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Canadian Journal of Behavioural Science
2008, Vol. 40, No. 1, 52–57

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0008-400x/08/$12.00 DOI: 10.1037/0008-400x.40.1.52

Examining the Cross-Race Effect in Lineup Identification Using Caucasian and First Nations Samples

Luke B. Jackiw, Katherine D. Arbuthnott, and Jeffrey E. Pfeifer
University of Regina

Jessica L. Marcon and Christian A. Meissner
University of Texas at El Paso

This study examined whether findings from research on the cross-race effect (CRE) in eyewitness memory with Caucasian–Black samples can be generalised to Caucasian–First Nations pairings in a lineup identification task. This study used a novel approach to investigate the CRE, using six targets, as well as simultaneous lineups that included both target-present and target-absent arrays. This study also addressed the efficacy of the contact hypothesis as it applies to these populations. A significant CRE was discovered. Furthermore, both Caucasian and First Nations participants were more likely to choose from the lineup when attempting to recognise First Nations faces than when attempting to recognise Caucasian faces. Contact with the other race had no effect on recognition accuracy of that race. Potential implications and directions for future research are discussed.

Eyewitness identifications are regarded as one of the most important methods in apprehending criminals and are often considered direct evidence of guilt (Wells et al., 1998). It has been argued, however, that the reliability of eyewitness identifications is open to debate under certain conditions, even when the eyewitness is confident about his or her belief (see Smith, Lindsay, & Pryke, 2000; Sporer, Penrod, Read, & Cutler, 1995). For example, in a review of 28 wrongfully convicted individuals, Conners, Lundregan, Miller, and McEwen (1996) discovered that 79% of the cases involved eyewitness identifications that supported the false conviction. More recent estimates from the first 130 cases of DNA exoneration support this trend, because 78% of these cases involved mistaken eyewitness identification (Innocence Project, 2006). A similar trend has been documented in Canada (FTP Heads of Prosecutions Committee Working Group, 2004). The actual reasons for these misidentifications are unknown but could include actual misidentification, motivated deception, and faulty or biased procedures, among others. Given the importance of eyewitness testimony, it is, therefore, vital that factors leading to mistaken identification be understood to the fullest.

Research on eyewitness identification has generally distinguished between two types of variables that can influence identification performance: namely estimator variables and system variables (Wells, 1978). A great deal of research has focused on system variables (i.e., those variables that can be controlled by the justice system, such as lineup size, instructions to witnesses, and lineup presentation format; see Wells & Olson, 2003). In contrast, fewer studies have sought to understand estimator variables (i.e., those present during the eyewitness situation that cannot be manipulated by law enforcement, such as arousal levels and exposure time; Wells, 1978). Estimator variables, however, are important for understanding the reliability of an identification given the circumstances surrounding the event. For example, studies have suggested that recognition accuracy increases with the more time an individual has to view the target (Reynolds & Pezdek, 1992), whereas increased delay between presentation and subsequent recognition of facial stimuli (Barkowitz & Brigham, 1982), the presence of a weapon (i.e., weapon focus; Steblay, 1992), and verbally describing the target (i.e., verbal overshadowing; Meissner & Brigham, 2001a; Schooler & Engstler-Schooler, 1990) have been shown to decrease recognition accuracy.

Another variable that is known to influence the accuracy of eyewitness identifications is the own-race bias or cross-race effect (CRE). The CRE occurs when individuals are more accurate at identifying photographs of someone of their own race than they are at identifying photographs of someone of another, less familiar race (see Meissner & Brigham, 2001b; Sporer, 2001). To date, research on the CRE has been conducted almost exclusively in the United States and has focused to a large extent on Caucasian–Black pairings. According to Meissner and Brigham (2001b), only 12% of the sample in their meta-analysis included participants whose race was other than Black or Caucasian. Across more than 30 years of research, the CRE has been shown to consistently produce a moderate effect, both in the laboratory (Brigham & Malpass, 1985; Chiroro & Valentine, 1995) and in field studies (Brigham, Maass, Snyder, & Spaulding, 1982; Platz & Hosch, 1988). Although it may be argued that the results of these studies provide insight into a number of basic underlying mechanisms regarding the impact of race on cognitive processing, there is at least some evidence from other psycholegal areas, such as mock juror racism studies, that direct generalisation of these results to other races or countries may be questionable at best. For example, although the majority of studies on mock juror racism are also based in the United States and primarily revolve around Caucasian–Black pairings (e.g., Pfeifer, 1990; Pfeifer & Ogloff, 1991), the results of this research are not directly applicable to a

We thank the individuals who aided in the construction of the lineups, who want to remain anonymous. We also thank two anonymous reviewers for their helpful comments on earlier drafts of this article.

