MATCHING FACES TO ID PHOTOS: THE INFLUENCE OF MOTIVATION ON CROSS-RACE IDENTIFICATION

Kyle J. Susa and Chase A. Gause
California State University, Bakersfield

Steven J. Dessenberger
Washington University in St. Louis

Years of psychological research indicate people are poor at matching the identity of a person with an ID photo. Known as the cross-race effect, this inept ability is exacerbated when the to-be-identified individual comes from a race that is different than the perceiver's own-race. Using a task that mimics document screening procedures, the purpose of the present study was to determine if perceiver motivation moderates the cross-race effect in face matching accuracy and the calibration between confidence and accuracy. In line with the Categorization-Individuation Model, results indicated perceiver motivation is critical to enhancing accuracy, particularly for other-race faces. The results have important implications for officers' "on the look-out" for a suspect or for document screeners seeking to identify imposter IDs.

Keywords: motivation, cross-race effect, face matching, perceptual identification

On September 9, 2015, detectives with the New York City Police Department set-up a sting operation to arrest a suspect they believed to be involved in credit card fraud. With a photo of the suspect in hand, officers identified and apprehended James Blake in a case that garnered national attention for what many perceived to be excessive use of force by a White detective against an African-American suspect. Within minutes of the apprehension detectives realized Blake was mistakenly identified as the suspect. Later it was publicly announced Blake was believed to be the suspect because he looked a lot like the suspect's twin brother (Tracy, 2015).

Known as *face matching*, or *perceptual identification* of faces, decades of research in Cognitive Psychology have demonstrated people are surprisingly poor at accurately determining whether a photo matches a to-be-identified individual (Hancock, Bruce, & Burton, 2000; Ritchie et al., 2015). This incompetence has been demonstrated in perceptual studies that resemble officers "on the look-out" for a suspect, as well as in studies that

Author Note: Kyle J. Susa, Department of Psychology, California State University, Bakersfield; Chase A. Gause, undergraduate student in the Department of Psychology, California State University, Bakersfield; Steven J. Dessenberger, graduate student in the Department of Psychology, Washington University in St. Louis.

Correspondence concerning this article should be addressed to Kyle J. Susa, Department of Psychology, California State University, Bakersfield, 9001 Stockdale Highway, Bakersfield, CA 93311. E-mail: ksusa@csub.edu. Co-authors can be contacted at: cgause1@csub.edu; sdessenberger@wustl.edu.

resemble more routine identity verification procedures (McCaffery & Burton, 2016; Marcon, Meissner, Frueh, Susa, & MacLin, 2009; Kemp, Towell, & Pike, 1997). In one seminal field study, Kemp et al. examined face matching ability of grocery store clerks by manipulating whether "supermarket shoppers" paid for their groceries with a real ID photo or an imposter ID photo on their credit card. They found clerks mistakenly accepted the imposter ID photo credit cards more than 50% of time, and errors occurred even when the ID photo looked nothing like the actual shopper. Much of the literature suggests that mistakenly identifying two different people as being the same person can occur in experimental trials as often as 30% of the time, even under low-stress environments, and even when the people making the match determination have specialized training or professional experience (Megreya & Burton, 2008; White, Kemp, Jenkins, Matheson, & Burton, 2014).

One factor that can exacerbate the inaccuracy of face matching is the race of the person being identified. Known as the *cross-race effect* (CRE) or *own-race bias*, dozens of studies in long-term recognition memory demonstrate that people are more likely to incorrectly identify faces that come from a race or ethnicity that is different than the perceiver's own. This robust effect has been found with people from different demographic regions around the world, with various racial and ethnic identities (Chiroro, Tredoux, Radaelli, & Meissner, 2008; see also Meissner & Brigham, 2001 for review). Surprisingly few studies, however, have examined the cross-race effect in a face matching task where a person is asked to make a match determination between a suspect and an ID photo (Megreya, White, & Burton, 2011; Meissner, Susa, & Ross, 2013; Sporer, Trinkl, & Guberova, 2007; Susa, Michael, Dessenberger, & Meissner, 2019). In an experiment similar to the screening procedures TSA agents perform at airports, Meissner et al. (2013) tasked participants with making own- and other-race match determinations (between an ID photo and a picture of the tendering individual) across a series of 80 trials. As predicted, they found participants were significantly more accurate with own- versus other-race faces and that conditions associated with the ID photo (such as whether the photo was years old) moderated the cross-race effect by hindering performance more for other-race faces.

