THE INFLUENCE OF INGROUP IDENTIFICATION AND TARGET PROTotypicality ON FACIAL RECOGNITION

by

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B.A. (Hons.), Simon Fraser University, 2006

THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS

in the

Department of Psychology

Faculty of Arts and Social Sciences

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SIMON FRASER UNIVERSITY

Fall 2008

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Abstract

Research on face recognition demonstrates that the cross-category effect—the phenomena of recognizing ingroup members better than outgroup members—results from individuation of faces categorized as ingroup, and assimilation of faces categorized as outgroup. However, because individuation occurs in comparison to the ingroup prototype, I argue that whether individuation aids recognition depends on the similarity between the ingroup prototype and the target faces. Assuming that ingroup identification encourages categorization, and thus individuation of ingroup members, I tested the relationship between ingroup identification and recognition of ingroup and outgroup targets that differed in ingroup prototypicality. Participants viewed prototypical and non-prototypical target faces from either the ingroup or outgroup university, and were then tested for recognition. As predicted, ingroup (university) identification was positively related to recognition of prototypical targets and negatively related to recognition of non-prototypical targets, regardless of differences in participant prototypicality. Ingroup identification was negatively related to outgroup member recognition.

Keywords: cross-race effect; facial recognition; categorization; prototypicality; self-categorization theory; social cognitive processes

Subject Terms: face perception; social comparison; ingroup outgroup; reference groups; perceptual discrimination; social identity
To my son, Lachlan,

whose birth moved me to seek more from this life

—for both him and I—

and whose beautiful existence continually

makes me strive to be a better father and a better person.
Acknowledgements

First and foremost, I would like to give my sincerest thanks to my primary supervisor, Dr. Michael Schmitt, for his limitless patience, ongoing encouragement, and creative insight as a mentor and a friend, and who has challenged me and helped me to grow both as a writer and a researcher. Dr. Schmitt dedicated an exorbitant amount of time to this project and much of the credit for its clarity is directly due to his efforts.

I would also like to thank my secondary supervisor, Dr. Cathy McFarland, for her time and guidance across multiple drafts of this thesis, and to my external supervisor Dr. Mark Schaller for his time and suggestions.

I would like to extend my thanks to Dr. Don Read and Dr. Kim Bartholomew for their help in developing this thesis topic and for their suggestions on an early draft. I would like to express gratitude to everyone at the centre for intergroup relations and social justice lab (CIRSJ) and the self-in-social-context lab (SISC), especially Diana Jung, Ulric Wong and Kelly Davies, for their help with data collection.

Finally, I would like to recognize Greg Tyndall, a great instructor and friend at the College of New Caledonia (CNC), who not only inspired and encouraged me to pursue graduate training but who also helped to ignite my passion and wonderment, through lecture, conversation and debate, to all that is social psychology and its seemingly limitless applications.
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INTRODUCTION

Jennifer Thompson, a White 22-year-old college student, was asleep in her apartment when a cold steel blade was put to her throat. She was subsequently raped. During the three hour ordeal she had the clarity of mind to study the facial features of her Black assailant determined that, if given the chance, she would be able to easily identify him. Several days later she identified Ronald Cotton as her attacker. Her compelling eyewitness account sent Ronald Cotton to prison for life. One year later a new trial was ordered. Another man in the same prison as Mr. Cotton, Bobby Poole, had apparently been bragging about the rape. During the second trial Jennifer was asked if she had ever seen Bobby Poole before. She answered "I have never seen him in my life." Ronald Cotton was again convicted of the crime. Eleven years after Mr Cotton’s first conviction, DNA evidence exonerated him of the rape. Bobby Poole was found to be her actual attacker. (Thompson, 2000, June 20)

The Cross-Race Effect (CRE; see Meissner & Brigham, 2001), as illustrated above, describes the tendency for people to be better at recognizing individual own-race members than they are at recognizing individuals belonging to a racial outgroup. Typical CRE studies utilize a paradigm in which participants first view own and other race faces; later, these ‘old’ faces are shown again mixed with ‘new’ faces. Recognition accuracy is measured by participants indicating whether or not they have seen each face previously. An influential study by Malpass & Kravitz (1969) had Whites view twenty slides of White and Black faces. Later, these faces were mixed with sixty new faces, and participants were asked to answer either ‘yes,’ if they recognized the face, or ‘no,’ if they did not recognize the face. Whites recognized White targets significantly better than
Black targets. This differential effect of recognizing ingroup members better than outgroup members is a robust pattern that has been replicated many times throughout the last four decades (Meissner & Brigham, 2001).

**Social Categorization and Cross-Group Recognition**

Much of the research on the CRE has focused on the perceptual expertise hypothesis that posits differential recognition of ingroup and outgroup members is due primarily to disparities in level of expertise with other racial groups. Most commonly the hypothesis focuses on racial segregation, or lack of contact, as the cause of poor cross-race recognition (e.g., Brigham & Malpass, 1985). Although there is some evidence for the perceptual expertise hypothesis (Meissner & Brigham, 2001), results are inconsistent (e.g., Ng & Lindsay, 1994), and some findings cannot be explained by this premise. For example, studies have found non-race recognition deficits for groups like gender (Wright & Sladden, 2003; Going & Read, 1974; Vokey & Read, 1988) and age (Anastasi & Rhodes, 2006; Wright & Stroud, 2002; Fulton & Bartlett, 1991), where cross-group exposure is more frequent. Thus, despite a considerable amount of investigation, the role of perceptual expertise in the CRE remains unclear.

