]

Biracial category judgments. First, to ensure that participants were attending to racial ambiguity cues in the faces and not simply categorizing all faces (including those that were clearly monoracial) as biracial, we regressed Biracial Category Judgment onto Target Morph (Monoracial vs. Biracial). As expected, biracial targets were significantly more likely to be

categorized as biracial compared to monoracial targets, $B = 2.66$, $SE = .09$, $z = 29.42$, $p < .0001$, 95% CI = [2.48, 2.84], OR = 14.31. This effect did not vary significantly across geographic context, $X^2(1) = .07$, $p = .79$, which means that participants in both contexts are selectively applying the biracial label to biracial targets and not applying the label to monoracial targets. All subsequent analyses were conducted only on biracial targets.

Next, we compared the probability of Biracial Category Judgments for the three biracial target categories (i.e., Asian-Black, Asian-White, and Black-White) for the entire sample. To test our prediction that multiracial minority (i.e., Asian-Black) targets would be more likely to be categorized as biracial, we regressed Biracial Category Judgment onto Target Race. The effect of Target Race on Biracial Category Judgments was significant, $X^2(2) = 47.43$, $p < .0001$. Specifically, Black-White targets were 29% more likely to be categorized as biracial compared to Asian-Black targets, $B = .26$, $SE = .09$, $z = 2.82$, $p = .005$, 95% CI = [.08, .44], OR = 1.29; Black-White targets were 90% more likely to be categorized as biracial compared to Asian-White targets, $B = .64$, $SE = .09$, $z = 6.86$, $p < .0001$, 95% CI = [.46, .82], OR = 1.90. Asian-Black targets were 47% more likely to be categorized as biracial compared to Asian-White targets, $B = .38$, $SE = .09$, $z = 4.09$, $p < .0001$, 95% CI = [.20, .57], OR = 1.47.

Next, we examined these effects across geographic context. To test our prediction that the effect of Target Race on Biracial Category Judgments would vary across geographic context, we regressed Biracial Category Judgments onto Target Race, Geographic Context, and their interaction. Overall, participants in Hawai‘i were 40% more likely to render Biracial Category Judgments compared to participants in California, $B = .34$, $SE = .17$, $z = 2.04$, $p = .042$, 95% CI = [.01, .66], OR = 1.40. However, the effect of geographical context was qualified by a significant interaction with Target Race, $X^2(2) = 31.93$, $p < .0001$. Pairwise comparisons revealed that

participants in Hawai‘i were 92% more likely to categorize Black-White and 40% more likely to categorize Asian-Black targets as biracial compared to participants in California, *B*s = .65 and .34, *SE*s =.17 and .17, *z*s = 3.95 and 2.04, *p*s = .0001 and .042, 95% CIs = [.33, .98] and [.01, .66], ORs = 1.92 and 1.40. However, participants in California were 52% more likely to categorize Asian-White targets as biracial compared to participants in Hawai‘i, $B = -.39$, $SE = .17$, $z = -2.29$, $p = .022$, 95% CI = [-.73, -.06], OR = .48.

To further decompose the interaction between Target Race and Geographic Context, we examined the effect of Target Race on Biracial Category Judgments separately for the California and Hawai‘i samples. For the California sample, the effect of Target Race on Biracial Category Judgments was not significant, $X^2(2) = 1.71$, $p = .4246$. Conversely, the effect of Target Race on Biracial Category Judgments was significant in the Hawai‘i sample, $X^2(2) = 73.01$, $p < .0001$, revealing a pattern similar to the overall Target Race pattern (Figure 1).

In summary, participants were more likely to categorize biracial targets as biracial when they lived in Hawai‘i ($M = 44.1\%$, $SD = 13.7\%$) as opposed to California ($M = 39.38\%$, $SD = 1.8\%$). Critically, however, this difference depended on the type of target participants were categorizing: Participants in Hawai‘i were more likely to categorize Black-White and Asian-Black targets as biracial, whereas participants in California were more likely to categorize Asian-White targets as biracial. Considering each geographic location separately, participants in California were equally likely to categorize all biracial targets as biracial, but participants in Hawai‘i were more likely to categorize Black-White and Asian-Black targets as biracial compared to Asian-White targets.

Hypodescent in category judgments. We calculated a hypodescent index for each participant (see Chen et al., 2014) that captured their tendency to categorize biracial targets

according to their subordinate identity by subtracting the number of monoracial categorizations into the racial group deemed higher status from the number of monoracial categorizations into the racial group deemed lower status in the U.S. racial hierarchy. According to past research, in the U.S., Whites have the highest social status, followed by Asians, Latinos, and Blacks (Ho et al., 2011). Thus, for Black-White targets, the hypodescent index would be calculated by subtracting the number of White categorizations from Black categorizations for that participant. Accordingly, for Asian-Black or Black-White targets, more positive scores on the hypodescent index indicated more frequent categorizations as Black compared to Asian or White, and for Asian-White targets, this would mean more categorizations as Asian compared to White. A negative score would indicate less use of hypodescent (i.e., more Asian than Black categorizations for Asian-Black targets and more White than Black or Asian categorizations for Black-White or Asian-White targets). For each participant, there are three hypodescent scores (one for each type of biracial target: Black-White, Asian-Black, Asian-White), and we conducted this analysis for only the biracial targets. Hypodescent scores ranged from -8 (categorizing all 8 faces for that type of biracial target into their "dominant" identity) to +8 (categorizing all 8 faces for that type of biracial target into their "subordinate" identity). For most participants, the range was smaller because they made biracial categorizations too. This analysis only captures the subset of biracial targets for which participants made monoracial categorizations. A hypodescent score of "0" indicated no bias in either direction for monoracial categorizations.