Correspondence concerning this article should be addressed to Katherine D. Arbuthnott, University of Regina, Regina, Saskatchewan, Canada, S4S 0A2. E-mail: katherine.arbuthnott@uregina.ca

Canadian context, especially with regard to Caucasian–First Nations pairings (Pfeifer & Ogloff, 2003).

First Nations individuals comprise approximately 2% of the adult population in Canada but are highly overrepresented in the federal penal system, representing 18% of the incarcerated population (Trevethan, Moore, & Rastin, 2002). Within the prairie region of Canada (Alberta, Saskatchewan, and Manitoba), the disparity is even more pronounced, with 41% of all federally incarcerated offenders being First Nations, even though this group comprises only 6% of the prairie population (Trevethan et al., 2002). At the very least, it may be argued that this proportional differentiation indicates a significant level of First Nations interaction with the justice system, including the very real possibility of cross-racial eyewitness identification evidence having played a significant role in their convictions. As such, there is a clear need to examine the degree to which the CRE extends to a Canadian sample, especially within the context of Caucasian–First Nations pairings.

To our knowledge, only two published studies have examined the CRE using Canadian samples. Most recently, Corenblum and Meissner (2006) examined the effect within a basic recognition paradigm across samples of Canadian Caucasian participants who were presented photographs of Caucasians, African Americans, and Canadian First Nations faces. Age of the participants and facial stimuli were also varied. Across two experiments, the authors found clear evidence of a CRE across all ages in measures of accuracy, reaction time, and confidence. Ng and Lindsay (1994) also examined the CRE with Canadian Caucasian and Asian participants and faces. Using a face recognition paradigm across two experiments, the authors found a significant CRE such that own-race face recognition was superior to other-race performance. To date, no studies have examined the CRE with Canadian samples using either First Nations participants or a lineup identification paradigm.

As highlighted by Meissner and Brigham (2001b), the majority of studies investigating the CRE have used a recognition paradigm, whereas only a rather small percentage (9% of those included in their meta-analysis) have used a (target-present [TP]) lineup identification task. Meissner and Brigham's meta-analysis found a nonsignificant trend such that lineup tasks produced a larger CRE compared with standard recognition paradigms. The current study sought to build on this research and provide an important methodological aspect, which has not been previously included in such studies. Furthermore, to our knowledge, no published study has yet to include target-absent (TA) lineups when investigating the CRE. Given the significant role of false-alarm responses in the CRE literature (Meissner & Brigham, 2001b), it would seem important to document whether the CRE might also be evidenced in TA lineups. Finally, no study to date has investigated the CRE using First Nations participants within a more applied lineup paradigm. Given the overrepresentation of such individuals in the Canadian criminal justice system (Trevethan et al., 2002), it would seem important to empirically evaluate the CRE within the context of a lineup identification task using First Nations stimuli.

The present study used a lineup recognition paradigm, consistent with that used by Meissner, Tredoux, Parker, and MacLin (2005), to assess the CRE across Caucasian and First Nations samples. Given that this is an attempt to demonstrate the phenomenon in a lineup paradigm, certain methodological choices were made. Simultaneous lineups, as opposed to showups or sequential lineups, were chosen for this initial study because they are the most common real-world identification procedure. For example, a survey conducted by Wogalter, Malpass, and McQuiston (2004) found that the majority of police jurisdictions in North America use simultaneous lineups.

The current study also investigated the degree to which the contact hypothesis plays a significant explanatory role with regard to any CRE that may be discovered in Caucasian–First Nations pairings. The contact hypothesis suggests that the amount of contact that an individual has with another race is positively correlated with the accuracy of recognising individuals from that race (Brigham & Malpass, 1985; Goldstein & Chance, 1985); however, research in this area has provided mixed results. For example, some studies have reported no significant effect of interracial contact on the CRE (e.g., Brigham & Barkowitz, 1978; Ng & Lindsay, 1994), whereas other studies have discovered at least a moderate effect of interracial contact on recognition rates (Byatt & Rhodes, 1998; Slone, Brigham, & Meissner, 2000; Wright, Boyd, & Tredoux, 2003).