More recently developed explanations for the CRE focus on cognitive processes that result from social categorization. Sporer’s (2001) ingroup/outgroup model of face processing, Hugenberg, Miller and Claypool’s (2007) categorization-individuation model, and Levin’s (1996, 2000) feature-selection model all suggest the CRE is due to differential processing of ingroup
and outgroup faces. For faces categorized as ingroup, we “individuate”—look for idiosyncratic features that distinguish one individual from another. When we look at outgroup faces, however, we tend to focus on their similarity to stereotypical expectations for the outgroup category (Levin, 2000). Thus, ingroup faces are processed in a way that aides recognition of individual group members, but outgroup faces tend to be processed in a way that impairs recognition of individual outgroup members.

To illustrate, Bernstein et al. (2007; study 2) provided White participants with false feedback that they had either a “red” or a “green” personality type. Target faces (all White Americans) were then displayed on either a red or a green background ostensibly indicating the target’s group membership. As predicted, participants remembered ingroup targets significantly better than outgroup targets. Because participants had no prior experience with either the ingroup or the outgroup category, these results demonstrate that differential expertise is unnecessary to produce a cross-group recognition effect.

Shriver et al. (2008) further established the relationship between categorization and differential recognition. Basing their assumptions on the categorization-individuation model (Hugenberg et al., 2007), Shriver et al. hypothesized recognition would be worse for targets perceived as outgroup, by race or by school, than for targets perceived as ingroup. Thus, only White school ingroup targets would be individuated. Several studies were conducted in which White participants viewed and later attempted to recall Black and White targets. In the first study, target ingroup and outgroup faces were simultaneously paired
with either a wealth-implying ingroup stimulus photo (e.g., a large home) or a poverty-implying outgroup stimulus photo (e.g., trailer park). A cross-race effect was found in which ‘wealthy’ White ingroup targets were better recognized than ‘wealthy’ Black ingroup targets; poor target recognition was found for both White and Black targets paired with poverty-implying photos. In a second experiment, White participants viewed Black and White targets ostensibly affiliated with either an ingroup university or an outgroup university. Similar to the first study, White ingroup targets (schoolmates) were recognized significantly better than Black school ingroup targets; recognition of both White and Black school outgroup targets was poor in comparison with White ingroup targets. Thus, the results of Shriver et al. (2008) are consistent with the view that categorizing faces as outgroup—based on race or other categories—results in impaired recognition.

**Individuation: Comparisons to the Category Prototype**

clearly, categorization and its associated processes play a role in differential recognition of individual ingroup members and outgroup members. However, I argue that whether individuation improves or impairs recognition depends on how targets are individuated. Typical descriptions of individuation mention treating targets according to ‘unique traits’ and ‘individual characteristics’ (Hugenberg et al., 2007; Shriver et al., 2008; Bernstein et al, 2007). However, when we individuate people, how do we know in what ways to individuate them or what details to attend to? Without some standard of what to expect from most (ingroup) faces, how can observers tell what features are redundant with others
and what features are idiosyncratic? Certainly, we don’t individuate people in a vacuum; we individuate them based on how they differ from the prototype of a contextually relevant shared social category (Turner et al., 1987; Rosch, 2000; also see Anthony, Copper & Mullen, 1992; Levin, 1996; 2000). A prototype is the ‘best example’ or clearest case of category membership as a whole (Rosch, 2002; also see Oakes, Haslam & Turner, 1998). Importantly, a number of studies have shown that an ingroup prototype acts as a reference point for perceiving and evaluating ingroup members based on their prototypicality level (e.g., Hogg & Hardy, 1991; Mummendey & Wenzel, 1999). Indeed, research that focuses on the evaluation of ingroup members suggests that the more a member embodies the group prototype, the more that person will be positively evaluated by other group members (e.g., Hogg & Hardie, 1991; 1992; Mummendey & Wenzel, 1999). It stands to reason that a reliance on a comparative prototype when evaluating and comparing ingroup members is also an important factor in face recognition. Therefore, I argue that individuation (and its effects) can only be understood if one takes into account the prototype used.

One example of how the comparative standard used alters the effect of individuation on recognition is a recent study by Hugenberg et al. (2006) which suggests that asking people to individuate ingroup and outgroup members increases recognition. White participants were exposed to a typical recognition paradigm employing Black and White target faces in one of two conditions. Participants in the ‘individuation’ condition were told to “…do your best to try to pay close attention to what differentiates one particular face from another face of
the same race, especially when that face is not of the same race as you…” in comparison to a control group who received no instructions (p. 337, emphasis added). Participants in the ‘motivation’ condition saw the same set of instructions but the qualifier, “of the same race…” was not included (Hugenberg et al., 2007, p. 338). Own-race and other-race faces were recognized equally well in the first condition while a typical CRE was shown in the control group. In the second condition by contrast, not specifying participants to differentiate faces based on race resulted in a typical CRE in both the experimental and the control group.

Essentially, by asking participants to ‘differentiate one particular face from another of the same race’ in the individuation condition, participants were asked to not only use a White prototype to make distinctions between White faces but also to use a Black prototype when making distinctions between Black faces—what makes them different from each respective prototype. As a result of focusing on unique facial aspects in relation to the relevant prototype, recognition of Black targets increased. In the second condition, participants were given no special instructions regarding how to individuate the faces, and a typical CRE emerged. Thus, Hugenberg et al.’s (2007) individuation instructions in the first condition are not just getting persons to pay closer attention to what differentiates racial outgroup members but rather persons are being asked to compare racial outgroup members to the prototype most representative of the stimulus set (i.e., the ethnic outgroup prototype).