Many theoretical explanations for cross-race face processing exist, each with its own merits. Generally the theories fall into two accounts. The first account, *perceptual expertise*, suggests that a person's relative experience living and interacting with people of a given race leads to a developed ability to distinguish between individuals of that race. This account is supported by research that shows interracial experience is directly correlated with increased accuracy in other-race face recognition (Chiroro & Valentine, 1995; Meissner & Brigham, 2001). The second theoretical account, *social categorization*, suggests that people use categorical cues to designate whether an individual is considered an in-group or out-group member (cf. Hugenberg, Young, Bernstein, & Sacco, 2010). When own-race (i.e., in-group) faces are observed attention is given to the individuating features of the face that make it unique to other own-race members. Conversely, when other-race (i.e., out-group) faces are observed attention is given to categorical information of shared characteristics at the expense of failing to encode the individuating features (Hugenberg, Wilson, See, & Young, 2013; Levin 2000). In support of the social categorization theory

several studies have demonstrated that experimental manipulations can induce participants to use categorization cues other than race to trigger other-race faces as being part of the in-group. Consequently, this reduces or eliminates racial categorization biases, and the cross-race effect in face recognition. In one study, Van Bavel and Cunningham (2012) assigned White participants to either a "lion" or "tiger" team and then tasked them to remember White and Black faces that were either associated members of their own team (e.g., lions) or the other team (e.g., tigers). For each team half the associated members were White and the other half were Black. Results indicated participants were equally accurate at recognizing own- and other-race faces, so long as the those faces were associated with their own, in-group, team (see also Bernstein, Sacco, Young, & Hugenberg, 2014; Bernstein, Young, & Hugenberg, 2007; MacLin & Malpass, 2003).

Recently Hugenberg et al. (2010) developed a Categorization-Individuation Model (CIM) to explain research supporting both perceptual expertise and social categorization accounts of the CRE. According to the CIM, perceptual experience, social categorization, and perceiver motivation work collectively to create biases in other-race face processing. One critical component of the model is that people are differentially motivated to individuate faces from their own-race relative to other races (Hugenberg et al., 2013; Wilson, Bernstein, & Hugenberg, 2016). When motivational need to individuate a face is low, the face is processed at a categorical level. However, when there is a specific self-relevant need to remember a face, individuation motivation can trigger greater attentional resources to the encoding of the face making it more memorable. Taken together the CIM argues that biases in cross-race face processing are determined on multiple dimensions, and that while experience with other-race faces can reduce the effort to individuate faces, perceiver motivation to individuate is critical.

Several studies have examined the effect external motivations can have on cross-race face recognition (DeLozier & Rhodes, 2015; Hugenberg, Miller, & Claypool, 2007; Pica, Warren, Ross, & Kehn, 2015; Young & Hugenberg, 2012). From a CIM perspective much of this research suggests the CRE in recognition memory can be alleviated through manipulations that motivate or incentivize people to remember other-race faces. This motivational influence has been demonstrated using both subtle and explicit motivational manipulations. In one study, Shriver and Hugenberg (2010) paired own- and other-race faces with occupations considered to be of low- (e.g., janitor) or high-power (e.g., doctor). They found other-race faces were only recognized as well as own-race faces when they were perceived as being from occupations of high-power. Other motivational manipulations have been more explicit, such as offering a monetary reward, or placing a value on the importance of to-be-remembered faces. For example, using a standard old/new recognition memory paradigm, DeLozier and Rhodes paired own- and other-race faces with low and high point values, and found that for high value faces (but not for low value) there was no CRE, so long as participants had sufficient time to study the faces. Together this research supports the CIM theoretical perspective of the CRE and suggests that external motivations can alleviate or even eliminate the cross-race effect in face recognition.