Consistent with previous research, we predicted that participants would make monoracial categorizations of biracial targets in line with hypodescent for Black-White more than Asian-White targets (Ho et al., 2011). For the Asian-Black targets, it is possible that participants will either not apply hypodescent or they will but to a lesser extent (Tshkay & Rule, 2015). To test

these predictions, we regressed the Hypodescent Index onto Target Race for the entire sample. The effect of Target Race on the Hypodescent Index was significant, $X^2(2) = 46.42$, $p < .0001$. Black-White targets were more likely to be categorized in line with hypodescent compared to Asian-Black targets, $B = 1.74$, $SE = .27$, $z = 6.41$, $p < .0001$, 95% CI = [1.21, 2.27], but not compared to Asian-White targets, $B = .33$, $SE = .27$, $z = 1.21$, $p = .227$, 95% CI = [-.20, .86]. Asian-White targets were more likely to be categorized in line with hypodescent compared to Asian-Black targets, $B = 1.41$, $SE = .27$, $z = 5.20$, $p < .0001$, 95% CI = [.88, 1.94].

Next, we examined these effects across geographic context. To test our prediction that the use of hypodescent would vary across geographic context, we regressed the Hypodescent Index onto Target Race, Geographic Context, and their interaction. Overall, individuals from California were more likely to use hypodescent in making their racial categorizations compared to individuals from Hawai‘i, $B = -1.76$, $SE = .38$, $z = -4.58$, $p < .0001$, 95% CI = [-2.51, -1.01]. This effect was qualified by a significant interaction between Target Race and Geographic Context, $X^2(2) = 25.93$, $p < .0001$. We examined these effects separately for each type of target. Compared to participants from Hawai‘i, participants from California were significantly more likely to use hypodescent to categorize the race of Asian-Black targets, $B = -1.76$, $SE = .38$, $z = -4.58$, $p < .0001$, 95% CI = [-2.51, -1.01], and the race of Black-White targets, $B = -2.20$, $SE = .38$, $z = -5.74$, $p < .0001$, 95% CI = [-2.95, -1.45]. Participants from California and Hawai‘i were equally likely to use hypodescent to categorize the race of Asian-White individuals, $B = .28$, $SE = .38$, $z = .73$, $p = .464$, 95% CI = [-.47, 1.03] (Figure 2).

In summary, participants in California were more likely than participants in Hawai‘i to use hypodescent when categorizing the race of Black-White or Asian-Black targets. In addition, when asked to judge Asian-Black targets, those in California leaned more heavily on the lower

subordinate category—Black—whereas those in Hawai‘i leaned on the Asian category. Black-White targets were most likely to be categorized as Black by participants from California, but were equally likely to be categorized as Black and White by participants from Hawai‘i. Asian-White targets were most likely to be categorized as Asian by participants from both California and Hawai‘i. Therefore, the extent to which perceivers used physical cues associated with different racial groups varied across the environments—Black cues took precedence in California, whereas Asian cues took precedence in Hawai‘i.

Study 2

Given the differences we found for both biracial categorizations and the use of hypodescent across geographic context in Study 1, we set out to replicate these findings in a second sample that was more carefully matched on demographics. We also sought to measure variables that could explain some of the geographic differences in biracial categorization (i.e., multiracial contact) and hypodescent (i.e., SDO and race essentialism). Because hypodescent depends on classifying individuals according to their socially subordinate identity, we measured participants' perceptions of the racial hierarchy, and we measured interracial contact to examine predictions based on cognitive explanations of hypodescent. We expected perceptions of the racial hierarchy to differ across California and Hawai‘i, such that the hierarchy in California would match that found in other U.S. samples (White, then Asian, then multiracial/Black) but that Hawai‘i would be different (Asian and White at the top, then multiracial, then Black; see Okamura, 2008). We also expected participants in Hawai‘i to have considerably more contact with Asian and multiracial individuals compared to those in California. According to cognitive explanations, this should reduce hypodescent for Asian-White targets in Hawai‘i.

Method

Participants. One-hundred twenty-nine American mTurk workers (72 female; age range = 19-68, M_{age} = 38.33) who either lived in Hawai‘i or California participated in the study for monetary compensation. The Hawai‘i sample (n = 65) included 22 White, 22 Asian, 1 Black, 2 Hispanic, 9 multiracial, 5 Native Hawai‘ian and other Pacific Islander, and 4 other/not identified participants. The California sample (n = 64) included 30 White, 13 Asian, 3 Black, 9 Hispanic, and 9 multiracial participants. Data collection took place over the course of one day for the California location and the Hawai‘i mTurk sample was recruited through an mTurk panel to reflect the gender, age, and racial demographics of the California sample.

