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Influencing Cross-Race Eyewitness Identification Accuracy Using Photographic Lineup Procedures

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Using Photographic Lineup Procedures

By

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ABSTRACT

The elimination lineup was created to improve children's eyewitness identification accuracy, but recent research suggests that it may be suitable for use with adults. However, there is a lack of research on its robustness, particularly for cross-race identifications which are known to result in poor accuracy. There is also limited research investigating how lineup procedures affect cross-race identifications. The current study sought to explore how lineup procedures affect same- and other-race identifications, and investigate whether lineup procedures can moderate the cross-race effect. White participants watched a video of a White or Chinese male stealing money and were asked to identify the culprit in a target-present or -absent lineup, using one of three lineup procedures (simultaneous, sequential, and elimination).Results showed that lineup procedures varied in effectiveness depending on the presence of the target and whether a cross-race identification was being made. More research is required before denunciation of the simultaneous lineup.

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CHAPTER I

Introduction

Eyewitnesses often play an important role during culprit investigations and culprit trials. Identification of a suspect from a lineup can aid police in building evidence implicating that suspect. Rejection of a lineup can lead police to focus their investigation in a new direction. During culprit trials, lawyers rely heavily on eyewitness evidence as jurors often place substantial weight on eyewitness testimony because they find it to be very persuasive (Leippe, 1995; Pozzulo, Bennell, & Forth, 2009). However, eyewitness evidence can be so compelling that sometimes innocent suspects are convicted (Innocence Project, 2009). According to the Innocence Project (2009), in the United States eyewitness misidentification is the leading cause of wrongful convictions (that have been overturned based on DNA evidence). In 53% of these cases, the witness and innocent offender were of different races, with the majority of innocent offenders being African American. Furthermore, in lab-based research, 24% of witnesses falsely reject the lineup when the suspect is present (Steblay, Dysart, & Wells, 2011). Due to the importance and weight that is put on eyewitness evidence, and the disastrous consequences that can arise from misidentifications, it is important to ensure that eyewitnesses are accurate.

Research investigating eyewitness identification can be categorized into two types: research that studies estimator variables and research that studies system variables (Wells, 1978). Estimator variables, on the one hand, are factors that are not under the control of the legal system, but they can impact the accuracy of identifications and can be used to estimate the accuracy of an eyewitness after the fact. Examples of estimator variables include the race of the suspect and witness, presence of weapons during the crime, quality and quantity of exposure to the suspect, suspect's change in appearance, and length of time between the crime and presentation of the lineup. On the other hand, system variables are factors that are under the control of the legal system and can be manipulated at the time of the lineup administration. Lineup instructions, lineup procedure, fairness of the lineup, and whether the administrator is aware of the suspect's position in the lineup, are all examples of system variables. The present study investigated the effect of the culprit's race compared to the witness's race (an estimator variable) and the effect of lineup procedures (a system variable) on eyewitness identification accuracy.

Lineup Procedures

For much of the twentieth century police have used the simultaneous lineup. In the simultaneous lineup procedure, the witness is shown all members of the lineup (usually six) at the same time and is asked to identify the culprit. When the culprit is present in the lineup, witnesses are moderately accurate (52% correct identification rate; Steblay et al., 2011). However, when the culprit is absent, witnesses frequently make false identifications (54% false identification rate; Steblay et al., 2011). Poor accuracy for target-absent lineups is particularly problematic because in reality it is rarely known whether the suspect is actually guilty or not. Although steps have been made to increase the accuracy of eyewitnesses (e.g., ensuring the lineup is fair, using unbiased instructions), accuracy rates are still unacceptable (Dupuis & Lindsay, 2007).

Inaccuracy in identifications using the simultaneous lineup has been understood in terms of the decision processes witnesses are using (Lindsay & Wells, 1985). In the simultaneous lineup, witnesses tend to make a *relative judgment* in which they compare all the lineup members to each other, and select the member that looks the most similar to the culprit (Lindsay & Wells, 1985). This strategy can be effective when the culprit is present, but can result in a false identification when the culprit is absent. Instead, an accurate identification is more likely to be made when the witness uses an *absolute judgment* strategy. When using an absolute strategy, the witness compares each lineup member to their memory of the culprit and in essence asks themselves "is this the culprit?" (Lindsay & Wells, 1985).

In order to force people to rely more on an absolute judgment strategy, and thus increase eyewitness accuracy, Lindsay and Wells (1985) created the sequential lineup procedure. In this method, the witness is shown one lineup member at a time and is asked to make a judgment about the member before the next lineup member is presented. Presenting the lineup members sequentially helps to prevent the witness from using a relative judgment strategy, however, it should be noted that it is possible that witnesses are engaging in relative judgments by comparing the current photo with the previously seen photographs. In their original study, Lindsay and Wells found that participants had similar accuracy rates for the simultaneous and sequential lineup procedures when the target was present, but found that correct rejection rates were significantly higher when the target was absent and the sequential lineup was used. This finding became known as the *sequential-superiority effect* and has been widely replicated (Cutler & Penrod, 1988; Lindsay, Lea, & Fulford, 1991; Lindsay, Lea, Nosworthy, et al., 1991). Additionally, two meta-analyses that compared accuracy rates between the simultaneous and sequential lineups found support for the sequential-superiority effect (Steblay, Dysart, Solomon, &

Lindsay, 2001; Steblay et al., 2011). Research has also shown that the sequential lineup remains superior for target-absent lineups when other biases such as a foil bias (i.e., other members in the lineup do not look similar enough to the suspect), clothing bias (i.e., when the lineup foils are not dressed similar to the culprit), or biased instructions (e.g., not letting the witness know the culprit may not be present), are involved (Lindsay, Lea, Nosworthy, et al., 1991).

Despite many of the positive findings supporting the effectiveness of the sequential lineup, recent research has identified limitations of using this procedure. For example, two meta-analyses (Steblay et al., 2001; Steblay et al., 2011) found that although the use of the sequential lineup results in better accuracy when the target is absent (64% verus 43% for sequential versus simultaneous respectively; Steblay et al., 2011), use of the sequential lineup results in decreased accuracy relative to the simultaneous lineup when the target is present (38% verus 52% for sequential versus simultaneous respectively; Steblay et al., 2011). Furthermore, the sequential lineup results in a lower overall choosing rate; possibly because an absolute decision increases the decision threshold making witnesses more conservative when deciding whether they will select someone or not. This conservatism leads to an increase in the overall number of lineups rejected, which decreases accuracy when the target is present, but helps to increase accuracy when the target is absent. This conservatism is problematic when the focus is on trying to correctly identify the guilty suspect. In other words, culprits are more likely to be identified when using the simultaneous lineup, whereas innocent people are more likely to be protected when using the sequential lineup. However, it should be noted that the sequential-superiority effect is not necessarily a result of lower choosing rates as diagnosticity considers both correct and false identifications (Steblay et al., 2011).

The robustness of the sequential lineup for target-present lineups when the culprit undergoes a change in appearance is another potential limitation that was investigated by Memon and Gabbert (2003). They had younger and older adults watch a short video of a theft, and then presented them with a target-present simultaneous or sequential lineup, with the culprit undergoing a change in appearance in half of the cases. They found that when there was a change in the culprit's appearance, younger, but not older, adults made more incorrect rejections using the sequential lineup than when using the simultaneous lineup. This finding indicated that the sequential lineup may be disadvantageous when the culprit changes appearance. Memon and Gabbert suggested that requiring witnesses to use an absolute judgment when the culprit changes appearance would result in lower accuracy because the culprit's new appearance would not closely resemble the witness's memory, and thus an identification would not be made. However, they did not include a target-absent lineup in their study. It is possible that the sequential lineup would be advantageous when the target is absent and the foils do not match the culprit.