The purpose of the present study was to examine the CIM perspective of the CRE within a face matching paradigm. Specifically, we were interested in whether external motivation (financial incentive) could alleviate or eliminate the CRE. While motivational effects on alleviating the CRE have been well documented in long-term recognition memory, the effects have not been examined in the forensically relevant context of face matching, where an officer may be on the look-out for a suspect, or a travel document screener is tasked with making a series of face/ID photo match determinations. This study sought to bridge this gap in the literature using a procedure similar to Meissner et al. (2013). In line with the CIM, we predicted that motivation would moderate the cross-race effect, in that it would enhance performance for other-race faces more than own-race faces and alleviate the CRE during this task. As a secondary, exploratory research question, we were also interested in the extent to which motivation would enhance the calibration between confidence and accuracy for other-race faces. Calibration reflects the degree to which subjective confidence in performance mirrors objective accuracy (Jonsson & Allwood, 2003; Juslin, Olsson, & Winwan, 1996). Although Meissner et al. found participants were more poorly calibrated and more overconfident in their matching ability for other- relative to own-race faces, we speculated that motivation could make participants more metacognitively aware of their (in)ability for other-race faces and in turn, better calibrated.

METHOD

Participants

Sixty-five college-aged students (M_{age} = 20.5 years) from a state university served as participants in this study. All participants self-identified as Hispanic and 71.9% were female. Participants were recruited from the Psychology Participant Pool and received course credit for their involvement in the study.

Materials

Stimuli for the study consisted of colored photographs of male college-aged persons from Hispanic and African-American racial/ethnic groups. Stimuli were gathered from a database maintained in our laboratory that consists of both still photos as well as scanned photos from the person's university ID. All photos were cropped at the chest level. A total of 80 face pairing trials were used in the study. For each trial a presented still photo of a face was joined with a scanned ID photo that was embedded into a mock U.S. passport. Half of the trials were Hispanic face pairings (i.e., own-race), the other half were African-American (i.e., other-race). In addition, for half the trials the two faces were of the same person (matched trials) and the other half were of two different yet similar looking people (mismatched trials). In a previous study confusability ratings indicated the degree of similarity in mismatched trials was approximately equal for Hispanic and African-American faces (Susa et al., 2019).

Design

The experiment consisted of a 2 x 2 within-subjects design. The first independent variable was race of the faces (Hispanic vs. African-American) and the second independent

variable was perceiver motivation (non-motivated vs. motivated). The dependent variable of interest was the signal detection estimate of discrimination accuracy (*Az*). Discrimination accuracy was calculated as a composite of correct identifications (i.e., hits, denoted when participants indicated the two faces matched when they actually did match) and mistaken identifications (false alarms, denoted when participants mistakenly indicated the faces matched when they were mismatched). Additionally, we estimated the calibration between confidence and accuracy using calibration and over/under confidence measures (Jonsson & Allwood, 2003; Juslin et al., 1996).

Procedure

The experiment was administered in a controlled laboratory setting using Qualtrics. Participants were first provided informed consent on the general nature of the experiment. At the outset of the experiment participants were provided instructions indicating they would be viewing a series of face matching trials where they would first see a person's face followed by a passport ID photo, and then have to determine whether the two images were of the same person. Further, they were instructed that after each trial decision (i.e., match or mismatch) they would rate their confidence in their decision.

Once the experiment began, participants viewed a face for a period of 3s. This was then immediately followed by the passport ID photo. The passport ID photo remained in view as participants determined whether the two images were of the same person. Once the participants' decision was made, the ID photo was removed from the screen, and participants rated their confidence, on a scale from 50% to 100% in increments of 5%. They were instructed that a rating of 50% indicated they were completely guessing, while a rating of 100% indicated they were absolutely certain in their decision. A pattern mask followed each confidence decision for a period of 500ms to minimize face consolidation before the next trial began.

Importantly, the first 40 trials served as the non-motivated trials while the last 40 trials served as the motivated trials. In each half, 20 of the face pairings were of each race, and 20 of them matched (10 for each race) while 20 mismatched (10 for each race). Two versions of the experiment were created so that each face pairing was equally likely to occur in the non-motivated and motivated conditions, and this was counterbalanced across participants. Within each version, as well as each half of the experiment, the order of the face pairings was randomized.

To motivate participants we provided them with a financial incentive after the first 40 trials (Beilock & Carr, 2005). Namely, we fictitiously told participants they made 24 correct decisions on the first set of 40 trials and that for the second set of trials they would be randomly paired with another participant. If they both (the participant and the random partner) got 34 out of 40 trials correct in the second set, they would each receive five dollars after completing the experiment. We then had a research assistant verbally reiterate the manipulation and when participants agreed they understood what they needed to do to get the five dollars, they were allowed to continue the experiment. However, before the next trial began the participants viewed a screen that indicated the computer was "working" on

determining their partner. After 10s, the computer indicated their partner was determined and that that person had already completed the experiment and had received a score of 35 correct trials out of the 40. In other words, participants were led to believe their own performance would determine whether they and their fictitious partner would receive the five dollars.