Procedure. Other than the addition of measures to assess participants' perceptions of the racial hierarchy, racial exposure, SDO, and race essentialism, the procedure was identical to Study 1. After completing the racial categorization task, participants reported their contact with Asian, Black, White and multiracial individuals, and then completed a status ladder measure, SDO scale, and race essentialism scale. The remaining measures were presented in consistent order, except for SDO and race essentialism, which were randomized.

Materials.

Contact. Participants reported how often they interacted with Asian, Black, White and multiracial/mixed individuals (1 = never, 2 = less than once a month, 3 = once a month, 4 = 2-3 times a month, 5 = once a week, 6 = 2-3 times a week, 7 = daily).

Status ladder. Depending on where they were from, participants were asked to rank different racial groups in either the Hawai‘i or the California community according to their perceived social status. The following racial groups were ranked on a scale from 1 (lowest social standing) to 7 (highest social standing): White, Asian, Black, and multiracial/mixed).

SDO. Respondents rated 4 items from the shortened Social Dominance Orientation

(SDO) scale from 1 (*very negative*) to 7 (*very positive*; Pratto, Sidanius, Stallworth, & Malle, 1994). Higher scores indicated greater support for social inequality, ($\alpha = .82$).

Race essentialism. We measured race essentialism with items from the race conceptions scale (RCS; Williams & Eberhardt, 2008). Respondents rated 7 items on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Higher scores indicated greater endorsement of race essentialism, ($\alpha = .63$).

Results and Discussion

Analytic strategy. We followed the same procedures for analyzing the data as in Study 1 for testing our focal predictions. Participant Gender and Participant Race (White/non-White) were initially included as factors in all analyses. None of these variables qualified the effects described below, so they were dropped from the analyses. Differences in contact and status ladder judgements were examined with mixed model ANOVAs and differences in SDO and race essentialism were examined with t-tests. We also examined whether multiracial contact mediated geographic differences in biracial categorization and whether SDO or race essentialism mediated geographic differences in hypodescent use.

Geographic differences in contact, status ladder judgments, SDO, and race essentialism. We expected that contact and perceived racial hierarchy for the four racial groups (White, Asian, Black, multiracial) would vary across geographic contexts. In other words, we predicted an interaction between geographic context and racial group for both outcomes. Thus, we ran a 2 (Geographic Context: California, Hawai‘i) x 4 (Racial Group: White, Asian, Black, multiracial) mixed model ANOVA with repeated measures on the last factor on the contact measure and status ladder judgments, separately. We conducted simple effects tests to probe significant interactions. One participant did not complete the contact measure and thus their data

is missing from reported results. Interracial contact differed based on the racial group being assessed, $F(3, 378) = 31.85$, $p < .001$, $\eta_p^2 = .20$, and varied across geographic context, $F(1, 126) = 16.86$, $p < .001$, $\eta_p^2 = .12$. As predicted, however, both of these effects were qualified by a Geographic Context x Racial Group interaction, $F(3, 378) = 7.79$, $p < .001$, $\eta_p^2 = .06$, see Table 1 for means and significant comparisons. On average, participants from Hawai‘i reported interacting with Asian and multiracial people more (2-3 times a week) than those from California (Asian: once a week, multiracial: 2-3 times a month). Within Hawai‘i, participants had the most contact with White and Asian people, then multiracial people, and the least contact with Black people. Within California, participants had the most contact with White people and equally little contact with Asian, Black, and multiracial people.

Status ladder judgments[2] differed based on the racial group being assessed, $F(3, 315) = 93.79$, $p < .001$, $\eta_p^2 = .47$, and varied across geographic context, $F(1, 105) = 13.39$, $p < .001$, $\eta_p^2 = .11$. As predicted, however, both of these effects were qualified by a Geographic Context x Racial Group interaction, $F(3, 315) = 28.48$, $p < .001$, $\eta_p^2 = .21$, see Table 1. Asian and Multiracial people were viewed as higher status in Hawai‘i compared to California, White people were viewed as higher status in California compared to Hawai‘i, and Black people were viewed as equally lower status in both contexts. Within Hawai‘i, Asian people were viewed as higher status, than White and multiracial people, and Black people were viewed as lower status. Within California, there was a clear racial hierarchy: White people, then Asian people, then multiracial people, and then Black people (all $ps < .001$).