The benefits of the sequential lineup also do not appear to be present when the lineup is used with children (Lindsay, Pozzulo, Craig, Lee, & Corber, 1997; Parker & Ryan, 1993; Pozzulo & Lindsay, 1998; Steblay et al., 2001; Steblay et al., 2011). For example, Lindsay et al. (1997) found that children 3 to 15 years of age were not more accurate when shown a sequential lineup than when shown a simultaneous lineup. A meta-analysis by Pozzulo and Lindsay (1998) found that children's accuracy was worse when using a sequential target-absent lineup compared to a simultaneous target-absent lineup. Also, children are more likely to select multiple lineup members when shown a sequential lineup (Lindsay et al., 1997; Parker & Ryan, 1993).

Finally, certain procedural issues may be of concern when administering the sequential lineup. For example, there have been questions raised regarding what to do when the witness makes an identification using the sequential lineup (Levi, 1998). Should the lineup presentation be discontinued (*the stopping rule*)? And, if the lineup is continued, what should happen when more than one identification is made? Furthermore, Lindsay and Bellinger (1999) found that modifications to the original sequential lineup procedure reduce the benefits of the sequential lineup. For example, Lindsay and Bellinger learned from legal professionals that in order to avoid the necessity that the officer administering the lineups be unaware of the suspect's lineup position, police modified the sequential lineup procedure by allowing the participants to self-administer the lineup after the instructions were given. Lindsay and Bellinger compared the original sequential lineup procedure to the police modified procedures and found that the modified procedures did not produce the same higher accuracy rates as the original sequential lineup.

Recent research has focused on exploring the limits of the sequential lineup, and on developing new lineup methods and modifications to the simultaneous and sequential lineups in order to improve accuracy. For example, since the sequential lineup is ineffective for children as mentioned above, Pozzulo and Lindsay (1999) created the elimination lineup in an attempt to increase children's identification accuracy. They hypothesized that child eyewitnesses were less accurate than adults because they have difficulties with the required judgment processes. Specifically, they may not make the required absolute judgments, possibly because they may feel pressured to make an identification and as a result fail to make an absolute judgment (Pozzulo & Lindsay, 1999). They may also fail to make absolute judgments because they may not know that they need to make them, or they may not know how (Pozzulo & Lindsay, 1999). The purpose of the elimination lineup is to assist children in making absolute judgments by breaking up the decision-making process. In the elimination lineup, the witness is first shown all the lineup members simultaneously and then asked to choose the member that looks most similar to the culprit (relative judgment). Following this, all the other lineup members are removed and the witness is asked if the remaining member is actually the culprit (absolute judgment). Results showed that the elimination lineup maintained correct identifications and reduced false identifications for children. However, for adult witnesses the elimination lineup decreased correct identifications relative to the simultaneous lineup when the target was present, and did not affect accuracy when the target was absent. The researchers suggested that these surprising findings regarding the adult sample could be a result of abnormally high accuracy rates in the simultaneous lineup condition.

Few studies have since investigated the elimination lineup using an adult sample. A follow-up study by Pozzulo et al. (2008) was done to determine if the elimination lineup procedure would be effective for adults. They had adult participants watch a video of a theft, and twenty minutes later presented them with either a target-present or target-absent lineup, using one of three lineup presentation methods: simultaneous, sequential, or elimination lineup. Findings showed that when the target was present, all three lineup procedures produced similar accuracy rates, although there was a trend that suggested that the elimination lineup may be related to lower accuracy. However, when the target was absent, the elimination was superior to the simultaneous lineup, but equivalent to the sequential lineup. A similar study was also conducted by Humphries, Holliday, and Flowe (2012), but using videos of lineup members instead of photographs. Their results indicated that all lineups produced comparable accuracy rates for adults, although a trend was found that the elimination lineup may increase correct rejection rates compared to the simultaneous lineup. These findings are in contrast to those of Pozzulo et al., however, it is possible that the effect of the lineup method was unobserved due to the use of videos rather than the simultaneous use of photographs because the simultaneous video lineup requires that each member's video be presented one at a time in a sequential order (Humphries et al., 2012).

Although research examining the robustness of the elimination lineup is sparse, it has been found to be robust to a clothing bias, which occurs when the suspect is the only member in the lineup to wear clothing matching the culprit's description. For adults, correct rejection rates were maintained with the elimination lineup when a clothing bias was introduced, whereas there was a trend for the sequential lineup to have correct rejections decrease as a result of the bias (Pozzulo, Dempsey, & Clarke, 2010). Another study found that when the culprit underwent a change in hairstyle (short, light brown hair versus long, dark brown hair) the elimination lineup was no longer superior to the simultaneous lineup (Pozzulo & Balfour, 2006). Both of these studies found that for target-absent lineups, the elimination lineup was superior to the simultaneous lineup (Pozzulo & Balfour, 2006) and the sequential lineup (Pozzulo et al., 2010). These results are encouraging for the possibility that the elimination lineup could be a suitable alternative lineup procedure for adults. However, the limited amount of research on the use of the elimination lineup with adults warrants further investigation. Thus, the first purpose of the proposed study is to replicate the previous findings of Pozzulo and colleagues, and to determine if the elimination lineup increases accuracy in comparison to the sequential and simultaneous lineups when the target is absent, and whether accuracy is maintained when the target is present.

Development of a lineup procedure that can be used across all ages would be particularly beneficial as it could be difficult to determine at which age the use of the sequential lineup should begin. Although a one size fits all approach may seem unlikely, Pozzulo, Dempsey, and Crescini (2009) found that the elimination lineup increased correct rejection rates over that produced by the simultaneous lineup for children as young as 3 years old. Furthermore, the use of only one lineup procedure would prevent lawyers from calling into question the correct use of the chosen lineup procedure (Pozzulo et al., 2008).

Cross-Race Effect

Another variable that can have a large impact on eyewitness accuracy is the race of the culprit compared to the race of the witness. The *cross-race effect* refers to the finding that people are less accurate at identifying faces of other races than they are at identifying faces of their own race (Meissner & Brigham, 2001). This finding has been found across many ethnic groups including, Caucasians, African Americans, Japanese, Chinese, and First Nations, although the effect is often stronger when majority ethnic groups identify faces of minority ethnic groups (Brigham, Bennett, Meissner, & Mitchell, 2007; Jackiw, Arbuthnott, Pfeifer, Marcon, & Meissner, 2008; Meissner & Brigham, 2001).

Various theories have been proposed to account for the cross-race effect, with the primary focus being on social processes, cognitive processes, or an interaction of both. There is currently no single agreed upon explanation that accounts for the cross-race effect. One theory of the cross-race effect posits that the amount of interracial contact moderates the effect, with less interracial contact causing a stronger effect (Brigham et al., 2007). Interracial contact has been found to play a small role in the occurrence of the cross-race effect (Brigham & Malpass, 1985; Meissner & Brigham, 2001), whether the quantity of contact was determined through self-reports or through more objective measures such as studying ethnic groups who have limited contact with other ethnic groups (Brigham et al., 2007). However, it has been suggested that quality of contact is more important than quantity of contact (Brigham & Malpass, 1985). Furthermore, racial attitudes have not been found to play a direct role in the cross-race effect, however they may affect the amount of contact an individual has with another ethnic group (Meissner & Brigham, 2001).

