NEGATIVE BIAS AND THE OTHER-RACE EFFECT IN ASIANS, CAUCASIANS, AND HISPANICS

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ABSTRACT

For decades, studies have shown that people are better able to distinguish own-race faces compared to other-race faces, a phenomenon known as the Other-Race Effect (ORE). Research suggests that perceptual experience and social context factors may play a role in mediating the ORE. However, investigations of the ORE using Hispanic faces have not been comprehensive and are limited. The purpose of this study was to provide an all-inclusive investigation of the ORE, implicit bias, and social experience for Hispanic faces. Participants from three different racial or ethnic groups (Asian, Caucasian, Hispanic) completed a face recognition task, an implicit racial bias task, and self-report measures of qualitative and quantitative experiences with members from other races. Results found no support for an overall ORE for Hispanics, however no ORE was found for Asian or Caucasian faces either, despite the extant literature. In addition, results found overall low implicit racial bias in the sample population. These data may be the result of regional demographics and/or ceiling effects.

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CHAPTER 1

INTRODUCTION

In a recent video clip featuring the comedian Kevin Hart, he is seen with a gleeful fan who vows to attend his show that night (FromHereThere, 2016). Although this may seem like a typical interaction between a comedian and a fan, the expression on the comedian's face gives you a hint that something unusual is occurring. The comedian is visibly attempting not to laugh because the fan refers to him as Chris Rock, another Black comedian who is significantly taller than Hart and whose facial features are very different from Kevin Hart. In the video Hart commented that he "loved" experiences such as this one. However, not everyone has pleasant experiences when experiencing misidentification. In a recent interview, actor Steven Yeun expressed his frustration with constantly being mistaken for other Asian individuals who, according to him, look nothing like him (Team Coco, 2015). Additionally, Yeun shared a picture and the story of a man who stated that he no longer was able to go out in public because too many people confused him for Yeun. Fans would harass him so often that he no longer felt safe going to a local mall.

Experiences such as these occur because of a bias referred to as the other-race effect (ORE, also referred to as cross-race effect or own-race bias) in which individuals exhibit superior recognition of own-race faces and poor recognition of other-race faces (Meissner & Brigham, 2001). Although a myriad of studies have been conducted to

understand the ORE, there is still uncertainty as to what underlying mechanisms drive it (Bornstein, Laub, Meissner, & Susa, 2013; Hourihan, Fraundorf, & Benjamin, 2013; Smith, Stinson, & Prosser, 2004; Wilson, Hugenberg, & Bernstein, 2013; Xiao, Quinn, Pascalis, & Lee, 2014). Years of research suggest that both social and perceptual factors (e.g., social experience and information, attitudes, and perceptual narrowing can play a role in mediating the ORE (Balas, Westerlund, Hung, & Nelson, 2011; Bernstein, Young, & Hugenberg, 2007; Bornstein et al., 2013). Recently, a small number of studies have suggested that the ORE may extend to certain ethnicities (e.g., Hispanics) (Hourihan et al., 2013; Meissner, Susa, & Ross, 2013). Thus, the extent of this phenomenon is unknown. In a society where individuals interact with one another on a daily basis it is imperative that we recognize our biases and how they impact our perceptions. Consequently, it is of great importance that the factors associated with the ORE are further investigated.

This literature review will first cover the importance of the ORE. Next, it will provide an overview of the role of experience on the mechanisms of the ORE. These are perceptual, cognitive, contact, categorization, and attitudes. Afterward, this review will address a gap in the literature. Finally, the design of the current study will be covered.

Literature Review

Perceptual Factors

To obtain a more comprehensive understanding of the ORE researchers have studied the ORE across numerous populations, including children (Pinkham et al., 2008; Sporer, 2001; Suhrke et al., 2014). A preference for own-race faces has been found to be present in infants as young as three months of age, however this is only observed in

infants living in predominantly homogeneous own-race environments (Bar-Haim, Ziv, Lamy, & Hodes, 2006). Additionally, Pezdek, Blandon-Gitlin, and Moore (2003) found that the ORE remains comparable from the age of five into young adulthood, thus indicating a developmental consistency of the ORE. This suggests that there is an element that influences the ORE at some point after birth, possibly deriving from the environment, such as perceptual or social experiences. In a related study, Pascalis, de Haan, and Nelson (2002) examined visual perceptual narrowing in human six-month-olds, nine-month-olds, and adults. The participants were presented with both human and monkey faces and tested on their ability to discriminate the faces of both species. Results revealed that only 6-month-olds had a significantly longer average looking time for novel faces across species, implying an ability to discriminate between faces regardless of species. The 9-month-olds and adults performed similarly in the recognition test in that they had a significantly longer average looking time for novel faces of humans but not monkeys, inferring that successful discrimination was only possible for same-species faces. These findings suggest that visual perceptual narrowing occurs early in infancy during the time when neural networks involved in early cognition undergo considerable changes. Consequently, this perceptual tuning may be due in part to the changes in these neural networks and may take into account the infants' experience with race as well.

Additionally, Balas et al. (2011) investigated the neural basis of the ORE in infants by using event-related potentials (ERPs) to assess sensitivity to low-level stimulus differences in 3D shapes and colors. When 9-month-old infants were shown Black and Caucasian faces, both with and without pigmentation and shape manipulations, the N290, a component of the ERP response known to be sensitive to face categorization, was

elicited. The ERP activation patterns were similar across all pigmentation and shape manipulations, suggesting that these results are not due to low-level sensory properties, but rather higher-level cognition.

In the adult population, additional ERP components showed changes in activity when presented with own-race and other-race faces suggesting that the ORE is a memory encoding- and recognition-based phenomenon (Tanaka & Pierce, 2009). Previous studies using ERPs have consistently found differences in several components including the N170, N250, P100, and P200 components (Chen, Pan, Wang, Xiao, & Zhao, 2013; Herzmann, Willenbockel, Tanaka, & Curran, 2011; Tanaka & Pierce, 2009). Different components showed varying patterns of neural activity depending on the type of task (e.g., discrimination task or recognition task) and whether own- or other-race faces were shown. In particular, the perceptual process of own-race faces was delayed and more detailed than other-race faces due to the preference for viewing own-race faces. These findings suggest the ORE is not due to low-level perceptual differences of faces across races but a memory encoding-based and retrieval-based phenomenon.