Reported levels of SDO did not differ across participants from California ($M = 2.59$, $SD = 1.93$) and Hawai‘i ($M = 2.50$, $SD = 1.46$), $t(127) = -.29$, $p = .769$. Participants from California

(M = 3.58, SD = .90) scored non-significantly higher on race essentialism compared to those in Hawai‘i (M = 3.37, SD = .65), $t(127) = -1.57$, $p = .118$

Biracial category judgments. To ensure that participants were attending to racial ambiguity cues present in the target faces and not simply categorizing all faces (including those that were clearly monoracial) as biracial we regressed Biracial Category Judgment onto Target Morph (Monoracial vs. Biracial). Replicating the results from Study 1, biracial targets were significantly more likely to be categorized as biracial compared to monoracial targets, $B = 2.96$, $SE = .10$, $z = 29.35$, $p < .0001$, 95% CI = [2.76, 3.16], OR = 19.25. This effect did not vary across Geographic Context, $X^2(1) = .09$, $p = .77$. Participants in both contexts selectively applied the biracial label to biracial targets and not to monoracial targets. All remaining analyses focused only on biracial targets.

Next, we compared the probability of Biracial Category Judgments for the three biracial target categories (i.e., Asian-Black, Asian-White, and Black-White) for the entire sample by regressing Biracial Category Judgment onto Target Race. The effect of Target Race on Biracial Category Judgments was significant, $X^2(2) = 102.15$, $p < .0001$. Specifically, Black-White targets were 69% more likely to be categorized as biracial compared to Asian-Black targets, $B = .53$, $SE = .10$, $z = 5.39$, $< .0001$, 95% CI = [.34, .72], OR = 1.69; Black-White targets were 179% more likely to be categorized as biracial compared to Asian-White targets, $B = 1.02$, $SE = .10$, $z = 10.09$, $p < .0001$, 95% CI = [.83, 1.22], OR = 2.79. Asian-Black targets were 64% more likely to be categorized as biracial compared to Asian-White targets, $B = .50$, $SE = .10$, $z = 4.90$, $p < .0001$, 95% CI = [.30, .70], OR = 1.64.

Next, we examined these effects across geographic context. To test our prediction that effect of Target Race on Biracial Category Judgments would vary across geographic context, we

regressed Biracial Category Judgments onto Target Race, Geographic Context, and their interaction. Overall, participants in Hawai‘i were 84% more likely to render Biracial Category Judgments compared to participants in California, B = .61, SE= .22, z = 2.74, p = .006, 95% CI = [.17, 1.05], OR = 1.84. However, the Target Race x Geographic Context interaction was not significant, $X^2(2)$ = .79, p = .6727. Thus, target race had the same effect on biracial categorizations across the two geographic contexts.

In summary, participants were more likely to categorize targets as biracial when they lived in Hawai‘i (M = 45.96%, SD = 10.0%) compared to California (M = 35.70%, SD = 10.4%), replicating the results from Study 1. Also replicating results from Study 1, participants were most likely to categorize Black-White targets as biracial, followed by Asian-Black targets and then Asian-White targets. Unlike Study 1, however, this pattern was similar across geographic contexts.

Explaining geographic differences in biracial categorization. Next, we tested whether self-reported contact with multiracial individuals mediated the effect of geographic context on biracial categorizations. We predicted that participants from Hawai‘i would report greater contact with multiracial individuals which in turn would explain the differential use of the biracial category label across geographic context. To test our prediction, we followed the approach for multilevel mediation outlined in Krull and MacKinnon (2001), using the ml_mediation package within Stata. Biracial categorization was at level one of the model, and multiracial exposure, geographic context, and participant were at level two. We modeled the effect of geographic context (1 = California, 2 = Hawai‘i) through multiracial exposure and tested the significance of this indirect effect. Indirect effects are often non-normally distributed, leading to biased coefficient estimates. We therefore computed 95% confidence intervals using

bootstrapping with 500 replicates to test the proposed mediated pathway. As predicted, the indirect effect of geographic context through multiracial exposure was significant, $B = .04$, $SE = .01$, 95% CI = [.02, .05] (see Figure 3). Increased use of the biracial category label by participants in Hawai‘i compared to those in California was explained by greater multiracial contact for participants in Hawai‘i.

Hypodescent in category judgments. In line with Study 1, we predicted that monoracial categorizations of biracial targets would tend to follow hypodescent for Black-White and Asian-White targets more than Asian-Black targets. To test this prediction, we regressed the Hypodescent Index onto Target Race for the entire sample. The effect of Target Race on the Hypodescent Index was significant, $X^2(2) = 88.49$, $p < .0001$. Black-White targets were more likely to be categorized in line with hypodescent compared to Asian-Black targets, $B = 2.93$, $SE = .33$, $z = 8.83$, $p < .0001$, 95% CI = [2.28, 3.58], but not compared to Asian-White targets, $B = .53$, $SE = .33$, $z = 1.61$, $p = .107$, 95% CI = [-.12, 1.19]. Asian-White targets were more likely to be categorized in line with hypodescent compared to Asian-Black targets, $B = 2.40$, $SE = .33$, $z = 7.22$, $p < .0001$, 95% CI = [1.75, 3.05]. Therefore, replicating Study 1, Black-White and Asian-White targets were more likely to be categorized in line with hypodescent compared to Asian-Black targets. Thus, Black-White targets were categorized as more Black, Asian-White targets were categorized as more Asian, and Asian-Black targets were *not* categorized as more Black and were instead categorized as more Asian.