Other theories take a more cognitive approach in explaining the occurrence of the cross-race effect. One theory states that people will encode diagnostic features (e.g., nose, eyes, lips, etc.) that help to discriminate own-race faces but fail to encode features that would be useful in discriminating other-race faces (Brigham et al., 2007; Meissner & Brigham, 2001). For example, certain features, such as hair colour, may be effective for distinguishing faces of one's own race, but will be ineffective for other races in which the same features show less variability. If an individual's primary experiences are with members of his or her own-race, he or she will then habitually encode the same features when he or she sees a member of another race (Wells & Olson, 2001).

The configural-featural hypothesis postulates that people encode facial features of same-race individuals configuraly (relationally), whereas they encode other-race facial features featuraly (Meissner & Brigham, 2001; Rhodes, Brake, Taylor, & Tan, 1989). Specifically, configural encoding involves encoding the spatial relations of facial features (e.g., the spacing between the eyes and the nose), whereas featural encoding involves encoding each feature separately while ignoring the spatial relations of the features. This is based on the observation that experience with certain stimuli leads to configural encoding, whereas inexperience with other stimuli results in featural encoding (Meissner & Brigham, 2001). Finally, the cognitive disregard theory (Rodin, 1987) suggests that people pay more attention to same-race faces and less attention to other-race faces because it is of lesser importance to do so (Brigham et al., 2007). This would result in superficial encoding of other-race faces, with a large focus placed on encoding the race of the individual, whereas encoding specific details would be the focus when viewing same-race faces.

More recent theories have attempted to integrate previous theories of the cross-race effect into a more encompassing explanation. Sporer's (2001) in-group/out-group model (IOM) hypothesizes that when an individual perceives an own-race or in-group face they automatically engage in a deeper level of processing that involves encoding the relevant facial features in a configural manner, thus enabling the individual to better discriminate the face from other faces in memory. Alternatively, the IOM hypothesizes that when an individual comes across an other-race (or out-group) face, out-group characteristics result in an initial, automatic categorization of the face (Brigham et al., 2007; Sporer, 2001; Wells & Olson, 2001). Categorization may then lead to cognitive processes—mentioned in other theories reviewed above—that contribute to the occurrence of the cross-race effect, such as cognitive disregard, shallower encoding, or featural encoding (Sporer, 2001). Furthermore, the extent to which an individual is able to efficiently process the face and determine the relevant facial features to focus on is related to the quantity and quality of contact with out-group members.

Although there is no consensus on which theory is correct, all of the theories do hold in common the underlying assumption that the cross-race effect is due to an encoding problem rather than a retrieval problem (Pezdek, O'Brien, & Wasson, in press). Additionally, participants themselves have reported having weaker memories for other-race faces than same-race faces (Smith, Stinson, & Prosser, 2004). As a result, the majority of research has focused on moderating the cross-race effect by manipulating events at the time of encoding. For example, it has been found that the strength of the cross-race effect increases as encoding time decreases (Marcon, Meissner, Frueh, Susa, & MacLin, 2010; Meissner & Brigham, 2001). Additionally, Pezdek et al. (in press) found that presenting faces in groups at the encoding phase increased the cross-race effect compared to presenting the faces one at a time. Although these studies are useful for understanding the mechanisms involved in creating the cross-race effect, they have limited applicability to eyewitness identification situations, particularly because the cross-race effect cannot be moderated at encoding in applied forensic settings.

Few studies have attempted to investigate factors that could moderate the cross-race effect at the retrieval stage, and even fewer studies have employed a lineup paradigm. For example, fewer than 10% of the studies included in the meta-analysis by Meissner and Brigham (2001) used a lineup paradigm; instead, the majority of studies used an old-new recognition paradigm when studying the cross-race effect. Evans, Marcon, and Meissner (2009) attempted to moderate the cross-race effect at the retrieval stage using context reinstatement and a simultaneous lineup design. They had participants view same- and other-race faces, and in some conditions presented extra semantic contextual information (e.g., a name or a hobby). At retrieval they presented the same semantic information corresponding to the target, before presentation of the lineup, in an attempt to create a context reinstatement effect. They found that context reinstatement improved identification accuracy for same-race faces, but that it did not affect other-race identification accuracy.

Smith, Lindsay, Pryke, and Dysart (2001) conducted a study to determine if certain variables (i.e., confidence, decision time, and judgment strategy) known to postdict same-race identification accuracy, could be used to postdict cross-race identification accuracy. Caucasian and Asian participants watched a video of a theft containing either a same-race or other-race culprit, and then were presented with either a target-present or target-absent simultaneous lineup. Participants then completed a two-item self-report measure in which they recorded whether their judgment strategy reflected either absolute judgments or relative judgments. Results indicated that for people who selected a member from the lineup (choosers), the judgment strategy was able to postdict accuracy for same-race identifications, but not for other-race identifications. Specifically, people who made same-race identifications were more likely to be correct if they reported using an absolute judgment strategy. None of the variables postdicted accuracy for people who did not select a member from the lineup (nonchoosers), for either same-race or other-race identifications. Smith et al. (2001) suggested that these results may indicate that the sequential-superiority effect may not exist for other-race identifications, although they did not directly assess this.

In a follow-up study, Smith, Stinson, and Prosser (2004) sought to determine if witnesses making a same-race identification were more likely to report using an absolute strategy, and if witnesses making a cross-race identification would be more likely to report using a relative judgment strategy. Using a procedure similar to Smith et al. (2001), Caucasian participants watched a video of a theft involving either a Caucasian or African American culprit, followed by the presentation of either a target-present or target-absent lineup. Using a two-item self-report scale and by describing their strategy using an open response format, participants recorded the judgment strategy they thought they employed. For choosers, the judgment strategy employed did not differ between people making same-race identifications and people making cross-race identifications, although there was a trend that participants in the cross-race condition were more likely to use a relative judgment strategy (Smith et al., 2004). Similar findings were found for nonchoosers, such that the judgment strategy reported did not differ between people making same-race or cross-race identifications, although there was another trend that an absolute judgment strategy was more likely to be reported by people making a same-race identification (Smith et al., 2004).

Considering these findings, and the limited amount of research investigating factors that could moderate the cross-race effect in an eyewitness identification situation, the second purpose of the current study is to determine if lineup procedures can moderate the cross-race effect. Currently, to my knowledge, there is no published study that has attempted to moderate the cross-race effect using a lineup procedure manipulation. This is surprising considering the fact that this research would have real-world applicability. As Wells and Olson (2001) have noted, realistic solutions to the cross-race effect will not likely come from understanding the causes of the cross-race effect, because the cause cannot be influenced at the time of lineup administration. Instead they recommended that the focus be put on minimizing the effect (Wells & Olson, 2001). By conducting this study, not only will factors be examined that may influence the cross-race effect at retrieval and that are under the legal system's control, but the robustness of the old and new lineup procedures will also be explored. Testing the robustness of lineups is important because it is often assumed that the sequential lineup is superior across most situations, and a change from using the simultaneous lineup to the sequential lineup has been recommended by researchers (e.g., Lindsay, Mansour, Beaudry, Leach, & Bertrand, 2009) and Justice Canada (FPT Heads of prosecutions commitee working group, 2004). As a result, sequential lineup procedures have been adopted by many jurisdictions (Pozzulo et al., 2010) even though the situations in which it may be inappropriate to use the sequential lineup (e.g., children), are often unspecified.