A similar effect is shown in a study testing the effects of short-term training on the CRE. Hills and Lewis (2006) trained White participants for one-hour to
focus on either the facial features that Whites use when differentiating between White faces (eyes, hair style) or the facial features Black’s reportedly use when differentiating between Black faces (chin, nose, mouth, cheeks); a control group received no training. The study was conducted over three phases—a typical recognition paradigm with Black and White target faces, a training session, and a final recognition paradigm similar to the first. Training consisted of pre-exposure to a number of target faces—these faces acted as the standard in which observers were asked to compare additional faces containing varying degrees of attribute similarity (see Hills & Lewis, 2006, for a complete explanation). As predicted, Whites trained to focus on Black facial features showed comparable performance on Black and White target faces but Whites trained in the White feature condition, and Whites who received no training, showed a typical CRE.

Combined, these studies make clear that focusing one’s attention on a helpful standard with which to compare target features aided in recognition. In contrast, when no training instructions were given regarding a “Black” prototype, or when observers were trained to focus on “White” prototypical features, recognition of Black target faces was impaired. In short, a White prototype was not as helpful for comparing Black target features leading to impaired recognition.

**Ingroup Identification, Prototypicality and Target Recognition**

In terms of categorization theory (e.g., Rosch, 2002), when discussing the role of the ingroup prototype (in relation to the individuation process) we must also consider the influence of identification with the category as a whole. The role
of ingroup identification is an essential aspect of the categorization process not addressed in previous CRE studies. Self-categorization theory (Turner et al., 1987) suggests we are more apt to categorize ourselves and others—and to make social comparisons based on those categorizations—when that category is an essential part of our self-concept (Turner et al., 1987). Importantly, identification with the ingroup increases perceptions of intergroup difference and intragroup similarity (see Turner et al., 1987 for a complete review). Thus, categorization allows us to identify the redundancies of the ingroup category and to individuate in terms of those redundancies. This is to say that knowing what is prototypical of the ingroup category helps us to individuate ingroup members by focusing on their unique traits and individual characteristics in relation to the ingroup redundancies (Levin, 1996; 2000). Categorization simultaneously helps make salient outgroup similarities in which we assimilate perceived outgroup members.

**Integrating Prototypicality and the Cross-Race Effect**

The objective of the current study is to integrate previous work on the cross-race effect with research on ingroup identification and individuation. It seems clear from the multitude of findings testing self-categorization theory (Turner et al., 1987) that as ingroup identification increases so too does the perception of intragroup similarity (in relation to intergroup difference). It is these category redundancies that form the category prototype—the standard in which to evaluate other ingroup members. In terms of facial recognition, I suggest
individuation aids recognition of prototypical ingroup faces by focusing attention on ‘unique traits’ and individual characteristics’ in relation to the prototype. For ingroup faces that are non-prototypical, however, individuation in terms of the prototype can impair recognition, as the prototype is not useful for filtering out redundancies with other faces, thus making it more difficult to locate and remember individual features that can aid in recognition.

For example, recall that Shriver et al. (2008; study 2) illustrated that recognition of White school ingroup targets was superior to Black school ingroup targets and Black and White school outgroup targets. One could argue that ‘Whiteness’ is likely seen as prototypical of the school ingroup at a mostly White school. As only White ingroup members are prototypical in relation to the ingroup prototype, recognition of White ingroup members is aided by individuation while recognition of all other targets for which the prototype is not as similar is impaired. I argue that recognition accuracy is not simply a case of individuating faces but rather individuating relative to a standard or prototype that reflects the redundancies in the individual faces being observed.

**Overview of the Current Study**

In this study I tested predictions concerning the influence of ingroup identification and category prototypicality on target recognition. White and Asian students from *Simon Fraser University* viewed a series of White and Asian male target faces. Each target face was superimposed with either the name of the ingroup school or, alternately, the name of an outgroup school. After a brief
distracter task, participants viewed old and new target faces and were asked to indicate if the target face was previously seen or not.

My primary hypotheses concern the relationship between ingroup school identification and target recognition. Self-categorization theory states that as ingroup identification increases so too does perceptions of intergroup difference (in relation to intragroup similarity; Turner et al., 1987). As such, I expect high ingroup identification to lead to outgroup assimilation and impaired recognition of outgroup school targets compared to school ingroup targets independent of participant race. As the ingroup prototype only applies to ingroup members, I do not expect high ingroup identification to lead to individuation of White and Asian school outgroup targets.

Self-categorization theory also states that the more central a particular group identity is to a person the more apt they will be to use the category prototype to compare other ingroup members (Turner et al., 1987). In the current study I assume that White is more prototypical of the ingroup than is Asian. Based on results from a pilot test with participants drawn from the same population as the main study, White students ($M = 4.16$ on a 1-7 scale, $N = 43$) perceived themselves as significantly more prototypical of the school ingroup than did Asian students ($M = 3.45$, $N = 80$), $p < .01$. Assuming that ‘White’ is more prototypical than “Asian” in this context, I hypothesize high ingroup identification will lead to better recognition of prototypical (White) school ingroup targets. I further argue that the increased use of a White prototype will impair recognition of Asian ingroup targets. As Whites and Asians are assumed to hold
the same ingroup prototype in this context, recognition will be aided only for those targets that are relatively similar to the category prototype. As such, I anticipate high ingroup identification will lead to worse recognition of non-prototypical (Asian) ingroup members by both Whites and Asians.