Another method to evaluate the ORE as a low-level process was developed by Goldstein (1979a, 1979b) who assessed facial feature variability at the basic physical level. Specifically, Goldstein examined anthropometric data to assess the facial feature variability across different races, genders, and ages of Caucasian, Black, and Japanese faces. The idea is that perhaps some races are harder to discriminate because they have less heterogeneity (e.g., the faces really are more similar). These studies found greater differences in facial feature variability for Japanese women and infants, but found no evidence for differences in facial heterogeneity for the other groups. Overall, Goldstein

concluded that the faces of those racial and ethnic groups are not more difficult to distinguish because they possess significantly less variation in facial features in comparison to each other. Therefore, although an individual uses low-level visual processing to view faces, the ORE cannot be attributed to greater physiognomic variability of one group compared to another. The findings of cross-over effects also suggests that there is more to it than less variability for some races for others. Researchers find an ORE for Blacks when viewing own-race faces compared to other races, and similarly for Asians.

These studies provide further evidence that the ORE is a multidimensional phenomenon that develops in early infancy and is influenced by various factors. Some of these factors include experience and low-level-and high-level processes that influence perception.

Contact

One of the earliest explanations for the ORE, the contact hypothesis, suggests that experience with other races and ethnicities can affect the ORE (Messiner & Brigham, 2001; Sporer, 2001). In support of this hypothesis, Hancock and Rhodes (2008) found that Chinese and Caucasian individuals with higher levels of contact with other races exhibited a lower ORE in face recognition tasks. However, Messiner and Brigham's meta-analysis found that contact played a small mediating role and only accounted for 2% of the variability found across individuals. One explanation for these findings is that the quality of the experience is more important than the frequency of contact with other groups (Brigham & Malpass, 1985). Similarly, Bukach, Cottle, Ubiwa, and Miller (2012) found that the quality of contact with other races, such as Blacks and Caucasians, was

associated with the way faces were processed; more individuating experience was correlated with increased use of holistic processing, or the tendency to process multiple parts of a face in an interactive manner. This use of holistic processing could lead to a reduced ORE and better recognition.

Messiner and Brigham's (2001) meta-analysis also found no evidence that racial attitudes directly influence the ORE. However, the study did find that the relationship between racial attitudes and interracial contact accounted for 13% of the variability across individuals, suggesting that attitudes may play a mediating role depending on experience and contact.

To further investigate the influence of contact, Sangrigoli, Pallier, Argenti, Ventureyra, and de Schonen (2005) conducted a study that assessed the ORE in adult individuals of Korean origin who were adopted as children between the ages of three and nine by European Caucasian families. The researchers found that the Korean individuals performed similar to the Caucasian comparison group in that they identified Caucasian faces better than Asian faces. These data suggest that one's surroundings, especially those that are extensively present from an early age, can overcome the bias and essentially reverse the ORE. In contrast, in a similar study testing a sample of Asian children adopted by Caucasian Western European families, de Heering, de Liedekerke, Deboni, and Rossion (2010) found face recognition performance with Asian and Caucasian faces can be modulated, but not completely reversed in children. Only when individuals had more than two decades of experience with other-race faces did the ORE appear to reverse. de Heering and colleagues argued that the difference in findings was due to Sangrigoli and collaborators' (2005) use of a less sensitive measure and smaller

sample size. These results emphasize the importance of the length of exposure to another race in the face recognition system. Overall, these findings illuminate the importance of environmental and contextual factors that can influence the ORE. It is still unclear from these studies, however, whether it was a perceptual or social experience that made the largest contribution.

Categorization

Another factor that has been found to be an influence is labeling pertaining to group categorizations (Hourihan et al., 2013). A study by Hourihan et al., found that when labels were provided to ambiguous faces the individuals showed a larger ORE, especially if the label was an own-race label. However, this study also found that if the labels were presented when the individuals were tested and not when the images were first shown, then the group labeling had no effect on the recognition performance. This suggests that the bias occurred when encoding took place and not at testing. This study demonstrates that how you categorize the faces at encoding is critical.

An alternative explanation for the ORE that encompasses perception, contact, and categorization was proposed in Levin's (1996, 2000) feature-selection model. This model argues that the ORE can be explained by differing social cognition toward in-group and out-group members. Individuals are hypothesized to think categorically about out-group members. Thinking of other individuals in terms of categories leads to the use of social categories such as race and sex instead of individual characteristics. People tend to use different recognition strategies for categorical versus individual recognition leading to differences in performance across racial groups and difficulty in distinguishing other-race faces. Balas, Peissig, and Moulson (2015) found that an in-group versus out-

group bias may also be present in children when learning to use shape information about faces. In other words, children and adults use shape and pigmentation differently to judge face similarity. These findings suggest children's exposure to faces of different racial categories not only shapes the way children define category boundaries but also influences how they use visual information within a category to make judgments about resemblance.

Furthermore, a meta-analysis found that contact with other racial groups reduces prejudice towards those groups (Pettigrew & Tropp, 2006). Research found that by eliciting individuation of out-group members at encoding, the ORE can be reduced (Hugenberg, Miller, & Claypool, 2007). Hence, social-cognitive factors that involve higher-level cognitive processes, such as group categorization and prejudice, can influence the ORE.

The majority of the previous studies included research that was conducted in laboratory settings using tasks that are not typically performed outside a laboratory, thus results may not necessarily carry over to real-world situations. Therefore, the question remains, how can we reduce the ORE beyond the visual laboratory? One study mimicked travel document inspection, providing evidence that the ORE can carry over to real-world scenarios (Meissner et al., 2013). Mexican-American and African-American individuals were given perceptual discrimination tasks that security screeners routinely encounter. Participants were asked to determine whether the image of a travel document photo of a particular individual matched a photo that either was the target at a different age or with a disguise (e.g., sunglasses). The results of this real-world type scenario

revealed an ORE for both ethnicities and suggested that disguises can affect an individual's ability to encode information, and as a result it can moderate the ORE.

Current research suggests that the ORE is relevant to the criminal justice system because of the use of eyewitness testimony and line-up identification across race and ethnicity groups (Abshire, & Bornstein, 2003; Jackiw, Arbuthnott, Pfeifer, Marcon, & Meissner, 2008; Loftus, 2013; Wells & Olson, 2001; Wilson et al., 2013). The ORE can lead to other-race misidentification, and thus, wrongful accusation and incarceration of innocent individuals. The Innocence Project, an organization dedicated to exonerating wrongly convicted individuals, estimates that in the U.S. eyewitness misidentification played a role in approximately 70% of convictions overturned through DNA testing (The Innocence Project, 2016). Therefore, in order to prevent misidentification in socially significant tasks it is important to further understand the extent of the ORE and whether it also applies to ethnic groups, such as Hispanics.