Current Study

The purposes of this study are (1) to determine if the elimination lineup is effective for adults, namely is it equivalent to or better than the sequential lineup; and (2) to determine if lineup procedures, and in particular the elimination lineup, can moderate the cross-race effect, which will also further indicate the robustness of the elimination lineup. In order to ensure that the current study was feasible, only the race of the suspect was manipulated. Differential predictions are made based on whether the target is present or absent, and whether the witness's race is the same or different from that of the culprit. However, as no previous research has used the sequential or elimination lineups with cross-race identifications, and little is known about how cross-race lineup identifications differ from same-race lineup identifications, no a priori hypotheses are made regarding which lineups may moderate the cross-race effect. Thus, the second research question for the current study is exploratory. Additionally, no hypothesis was made for target-present, same-race lineups as there was no reason to expect that accuracy would differ between lineup procedures based on previous research involving elimination lineups and some research with sequential lineups; although Steblay et al. (2011) did find that the simultaneous lineup results in higher correct identification accuracy than the sequential lineup. .

The first hypothesis is in regards to same-race identifications. In accordance with the previous research of Humphries et al. (2012), Pozzulo and Balfour (2006), and Pozzulo et al. (2008), and based on the theory that making absolute judgments increase accuracy, particularly for target-absent lineups, it is predicted that there will be an increase in correct rejections for the sequential and elimination lineups compared to the simultaneous lineup, with the elimination lineup producing the highest accuracy rate for target-absent lineups.

The second set of hypotheses is in regards to other-race identifications. As previous research has shown that absolute judgment strategies increase accuracy and, based on the theory that the cross-race effect is a result of ineffective encoding, it is predicted that the elimination lineup and the sequential lineup will increase accuracy relative to the simultaneous lineup when the target is absent, but will decrease accuracy when the target is present. Specifically, because other-race faces will likely not be encoded sufficiently, this will hinder the ability to select a photograph resembling their memory, thus resulting in an increase in accuracy when the culprit is absent (Sporer, 2001). Conversely, a relatively weak memory trace for other-race faces and the requirement of an absolute judgment strategy, will make it less likely for the witness to choose the culprit when he or she is actually present (Charman & Wells, 2004; Dupuis & Lindsay, 2007; Sporer, 2001). It should be noted that if one difficulty with identifying other-race faces is the inability to distinguish different faces, or if witnesses making other-race identifications are more inclined to use a relative judgment strategy (Smith et al., 2004), it would be even more critical to ensure witnesses are using an absolute judgment strategy, rather than allowing them to compare all the photos in order to select the one that most resembles the culprit.

CHAPTER II

Method

Participants

Two hundred sixty-nine participants who self-identified as Caucasian were recruited through the Department of Psychology’s participant pool. A minimum sample of 240 was determined based on Peng, Lee, and Ingersoll (2002) who recommended 10 participants per variable or a minimum sample of 100 participants when using logistic regression to analyze the data.

None of the participants reported having any previous experience with a police lineup. However, 51 of the participants had reported that they had taken a psychology and law course, forensic psychology course, or another course in which eyewitness identification or lineup methodology had been discussed. As an unexpected number of students reported taking a course involving the discussion of lineups, chi-square analyses were performed to determine if there were differences in accuracy between participants reporting taking such a course or not. As no differences emerged, all were retained in the final sample.

After one participant was excluded because of missing data, the final sample included 268 participants (M = 21.64 years, SD = 6.17 years; 2 transgender, 46 males, 220 females), with 136 viewing a target-present lineup, and 132 viewing a target-absent lineup. All participants received academic credit in exchange for their participation.

Design

Participants were randomized to a 2 (Race of Culprit: Same [Caucasian], Other [Chinese]) x 3 (Lineup Procedure: Simultaneous, Sequential, Elimination) x 2 (Lineup

Type: Target-Present, Target-Absent) between-subjects design, with the restriction that gender would be evenly distributed across conditions. The dependent measure was correct identifications for target-present lineups and correct rejections for target-absent lineups.

Materials

Video. An approximately 55 second video of a mock, non-violent theft was filmed twice, once using a Caucasian man and again using a Chinese man as the culprit. The video shows the culprit approaching an empty lemonade stand in a park during daylight. Once at the lemonade stand, the culprit cautiously looks around, drinks some lemonade, and steals some cash from a jar before running off. The video contained both front and side profile views of the culprit, with an approximately 10 second close-up of the culprit's face.

Lineup Construction. In order to create the lineup stimuli, head-and-shoulder colour photographs were taken of Caucasian and Chinese volunteers who were known to the author. Online face databases (Minear & Park, 2004) were also searched for suitable photographs that could be used as foils to create a six-person lineup. The photographs were then visually compared to a photograph of the culprit and six photos that were considered to contain males who looked similar to the culprit were selected by the researcher and six peers for each race. Each final photograph was 4" by 4" and contained a male wearing a black t-shirt with a neutral facial expression. Two, single-race, six-person preliminary lineups containing the culprit were created (one for each race).

The match-to-description method (see Wells, Rydell, & Seelau, 1993) was used to test the preliminary lineups. Four individuals were shown the mock crime videos for the

Chinese and Caucasian culprits and asked to create a description of the culprits from memory. A modal description (see Lindsay et al., 2009) was then created for each culprit. The final description for the Caucasian culprit was: *Caucasian male, early 20s, short brown hair, brown eyes, slim to average build*; and the final description for the Chinese culprit was: *Asian male, early to mid-20s, short black hair, medium build*. The lineups were then presented using the mock witness paradigm (Doob & Kirshenbaum, 1973; Wells, Leippe, & Ostrom, 1979) to numerous individuals who were unfamiliar with the study. Specifically, participants were given the preliminary lineups (displayed in a 2x3 matrix) with a form containing the description, and were asked to select who they thought the culprit was, based solely on the provided description. If the lineup is fair and unbiased, the foils and culprit should be selected at a rate no difference than chance (Malpass, Tredoux, & McQuiston-Surrett, 2007). As some foils and the culprit were chosen more frequently than expected, their photo was removed and another photo resembling the culprit took its place. New participants were then shown the new lineups and modal descriptions and the process was repeated until the final lineups were determined to be as unbiased as possible.

Measures of lineup bias and effective lineup size were calculated (Malpass, 2004) in order to assess the fairness of the lineups. A measure of lineup bias is used to determine if the suspect is selected at a rate equal to chance by people who have not seen the culprit (chance is equal to 1/number of lineup members; Malpass et al., 2007). The lineup is biased if the suspect is chosen significantly more or less than chance. For the current study, lineup bias was determined by directly calculating binomial probabilities using software provided by Malpass (2004). Effective lineup size assesses the number of plausible members in the lineup such that no one member stands out above the rest. Tredoux's E' was used to calculate effective size (Malpass et al., 2007; Tredoux, 1998). With Tredoux's E', the maximum value is the total number of people in the lineup, thus for the current lineup, the maximum value is six–indicating six plausible lineup members.

Participants for the mock witness paradigm were recruited from volunteers on campus and from participants in other psychology studies who agreed to participate. Forty-seven individuals participated in identifying the suspect from a mock Caucasian lineup. The lineup bias measure indicated the suspect was not selected at a rate different than chance (proportion selecting culprit = 0.21; chance = 0.17; α = .05; critical value = 1.96, obtained critical ratio = 0.77) and Tredoux's E' indicated the final Caucasian lineup had 4.08 plausible members. Forty-seven different individuals participated in identifying the suspect from a mock Chinese lineup. The lineup bias measure indicated the suspect was not selected at a rate different than chance (proportion selecting culprit = 0.21; chance = 0.17; α = .05; critical value = 1.96, obtained critical ratio = 0.77) and Tredoux's E' indicated the final Chinese lineup had 5.43 plausible members. Table 1 presents the number of individuals who selected each lineup member during the mock witness paradigm. It should be noted that there is no set standard for determining an acceptable effective size as many researchers note that recommending a nominal lineup size would be arbitrary and that it is up to the justice system to determine what is defensible and considered fair (Levi & Lindsay, 2001; Malpass, 1981; Turtle, Lindsay, & Wells, 2003; Wells et al., 1979; Wells et al., 1998). However, the general consensus is that the more people that compose a lineup, the better, so as to better protect an innocent suspect from being identified (Levi & Lindsay, 2001; Turtle et al., 2003; Wells & Olson, 2001).