Next, we examined these effects across geographic context by regressing Hypodescent Index onto Target Race, Geographic Context, and their interaction. There was no effect of Geographic Context on use of Hypodescent, $B = -.32$, $SE = .32$, $z = -1.02$, $p = .309$, 95% CI = [-.94, .30], but there was a significant interaction between Target Race and Geographic Context,

$X^2(2) = 7.46$, $p = .024$. We examined these effects separately for each target type. Participants from California were significantly more likely to use hypodescent to categorize the race of Asian-White targets compared to participants from Hawai‘i, $B = -1742$, $SE = .48$, $z = -3.62$, $p < .0001$, 95% CI = [-2.68, -.80]. Participants from California and Hawai‘i were equally likely to use hypodescent to categorize the race of Asian-Black and Black-White individuals, Bs = -.32 and -.09, SEs = .48 and .48, zs = -.67 and -.18, ps = .503 and .855, 95% CIs = [-1.26, .62] and [-1.03, .85]. Examination of Figure 4 shows that participants applied hypodescent equally in California and Hawai‘i for Black-White individuals (i.e., categorized them more often as Black than White across both contexts), but did not apply hypodescent to Asian-Black targets (i.e., categorized them more often as Asian than Black across both contexts).

In summary, we replicated Study 1 in terms of which targets participants categorized in a manner consistent with hypodescent: Black-White targets and Asian-White targets were more likely to be categorized in line with hypodescent compared to Asian-Black targets. In contrast to Study 1, however, we found no overall geographic context differences in the application of hypodescent. We also found a slightly different pattern of results across context for which targets garnered more use of hypodescent. Participants from California and Hawai‘i applied hypodescent equally to Black-White targets, whereas those from California were more likely than those from Hawai‘i to use hypodescent when categorizing the race of Asian-White targets. Additionally, neither those from California nor those from Hawai‘i used hypodescent when categorizing Asian-Black targets. Given the lack of significant geographic differences in hypodescent, it is not surprising that neither race essentialism nor SDO explained geographic differences in hypodescent.

General Discussion

Across two studies, we found considerable malleability in biracial categorizations. Biracial categorizations differed based on both geographic context and the racial heritage of the targets. In both studies, participants were most likely to categorize Black-White targets as biracial, followed by Asian-Black targets and then Asian-White targets, suggesting that biracial categorizations are more likely for some combinations of racial categories than others. Participants did not simply use the biracial label for anyone, but only applied the biracial label to multiracial (racially ambiguous) targets and not to monoracial targets across both contexts. It is important to note that biracial individuals differ substantially in their appearance and not all biracial individuals are racially ambiguous. Although, it appears that perceivers do use racial ambiguity as a cue for biracial categorizations.

When examining only biracial targets, both studies revealed that participants utilized the biracial label to categorize biracial targets more frequently in Hawai‘i compared to California, and in Study 2, we confirmed that this effect was explained by greater contact with multiracial individuals among participants in Hawai‘i. Thus, exposure to a large multiracial population appears to foster increased cognitive accessibility and use of the biracial category, confirming theoretical predictions set forth by Chen and Hamilton (2012). Given the growing multiracial population in U.S. society, these findings suggest that the use of multiracial labels may become more prevalent over time, which could have implications for the flexibility with which we think about race as a category more broadly (Sanchez, Young, & Pauker, 2015; Young, Sanchez, & Wilton, 2013).

One limitation of the current study, however, is that we did not directly measure the cognitive accessibility of the biracial category in each location. This, along with measuring what biracial calls to mind for participants (i.e., what type of biracial person do they picture), would be

excellent avenues for future research to pursue. We also did not measure participants' exposure to specific subgroups of biracial individuals, but instead asked them about their contact with multiracial individuals broadly. Based on the U.S. 2010 census data, it is likely that those in California were referring to White-Hispanic and White-Asian exposure (which together comprise > 51% of the multiracial population in California) and those in Hawaii were referring to White-Asian-Native Hawaiian Pacific Islander (NHPI), Asian-NHPI, and White-Asian exposure (which together comprise > 70% of the multiracial population in Hawai'i). Future research should include more specific measures of contact with biracial subgroups.

California boasts one of the larger multiracial populations in the U.S., though it clearly lags behind Hawai'i. Thus, future research should also examine states with smaller biracial populations, though California served as a good initial comparison given that both states are well matched in the size of their Asian-White populations (CA: 24.6%, HI: 20.79% of the state's total multiracial population). Across both studies, Black-White and Asian-Black targets were more likely to be categorized as biracial than Asian-White targets (though the pattern only held for those in Hawai'i in Study 1). It is somewhat surprising, then, that in both contexts Asian-White targets were not categorized as biracial more frequently. Perhaps exposure to Black-White biracial exemplars in the media contributed to the formation of a biracial prototype over and above the influence of exposure to biracial exemplars in everyday contact, or alternatively, Black cues (especially skin color) may be weighted more heavily than Asian cues in perceiving the boundaries between groups (Dunham, Dotsch, Clark & Stepanova, 2016).