The current study adopts much of its procedure from Shriver et al. (2008, study 2). Shriver and associates hypothesized an interaction effect in which recognition differences would be greater between school ingroup targets than between school outgroup targets. Essentially, for both studies it was expected that recognition would be impaired for any members perceived as outgroup. These hypotheses were based on the categorization-individuation model (CIM; Hugenberg et al., 2006) in which individuation aids in ingroup member recognition while categorization impairs outgroup member recognition. Accordingly, if individuation is simply a matter of focusing on ‘unique traits’ and ‘individual characteristics’ (not in relation to a prototype) increases in school ingroup identification would be expected to increase individuation of all school ingroup members regardless of race.

A perceptual expertise hypothesis on the other hand would expect differential recognition of racial ingroup and outgroup targets by both Asian and White observers independent of differences in school label. As such, Whites would be expected to recognize White targets better than Asian targets and Asians would be expected to recognize Asian targets better than White targets independent of school affiliation. Furthermore, there is no reason to expect
moderation by school ingroup identification from the perceptual expertise point of view.
METHOD

Participants and Design

Sixty-five male Asian (N = 33) and Caucasian (N = 32) introductory psychology students from Simon Fraser University were recruited to take part in a “Face Perception” study and given course credit. Participant ages ranged from 17 to 24 years (M = 19.2). Participants gave informed consent before beginning the study. As ingroup identification increases the use of the category prototype as a standard for individuating ingroup members, I will test the relationship between ingroup identification and recognition of each of the four target types, as well as the effect of participant race and the interaction between the two.

Materials

Forty-eight Caucasian and Asian young adult male faces identified as highly prototypical of their racial groups were used as stimulus targets. The purpose of using highly prototypical targets was to ensure that target faces were perceived as members of their racial category.

Pilot Test

Target racial group prototypicality ratings were collected during a pilot test in which forty-one male and female introductory psychology students ranging in age from 17 to 49 (M = 20.49) viewed one-hundred and twenty 10.16 x 12.65 cm (59 pixels/cm) full-colour head-and-shoulder photographs randomly presented
via MediaLab. Using a digital imaging program, all stimulus targets were standardized such that each target person was wearing a burgundy-coloured sweatshirt standing in front of a grey background. All targets were presented with neutral expression so as to avoid facial expression variability (e.g., smiling; Baudouin, Gilbert, Sansone, & Tiberghien, 2000). Familiarity cues such as eyeglasses, jewellery, facial hair and facial blemishes were also absent. Each target face was shown for 25s during which participants identified the apparent ethnicity of the target face (Asian, Caucasian or Other) and indicated how prototypical or representative each target face was of that apparent ethnicity. For each target, prototypicality ratings ranged from 1 (Not prototypical) to 7 (Very prototypical). Mean target prototypicality ratings were 5.28 and 5.19 for the forty-eight Asian and Caucasian targets (24 of each race) chosen for the current study. On average, the chosen Caucasian faces were correctly categorized as Caucasian by 89% of participants; the chosen Asian faces were correctly categorized as Asian by 98% of participants.

**School Affiliation**

Each target person appeared with a 10.16 x 1.3 school label (SFU or UBC) superimposed at the top of each target photo (see Appendix). The Simon Fraser University logo appeared on a red background along with the full name of the university in red lettering on a White background. The UBC label appeared on a blue background with the university name in blue lettering on a White background. Red and blue are the official colours of each respective school.
Procedure

At the beginning of each experimental session a group of up to seven participants were seated at computers in separate cubicles. The instructions delivered via computer screen stated that participants would be shown a series of facial photographs of male students attending either *Simon Fraser University* or the *University of British Columbia* and that a label identifying the school that person attended would be affixed to each photograph. Participants were asked to pay close attention to each face as they may be asked about those faces at a later time.

To increase the salience of the university category, participants were told that the study was also being conducted with students at the *University of British Columbia* and that the aim of the study was to explicitly compare the performance of SFU and UBC students. These kinds of intergroup comparisons have been used in past research to successfully raise the salience of group identity (see Schmitt, Silvia, & Branscombe, 2000; Kramer & Brewer, 1984). Participants were then asked to identify the university they were currently attending.

There were two phases to the current study. In the initial study phase participants viewed stimulus target faces randomly presented on a computer screen by means of *MediaLab*. Three stimulus target sets were fully counterbalanced between target ethnicity and school affiliation wherein each target was equally likely to appear with an ingroup or outgroup school affiliation and just as likely to be seen or not seen during the test phase and study phase.
Stimulus target set did not significantly moderate any of the effects reported below (p’s > .21), and will therefore not be discussed further. Sixteen SFU, and Sixteen UBC target faces were displayed for 3s each with a 1s delay between stimuli. To avoid recency effects, participants were given a five minute synonym/rhyme generating distracter task following the study phase.

In the test phase, participants were presented with sixteen previously viewed target faces (without university labels)—8 target persons of each race per school—along with sixteen previously unseen target faces. As per Vokey and Read (1988), participants were asked to indicate target recognition by specifying either ‘Old’ indicating that the target appeared in the study phase, or ‘New’ if the target had not been seen before. Each target face remained on the screen until a decision had been made (\(M = 2.04\)s; \(SD = 0.53\)) in which case the next target face would appear.