Table 1

The Number of Individuals Selecting Each Lineup Member During the Final Mock Eyewitness Paradigm.

Lineup	Lineup Member					
	1	2	3	4	5	6
Caucasian Lineup	0	12	5	10	16	4
Asian Lineup	11	7	8	10	8	3

Target-absent lineups were created by removing the culprit and replacing it with an alternative photograph (see Appendix A for the photos contained in the lineup). For all lineups, all of the foils remained the same and remained in the same position for each of the conditions. The culprit's photo, or the substituted photo in the target-absent conditions, remained in position four for all conditions.

Procedure

The following procedure received clearance by the Research Ethics Board prior to the start of the study. Participants were brought into the lab in groups of up to eight. Each participant was presented the video and lineup individually and out of sight from the remaining participants. Each participant was randomly assigned to one of twelve conditions with the restriction that male and female participants be evenly distributed across the 12 conditions.

Once in the lab, the participant was informed that she/he would be participating in a study examining perceptual experiences and that she/he would be asked to complete questionnaires regarding his or her experience. After obtaining written consent, participants were asked to watch a short video on their computer screen while the experimenter collected the remaining materials for the study. This nonchalant method of introducing the video was done to help minimize participants' awareness about later being asked to remember information from the video. Half of the study's participants watched a video containing a Caucasian culprit and half watched a video containing a Chinese culprit. Following the short video of the mock crime, the participants completed the HEXACO-PI-R (Lee & Ashton, 2004), a 100-item personality inventory used as a distractor task. If participants completed the questionnaire before the 20 minutes had passed, they were instructed to do other work. After 20 minutes, each participant was taken individually to another room and informed that the video he or she watched was of a mock crime and that he or she now needed to identify the culprit from the video. Depending on the condition, the participant viewed either a target-present or target-absent lineup using one of the three lineup procedures (i.e., simultaneous, sequential, or elimination) and were asked to make an identification using the identification form and directions similar to those used by Pozzulo et al. (2008; see Appendix B, C, and D for forms). In order to ensure that the person administering the lineup could not influence the witness's choice by giving unintentional cues, and to mimic best-practice procedures (Wells et al., 1998), the experimenters running the study were not familiar with the mock crime video or were aware of who the culprit was.

In the simultaneous lineup conditions, the participant was presented with six photographs in two rows of three, and an identification form (see Appendix B). The experimenter then read the following directions:

> Now I am going to show you some pictures. The culprit's picture may or may not be present. To start off, think back to what the culprit looks like. If you see the culprit, place a checkmark in the box corresponding to the culprit's picture location. If you do not see the culprit, place a check mark in the "not here" box.

In the sequential lineup condition, the participant was provided with a five page response form that allowed the participant to judge up to 15 photos, although only a six photo lineup was used (see Appendix C). As originally suggested by Lindsay and Wells (1985), each participant was unaware of how many photos they would be viewing, in order to prevent them from feeling pressured to make an identification as the number of remaining photos decreased. The experimenter then read the following directions:

> Now I am going to show you some pictures. The culprit's picture may or may not be present. You will see each picture once. You need to make an identification decision each time I show you a picture. Once you have made an identification decision, you will not be able to see that picture again. You will not be able to move ahead or back in the sequence. To start off, think back to what the culprit looks like, and compare your memory of the culprit's face to each picture. If the picture shown is the culprit, place a checkmark beside "yes." If the picture shown is not the culprit, place a checkmark beside "no."

The experimenter then proceeded to pull one photo at a time out of a folder and asked the participant "Is photo X, a picture of the culprit?" After the participant made a decision, the experimenter proceeded until all six photos had been shown. Because all of the photographs were shown, only the first identification was recorded as the witness's response, even if she/he made more than one identification. This was done to ensure that the results would be comparable to previous research that stopped the lineup after the first identification, but it is more informative as it can be determined whether witnesses will make more than one identification.

For the elimination lineup, the participant was presented with the same lineup display as used in the simultaneous lineup condition; however, a different identification was used (see Appendix D). Upon presenting the lineup, the experimenter read the following directions:

> Now I am going to show you some pictures. The culprit's picture may or may not be present. To start off, think back to what the culprit looks like. Please look at the pictures and pick out the person that looks most like the culprit.

Following the selection of a photo, all of the other photos were removed out of view and the participant was told the following instructions:

> This may or may not be a picture of the culprit. Think back to what the culprit looked like. Now, compare your memory to this photograph. Then make a decision. If this is a picture of the culprit, place a checkmark beside "Yes, this is a picture of the culprit." If this is a picture of someone else, place a checkmark beside "No, this is not a picture of the culprit."

Following each judgment, all participants in each condition were also asked to make a confidence rating on a scale ranging from *not at all confident (0)* to *completely confident (100)*. After administration of the lineup, participants immediately completed a demographics questionnaire (see Appendix E). The participants were then debriefed, asked not to discuss the study with others, and were awarded his or her bonus credit. The entire procedure took approximately 45 minutes.

CHAPTER III

Results

The data were analyzed separately for target-present and target-absent lineups. The proportion of correct identifications was the dependent variable for target-present lineups, and the proportion of correct rejections was the dependent variable for target-absent lineups. Table 2 presents the number of individuals selecting each lineup member for each lineup procedure. Table 3 presents the number of participants selecting more than one photograph when presented the sequential lineup. Table 4 presents the rate that each lineup member "survives" judgment one during the elimination lineup followed by the identification rate after judgment two. Table 5 presents the proportion of participants identifying any of the lineup members for each lineup type.

Logistic regression was used to analyze correct identifications (target-present) and correct rejection (target-absent) rates, with lineup procedure and culprit-race as the independent variables. Both independent variables and their interaction were entered simultaneously into the model, but the interaction was dropped when it was found to be nonsignificant. Overall goodness-of-fit was assessed using the Hosmer and Lemeshow test, and odds ratios were used as an estimate of effect size. Chi-square tests were used for simple group contrasts. Cramer's V was used to estimate effect size for the chi-square analyses.

Target-Present Lineups

Main effects. A logistic regression was conducted to determine if lineup procedure and race of the culprit could predict correct identification. Lineup procedure (simultaneous, sequential, and elimination), race of culprit (same-race and other-race),

Table 2

The Number of Individuals Selecting Each Lineup Member for Each Lineup Procedure

Lineup Type	Lineup member						No one chosen	Total
	1	2	3	4	5	6		
Same-race; target-present								
Simultaneous	0	3	0	16	0	0	3	22
Sequential	5	0	0	7	0	1	10	23
Elimination	1	2	0	13	1	0	5	22
Same-race; target-absent								
Simultaneous	1	2	1	1	4	0	13	22
Sequential	3	1	0	0	1	0	17	22
Elimination	0	2	0	0	4	1	16	23
Other-race; target-present								
Simultaneous	1	3	0	10	1	0	7	22
Sequential	14	0	0	2	0	0	6	22
Elimination	7	1	0	5	0	0	12	25
Other-race; target-absent								
Simultaneous	6	4	1	2	1	0	6	20
Sequential	6	1	1	0	0	0	14	22
Elimination	8	3	1	1	0	0	10	23

Note. The culprit was in position four for target-present lineups. An alternative photograph replaced the culprit's photograph for target-absent lineups.