We also found that hypodescent differed based on geographic context and targets' racial heritage. Although the pattern of hypodescent was not entirely consistent across studies, one consistent finding was that Black-White targets and Asian-White targets were more likely to be

categorized in line with hypodescent than Asian-Black targets. A curious finding, however, is that Asian-Black targets were not categorized in line with hypodescent (i.e., as Black). This raises the question of whether hypodescent only applies in cases where individuals are part White, since hypodescent was developed in the historical context of protecting Whiteness. Thus, it is unclear whether hypodescent applies in contexts where the target does not possess White features or in contexts that suggest there is no possibility of the target being White. For example, Tskhay & Rule (2015) found that when participants categorized Hispanic-Black faces of varying morph combinations, they categorized the Hispanic-Black face as Black at a lower threshold of Black features if the categorization options ranged from White to Black compared to Hispanic to Black. In this case, changing the context to include the possibility of Whiteness changed participants' categorizations of the same faces. In fact, most research examining hypodescent has done so with White-minority targets, highlighting the need for further research to test the theoretical predictions of hypodescent with minority-minority targets.

Patterns of hypodescent also differed across both geographic contexts and studies in patterns not wholly explainable by existing theory about racial hierarchy or cognitive processes. Although results from the California samples were generally in line with predictions from both perspectives, results from the Hawai‘i samples were harder to explain. For example, the racial hierarchy in Hawai‘i was flattened compared to California, such that Asians and multiracials were rated as the highest status groups, followed by Whites, and then Blacks—a hierarchy in line with past analyses of educational achievement and income data (Okamura, 2008). This hierarchy still should have caused Black-White targets and Asian-Black targets to be categorized as monoracially Black in Hawai‘i, but neither of these trends consistently emerged. In terms of predictions based on cognitive theories, participants in Hawai‘i reported equally high exposure to

White and Asian individuals, followed by multiracial individuals, and then Black individuals. Thus, participants in Hawai‘i should have been particularly attuned to detecting Black features and differentiating them from both White and Asian faces, leading to more hypodescent for Asian-Black and Black-White targets but less hypodescent for Asian-White targets. This is not what we found. Although our findings with regard to hypodescent were unexpected, they identify questions for future research and perhaps boundary conditions of past research. For example, past results have been largely consistent in finding hypodescent under conditions that could be explained by the racial hierarchy or individuals' exposure to different racial groups. However, most of these studies have been conducted with White participants in majority White contexts. It is possible that predictions based on the racial hierarchy break down when there is no longer only one group at the top of the hierarchy and that predictions based on exposure become more nuanced when participants are exposed to a number of different racial groups frequently. Future research with more diverse populations, contexts, and methods may help to make sense of these possible boundary conditions.

Nevertheless, we consistently found that certain types of biracial targets (e.g., Black-White faces) are categorized as biracial more frequently than others, although this depends on factors such as perceivers' contact with multiracial individuals. While past research finds that the biracial category is relatively inaccessible for Americans (Chen & Hamilton, 2012), we find that in geographic contexts with more multiracial contact, the biracial category is more readily used. As the current studies demonstrate, examining the categorization of racially ambiguous targets helps us understand the malleable nature of racial categorizations that are informed by multiple interacting cues, including influences from bottom-up perceptual features and top-down cognitive processes. Additionally, attending to the contexts in which perceivers make these

categorizations—both in terms of method and geographic location—will help to extend existing theory about how these racial categorizations operate. This work becomes all the more pressing in light of contemporary demographic shifts that have dramatically increased the number of multiracial people living in the U.S.

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Footnotes

1. Coding race as Asian/non-Asian does not change any of the results for either Study 1 or Study 2.
2. Data for 22 participants was missing and thus, not included in the reported analyses.

Table 1.

Geographic Differences in Interracial Contact and Perceived Racial Hierarchy

		Target Race in Measure			
Measure	Geographic Context	White	Asian	Black	Multiracial
Interracial Contact	Hawai'i	6.41_{a} (1.24)	6.30_{b} (1.47)	$4.59_{a,b}$(1.88)	$5.97_{a,d}$ (1.66)
	California	$6.06_{b,c,d}$ (1.73)	$4.86_{b,}$ (1.96)	4.39_{c} (1.96)	4.38_{d} (2.09)
Status Ladder Judgments	Hawai'i	$4.92_{a,b}$ (1.49)	6.08_{a} (.77)	$3.38_{a,c}$ (1.59)	$5.94_{b,c}$ (1.08)
	California	$5.68_{b,d}$(1.03)	$4.95_{a,d}$ (1.18)	3.25_{d} (1.35)	$4.19_{c,d}$ (1.09)

Notes. Means and standard deviations. Shared subscripts within a column or within a row for each measure indicates significant comparisons ($p < .02$).