The experiment continued until all 80 trials were completed. Participants then answered a few demographic questions and were ultimately informed they received a correct score of 34. Lastly, participants were debriefed, thanked for their participation, and given the five dollars.

RESULTS

Signal detection estimates of correct identifications (hits), mistaken identifications (false alarms), discrimination accuracy (*Az*), and response criterion (*C*), as well as calibration measures (i.e., calibration and over/under confidence) were analyzed. The descriptive statistics for each of these estimates can be found in Table 1.

Table 1: *Descriptive Statistics for Signal Detection and Calibration Estimates*

	Own-Race			Other-Race		
	M	*SD*	95% CI	*M*	*SD*	95% CI
No Motivation						
Hits	.86	.11	[.83, .89]	.60	.19	[.55, .65]
False Alarms	.36	.20	[.31, .41]	.39	.18	[.35, .43]
Disc. Accuracy (*Az*)	.86	.09	[.84, .88]	.65	.16	[.61, .69]
Response Bias (*C*)	-.42	.52	[-.55, -.29]	.03	.48	[-.55, -.29]
Calibration	.028	.019	[.023, .033]	.06	.035	[.051, .069]
Over/Under	.049	.057	[.035, .063]	.119	.07	[.102, .136]
Motivation						
Hits	.84	.16	[.79, .89]	.72	.14	[.69, .75]
False Alarms	.29	.16	[.25, .33]	.24	.18	[.20, .28]
Disc. Accuracy (*Az*)	.88	.09	[.86, .90]	.83	.12	[.80, .86]
Response Bias (*C*)	-.32	.57	[-.46, -.18]	.11	.47	[-.55, -.29]
Calibration	.025	.018	[.021, .029]	.062	.035	[.053, .071]
Over/Under	.042	.057	[.028, .056]	.124	.067	[.107, .141]

A 2 x 2 within-subjects ANOVA was conducted to analyze the effects of race of face and perceiver motivation on discrimination accuracy during the face matching task. Results indicated there was a main effect for race of face, $F(1, 64) = 92.14$, $p < .001$, $d = 1.41$. As expected, this CRE supports previous research indicating that overall participants were

significantly better at matching own-race faces (M = .87, SD = .07) relative to other-race faces (M = .74, SD = .11). We also found a main effect for perceiver motivation suggesting that motivated participants (M = .86, SD = .10) were more accurate than non-motivated participants (M = .75, SD = .09), $F(1, 64) = 60.44$, $p < .001$, $d = 1.16$. Importantly, the main effects were qualified by a significant interaction effect, $F(1, 64) = 40.48$, $p < .001$, $h_p^2 = .39$. In support of the CIM, and in line with our predictions, simple effect analyses indicated that the magnitude of the cross-race effect was substantially reduced when participants were motivated to perform (d = 1.62 vs. .47). That is, under both non-motivated, $t(64) = 10.610$, $p < .001$, and motivated conditions, $t(64) = 3.029$, $p = .004$, participants were more accurate at matching own- versus other-race faces. However, when motivated, the cross-race effect was reduced by a standardized mean difference (Cohen's d) of 1.15. Essentially, this indicated accuracy in performance for African-American faces under motivated conditions was statistically equivalent to performance of Hispanic faces under normal (i.e., non-motivated) conditions, $t(64) = -1.581$, $p = .119$, $d = -.29$.

Given the real-world applicability of correct identification (hit) and mistaken identification (false alarm) rates we also analyzed the impact of race of face and perceiver motivation on these measures. Notably the effects found in discrimination accuracy appear to be a product of both correct identification and mistaken identification rates. Specifically, we found a significant interaction for correct identifications, $F(1, 64) = 24.34$, $p < .001$, $h_p^2 = .28$, suggesting that motivation enhanced correct identifications for other-race faces $t(64) = 5.277$, $p < .001$, $d = .72$, but not for own-race faces, $t(64) = .685$, $p = .496$, $d = .15$. A significant interaction was also found for mistaken identifications, $F(1, 64) = 9.18$, $p = .004$, $h_p^2 = .13$, such that motivation reduced the number of mistaken identifications (i.e., saying the two faces matched when they actually did not) for both own-, $t(64) = 2.829$, $p = .006$, $d = .39$, and other-race faces, $t(64) = 5.596$, $p < .001$, $d = .83$, but had a significantly greater impact on reducing mistaken identifications for other-race faces. Importantly, correct and mistaken identification rates did not indicate much influence of motivation on a response criterion shift, as there was a significant effect of race of faces on response criterion, $F(1, 64) = 84.10$, $p < .001$, $d = 1.08$, but no main effect for motivation, $F(1, 64) = 2.13$, $p = .15$, $d = .20$, nor an interaction effect, $F(1, 64) = 0.02$, $p = .89$, $h_p^2 < .001$. The main effect of race suggests that participants were more conservative in their response criterion (i.e., more likely to say mismatch) for other-race faces (M = .068, SD = .37), than for own-race faces (M = -.369, SD = .44).