Racial/Ethnic Attitudes

Although Meissner and Brigham's (2001) meta-analysis suggested that racial attitudes did not directly impact the ORE, racial biases are multifaceted, and similar to other concepts, often require extensive research to thoroughly understand their complexity. A study that examined differences in explicit and implicit attitudes found that in face recognition tasks, these attitude measures predict recognition in opposite directions (Ferguson, Rhodes, Lee, & Sriram, 2001). The high implicit prejudice group categorized own- and other-race faces quicker and more accurately than the high explicit prejudice group. The authors suggested that this occurred because implicit prejudice is automatic and well-practiced while explicit prejudice is slow and deliberative.

These researchers only investigated the relationship between attitudes and the ORE, and it did not provide support for the view that explicit racial prejudice directly affects the ORE (Ferguson et al., 2001). However, more recent research has established a causal association between the ORE and implicit racial bias (Lebrecht, Pierce, Tarr, & Tanaka, 2009). These researchers found that training that reduces the ORE also led to a reduction in an individual's implicit racial bias. These findings suggest that implicit racial bias is one component of the ORE and is malleable.

Furthermore, Lebrecht et al.'s, (2009) study reveals the noteworthy finding that individuals may not have comparable results on explicit and implicit prejudice measures. Some reasons for this discrepancy may be because of the common problem in research, the social desirability bias which means people may not want to admit to racial bias. The individual may also be unaware of his/her implicit bias, and thus would not report it on an explicit attitude measure. One commonly used measure to assess an individual's implicit attitudes on race is the Implicit Association Test (IAT) (Greenwald, McGhee, & Schwartz, 1998; Greenwald, Nosek, & Banaji, 2003). It measures the differential association of two target concepts with an attribute. This test is often used in studies to measure the strength of association between the faces' racial and ethnic groups and words which are pleasant or unpleasant. It is useful in assessing differences in evaluative associations between pairs of semantic or social categories, such as race or ethnicity. Since its development, a shortened version has been developed, the Brief Implicit Association Test (BIAT), which exhibits validity and reliability similar to the longer version (Sriram & Greenwald, 2009). The BIAT consists of two blocks of trials, which

may be repeated, with the same four categories and stimulus-response mappings as the standard IAT, but with one-third the number of trials.

The Gap in the Literature

The meta-analyses of ORE studies (Messiner & Brigham, 2001; Sporer, 2001) represent the current field in that studies mostly include Caucasian participants, some studies also include Black participants, and even fewer studies include Asian participants; however, almost none of the previous studies included Hispanic participants. This is not surprising, because Hispanics are considered an ethnicity that is comprised of individuals of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race (U.S. Census Bureau, 2013). However, there may be an ORE for those individuals who appear "Hispanic."

Because past research (Lebrecht et al., 2009) has found that social attitudes can impact the ORE, there may be an influence of those attitudes on the strength of a possible Hispanic ORE. A recent report by Latino Decisions and National Hispanic Media Coalition (NHM) (Barreto, Manzano, & Segura, 2012), which found that news and media have a strong influence on non-Hispanic perceptions about Hispanics, suggests there are strong attitudes towards Hispanics which may influence the ORE. In particular, the report found that media portrayals of Hispanics can diminish or exacerbate stereotypically negative opinions about them and that most individuals attribute a combination of both positive and negative stereotypes to Latinos and immigrants. Given that attitudes can affect the ORE, it is imperative that Hispanics be included in further research studies of the ORE.

The limited number of studies that do include Hispanic individuals suggest an ORE for this population. However, these studies have several limitations (Hourihan et al., 2013; Meissner et al., 2013; Tanaka & Pierce, 2009). For example, in Tanaka and Pierce's study Caucasians were trained to differentiate and categorize Hispanic and African American faces, which led to an improvement of recognition of other-race faces. Because participants from other races or ethnicities were not tested in this context, the results cannot conclusively suggest a crossover effect to participants who are not Caucasian. Also, these results do not rebuff the argument that Hispanic faces were harder to recognize than the faces of other races. Moreover, studies by Hourihan et al., (2013) and Meissner et al. (2013) only included Hispanics and African Americans as participants, but did not include Caucasians, the race included in nearly every ORE study. The results of these studies suggested African Americans have an ORE for Hispanic faces and Hispanics have an ORE for African American faces. Because other races were not included as participants or face stimuli in these studies, the conclusion cannot be made that the ORE for Hispanic extends to other races. Overall, these studies failed to demonstrate any crossover effects between these ethnicities because they were conducted with limited groups of races.

Because the Hispanic population is the third fastest growing population in the United States and is expected to be 29% of the total population by 2060 (Colby & Ortman, 2015), it is more important than ever to include Hispanics when exploring the factors associated with the ORE, implicit bias, and how they guide perception.

The Current Study

In summary, this review has provided an overview of the ORE and a gap in the literature. The present study will seek to close that gap by including Hispanics in this investigation and examine how quantity and quality of interracial experiences are associated with the ORE and implicit attitudes. First, this investigation sets out to build on previous research (Tanaka & Pierce, 2013) which suggests an ORE for Hispanics. The current study will expand the research by including Asians, Caucasians, and Hispanics as both face stimuli and participants. Furthermore, this investigation will examine if the quantity and/or quality of exposure to other-race faces is associated with differing levels of ability in discriminating faces of other races and ethnicities. Lastly, this study will build on previous research by Ferguson et al. (2001) which found that, although past research has commonly used explicit racial attitudes measures, an implicit racial attitudes measure detects different information about the ORE. Implicit racial measures reduce social desirability bias and can capture attitudes that individuals are unaware of, thus are important when examining the ORE. The aims of this study are to investigate both the perceptual mechanisms underlying the ORE and whether attitudes and social context interact with perceptual judgments.

The following hypotheses were examined in this study:

1. Asian and Caucasian individuals will exhibit an ORE for Hispanic faces but Hispanic individuals will not.
2. ORE scores will be negatively correlated with BIAT scores (implicit racial bias measure), in other words low ORE scores (high face recognition bias) will be associated with high BIAT scores (high implicit racial bias).

3. Qualitative experience scores will be negatively correlated with BIAT scores.
4. Quantitative experience scores will be negatively correlated with BIAT scores.