Following completion of the test phase, participants completed a measure of ingroup school identification based on the 4-item centrality subscale of Cameron’s (2004) *Three-Factor Model of Social Identity* (\(\alpha = .83\)). The measure consisted of the following items: (1) I often think about the fact that I am an SFU student, (2) Overall, being an SFU student has very little to do with how I feel about myself (reversed), (3) In general, being an SFU student is an important part of my self-image, and (4) The fact that I am an SFU student rarely enters my mind (reversed). Responses ranged from 1 (strongly disagree) to 6 (strongly agree). Finally, participants provided demographic information (e.g., age) and
were then fully debriefed. No participants indicated any suspicion as to the true purpose of the study.
RESULTS

Overview

Within Signal Detection Theory (MacMillan & Creelman, 1995), recognition accuracy is tested with a sensitivity parameter, such as $d'$. Sensitivity ($d'$) scores are created by subtracting the standardized proportion of ‘False Alarms’ (mistaken recognition of new targets) from the standardized proportion of ‘Hits’ (correct recognition of previously seen targets; MacMillan & Creelman, 1995). Thus, higher sensitivity scores reflect more accurate differentiation between ‘old’ target faces and ‘new’ target faces. In the current study, separate $d'$ sensitivity parameters were calculated: White SFU, Asian SFU, White UBC, and Asian UBC.

In the test phase of the current study, both ‘old’ and ‘new’ targets appeared without a school label. Because “old” faces appeared with a school label in the study phase, hit rates were calculated by both target race and target school. However, I could not calculate separate false alarm rates depending on target school, as the new targets essentially had no school group membership. Thus, following Shriver et al. (2008, Study 1), for each of the four target types I calculated $d'$ by using a false alarm score based on the target’s race only. In sum, the hit rates differed by both race and school while the false alarm rates differed by race only.
Preliminary Analysis

Before testing the hypotheses concerning ingroup identification, I first examined the effects of participant race, target race, and target school on recognition in order that I may better compare the results of the current study to the findings of Shriver et al. (2008). The four $d'$ sensitivity scores were submitted to a $2 \times 2 \times 2$ mixed measures analysis of variance (ANOVA). As shown in Figure 1, target race and participant race interacted to predict recognition, $F(1, 63) = 4.18, p = .045$. White participants recognized White targets better ($M = 2.33$, $SD = 1.54$) than Asian targets ($M = 1.57$, $SD = 1.28$), $t(32) = 2.45, p = .02$. In contrast, Asian participants tended to remember Asian targets ($M = 2.27$, $SD = 1.21$) better than White targets ($M = 1.97$, $SD = 1.06$), but not significantly so, $t(33) = -1.08, p = .29$. Comparing participant groups, White participants ($M = 2.33; SD = 1.54$) and Asian participants ($M = 1.97; SD = 1.06$) did not differ in recognition of White targets, $t(55) = -1.11, p = .27$, Asian participants ($M = 2.27; SD = 1.21$) and White participants ($M = 1.57; SD = 1.28$) did differ in recognition of Asian targets, $t(63) = 2.25, p = .03$. Although weaker for Asian participants, these results replicate the CRE (Meissner & Brigham, 2001).
No main effect of target race was found, $F(1, 63) = 1.24, p = .27$; and target race did not interact with target school affiliation, $F(1, 63) = .00, p = .96$. Counter to previous findings, school outgroup targets ($M = 1.46$) were recognized marginally better than school ingroup targets ($M = 1.30$), $F(1, 63) = 3.803, p = .056$. This difference was qualified by a 3-way interaction between target school, target race, and race of participant, $F(1, 63) = 6.09, p = .016$. I decomposed this interaction by conducting separate analysis for White and Asian participants.
For White participants, main effects were significant for both target race and school, \( p = .038, p = .011 \). However, these main effects were qualified by a marginal two-way interaction in which a stronger cross-race effect was found for ingroup faces than outgroup faces, \( F(1, 31) = 3.12, p = .087 \). Asian school ingroup targets were recognized worse \( (M = .88, SD = 0.95) \) than White school ingroup targets \( (M = 1.52, SD = 1.15), t(32) = 2.74, p = .01, \) but Asian school outgroup targets \( (M = 1.39, SD = .97) \) and White school outgroup targets \( (M = 1.62, SD = 1.03) \) were not differentially recognized, \( p = .32 \). White participants recognized Asian school outgroup targets better than Asian school ingroup targets, \( t(32) = -3.12, p < .01 \), while White school ingroup and outgroup targets were not differentially recognized, \( t(32) = -.65, p = .52 \).

For Asian participants, a similar marginal two-way interaction emerged between target race and target school, \( F(1, 32) = 3.00, p = .093 \). Results revealed that a marginal cross-race effect was found in which Asians recognized Asian school ingroup targets \( (M = 1.58, SD = 0.92) \) better than White school ingroup targets \( (M = 1.24, SD = 0.77), t(33) = -1.71, p = .098 \), compared with no differential recognition between Asian \( (M = 1.38, SD = .99) \) and White \( (M = 1.46, SD = .94) \) school outgroup targets, \( p = .74 \). No other comparisons were found to be significant (Table 1). Neither main effect was significant \( (p’s > .5) \). Thus, for both White and Asian participants a cross-race effect was more apparent for school ingroup targets than outgroup targets, replicating the findings of Shriver et al. (2008). The results of the current study differ however from those of Shriver et al. in terms of overall recognition of school outgroup targets. School outgroup
targets in the current study were recognized equivalently with White school ingroup members while school outgroup members in Shriver et al. were recognized on par with Black school ingroup members.

Table 1.