An exploratory analysis examined the 2 (race of face) x 2 (perceiver motivation) design on the calibration between confidence and accuracy. Calibration reflects the extent to which subjective confidence and objective accuracy are in congruence with each other. For example, perfect calibration (indicated by a value of 0) results when participants state they are 70% confident when they are actually 70% accurate. Over/under confidence, is a related measure that indicates whether an imperfect calibration is the result of confidence exceeding or being less than accuracy.

Consistent with previous research, results indicated there was a significant main effect for race of faces on calibration, $F(1, 64) = 75.29$, $p < .001$, $d = 1.34$, indicating there

was greater calibration for own-race faces (M = .027, SD = .016) relative to other-race faces (M = .061, SD = .032). Over/under analyses found that confidence exceeded accuracy for both own- and other-race faces; however, participants were significantly more over-confident for other-race faces (M = .046, SD = .048) than for own-race faces (M = .121, SD = .064), $F(1, 64) = 144.79$, $p < .001$, $d = 1.33$. There was no effect for perceiver motivation and no interaction between race of face and perceiver motivation for either measures of calibration or over/under confidence.

DISCUSSION

Using an experimental design that mimics the task travel document screeners perform at our nation's airports, the present study examined the influence perceiver motivation can have on reducing or eliminating the CRE in face matching. A number of important findings emerged. First, consistent with a body of literature in both recognition memory and few studies in face matching, we found strong cross-race effects during this task (Megreya et al. 2011; Meissner et al., 2013). Participants were more accurate at making match determinations for own-race faces, and this was manifested in discrimination accuracy, correct identification, and mistaken identification rates. We also found support that race influences the calibration between confidence and accuracy (Meissner et al. 2013). Namely, participants' confidence exceeded their accuracy for both own- and other-race faces, but they were more overconfident for other-race faces. Contrary to our speculation, we did not find perceiver motivation to have any impact on calibration. From an application perspective these results suggest it is important for law enforcement to be cautious when using confidence as an indicator of accuracy when making match determinations.

Of primary interest, this study is the first to demonstrate that perceiver motivation can interact with race of face to reduce the CRE effect in face matching. That is, when participants were motivated to perform, their performance for other-race faces was enhanced to a level that was statistically equal to own-race performance under normal conditions. While the CRE was not eliminated for motivated participants, the reduction in disparity of accuracy (between own- and other-race faces), is consistent with a CIM theoretical framework, and findings within recognition memory (DeLozier & Rhodes, 2015; Hugenberg et al. 2010; Young & Hugenberg, 2012). It appears that motivation leads to greater attentional resources being devoted to individuation of cross-race faces, which facilitates subsequent matching ability. Future research should examine the role of perceptual expertise, as it pertains to the CIM framework, and specifically examine the extent to which interracial experience with cross-race faces might moderate the self-relevant motivational need to individuate.

The results have important applied implications for law enforcement officers "on the look-out" for a suspect or for travel document screeners seeking to identify imposter travelers. Motivation can enhance law enforcement ability to correctly identify matches in other-race faces, and also reduce the chance that own and other-race suspects will go unnoticed when attempting to fake their identity. Importantly, as in the case of James Blake, this also means that motivated law enforcement officers are also less susceptible to

mistakenly identifying a suspect that is wrongfully accused. There are several limitations to real-world implications of these results that are important for future research to consider. One limitation of using student participants in a laboratory study is that law enforcement may naturally differ in self-relevant motivation relative to student participants. Clearly, the stakes are higher and the presumably motivation is naturally higher with law enforcement officers. It is prudent for future research to examine motivational effects within more real-world contexts with life altering consequences. Perhaps it might be the case law enforcement are naturally more motivated but could still benefit from external incentives. The extent to which those motivations can enhance face matching ability and how they might be construed and measured within a real-world context, is grounds for empirical investigation. One challenge to this is that ground-truth is often not known or at least not immediately available within real-world contexts.