Table 3

Proportion (Number) of Participants Selecting More Than One Photograph When Presented the Sequential Lineup and the Proportion (Number) Who Were Correct

Same-race lineups	% (n)	% (n)
Target-present	8.7 (2)	0.0 (0)
Target-absent	4.5 (1)	0.0 (0)
Other-race lineups		
Target-present	31.8 (7)	0.0 (0)
Target-absent	9.1 (2)	0.0 (0)

Table 4

Survival Rates After Judgment 1 and Identification Rates Following Judgment 2 for Each Lineup Member for the Same- and Other-Race Elimination Lineups

Lineup member	Target-present		Target-absent	
Same-race	Survival rate at judgment 1	Identification rate at judgment 2	Survival rate at judgment 1	Identification rate at judgment 2
1	1	1	1	0
2	2	2	8	2
3	0	--	0	--
4	16	13	0	--
5	1	1	8	4
6	1	0	5	1
Other-race				
1	9	7	14	8
2	2	1	4	3
3	2	0	1	1
4	9	4	2	1
5	1	0	1	0
6	1	0	1	0

Note. Survival rate at judgment 1 indicates how many participants chose each lineup member when asked to pick the lineup member who was most similar to the culprit. Identification rate at judgment 2 indicates how many participants identified each lineup member as the culprit.

Table 5

The Proportion of Participants Identifying Any of the Lineup Members for Each Lineup Type (Choosing Rate)

	Lineup procedure		
Lineup type	Simultaneous	Sequential	Elimination
Same-race			
Target-present	86.40	56.50	77.30
Target-absent	40.90	22.70	30.40
Other-race			
Target-present	68.20	72.70	48.00
Target-absent	65.00	36.40	56.50

and their interaction, were entered simultaneously into the model. Analyses revealed that the interaction was nonsignificant, $\chi^2(2) = .836$, $p = .658$, and thus the interaction term was dropped from the model and the analysis was run again. Overall goodness-of-fit was assessed using the Hosmer and Lemeshow test which indicated that the incomplete model was a good fit for the data, $\chi^2(4) = 0.842$, $p = .933$. A main effect of culprit race was found to be significant such that participants identifying a same-race culprit were 4.74 times more likely to correctly identify the culprit than a participant identifying an other-race culprit, $\chi^2(1) = 14.17$, $p < .001$ (Figure 1). A main effect of lineup procedure on correct identifications was also found, $\chi^2(2) = 14.81$, $p = .001$ (Figure 2). Specifically, regardless of the race of the culprit, participants shown the simultaneous lineup were 7.46 times more likely to correctly identify the culprit than participants shown a sequential lineup, $\chi^2(1) = 14.63$, $p < .001$, and 6.94 times more accurate than participants shown an elimination lineup, $\chi^2(1) = 4.84$, $p = .028$. However, correct identification rates were similar between the sequential and elimination lineups, $\chi^2(1) = 2.97$, $p = .085$ (Cramer's V = .18).

Effectiveness of the elimination lineup. To determine the effectiveness of the elimination lineup with adults, chi-square analyses were run separately for both same-race and other-race conditions in order to determine the effectiveness of the lineups, without race acting as a possible confound. Figure 3 represents the proportion of correct identifications for each lineup.

Same-race lineups. Three 2 x 2 chi-square analyses (simultaneous vs. sequential; simultaneous vs. elimination; and sequential vs. elimination) were run to determine the association between lineup procedure and correct identifications for participants who

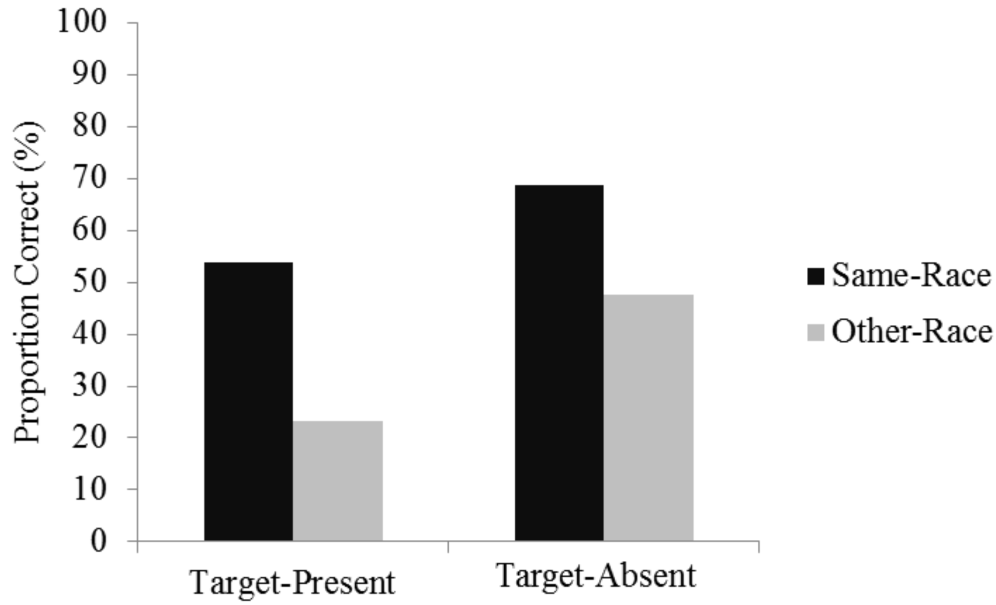

Figure 1. Proportion of Correct Identifications (Target-Present) and Correct Rejections (Target-Absent) for Same- and Other-Race Identifications Collapsed Across Lineup Procedures.

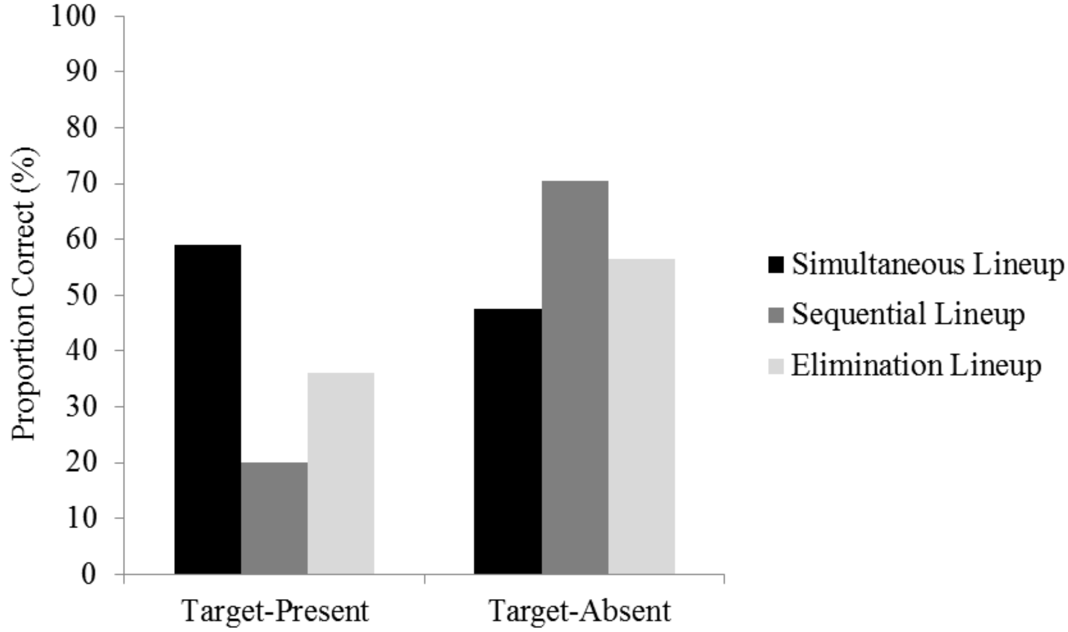

Figure 2. Proportion of Correct Identifications (Target-Present) and Correct Rejections (Target-Absent) for Each Lineup Collapsed across Same- and Other-Race Identifications.