A study by Slone et al. (2000) demonstrated that the Social Experiences Questionnaire (SEQ) was predictive of Caucasians' performance on Black faces. The SEQ assesses the frequency of interracial contact across a number of different situations (e.g., frequency of minority contact across schooling years, minorities who are close friends, and frequency of interracial dating). This measure was used in the present study.

It was hypothesised that a significant CRE would be found across both Caucasian and First Nations participants in measures of hits, false alarms, discrimination accuracy, and response bias. Self-reported amount of contact with the other-race individuals was also predicted to be positively correlated with recognition accuracy rates of that race of face.

Method

Participants

Twenty-nine Caucasian students (mean age = 22.48 years[1]; range = 18–49 years; 22 women, 7 men) were recruited from the University of Regina psychology participant pool. These participants received course credit. Twenty-four First Nations participants were recruited from Northlands College, La Ronge, Saskatchewan (mean age = 30.5 years; range = 20–48 years; 16 women, 8 men). These participants were recruited by means of sign-up sheets advertising the study and received no compensation.

Stimuli

The stimuli for this study consisted of 179 photographs of individuals of First Nations descent and 184 photographs of individuals of Caucasian descent. Two different photographs of each face were taken. The first photograph depicted the target person in

[1] The mean age of the two groups was significantly different ($p < .05$). However, age did not correlate with any of the four measures of recognition accuracy for the 29 Caucasian participants, the 24 First Nations participants, or all 53 participants combined. Because there was no relationship, it was not included in any further analyses.

a full-frontal pose and wearing casual clothing, whereas the second photograph depicted the same person in a full-frontal pose wearing a burgundy-coloured sweatshirt. All targets were positioned 5 ft from the camera and 2 ft from the background wall. All distinguishing materials (e.g., glasses, piercing) were removed for the purposes of the photographs. All photographs were then edited using Adobe Photoshop 7.0. Photographs were cropped to include only the individual's head and shoulders, and the background colour was changed from white to gray. Photographs, saved in JPEG format, measured 4 × 5 in and had a resolution of 150 dots/in.

Six target faces of each race were randomly selected from the databases of available stimuli. One TP and one TA lineup was then constructed for each of the 12 target faces, with each lineup array consisting of six faces. Studies have indicated that when the race of the individual constructing the lineup differs from the race of the faces in the array, the fairness of the lineup decreases (Brigham & Ready, 1985). As such, a colleague of First Nations descent was recruited to aid in the construction of the First Nations lineup arrays. The arrays were first constructed by the primary researcher, based on the physical similarity of the foils to the target.

The colleague then made minor changes to the arrays based on his perceptions of the lineups, until mutual satisfaction was reached by both parties. Once the arrays were selected, they were assessed for positive versus negative bias. A positive bias occurs when the target is selected more often than expected by chance because of the distinctiveness of the target in the array, even if the selector has a poor memory of the target. A negative bias occurs when the distractors look so similar to the target that the target is less likely to be chosen (compared with chance responding) from among the array, even when the selector has a good memory of the target (Brigham, Meissner, & Wasserman, 1999). A pilot study of 28 participants determined that no such biases existed in the lineups. Pilot study participants were given descriptions of each of the six targets (e.g., target is a First Nations male; approximately 18–25 years of age; has short, dark hair, dark eyes, and a medium build). The descriptions given to participants were compilations of three independent descriptions of the target. Any features that showed up in all three descriptions were used in the final description presented to participants. Using a mock witness paradigm, participants were given a description of a target and asked to identify the target that was described from an array of 12 photographs. The 12 photographs consisted of the target and 11 foils taken from the TA and TP lineups. Photographs were presented simultaneously to all 28 participants by an overhead projector. The descriptions of the targets were given to participants on paper. Participants were given 1 min to make their decision and write down the number of the photograph they believe best fit the description. This process was repeated for all six targets. Participants showed no significant bias toward any particular face in any of the six arrays ($p > .05$).

Apparatus

All participants viewed the photographs on a laptop computer with a 15-in monitor and an external mouse. A specially written program, PC_Eyewitness, presented the photographs to participants (MacLin, Meissner, & Zimmerman, 2005).