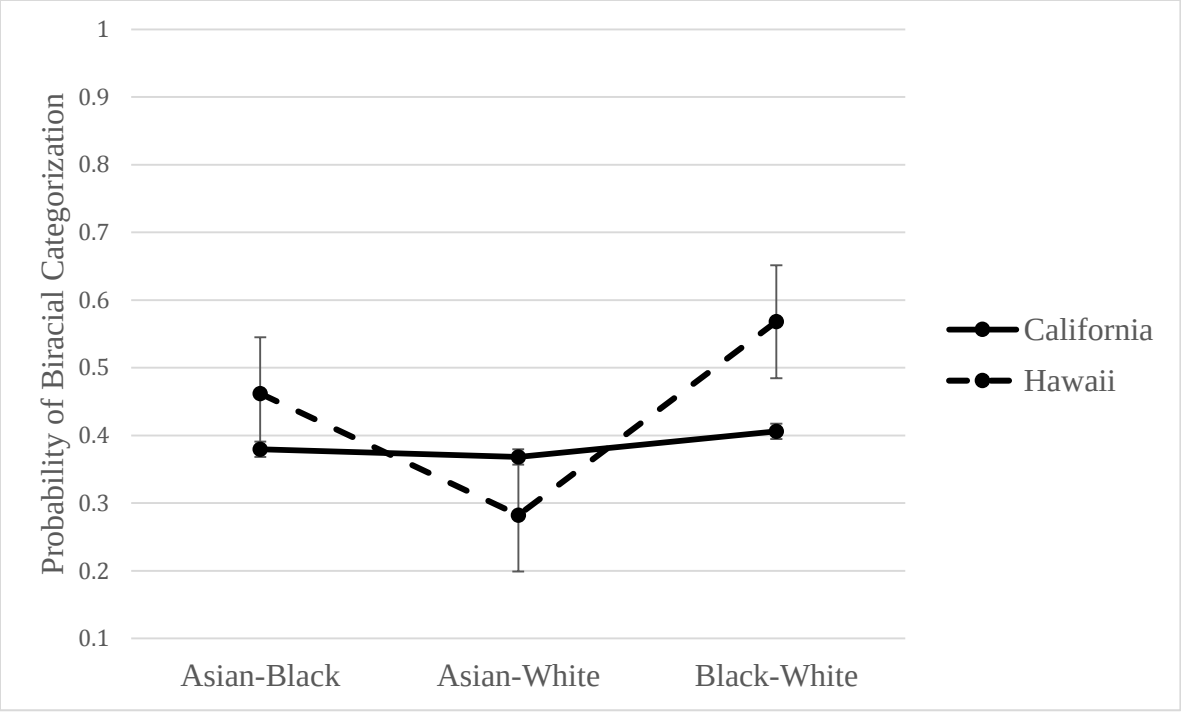

Figure 1. Probability of biracial categorizations across geographic contexts and different types of biracial targets in Study 1. Error bars denote standard error.