CHAPTER 2

METHOD

Participants

Seventy-six (60 female, 16 male) students from California State University, Fullerton (CSUF) and individuals from the surrounding community participated in this study for either partial fulfillment of course credit or $8. They were recruited from CSUF's Psychology Research Pool and convenience sampling locally. The participants included 26 Asians, 21 Caucasians, 25 Hispanics, and 4 individuals who identified as another race, ethnicity, or multiracial. The data of the individuals who identified as other races or ethnicities were excluded due to a lack of stimuli that matched their races or ethnicities, which prevented own- versus other-race analysis. An additional participant, who identified as Hispanic, was excluded because she was personally familiar with a face used in the Brief Implicit Association Task. This left a total of 71 participants aged from 18 to 33 years (Age $M = 20.10$ years, Female $N = 56$).

Materials and Procedures

This study was comprised of three tasks: a facial recognition task, the BIAT, and self-report measures. To avoid revealing the purpose of the present study early on in the experimental session, the order in which participants completed these tasks was in the sequence listed above. The BIAT and self-report measures both explicitly instruct participants to consider race and ethnic categories/groups. The recognition task was

presented first to avoid influencing participants to change their normal recognition behavior based on social expectations related to race.

Face Recognition Task

The facial recognition task, which was an ‘‘old/new’’ task, assessed an individual’s ability to recognize previously encountered faces.

Materials. The study was conducted using an Apple iMac G5 21.5-inch computer (Apple Inc., Cupertino, CA) using the program Superlab 5.0 (Cedrus Corporation: San Pedro, CA).

Stimuli. Photos of 10 Asian faces, 10 Caucasian faces, and 10 Hispanic faces (half male and half female) were presented in color with a white background on the monitor. All images were standardized for size by normalizing the distance between the pupils. All images were taken under standardized conditions.

Procedure. The facial recognition task consisted of a learning phase and testing phase. The learning phase consisted of three runs and used half the faces (15, five of each race). The faces were presented in random order while participants carried out each run. In the first run participants judged whether he or she thought each face belonged to a smoker or not, in the second run he or she judged whether each face was younger or older than 21 years of age, and in the third run he or she judged whether each face was attractive or unattractive. Each face was displayed until the participant made a response, with an intertrial interval (ITI) of 1000 ms. The testing phase consisted of a single run which included all of the faces shown during the learning phase and the other half of the faces for a total of 30 faces (10 of each race). During this phase the participant was presented each face in a random order and decided whether he or she remembered or did

not remember seeing that particular face during the learning phase. Each face was shown until the participant made a response using one of two keys corresponding to old and new.

Brief Implicit Association Task

The Brief Implicit Association Test (BIAT), is a latency measure developed by Sriram and Greenwald (2009) and was used to assess implicit attitudes towards Asian, Caucasians, and Hispanics; this shorter version of the standard IAT (Greenwald et al., 1998; Greenwald et al., 2003) was selected because it reduced administration time by one third.

Materials. The study was conducted on an Apple iMac G5 21.5-inch computer (Apple Inc., Cupertino, CA) using the program Superlab 4.5 (Cedrus Corporation: San Pedro, CA).

Stimuli. The photos of four Asian faces, four Caucasian faces, and four Hispanic faces (half male and half female; chosen based on the results of a pilot of this study), were presented in color with a white background. All images were enlarged or reduced to ensure all faces had the same pupil distance. In addition, all images were taken under consistent controlled conditions. Participants also viewed pleasant (delightful, friendly, happy, wonderful) and unpleasant (horrible, nasty, offensive, repulsive) words (also chosen based on the results of a pilot on this study), which were presented in black font.

Procedure. The response latency measure was used to assess the strength of association between traditional Asian, Caucasian, and Hispanic faces and words that are pleasant or unpleasant. In total, each participant was presented with four runs. During each run, two of the three groups of faces mentioned above and pleasant and unpleasant

words were presented (each four times within a run) and the participant was asked to categorize faces as either the target race or ethnicity (e.g., Hispanic) or words as pleasant using one key response. The other race or ethnicity and unpleasant words were assigned a different key on the keyboard. The target race or ethnicity and pleasant words were always shown before the run began and corresponded to the same key. For the next run the target faces would be switched and paired with the other group of words (e.g., if Hispanic faces were assigned to the same key as pleasant words they would now be assigned to the same key as unpleasant words). Afterwards, these trials were repeated. For example, in one run Asian faces were paired with pleasant words and Hispanic faces were presented with unpleasant words and participants were asked to categorize the stimuli as either the target stimuli (Asian faces or pleasant words) or anything else (Hispanic faces or unpleasant words). In the following run, Hispanic faces were paired with the pleasant words and Asian faces were paired with the same unpleasant words. These two runs were then repeated. The order in which participants completed each run and combination of face and word pairing was counterbalanced to avoid order effects.

Stimuli were presented in random order within each run and trials were separated by a 250 ms ITI. Participants received feedback for incorrectly categorized items and had to correct these mistakes before moving onto subsequent trials. To designate mistakes, a red "X" appeared. Stimuli remained on screen until participants responded.

Self-Report Measures

Procedure. All surveys were administered on the computer using Qualtrics. The order in which participants completed the demographic survey and experience surveys was pseudorandomized to avoid order effects.

Demographic Survey. Participants were presented a form on which they filled out their demographic information. The six item demographics survey was administered by the researcher via the online survey website Qualtrics to collect information on each participant. This survey asked participants questions pertaining to age, gender, self-identified ethnicity or race, education, and so on (see Appendix A).

Experience surveys. We also measured experience with the race and ethnicity groups used in the experiment (Asian, Caucasian, Hispanic) using a questionnaire. The measure consisted of 25 questions primarily evaluated on a five-point Likert-type scale from *strongly agree* to *strongly disagree*. The remaining questions either open-ended or were evaluated using Likert-type scales which consisted of percentages or number of individuals. The first eight questions were from Brigham's (1993) Social Experience Questionnaire (SEQ) which primarily captures early experience. The first seven questions of the SEQ assessed the quantity of experience with other groups. In contrast, question either evaluated the qualitative experience with other groups. Questions nine through 13 were from Walker and Hewestone's (2006) Social Contact Scale (SCS). This measure inquires about the quantity of experience with other individuals. Questions 14 through 18 were from Walker and Hewstone's Individuating Experiences Scale (IES; 2006) which is a measure of quality of experience with other individuals. Questions 19 through 25 were designed to measure current quality of experience with other groups (Duan et al., 2013). Quantitative experience scores, from low to high contact, could range from 1 to 7.92 since some were on a five-point scale and others were on a 10-point scale. The items on all these questionnaires were modified to measure the amount of social contact participants had with the two races and one ethnicity used in the study,

Asians, Caucasians, and Hispanics. The quantitative, which could range from 1 to 7.92. The quantitative and qualitative experience items were analyzed separately because they did not significantly correlate with one other and previous research has indicated that they measure separate experiences (Brigham & Malpass, 1985).