Paired-Samples T-Tests of Participant Race and Target Recognition

<table>
<thead>
<tr>
<th>P. Ethnicity</th>
<th>Pair</th>
<th>Variable</th>
<th>MD</th>
<th>SD</th>
<th>df</th>
<th>t</th>
</tr>
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<td>1 SFU White-SFU Asian</td>
<td>-.34&lt;sup&gt;1&lt;/sup&gt;</td>
<td>1.15</td>
<td>32</td>
<td>-1.707</td>
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<td>2 UBC White-UBC Asian</td>
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<td>1.43</td>
<td>32</td>
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<td>3 SFU White-UBC White</td>
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<td>0.91</td>
<td>32</td>
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<td></td>
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</tr>
<tr>
<td>4 SFU Asian-UBC Asian</td>
<td>.20</td>
<td>1.04</td>
<td>32</td>
<td>1.089</td>
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<td></td>
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<tr>
<td>White</td>
<td>5 SFU White-SFU Asian</td>
<td>.64**</td>
<td>1.33</td>
<td>31</td>
<td>2.735</td>
<td></td>
</tr>
<tr>
<td>6 UBC White-UBC Asian</td>
<td>.24</td>
<td>1.31</td>
<td>31</td>
<td>1.021</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 SFU White-UBC White</td>
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<td>0.90</td>
<td>31</td>
<td>-0.646</td>
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<td></td>
</tr>
<tr>
<td>8 SFU Asian-UBC Asian</td>
<td>-.51**</td>
<td>0.92</td>
<td>31</td>
<td>-3.116</td>
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</table>

Note. **p < .01, 1 p < .1.

Ingroup Identification as a Predictor of Target Recognition

Of key importance in this study was the influence of ingroup identification on target recognition. From the tenets of self-categorization theory (Turner et al., 1987) we predicted that ingroup identification, independent of participant race, would predict target recognition. Accordingly, a hierarchal multiple regression analysis was conducted to evaluate how well participant race, ingroup identification and the two-way interaction between participant race and ingroup identification predicted target recognition. To examine the zero-order relationship between ingroup identification and recognition, we entered just ingroup identification as a predictor in Block 1. In Block 2 we included ingroup
identification, participant race and the interaction between participant race and ingroup identification. For none of the four targets did participant race significantly moderate the relationship between ingroup identification and target recognition.

**Figure 2.**

*Ingroup Identification and Recognition of School Ingroup and Outgroup Targets Controlling for Race and the Interaction between Race and Ingroup Identification*

Participant race did not predict White school ingroup (SFU) target recognition (Table 2). However, in line with predictions high ingroup identification led to better recognition of White school ingroup targets (Figure 2). In contrast, high ingroup identification led to impaired recognition of Asian school ingroup
targets. Asian school ingroup targets were recognized more poorly by Whites than by Asians even when controlling for ingroup identification.

**Table 2.**

*Hierarchal Multiple Regressions of Participant Race, School Ingroup, Ingroup Identification and the Interaction Predicting Target Recognition*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Prediction</th>
<th>b</th>
<th>SE b</th>
<th>p-value</th>
<th>R²</th>
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<td><strong>White SFU</strong></td>
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<td>.11</td>
<td>.041</td>
<td>.065</td>
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<tr>
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<td>.046</td>
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<td></td>
<td>P. Ethnicity (P)</td>
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<td>.12</td>
<td>.392</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I x P</td>
<td>-.08</td>
<td>.11</td>
<td>.453</td>
<td>.085</td>
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<td>.11</td>
<td>.021</td>
<td>.082</td>
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<tr>
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<td>P. Ethnicity (P)</td>
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<td>.009</td>
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<td></td>
<td>I x P</td>
<td>.00</td>
<td>.11</td>
<td>.997</td>
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<td>I x P</td>
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<td>.12</td>
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<td>Ingroup ID</td>
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<td>.064</td>
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*Note.* Hierarchal Regression with only ingroup identification as a predictor in Model 1 and ingroup identification, participant race and the interaction between participant race and ingroup identification as predictors in Model 2.
As shown in Table 2, recognition accuracy for White UBC targets was not predicted by either participant race or ingroup identification. For Asian UBC targets no main effect of participant race was found. However, as ingroup identification increased, UBC Asian target recognition decreased. Thus the expectation that ingroup identification would decrease recognition of school outgroup targets was only confirmed among Asian outgroup targets. Further testing, however, revealed that ingroup school identification had a marginal, negative relationship with outgroup school recognition averaged across target race, $b = .15$, $t(61) = 1.86$, $p = .07$.

Finally, I tested whether the relationship between ingroup identification and recognition differed between targets. To achieve this I used the four zero-order correlations between ingroup identification and recognition for each target type. Identification’s relationship with recognition of White ingroup targets differed significantly from identification’s relationship with recognition of the other three target types: SFU-Asian $t(62) = 3.44$, $p < .001$, UBC-White, $t(62) = 2.96$, $p = .002$, and UBC-Asian, $t(62) = 2.79$, $p = .003$. Identification’s relationship with recognition of Asian ingroup targets did not differ significantly from identification’s relationship with recognition of the other two target types: UBC-White, $t(62) = 1.44$, $p = .92$, UBC-Asian, $t(62) = .37$, $p = .64$. Similarly, UBC-White did not differ significantly from UBC-Asian, $t(62) = .98$, $p = .37$. Thus, the differences in slopes for White ingroup targets and for all other targets suggests that the White ingroup prototype only aided recognition for White ingroup targets. Therefore, these results suggest that ingroup identification is only helpful for recognition of
prototypical ingroup members, but lowers recognition of non-prototypical ingroup members and outgroup members.
DISCUSSION

Key Findings

This study tested predictions concerning the influence of ingroup identification on recognition of prototypical and non-prototypical ingroup members; it is the first study to my knowledge to show a relationship between ingroup identification and any recognition effects. As expected, high ingroup identification aided recognition of prototypical school ingroup members (Whites) and impaired recognition of non-prototypical school ingroup members (Asians). These results were consistent for both White and Asian observers. Thus, comparison to the White school ingroup prototype aided recognition of White school ingroup members but impaired recognition of Asian school ingroup members.