Procedure

Participants were seated at a desk with the computer approximately 2 ft in front of them. Consent was obtained immediately on arrival. The computer program informed participants that they were "participating in an experiment that will assess your memory for a series of human faces. You will be presented with a series of faces, and later you will be tested for your ability to identify the faces that you saw." Participants were then presented with six target faces of one race (either First Nations or Caucasian). The faces were viewed for 3 s each, with a 1-s interstimulus interval. Immediately following the study phase, participants were given a distractor task. This distractor task required participants to change one phrase (family outing) into a related phrase (amusement park) by following 21 instructions that consisted of simple letter manipulations. After 5 min, the program proceeded to the test phase of the study. Participants were instructed that they would "now be presented with a series of lineup identifications tasks. Your objective is to identify the faces that you saw at the beginning of the experiment. For each lineup, one of the faces may or may not be present." Participants were then presented with a series of 12 lineups (6 TP and 6 TA) involving faces of the same race they had viewed during the study phase. All 12 lineups consisted of six photographs that were presented simultaneously on the screen. For each lineup, participants either selected the individual face they believe they had seen in the study phase, or they selected the option "Don't see face" if none of the six faces looked like one of the targets. After viewing all 12 lineups, participants entered their general demographic information, including age, gender, year in university, and race, into the computer.

Once completed, participants followed the same procedure for the other race of face. The order in which the targets were presented, the order of lineup presentation, and placement of photographs in each lineup were randomised across participants. The race of face that was presented first was also counterbalanced across participants in the study. Participants then completed the 13-item SEQ to assess the amount of contact that participants have had with the other race. The original SEQ was slightly modified for the purposes of this experiment. Two questions referring to middle school were omitted, and questions were duplicated to apply to both races. Lastly, participants were debriefed and thanked for their time.

Results

A hit (H) was defined as the correct identification of a previously viewed target when he was presented in the lineup (TP lineups). A false alarm (F) was defined as any identification of a nontarget face from a TA lineup. These hit and false-alarm rates were used to compute signal detection estimates of discrimination accuracy (i.e., the participant's ability to distinguish between detection of the target when present vs. absent from the array) and response bias (i.e., the participant's willingness to respond "seen before" to a stimulus, independent of discrimination accuracy), and these combined estimates were examined across all variables (cf. Meissner et al., 2005). Discrimination accuracy was calculated using A' (Rae, 1976). The formula that produces A' when $H < F$ is

$$A' = H - H^2 + F - F^2/4F * (1 - H),$$

Table 1
Mean Recognition Measures for Own- and Other-Race Faces by Race of Participant

	Own-race identification			Other-race identification		
Variable	Caucasian	First Nations	Total	Caucasian	First Nations	Total
A′	.59 (.28)	.53 (.23)	$.59_1$ (.26)	.53 (.23)	.50 (.26)	$.51_1$ (.24)
B″	$.29_a$ (.55)	$-.14_a$ (.67)	.10 (.65)	$-.18_a$ (.59)	$.12_a$ (.62)	−.04 (.62)
Hits	$.49_b$ (.25)	$.58_b$ (.26)	.53 (.26)	$.57_b$ .24	$.45_b$ (.21)	.52 (.23)
False alarms	$.35_c$ (.25)	$.47_c$ (.24)	$.40_2$ (.25)	$.52_c$ (.21)	$.46_c$ (.27)	$.49_2$ (.24)

Note. *A′* and *B″* refer to participants' mean recognition accuracy and response bias scores, respectively. Standard deviations are given in parentheses. Matching numeric subscripts indicate significant main effects ($p < .05$). Matching alphabetic subscripts indicate significant interactions ($p < .05$).

and when H ≥ F the formula is

$A' = H^2 + F^2 + 3H - F - 4FH/4H * (1 - F)$.

Response bias (B″) was calculated (Donaldson, 1992):

$B'' = [(1 - H) * (1 - F) - (H * F)]/[(1 - H) * (1 - F) + (H * F)]$.

Accuracy

A 2 × 2 mixed factorial analysis of variance (ANOVA), with race of participant (Caucasian × First Nations) and race of face (Own-Race Identification × Other-Race Identification) as factors, was conducted on participants' *A′* scores, with higher scores representing more accurate recognition rates. As expected, participants were significantly more accurate on own-race identifications than on other-race identifications, $F(1, 51) = 4.80$, $p < .05$, $\eta^2 = .09$ (Table 1). There was no main effect of race of participant, $F(1, 51) = 0.043$, $p = .84$, $\eta^2 = .00$, nor an interaction between race of the participant and race of target, $F(1, 51) = 0.19$, $p = .66$, $\eta^2 = .00$, suggesting that the CRE observed in the main effect was consistent across both participant races.