Despite the need for future research, we believe the present study provides an important step in bridging the gap in the literature on how perceiver motivation can reduce the CRE during face matching procedures. While the difficulty of face matching is now well established, the need to determine ways to minimize wrongful identifications, without sacrificing correct identifications, is of utmost importance. The CIM framework and importance of a motivational need to individuate cross-race faces, is one important path forward in this endeavor.

REFERENCES

Beilock, S. L., & Carr, T. H. (2005). When high-powered people fail: working memory and "choking under pressure" in math. *Psychological Science, 16*, 101-105. doi: 10.1111/j.0956-7976.2005.00789.x

Bernstein, M. J., Sacco, D., Young, S. G., & Hugenberg, K. (2014). The impact of race and inclusionary status on memory for ingroup and outgroup faces. *Basic and Applied Social Psychology, 36*, 191-198. doi: 10.1080/01973533.2014.887565.

Bernstein, M. J., Young, S. G., & Hugenberg, K. (2007). The cross-category effect: Mere social categorization is sufficient to elicit an own-group bias in face recognition. *Psychological Science, 18*, 706-712. doi: 10.1111/j.1467-9280.2007.01964.x.

Chiroro, P. M., Tredoux, C. G., Radaelli, S., & Meissner, C. A. (2008). Recognising faces across continents: The effect of within-race variations on the own-race bias in face recognition. *Psychonomic Bulletin & Review*, *15*, 1089-1092. doi: 10.3758/PBR.15.6.1089.

Chiroro, P. M., & Valentine, T. (1995). An investigation of the contact hypothesis of the own-race bias in face recognition. *Quarterly Journal of Experimental Psychology, 48A*, 879-894. doi: 10.1080/146407495080401421.

DeLozier, S., & Rhodes, M. G. (2015). The impact of value-directed remembering on the own-race bias. *Acta Psychologica, 154*, 62-68. doi: 10.1016/j.actpsy.2014.11.009.

Hancock, P. J. B., Bruce, V. V., & Burton, A. M. (2000). Recognition of unfamiliar faces. *Trends in Cognitive Sciences, 4*, 330-337. doi: 10.1016/S1364-6613(00)01519-9.

Hugenberg, K. Miller, J., & Claypool, H. M. (2007). Categorization and individuation in the cross-race recognition deficit: Toward a solution to an insidious problem. *Journal of Experimental Social Psychology, 43*, 334-340. doi: 10.1016/j.jesp.2006.02.010.

Hugenberg, K., Young, S. G., Bernstein, M. J., & Sacco, D. F. (2010). The categorization-individuation model: An integrative account of the other-race recognition deficit. *Psychological Review, 117*(4), 1168-1187. doi: 10.1037/a0020463.

Hugenberg, K., Wilson, J. P., See, P. E., & Young, S. G. (2013). Towards a synthetic model of own group biases in face memory. *Visual Cognition, 21*, 1392-1417. doi: 10.1080/13506285.2013.821429.

Jonsson, A. C., & Allwood, C. M. (2003). Stability and variability in the realism of confidence judgments over time, content domain, and gender. *Personality and Individual Differences, 34,* 559-574. doi: 10.1016/S0191-8869(02)00028-4.

Juslin, P., Olsson, N., & Winwan, A. (1996). Calibration and diagnosticity of confidence in eyewitness identification: Comments on what can be inferred from the low-confidence accuracy correlation. *Journal of Experimental Psychology: Learning, Memory, & Cognition, 22,* 1304-1316. doi: 10.1037/0278-7393.22.5.1304.

Kemp, R., Towell, N., & Pike, G. (1997). When seeing should not be believing: Photographs, credit cards and fraud. *Applied Cognitive Psychology, 11,* 211-222. doi: 10.1002/(SICI)1099-0720(199706)11:3<211::AID-ACP430>3.0.CO;2-O.

Levin, D. T. (2000). Race as a visual feature: Using visual search and perceptual discrimination tasks to understand face categories and the cross-race recognition deficit. *Journal of Experimental Psychology: General, 129*, 559-574. doi: 10.1037/0096-3445.129.4.559.