Additionally, as predicted, high ingroup identification did not lead to differential recognition of White and Asian school outgroup members. As the school ingroup prototype was relevant only for school ingroup member comparisons, recognition of school outgroup members was not differentially affected. In short, results from the current study suggest that high ingroup identification increased reliance on the school ingroup prototype as a comparative standard—recognition was aided for prototypical school ingroup members while it was impaired for less prototypical school ingroup members.
School outgroup members were not individuated as the school ingroup prototype was not a helpful standard in which to compare.

This study adds to the social cognitive literature first by supporting the assumptions of self-categorization theory (Turner et al., 1987), which suggests that identification with a particular category not only increases the tendency to use that category to make social comparisons but also to use an ingroup prototype as a standard with which to compare other ingroup members (Turner et al., 1987). Secondly, the results of the current study help support prior findings that individuation aids in ingroup member recognition (e.g., Levin, 1996; 2000; Sporer, 2001; Hugenberg et al., 2007). Most importantly, the current study helps to clarify the individuation process by showing, preliminarily, that recognition of ingroup members is aided by individuating people in relation to a contextually relevant ingroup prototype.

**Research on Cross-Group Recognition**

The results of the current study have implications for how we understand and interpret prior work. That we individuate persons in comparison to a contextually relevant prototype seems clear. Although individuation may be a relatively new concept in relation to the cross-race effect, the current findings suggest that much of this prior work may be reframed in terms of comparison to an ingroup prototype. To begin, the majority of work testing the CRE was conducted in the United States. As such, many CRE studies have focused on Whites recognition of White and Black faces. Not surprisingly, the majority of
these studies show that White target faces are recognized significantly better than Black target faces (Meissner & Brigham, 2001; Anthony et al., 1992; Bothwell, Brigham & Malpass, 1989). Notably, a number of studies have illustrated that, when tested together, Black and White observers recognize White faces equivalently well (Anthony et al., 1992; Bothwell et al., 1989).

Comparable recognition of White faces by both Black and White observers is the expected pattern if ‘White’ is the agreed upon comparative prototype. Recently, Devos and Banaji (2005) have shown that White is the prototype equated with ‘American.’ Thus, if White is the ‘American’ prototype then it is understandable that prototypical (White) targets would be recognized well by both prototypical (White) and non-prototypical (Black) observers. The use of an ‘American’ prototype is especially probable when we consider that the majority of target faces used in prior CRE studies were shown without context. Given what we know about the categorization process, it is clear that context is essential for group comparisons (Turner et al., 1987). As such, observers likely relied on a default ‘American’ prototype as a comparative standard.

Importantly, the fact that ingroup members—independent of race—recognize White target faces equivalently suggests there must first be agreement as to the category prototype itself. For example, if within a shared category Blacks considered Blacks more prototypical and Whites considered Whites more prototypical, a typical CRE pattern would be evident. That a cross-race effect is often not the case when Blacks observe White targets may be a reflection of the social reality constraints that exist in American society in which one group
(Whites) holds a higher status position than other racial groups (e.g., Moghaddam, 2003). In this regard, lower status groups are constrained by the realities of the social world around them; although they may desire their group to be highly prototypical of a particular social category a higher status group is typically regarded as most representative of the category. As a result attention is drawn to the category member most similar to the category prototype thus aiding recognition independent of race.

Perceptual Expertise

Much of the CRE literature has focused on the perceptual expertise hypothesis as the underlying mechanism for differential ingroup-outgroup recognition effects. One basic assumption of this premise is that a lack of social contact makes it difficult to distinguish between other race members. Although a cross-race effect was found in the current study for the school ingroup, no differential recognition effects were found for the school outgroup targets. It is clear then that the perceptual expertise hypothesis, in its simplest form, does not help explain the findings of the current study nor a variety of others (e.g., Bernstein et al., 2007). That does not mean, however, that perceptual expertise has nothing to contribute. On the contrary, some findings suggest that expertise or familiarity with a racial outgroup can lead to better cross-race recognition. However, I argue that it is not expertise alone but rather expertise with a contextually relevant ingroup prototype with which to compare that actually aids in recognition. For example Dunning, Li, & Malpass (1994) illustrated that White
basketball ‘fans’ showed no cross-race effect when viewing Black target faces compared to White basketball ‘novices’ who showed a typical CRE with the same target faces. Because of their expertise and familiarity with Black basketball players, White basketball fans were shown to recognize Black targets no worse than Black participants did.

Other studies have found that the relevant group prototype can be learned through short-term training. Goldstein and Chance (1985) found that with only three hours of training spread out over several weeks the CRE was eliminated. Other studies have shown that the CRE can be removed, if for only a short while, with a single hour-long training session (Elliot, Willis & Goldstein, 1973; Lavakis, Buri, & Mayzner, 1976; Malpass, Lavigueur, & Weldon, 1973). As previously mentioned, a more recent study by Hills and Lewis (2006) trained White participants for one-hour to focus on the facial features of Black targets that Black participants tend to use to recognize Black faces. In essence White participants were asked to focus on a Black prototype in which to compare Black faces. As a result Whites recognized Black faces on par with White faces—an elimination of the CRE. These results suggest that expertise or familiarity with the relevant group prototype aids in recognition.