To reduce administration time, participants only completed contact measures of the race or ethnicity with which he or she did not identify. Examples of statements included in this scale are: "How many *Hispanic* friends did you have in elementary school?" and, "I discuss my personal life with a *Caucasian* individual." The complete measure can be found in Appendix B. All versions of the questionnaire asked the same questions with the race or ethnicity altered for that group, so only one version is included in Appendix B.

CHAPTER 3

RESULTS

Several analyses were carried out to address the hypotheses. SPSS statistical software Version 23 (SPSS, Chicago, IL) was used for all analyses. For the first hypothesis, the dependent variable, individual participants' recognition memory performance, was assessed by computing d' (sensitivity for discriminating old from new items) for each race or ethnicity of the faces (Asian, Caucasian, Hispanic). The independent variable influencing this dependent measure was the race or ethnicity of the participant (Asian, Caucasian, and Hispanic). Three statistical analyses were run on the data collected, one for each race or ethnicity face (Asian, Caucasian, Hispanic).

First, a one-way Analysis of Variance (ANOVA) was conducted on Asian sensitivity (d') to analyze the ORE for Asian (M = 2.47 SD = .67), Caucasian (M = 2.495 SD = .40), and Hispanic (M = 2.53 SD = .56) participants. The ANOVA showed that there was not a significant effect for participants' race or ethnicity, $F(2, 68) = .057$, $p = .944$ (see Figure 1). This result indicated that no differences between group means were found.

Next, no statistically significant differences between group means were found in an ANOVA on Caucasian sensitivity (d') which assessed the ORE for Asian (M = 2.64 SD = .79), Caucasian (M = 2.77 SD = .55), and Hispanic (M = 2.71 SD = .67)

participants. The analysis showed that there was not a significant effect for participants' race or ethnicity, $F(2, 68) = .236$, $p = .790$ (see Figure 1).

Lastly, a one-way ANOVA was conducted on Hispanic sensitivity (d') to measure the ORE for Asian ($M = 2.57$ $SD = .76$), Caucasian ($M = 2.66$ $SD = .53$), and Hispanic ($M = 2.76$ $SD = .55$) participants. The ANOVA showed that there was not a significant effect for participants' race or ethnicity, $F(2, 68) = .589$, $p = .558$ (see Figure 1).

It is important to note that although the d' scores for Asian participants and the overall trials in which Asian faces were shown tended to have lower d' scores than all other groups, overall these results indicated that no differences between groups were found.

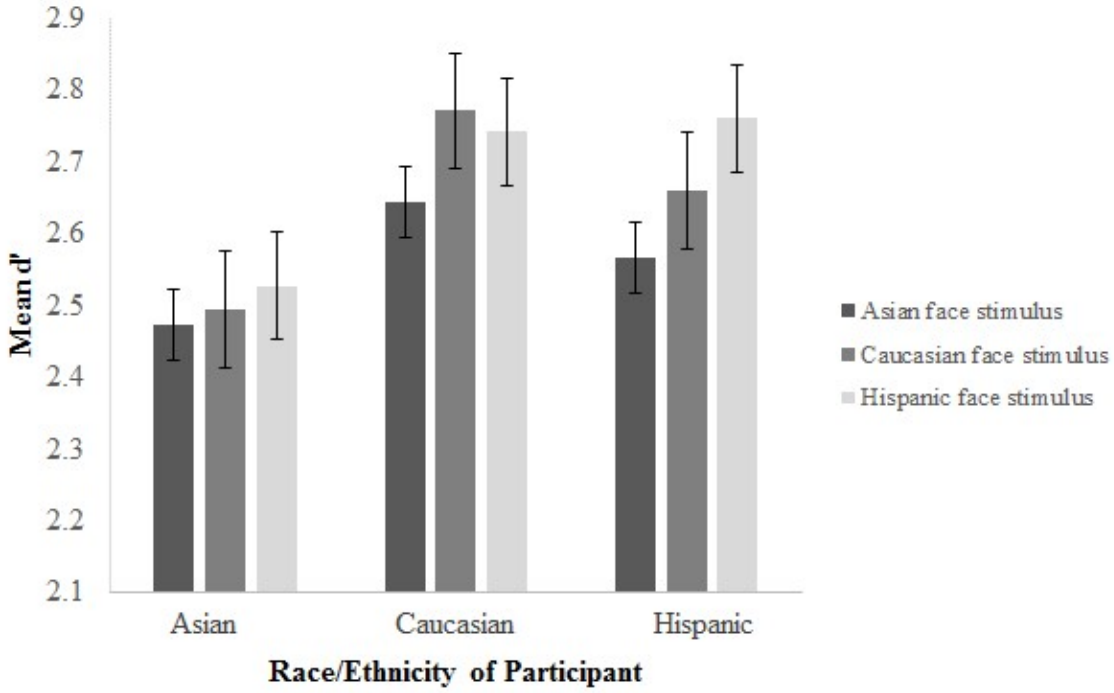

Figure 1. Mean sensitivity (d') by race or ethnicity of each group of participants. Error bars represent standard error of the means

The relationship between the ORE and BIAT scores was examined using bivariate correlations. A BIAT score (see Table 1 for descriptive statistics of these scores), which can range from -2 to 2, was computed for each participant using D measure, known as the implicit racial bias measure, an individual-variability calibrated score which divides the differences between test block means by the standard deviation of all the latencies in the test blocks (Greenwald et al., 2003). A higher *D* measure score on the BIAT suggests a less favorable implicit bias toward the target race. Every participant obtained an ORE and BIAT score for every race and ethnicity, accordingly, the following correlations assessed the relationship between these measure for each individual race and ethnicity. There was not a significant correlation between Asian ORE and Asian implicit bias $r(69) = -.051$, $p = .337$ (see Figure 2). Also, there was not a significant correlation between Caucasian ORE and Caucasian implicit bias $r(69) = .014$, $p = .454$ (See Figure 3). Lastly, there was no significant correlation between Hispanic ORE and Hispanic implicit bias $r(69) = .135$, $p = .131$ (See Figure 4). There were no significant correlations between each race or ethnicity's sensitivity measure and its corresponding D measure, indicating high face recognition bias (low ORE score) was not associated with high implicit racial bias (high D measure).