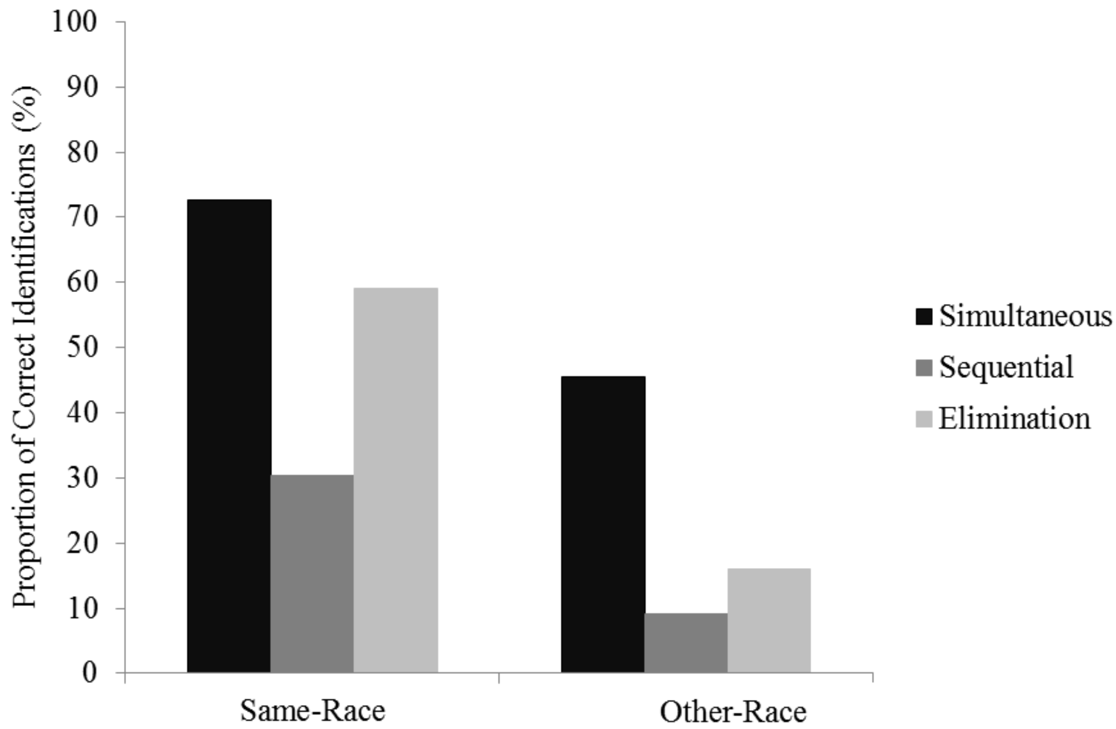

Figure 3. Proportion of Correct Identifications for Each Lineup for Same- and Other-Race Identifications.

viewed a culprit of the same race. Participants who were presented with a simultaneous lineup were 6.09 times more likely to correctly identify the culprit than participants who were presented a sequential lineup, χ^2 (1, N = 45) = 8.05, p = .005 (Cramer's V = .42). Additionally, participants who were presented with an elimination lineup were 3.30 times more likely to correctly identify the culprit than participants who were presented a sequential lineup, however, this association was only approaching significance χ^2 (1, N = 45) = 3.74, p = .053 (Cramer's V = .29). Finally, accuracy was comparable between participants who were presented the simultaneous lineup and those who were presented the elimination lineup, χ^2 (1, N = 44) = 0.91, p = .340 (Cramer's V = .14).

Other-race lineups. Three 2 x 2 chi-square analyses were run to determine the association between lineup procedure and correct identifications, for participants who viewed a culprit of a different race from themselves. Participants who were presented with a simultaneous lineup were 8.33 times more likely to correctly identify the culprit than participants who were presented a sequential lineup, χ^2 (1, N = 44) = 7.33, p = .007 (Cramer's V = .41), and were also 4.38 times more likely to correctly identify the culprit than participants who were presented an elimination lineup, χ^2 (1, N = 47) = 4.85, p = .028 (Cramer's V = .32). A statistical comparison between participants who viewed the sequential lineup and those who viewed an elimination lineup cannot be run, as two of the cells have an expected count of less than 5, which violates the assumption of chi-square. However, based on an examination of the frequency of correct identifications between the two conditions, it can be assumed that accuracy between the sequential (9% correct identification) and elimination lineup (16% correct identification) is comparable, which is to say, poor. It should also be noted that 31.80% of participants selected more than one lineup member during the sequential lineup procedure, and none of these participants were coded as correctly identifying the culprit.

Moderating the cross-race effect. Chi-square analyses were used to determine if any of the three lineup procedures could be used to moderate the cross-race effect with target-present lineups. Fisher's exact test was used for comparing the sequential lineups under same- and other-race conditions as two of the cells had an expected cell count less than 5. As this portion of the study was exploratory, no a priori predictions were specified. Both the simultaneous and sequential lineup were found to be protective against the cross-race effect, χ^2 (1, N = 44) = 3.39, p = .066 (Cramer's V = .28) and p = .135 (odds ratio = 4.38) respectively. In other words, identifying a culprit of another race did not negatively impact correct identification rates when presented with a simultaneous or sequential lineup. In contrast, the elimination lineup significantly impacted correct identification rates when participants were required to identify an other-race culprit, χ^2 (1, N = 47) = 9.41, p = .001 (Cramer's V = .45). Specifically, when given an elimination lineup, participants were 7.58 times more likely to misidentify or incorrectly reject the lineup when attempting to identify an other-race culprit compared to a same-race culprit. Overall, the simultaneous and sequential lineups appear to protect against the cross-race effect, whereas the elimination lineup inflates the cross-race effect.

It should be noted that the simultaneous lineup comparison was approaching significance, and that with increased power it may no longer be protective against the cross-race effect. In fact, when shown a simultaneous lineup, participants were 3.20 times more likely to misidentify or incorrectly reject the lineup when attempting to identify an other-race culprit compared to a same-race culprit.

Target-Absent Lineups

Main effects. A logistic regression was conducted to determine if lineup procedure and race of the culprit could predict correct rejection of target-absent lineups. Lineup procedure (simultaneous, sequential, and elimination), race of culprit (same-race and other-race), and their interaction, were entered simultaneously into the model. Analyses revealed that the interaction was nonsignificant, $\chi^2(2) = .23$, p =.122, and thus the interaction term was dropped from the model and the analysis was run again. Overall goodness-of-fit was assessed using the Hosmer and Lemeshow test which indicated that the incomplete model was a good fit for the data, $\chi^2(4) = 0.23$, $p = .944$. A main effect of culprit race was found to be significant such that participants identifying a same-race culprit were 2.53 times more likely to correctly reject a target-absent same-race lineup than a participant identifying an other-race target-absent lineup, $\chi^2(1) = 6.25$, $p = .012$ (Figure 1). No main effect of lineup procedure on correct rejections was found, $\chi^2(2) = 5.00$, $p = .082$ (Figure 2). However, regardless of the race of the culprit, participants shown the sequential lineup were 2.82 times more likely to correctly reject the lineup than participants shown a simultaneous lineup, $\chi^2(1) = 4.95$, $p = .026$.