Similar results have been found in which expertise aids in recognition of non-face stimuli. For example, Myles-Worsley, Johnston and Simons (1988) looked at the proficiency of recognizing abnormal chest x-rays between novices with no experience reading chest x-rays and radiologists with four or more years of experience reading chest x-rays. Similar to procedures used in prior CRE
In group Identification and Target Prototypicality

studies, an initial study phase was used in which participants were shown a series of normal chest x-rays, abnormal chest x-rays, and target faces; later these stimuli were shown again mixed with new stimuli and participants indicated if they had seen them before or not. Results revealed that radiologists were very good at recognizing previously seen abnormal chest x-rays compared to novices. Thus, as radiologists have a clear prototype of a normal chest x-ray they are much better at noticing variability than novices who are still learning what the prototype really is (Myles-Worsley et al., 1988). Well developed knowledge of a prototype allows one to focus outside of the prototype to what is atypical—for radiologists this means focusing on things that would be most diagnostic of disease. Importantly, target faces were recognized equally well by both radiologists and novices, illustrating that radiologists are not simply better at recognition but rather they are better at recognition of stimuli for which they have a clearer, more developed prototype.

These studies make clear that recognition is dependent on the use of a contextually relevant prototype with which to compare. This is an essential point that bears repeating. A prototype is only helpful if it is contextually relevant to the group being compared. As alluded to by Hugenberg et al. (2007), who asked participants, to “pay close attention to what differentiates one particular face from another face of the same race” (p. 337), directing a person to use a contextually relevant prototype—a Black prototype for a Black face—increased recognition. When no special instructions were given however, a typical cross-race effect was
shown. Therefore, recognition occurs when the ‘right’ prototype is used in the ‘right’ context.

**Future Directions**

In this study I found that high ingroup identification aided recognition through individuation and reliance an ingroup prototype as a comparative standard. However, prototypicality was not directly measured in the current study. Therefore it is important for future studies to incorporate a direct measure of ingroup prototypicality. Such a measure would be expected to be linearly related to ingroup target recognition wherein the more one ascribes to a particular ingroup prototype the better one would recognize target faces that better match the prototype than target faces that do not.

Importantly, the results of the current study suggest that recognition impairment is the result of a target’s low prototypicality in comparison to the ingroup prototype. The dissimilarity between the target and the prototype may be enough to impair recognition without perceiving members as part of an outgroup. It is yet unclear however, whether poor recognition is the result of comparison to a dissimilar ingroup prototype or the assimilation effects of outgroup categorization. This distinction is important; individuating certain ingroup members using a prototype they don’t match is different from categorizing them as outgroup and failing to individuate them altogether. However, the fact that highly identified Asians showed impaired recognition of Asian ingroup targets is supportive of the former as it is improbable that Asian SFU students perceive
other Asian SFU students as belonging to an outgroup. Nevertheless, as these processes are not easily distinguished in terms of effects of recognition, future studies must do more to tease apart these differential processes.

Applications

Research in this area, particularly the cross-race effect, developed initially out of a need to understand the fallibility of eyewitness memory (e.g., Malpass & Kravitz, 1969). According to the Innocence Project (2008), the single greatest cause of wrongful conviction is eyewitness misidentification. Of the 217 overturned convictions so far as a result of DNA exoneration in the United States, 75% of those convictions were the result of poor eyewitness memory. Importantly, of 180 of these cases where race of eyewitness and defendant were known, 78% of eyewitness misidentifications were by Whites while only 14% were by Blacks. In contrast, 61% of the defendants were Black; 72% if we consider all racial minorities.

Perhaps this imbalance is in part due to the tendency for Americans to see White as prototypical of Americans (Devos & Banaji, 2005). If “White” is the national prototype, the results of the current study imply that recognition of a White suspect will be aided while recognition of minority suspects may be impaired. Typically, impaired recognition of minority persons has been shown to lead to eyewitness misidentifications and wrongful conviction (Meissner & Brigham, 2001); if a prototype is not helpful as a comparative standard recognition will be impaired. As such, comparing minority suspects to a dissimilar
group prototype (White) may be a contributing factor to the high percentage of minority persons wrongfully convicted. From the current findings, one way to overcome the CRE may be for a witness to think in terms of comparison to a helpful standard. Thus the use of a helpful standard with which to compare may aid accuracy of descriptive information during police interviews and constructing suspect sketches.

Although the focus of the current study is on facial recognition, by no means should this suggest the phenomenon is restricted to faces. In fact, I believe these types of recognition effects would be found in other categorization processes and is in keeping with categorization theory in general (Turner et al, 1987; Rosch, 2002). Further, it is probable that we would find the same prototypicality effects that were found in the current study for other category types when one group is more prototypical than another group. For example, individuals’ attitudes and beliefs similar to the ingroup prototype may be better remembered than attitudes and beliefs dissimilar from the ingroup prototype. Issues such as these have implications for which group members have the power to influence the group and which do not.

**Conclusions**

This study supports recent findings that the cross-race effect is a product of social cognitive processes. In particular, this study supports prior findings that individuating ingroup members aids in face recognition. Importantly, my findings suggest that individuation alone is not enough. Rather, it is individuation in
relation to an ingroup prototype that allows one to identify unique facial attributes that aid recognition. One aspect that sets this study apart from prior studies in this area is that facial recognition was found to be increased by how central or important ingroup category membership was to the perceiver. As such, results of this study showed that high ingroup identification increased recognition of prototypical ingroup members (Whites) and decreased recognition of non-prototypical ingroup members (Asians)—this effect was consistent for both prototypical and non-prototypical observers. The implication of this finding is that impaired recognition is not always a product of outgroup categorization but can also result from using a comparative standard that is not as useful for less prototypical members.
REFERENCES


APPENDIX.

TARGET PERSON EXAMPLES

Source. Asian target photo used by permission Dr. Steve Lindsay, University of Victoria; Caucasian target photo used by permission Dr. Christian Meissner, University of Texas at El Paso.