Table 1. Summary of BIAT Scores

	N	*M*	*SD*
Implicit Bias Towards Asians	71	-.81	.21
Implicit Bias Towards Caucasians	71	.06	.24
Implicit Bias Towards Hispanics	71	.02	.25

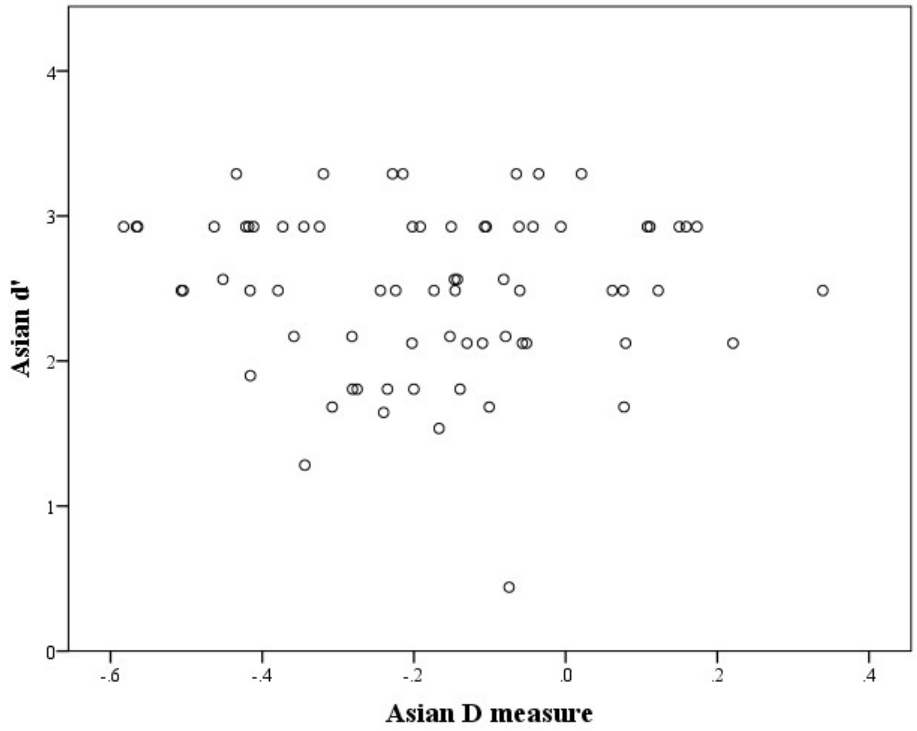

Figure 2. Scatterplot of Asian d' (ORE) and Asian D measure (implicit racial bias).

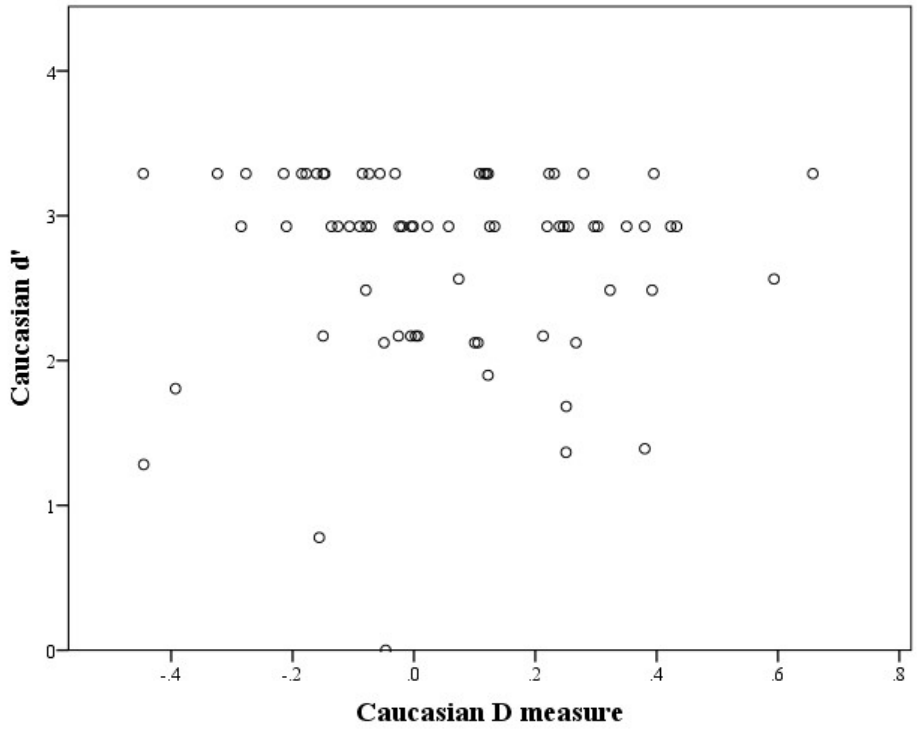

Figure 3. Scatterplot of Caucasian d' (ORE) and Caucasian D measure (implicit racial bias).

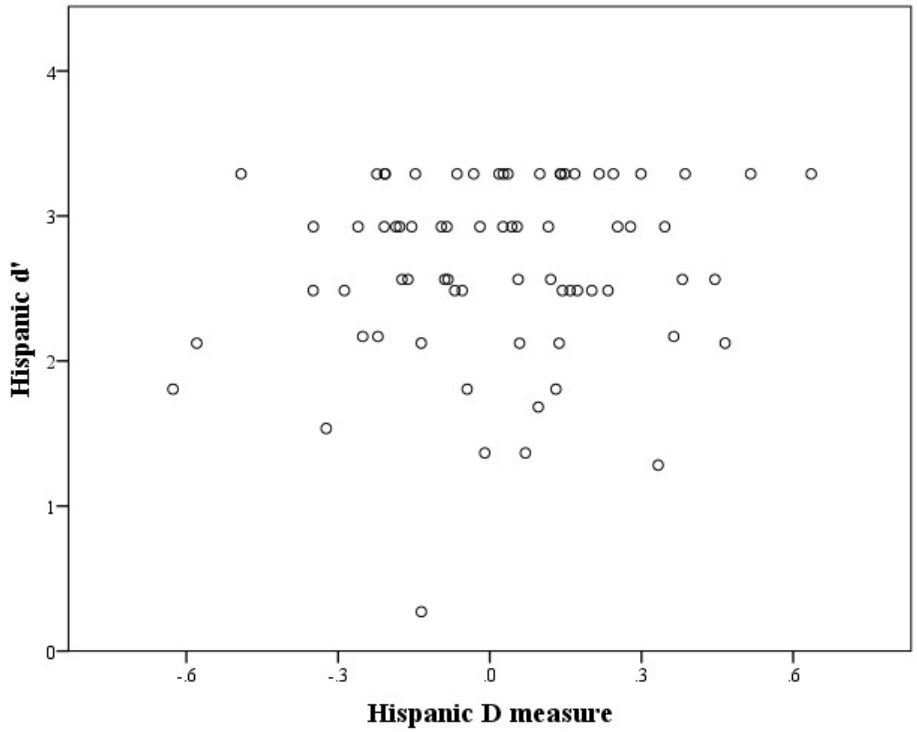

Figure 4. Scatterplot of Hispanic d' (ORE) and Hispanic D measure (implicit racial bias).