Response Bias

A similar 2 × 2 mixed factorial ANOVA, with race of participant (Caucasian × First Nations) and race of face (Own-Race Identification × Other-Race Identification) as factors, was conducted on participants' response bias estimates (B″). A positive value indicates a conservative response bias, whereas a negative value indicates a liberal response bias. There was no significant main effect of race of participant, $F(1, 51) = 1.36$, $p = .25$, $\eta^2 = .03$, or race of face, $F(1, 51) = 0.18$, $p = .67$, $\eta^2 = .00$. There was, however, a significant interaction between race of participant and race of face, $F(1, 51) = 16.26$, $p < .01$, $\eta^2 = .24$. As displayed in Figure 1, both Caucasian and First Nations participants showed a significantly more liberal response bias (i.e., they were more likely to choose from the lineup) when First Nations faces were tested compared with Caucasian faces.

Hits and False Alarms

Two 2 × 2 mixed factorial ANOVAs, with race of participant (Caucasian × First Nations) and race of face (Own-Race Identification × Other-Race Identification) as factors, were also conducted on hit and false-alarm rates. Consistent with the response bias data, hit responses demonstrated no significant main effects of race of participant, $F(1, 51) = 0.73$, $p = .40$, $^2 = .01$, or race of face, $F(1, 51) = 0.06$, $p = .80$, $\eta^2 = .00$; however, a significant interaction between race of participant and race of face was observed, $F(1, 51) = 9.75$, $p < .01$, $\eta^2 = .16$. First Nations participants were 1.3 times more likely to produce a hit on own-race photographs, whereas Caucasian participants were 1.2 times more likely to produce a hit on other-race photographs.

With regard to false-alarm responses, participants showed the expected CRE such that significantly more false alarms were demonstrated on other-race faces compared with own-race faces, $F(1, 51) = 8.82$, $p < .01$, $\eta^2 = .15$. There was, however, a significant interaction between race of participant and race of face, $F(1, 51) = 10.20$, $p < .01$, $\eta^2 = .17$, suggesting that Caucasian participants were more likely to demonstrate the false-alarm CRE, whereas First Nations participants produced equivalent false-alarm rates on both own- and other-race faces. Overall, participants were 1.25 times more likely to produce a false alarm on First Nations faces than on Caucasian faces.

Contact

Amount of contact was assessed using Slone et al.'s (2000) SEQ. Scores for all 13 questions were summed together to create one measure of contact. Reliability analysis of this scale revealed

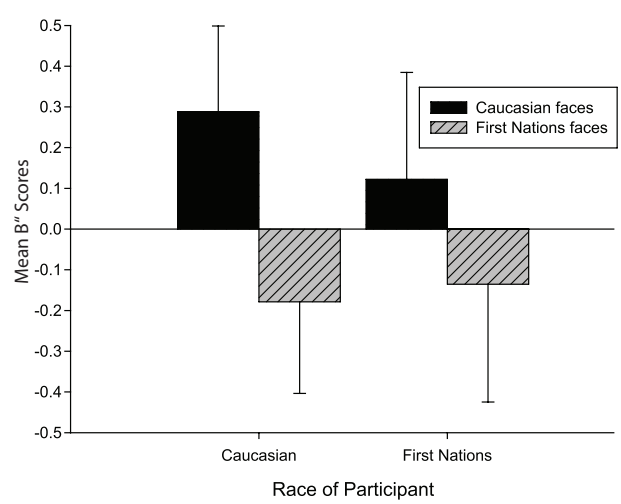

Figure 1. Mean *B″* scores on own- and other-race faces for Caucasian ($n = 29$) and First Nations ($n = 24$) groups. Error bars indicate 95% confidence intervals. Positive scores indicate a more conservative response bias; negative scores indicate a more liberal response bias.

an α value of .92. No significant correlation between amount of contact with other-race persons and recognition accuracy (A') of other-race faces was observed ($r = .088$, $p = .23$). Likewise, there were no significant correlations between amount of contact and other-race hits ($r = -.09$, $p = .26$), false alarms ($r = -.19$, $p = .08$), or response bias (B $r = .15$, $p = .15$).