MacLin, O. H., & Malpass, R. S. (2003). The ambiguous-race face illusion. *Perception, 32*, 249-252. doi: 10.1068/p5046.

Marcon, J. L., Meissner, C. A., Frueh, M., Susa, K. J., & MacLin, O. H. (2009). Perceptual identification and the cross-race effect. *Visual Cognition, 18*, 767-779. doi: 10.1080/13506280903178622

McCaffery, J. M., & Burton, A. M. (2016). Passport checks: Interactions between matching faces and biographical details. *Applied Cognitive Psychology, 30,* 925-933. doi: 10.1002/acp.3281

Megreya, A. M., & Burton, A. M. (2008). Matching face to photographs: Poor performance in eyewitness memory (without the memory). *Journal of Experimental Psychology: Applied, 14,* 364-372. doi: 10.1037/a0013464.

Megreya, A. M., White, D., & Burton, A. M., (2011). The other-race effect does not rely on memory: Evidence from a matching task. *The Quarterly Journal of Experimental Psychology, 64,* 1473-1483. doi: 10.1080/17470218.2011.575228.

Meissner, C. A., & Brigham, J. C. (2001). Thirty years of investigating the own-race bias in memory for faces: A meta-analytic review. *Psychology, Public Policy, and Law, 7*, 3-35. doi: 10.1037/1076-8971.7.1.3.

Meissner, C. A., Susa, K. J., & Ross, A. B. (2013). Can I see your passport please? Perceptual discrimination of own- and other-race faces. *Visual Cognition, 21,* 1287-1305. doi: 10.1080/13506285.2013.832451.

Pica, E., Warren, A. R., Ross, D. F., & Kehn, A. (2015). Choosing your words and pictures wisely: When do individuation instructions reduce the cross-race effect? *Applied Cognitive Psychology, 29*, 360-368. doi: 10.1002/acp.3112.

Ritchie, K. L., Smith, F. G., Jenkins, R., Bindemann, M., White, D., & Burton, A. M. (2015). Viewers base estimates of face matching accuracy on their own familiarity: Explaining the photo-ID paradox. *Cognition, 141*, 161-169. doi: 10.1016/j.cognition.2015.05.002.

Shriver, E. R., & Hugenberg, K. (2010). Power, individuation, and the cross-race recognition deficit. *Journal of Experimental Social Psychology, 46*, 767-774. doi: 10.1016/j.jesp.2010.03.014.

Sporer, S. L., Trinkl, B., & Guberova, E. (2007). Matching faces: Differences in processing speed of out-group faces by different ethnic groups. *Journal of Cross-Cultural Psychology, 38,* 398-412. doi: 10.1177/0022022107302310.

Susa, K. J., Michael, S. W., Dessenberger, S. J., & Meissner, C. A. (2019). Imposter identification in low prevalence environments. *Legal and Criminological Psychology, 24,* 179-193. doi: 10.1111/lcrp.12138.

Tracy, T. (2015, September 11). Officer who tackled James Blake followed arrest protocol, but he should've apologized, NYPD training specialist says. *New York Daily News*. Retrieved from https://www.nydailynews.com.

Van Bavel, J. J., & Cunningham, W. A. (2012). A social identity approach to person memory: Group membership, collective identification, and social role shape attention and memory. *Personality and Social Psychology Bulletin, 38*, 1566-1578. doi: 10.1177/0146167212455829.

White D., Kemp, R. I., Jenkins, R., Matheson, M. & Burton, A. M. (2014). Passport officers' errors in face matching. *PLoS ONE, 9,* doi:10.1371/journal.pone.0103510.

Wilson, J. P. Bernstein, M. J., & Hugenberg, K. (2016). A synthetic perspective on the own-race bias in eyewitness identification. In B. Bornstein & M. Miller (Eds.), *Advances in Psychology and Law, Vol. 2*., pp. 240-270, Springer.

Young, S. G., & Hugenberg, K. (2012). Individuation motivation and face experience can operate jointly to produce the own-race bias. *Social Psychological and Personality Science, 3*, 80-87. doi: 10.1177/1948550611409759.

Date Received: 01/2019
Date Accepted: 06/2019

Suggested citation: Susa, K.J., Gause, C.A., & Dessenberger, S.J. (2019). Matching Faces to ID Photos: The Influence of Motivation on Cross-Race Identification. [Electronic Version]. *Applied Psychology in Criminal Justice, 15*(1), 86-96.