To address the hypothesis that qualitative experience (see Table 2 for summary of scores) is negatively correlated with BIAT scores multiple correlations were run. There was no significant correlation between qualitative experience and Asian implicit bias $r(43) = .148$, $p = .332$. Similarly, a correlation between qualitative experience and Caucasian implicit bias yielded a nonsignificant result, $r(48) = -.105$ $p = .468$. Also, the correlation between qualitative experience and Hispanic implicit bias was not significant, $r(45) = -.212$, $p = .153$. There were no associations between qualitative experience and implicit racial bias for any race or ethnicity.

Additional correlations were run to address the hypothesis that quantitative experience (see Table 2 for summary of scores) is negatively correlated with BIAT scores. There was no significant correlation between quantitative experience and Asian implicit bias $r(43) = .229$, $p = .130$. Similarly, a correlation between quantitative

experience and Caucasian implicit bias yielded a nonsignificant result, $r(48) = .003$, $p = .983$. Lastly, the correlation between quantitative experience and Hispanic implicit was not significant, $r(45) = -.245$, $p = .097$. There were no associations between quantity of experience and implicit racial bias for any race or ethnicity.

Table 2. Summary of Qualitative and Quantitative Experience Scores

Questionnaire	Qualitative		Quantitative	
	M	*SD*	*M*	*SD*
Asian	3.00	2.40	3.31	.79
Caucasian	2.65	1.15	3.53	.83
Hispanic	3.33	1.52	3.61	.93

Overall, none of the hypotheses in this study were supported by these data.

CHAPTER 4

DISCUSSION

The current study extends previous research on the ORE by including a largely ignored population in ORE research, Hispanics, by including this population as participants as well as including Hispanic faces as stimuli. In addition, other races (Asians and Caucasians) were included in this study to assess if the ORE for Hispanic faces was present and to provide comparisons. The hypothesis that Asian and Caucasian individuals would exhibit an ORE for Hispanic faces but Hispanic individuals would not was not supported. Similarly, the findings of the study did not support the hypothesis that race face sensitivities and corresponding implicit racial bias scores would be negatively associated. Furthermore, the results did not support the hypothesis that qualitative experience is negatively associated with implicit racial attitudes for Asians, Caucasians, or Hispanics. Lastly, the final hypothesis that quantitative experience is negatively associated with implicit racial attitudes for Asians, Caucasians, or Hispanics was not supported.

Although it may seem logical to conclude that these results suggest that a Hispanic ORE does not exist, a review of the overall findings implies a more complex explanation. The ORE for Asian and Caucasian faces has been a well-documented occurrence (Meissner & Brigham, 2001), however the results of this study did not show

an ORE for Asian or Caucasian individuals. Thus, one must explore the methodology, overall results, and sample population to further understand the implications of this study.

One point of interest was that obtaining face stimuli for this study was challenging because limited research is conducted on the ORE and Hispanic faces. Because Hispanic faces were scarce, only 10 faces per race or ethnicity were used. It may be possible that too few faces were shown for each group. To obtain a more comprehensive understanding of the ORE, in the future researchers could replicate this study and include more faces from each group.

Furthermore, overall experience scores reveal that most participants had high levels of contact with multiple races. Previous research (Lebrecht et al., 2009; Meissner & Brigham, 2001) indicated that social experience and implicit racial bias can influence the ORE. Because higher levels of social experience and contact with other racial groups can reduce the ORE, this may have led to high accuracy on the face recognition task for most participants and masked the ORE for participants with little to no experience with other race individuals. Similarly, the implicit racial bias measure showed low overall values indicating little to no implicit bias for Asian, Caucasian, and Hispanic faces. Furthermore, a closer inspection of the results of the face recognition task reveals a possible ceiling effect. The average d' for each race or ethnicity was relatively high and close to expert level, which meant that most participants were able to correctly identify most new and old faces. Because the average values for the experience and implicit bias measures were at extremes they may have led to the ceiling effect found on the face recognition task. Overall, these findings suggest that the results were null because the sample population was too experienced with these races and ethnicities.

In addition, past research (Hourihan et al., 2013) has indicated that face categorization is influenced by social category information, such as social in-group and social out-group, and the racially heterogeneous population in Orange County, CA, which consists of 20.1% Asian, 2.1% Black, 41.4% Caucasian, and 34.4% Hispanic population (U.S. Census Bureau, 2015), may have changed the categorization of in-group individuals to be more inclusive. Future researchers could recruit participants from racially homogenous environments, such as the Midwest, or other countries.

Due to the limited Black population in Orange County, Blacks were not recruited for inclusion in this study. Because the ORE for Black faces has also been widely documented for other races (Meissner & Brigham, 2001), it is essential that an inclusive study examining the Hispanic ORE include this population as well as Asians and Caucasians to determine if there is a crossover effect. Future studies should attempt to recruit from areas with larger populations of Blacks.

Overall, the findings of an ORE in any racial or ethnic group found in previous research could not be replicated because this study was not conducted in a homogeneous context. Thus, the study cannot conclusively provide evidence that there is an ORE for Hispanic faces, and more studies are needed to understand the complexity of the ORE and the role of experience and implicit bias.

APPENDIX A

DEMOGRAPHIC SURVEY

Please complete the following questionnaire. In the questionnaire, we are going to ask you to provide demographic information. For each question below, please choose an appropriate answer (e.g. a number, a percentage or a frequency, etc.) that best describes your experiences. Take as much time as you need to answer the questions thoroughly and accurately and get the experimenter once you are finished. Please remember too that all answers are coded and your responses will be kept confidential. Thank you again for your cooperation!