Discussion

The purpose of this study was to replicate and extend research on the CRE to determine whether a significant CRE exists between Caucasian and First Nations participants, using a lineup identification task that included both TP and TA lineups. The results of this study were generally consistent with those found using Black and Caucasian participant samples (Meissner & Brigham, 2001b). Participants were significantly more accurate at recognising faces of their own race and had a more difficult time recognising faces of the other race. Unlike the typical Caucasian–Black results, participants in this study did not exhibit a more liberal response bias when responding to other-race faces. In fact, both Caucasian and First Nations individuals applied a significantly more liberal response bias when identifying First Nations faces than when identifying Caucasian faces. Admittedly, however, this response bias effect was more pronounced in Caucasian participants, a finding consistent with prior studies in the CRE literature that indicate the effect is more likely to be exhibited in majority-race participants (Meissner & Brigham, 2001b; Sporer, 2001).

One possible interpretation of the null effect of response criterion in First Nations participants might be found in an anthropological analysis of the First Nations stimuli and participants. A closer examination of the First Nations stimuli suggested that faces from several tribal communities (e.g., Cree, Blackfoot) had been included. Although anthropologically these various tribal communities can be grouped under the larger umbrella of First Nations peoples, physiognomic differences can be noted by most First Nations people that categorise individuals as belonging to a particular community. In this study, the patterns of false alarms and response criterion that First Nations participants displayed with First Nations faces more closely resembled the typical other-race recognition pattern. In fact, several First Nations participants relayed to the researcher that they could easily distinguish among Cree, Blackfoot, and other bands of Indians. Given the between-groups nature of categorisations that some participants may have encountered within the First Nations stimuli, it is possible that "out-group" effects might be found between different tribal communities (e.g., a Cree participant who commits a false alarm when attempting to identify a Blackfoot target may actually represent an out-group identification error).

Furthermore, this out-group effect may be responsible for the null effect of the contact hypothesis in this study. The SEQ measured contact with First Nations individuals as a whole. It is possible that participants' self-reported amount of contact with First Nations individuals actually represents a sum score of contact with several out-groups, such as Cree and Blackfoot individuals, and thus cannot be considered a valid predictor of recognition accuracy. Future research to determine whether this out-group effect exists between different tribal communities would prove worthwhile.

These results confirm that the CRE exists between Caucasian–First Nations pairings using a simultaneous TA and TP lineup identification task. Given the significant role of false-alarm responses in the CRE literature (Meissner & Brigham, 2001b) and the results of this study, it seems there is potential for the inclusion of TA lineups to provide some insight into the cognitive mechanisms driving the CRE.

Although participants were more accurate at recognising own-race faces, both Caucasian and First Nations participants applied a more liberal response bias (i.e., more willing to choose from the lineup) when attempting to identify First Nations faces. It appears that the potential for mistaken identification of First Nations individuals is high, regardless of the race of the eyewitness. Individuals who are visible minorities are typically overrepresented in the legal system and in cases of wrongful convictions (Anderson & Anderson, 1998), and eyewitness identifications are typically the primary contributor of a conviction (Anderson & Anderson, 1998). Anecdotally, it seems these results may provide some insight into the proportional disparity between the actual (2%) and incarcerated (18%) First Nations populations across Canada.

Although the CRE is known to be a robust effect, the effect sizes reported here are rather small; thus, replication of these results is necessary. This study was the first attempt to demonstrate the CRE in a Canadian sample of First Nations and Caucasian pairings. Given that the purpose was to demonstrate the effect, the only lineups used in the current study were simultaneous lineups. Future research should seek to demonstrate the effect in other types of lineups given that simultaneous procedures, sequential procedures, and showups are all used in real-world identification practices.

Résumé

Cette étude vise à savoir si les recherches réalisées sur de l'effet croisé de race auprès de témoins visuels composés de caucasiens et de noirs peuvent être généralisées auprès d'autres clientèles composées de caucasiens et de personnes issues des premières nations, lors d'une séance d'identification. La présente étude a utilisé une nouvelle approche pour étudier l'effet croisé de race, en utilisant six cibles lors de séances d'identification simultanées, qui comprenaient des figures de cibles présentes et de cibles absentes. Cette étude s'est également penchée sur l'efficacité des hypothèses de contacts appliquées à ces populations. Un important effet croisé de race a été découvert. De plus, les participants caucasiens et ceux provenant des premières nations avaient plus tendance à reconnaître dans l'alignement des visages, des personnes des premières nations, lorsqu'ils tentaient d'identifier des visages caucasiens. Le contact avec l'autre race n'a pas eu d'effet sur la précision de la reconnaissance de cette race. La discussion s'attache à examiner les implications potentielles des résultats et les perspectives de futures recherches.

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Received August 4, 2006
Revision received March 28, 2007
Accepted August 27, 2007 ■