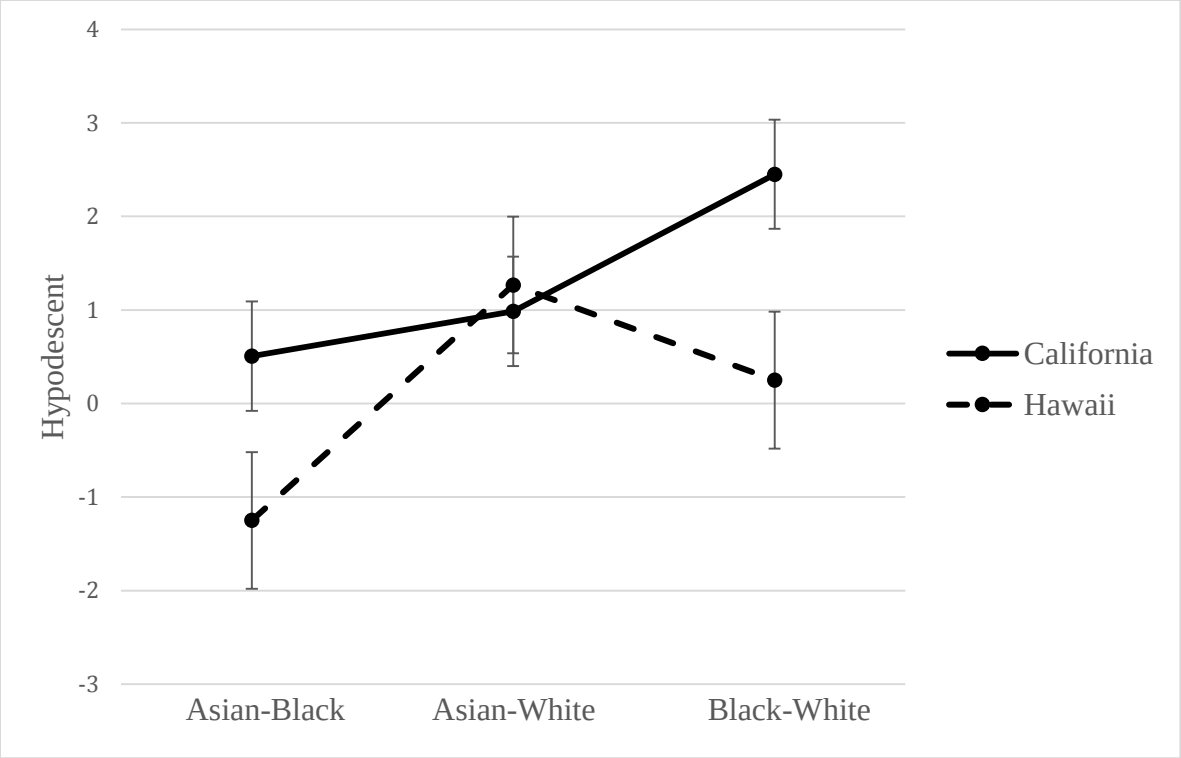

Figure 2. Hypodescent index (positive scores indicate hypodescent and negative scores indicate the opposite) across geographic context and different types of biracial targets in Study 1. Error bars denote standard error.

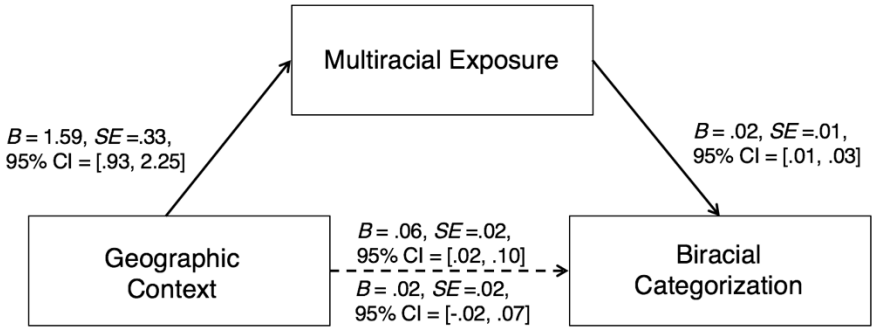

Figure 3. The relationship between geographic context and participants' use of the biracial category label is mediated by their exposure to multiracial individuals. The values above the dashed line indicate the total unmediated effect (c pathway) and the numbers below the line indicate the dirrect effect (c' pathway).

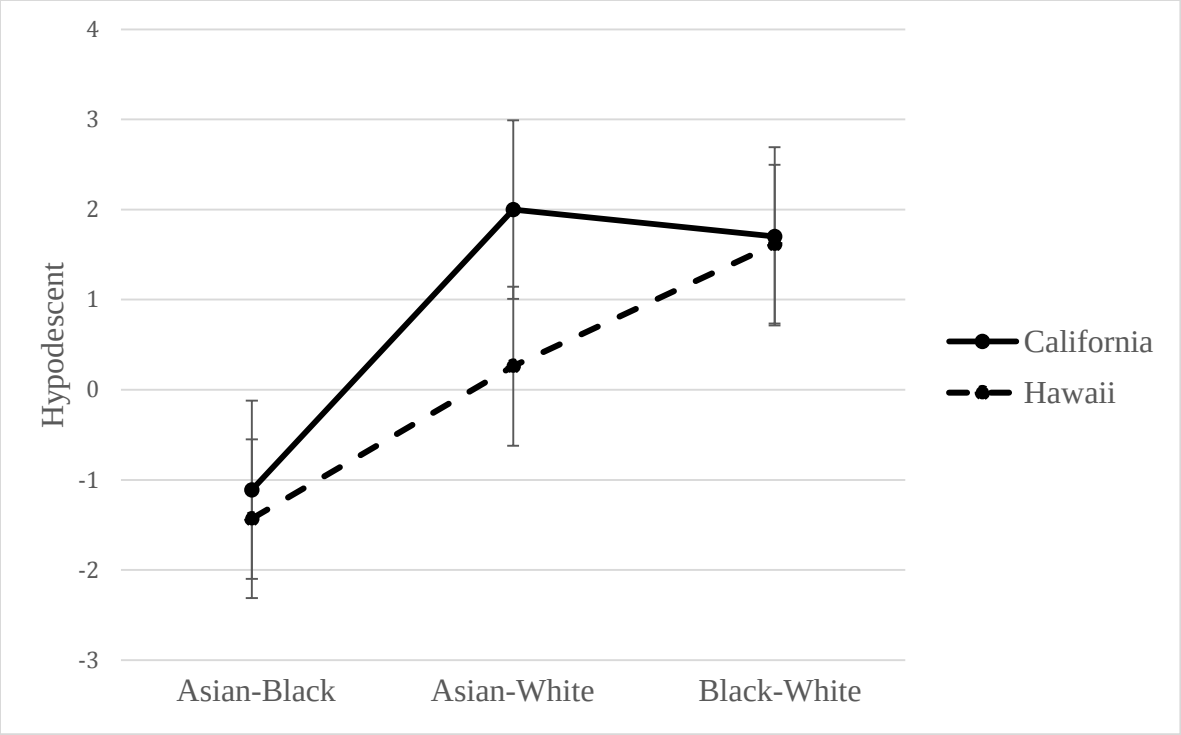

Figure 4. Hypodescent index (positive scores indicate hypodescent and negative scores indicate the opposite) across geographic context and different types of biracial targets in Study 2.