Highest Level of Education Completed:
Postgraduate Degree (e.g., Masters or Ph.d.)____
Bachelor's Degree ____
Associate's Degree____
High School____
Primary School____

Age: _____

Gender:
Male
Female

Sexual Preference:
Bi Sexual ____
Straight ____
Gay ____
Other ____
Decline to State ____
If checked Other please specify _____

Ethnicity:
African/African American/Black
American Indian/Alaska Native
Asian/Pacific Islander
Caucasian/European/White
Hispanic/Latino(a)
Middle Eastern

Other _____
Biracial/Multiracial_____

Handedness:
Right
Left
Ambidextrous

APPENDIX B

EXPERIENCE QUESTIONNAIRES

Please complete the following questionnaire. In the questionnaire, we are going to ask you about your personal experiences with *Asian/Caucasian/Hispanic* individuals. For each question below, please choose an appropriate answer (e.g. a number, a percentage or a frequency, etc.) that best describes your experiences. For the questions regarding your interactions with *Asian/Caucasian/Hispanic* individuals, we are interested in face-to-face interactions in which you have exchanged greetings, conversed, conducted business, asked for, gave, or received information or services, or in some other way responded to each other. For example, merely attending a class with a(n) *Asian/Caucasian/Hispanic* individual is not an interaction unless you had a conversation, made direct eye contact, etc. Take as much time as you need to answer the questions thoroughly and accurately and get the experimenter once you are finished. Please remember too that all answers are coded and your responses will be kept confidential. Thank you again for your cooperation!

Approximately what percentage of the students in the elementary school you attended were *Asian/Caucasian/Hispanic*?
○ 0-9%
○ 10-19%
○ 20-29%
○ 30-39%
○ 40-49%
○ 50-59%
○ 60-69%
○ 70-79%
○ 80-89%
○ 90-100%

How many *Asian/Caucasian/Hispanic* friends did you have in elementary school?
○ 0
○ 1
○ 2
○ 3
○ 4
○ 5
○ 6
○ 7

○ 8
○ 9 or more

Approximately what percentage of the students in the middle school or junior high school you attended were *Asian/Caucasian/Hispanic*?
○ 0-9%
○ 10-19%
○ 20-29%
○ 30-39%
○ 40-49%
○ 50-59%
○ 60-69%
○ 70-79%
○ 80-89%
○ 90-100%

How many *Asian/Caucasian/Hispanic* friends did you have in middle school or junior high?
○ 0
○ 1
○ 2
○ 3
○ 4
○ 5
○ 6
○ 7
○ 8
○ 9 or more

Approximately what percentage of the students in the high school you attended were *Asian/Caucasian/Hispanic*?
○ 0-9%
○ 10-19%
○ 20-29%
○ 30-39%
○ 40-49%
○ 50-59%
○ 60-69%
○ 70-79%
○ 80-89%
○ 90-100%

How many *Asian/Caucasian/Hispanic* friends did you have in high school?
○ 0
○ 1
○ 2

○ 3
○ 4
○ 5
○ 6
○ 7
○ 8
○ 9 or more

Approximately what percentage of the people in the neighborhood in which you grew up were *Asian/Caucasian/Hispanic*?
○ 0-9%
○ 10-19%
○ 20-29%
○ 30-39%
○ 40-49%
○ 50-59%
○ 60-69%
○ 70-79%
○ 80-89%
○ 90-100%

Of all the *Asian/Caucasian/Hispanic* individuals you know personally how many would fit into each of the following categories? Please estimate a number of individuals.
Casual Acquaintance.....
_____
Moderately Well .....
_____
Very Close Relationship .....
_____

How many *Asian/Caucasian/Hispanic* people do you know very well?
○ 0-2
○ 3-5
○ 6-8
○ 9-11
○ 12 or more

I often spend time with *Asian/Caucasian/Hispanic* people.
○ Strongly Disagree
○ Sort of Disagree
○ Not Sure
○ Sort of Agree
○ Strongly Agree

I spend a lot of free time doing things with *Asian/Caucasian/Hispanic* people.
○ Strongly Disagree

○ Sort of Disagree
○ Not Sure
○ Sort of Agree
○ Strongly Agree

I often go round to the houses of *Asian/Caucasian/Hispanic* people.
○ Strongly Disagree
○ Sort of Disagree
○ Not Sure
○ Sort of Agree
○ Strongly Agree

Asian/Caucasian/Hispanic people often come around to my house.
○ Strongly Disagree
○ Sort of Disagree
○ Not Sure
○ Sort of Agree
○ Strongly Agree

I have looked after or helped a(n) *Asian/Caucasian/Hispanic* friend when someone was causing them trouble or being mean to them.
○ Strongly Disagree
○ Sort of Disagree
○ Not Sure
○ Sort of Agree
○ Strongly Agree

A(n) *Asian/Caucasian/Hispanic* person has looked after me or helped me when someone was causing me trouble or being mean to me.
○ Strongly Disagree
○ Sort of Disagree
○ Not Sure
○ Sort of Agree
○ Strongly Agree

I have comforted a(n) *Asian/Caucasian/Hispanic* friend when they were feeling sad.
○ Strongly Disagree
○ Sort of Disagree
○ Not Sure
○ Sort of Agree
○ Strongly Agree

A(n) *Asian/Caucasian/Hispanic* person has comforted me when I have been feeling sad.
○ Strongly Disagree
○ Sort of Disagree
○ Not Sure

○ Sort of Agree
○ Strongly Agree

I have asked a(n) *Asian/Caucasian/Hispanic* person to be on my team or in my group during sports or activities.
○ Strongly Disagree
○ Sort of Disagree
○ Not Sure
○ Sort of Agree
○ Strongly Agree

How many times have you gone on a date with a(n) *Asian/Caucasian/Hispanic* individual?
○ 0
○ 1
○ 2
○ 3
○ 4 or more

If you have ever held a job, how many of your coworkers have been *Asian/Caucasian/Hispanic*?
○ 0-2
○ 3-5
○ 6-8
○ 9-11
○ 12 or more

Of your 9 closest friends at college, how many are *Asian/Caucasian/Hispanic*?
○ 0
○ 1
○ 2
○ 3
○ 4 or more

I often spend time in conversation with *Asian/Caucasian/Hispanic* individuals.
○ Never
○ Hardly Ever
○ Sometimes
○ Quite Often
○ Very Often

I share meals with a(n) *Asian/Caucasian/Hispanic* individual at the same table while eating on campus.
○ Never
○ Hardly Ever
○ Sometimes

○ Quite Often
○ Very Often

I discuss my personal life with a(n) *Asian/Caucasian/Hispanic* individual.
○ Never
○ Hardly Ever
○ Sometimes
○ Quite Often
○ Very Often

I discuss school work with a(n) *Asian/Caucasian/Hispanic* individual.
○ Never
○ Hardly Ever
○ Sometimes
○ Quite Often
○ Very Often

That is the end of the questionnaire. Please press the finish button below and get the experimenter. Thank you for your participation!

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