Effectiveness of the elimination lineup. To determine the effectiveness of the elimination lineup with adults, chi-square analyses were run separately for both the same-race and other-race conditions, in order to determine the effectiveness of the lineups without race acting as a possible confound. Figure 4 represents the proportion of correct rejections for each lineup.

Same-race lineups. Three 2 x 2 chi-square analyses were run to determine the association between lineup procedure and correct identifications, for participants who

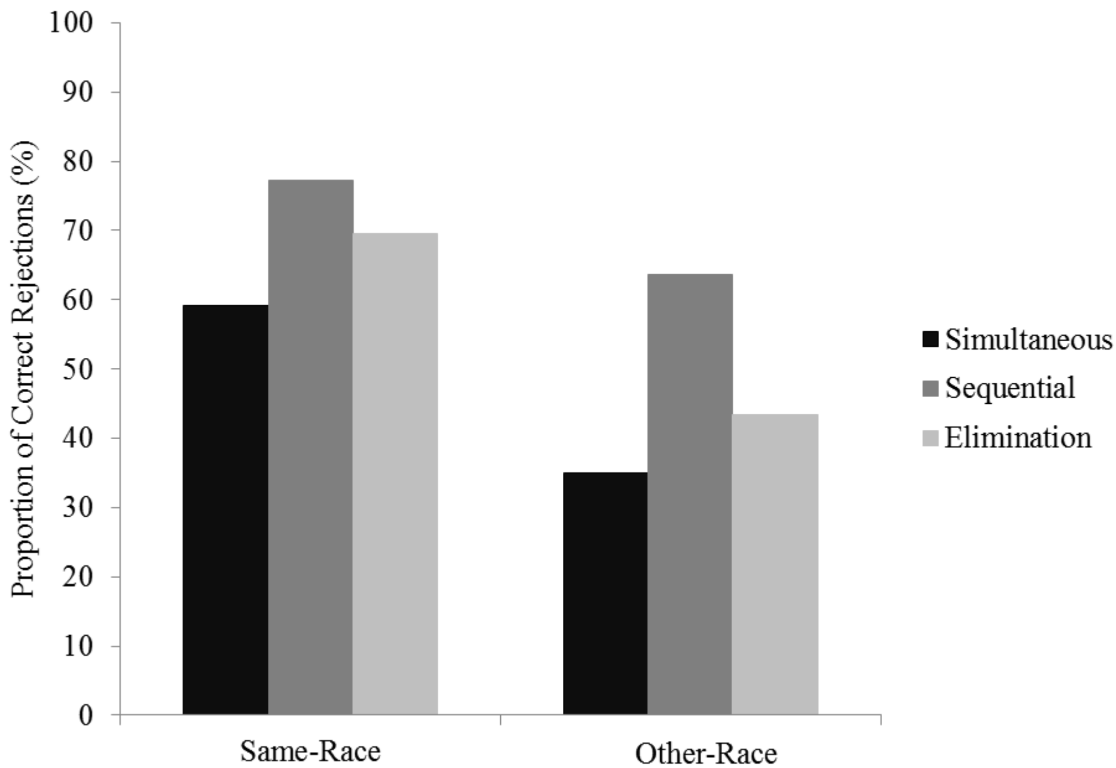

Figure 4. Proportion of Correct Rejections for Each Lineup for Same- and Other-Race Identifications.

viewed a culprit of the same race. Comparable identification rates were observed between each lineup presentation method such that no lineup procedure produced higher accuracy than another procedure: Simultaneous vs. Sequential, χ^2 (1, N = 44) = 1.68, p = .195 (Cramer's V = .20); Simultaneous vs. Elimination, χ^2 (1, N = 45) = 0.54, p = .463 (Cramer's V = .11); and Sequential vs. Elimination, χ^2 (1, N = 45) = 0.34, p = .559 (Cramer's V = .09).

Other-race lineups. Three 2 x 2 chi-square analyses were run to determine the association between lineup procedure and correct identifications, for participants who viewed a culprit of a different race from themselves. Participants who were presented with a sequential lineup were 3.25 times more likely to correctly identify the culprit than participants who were presented a simultaneous lineup, although this association was nonsignificant, χ^2 (1, N = 42) = 3.44, p = .064 (Cramer's V = .29). Participants who were presented an elimination lineup had comparable accuracy to participants who were shown a simultaneous, χ^2 (1, N = 43) = 0.32, p = .571 (Cramer's V = .09), or sequential lineup, χ^2 (1, N = 45) = 1.84, p = .175 (Cramer's V = .20).

Moderating the cross-race effect. Chi-square analyses were used to determine if any of the three lineup procedures could be used to moderate the cross-race effect with target-absent lineups, in order to minimize the cross-race bias. As mentioned above, as this portion of the study was exploratory, no a priori predictions were specified. Both the simultaneous and sequential lineup were found to be protective against the cross-race effect, χ^2 (1, N = 42) = 2.44, p = .118 (Cramer's V = .12) and χ^2 (1, N = 44) = 0.98, p = .322 (Cramer's V = .15) respectively. In other words, identifying a culprit of another race did not negatively impact correct rejection rates when presented with a simultaneous or sequential lineup. Similarly, the elimination lineup also did not negatively influence correct rejection rates, however, the comparison approached significance and with more power an effect may be detected, χ^2 (1, N = 46) = 3.19, *p* = .074 (Cramer's V = .26). Overall, the simultaneous, sequential, and elimination lineups produced comparable correct rejection rates regardless of whether the participant was identifying a same- or other- race culprit.

Diagnosticity

Suspect identification diagnosticity ratios were calculated for each lineup procedure for both same- and other-race identifications using conditional probabilities, as suggested and outlined by previous researchers (e.g., Clark, Howell, & Davey, 2008; Wells & Lindsay, 1980). Diagnosticity ratios can be compared as a way to measure the overall effectiveness of a lineup and indicate the superiority of one lineup over another, with higher values indicating a superior lineup (Steblay et al., 2011; Wells & Lindsay, 1980). In general, suspect diagnosticity ratios indicate the likelihood that a guilty suspect is identified relative to an innocent suspect being identified. In other words, suspect diagnosticity ratios give information about the probability that the chosen suspect is actually guilty. Conditional probability of diagnosticity was calculated by taking the proportion of correct identifications for target-present lineups divided by the sum of the proportion of correct identifications for target-present lineups and the proportion of false identifications from target-absent lineups. Because there was no a priori designated innocent suspect for the target-absent lineup, the proportion of false identifications was divided by the lineup size (6).

For same-race identifications, the elimination lineup had the largest diagnosticity ratio (0.66), followed by the simultaneous lineup (0.64) and then the sequential lineup (0.57). In comparison, for other-race identifications, the simultaneous lineup had the largest diagnosticity ratio (0.41) followed by the elimination lineup (0.22) and the sequential lineup (0.20). Overall, the elimination lineup was marginally superior compared to the other lineup procedures for same-race identifications, whereas the simultaneous lineup was a superior lineup procedure for other-race identifications. It should also be noted that the elimination lineup experienced the greatest drop in diagnosticity between same- and other-race identifications (difference of .44), followed by the sequential (difference of .37) and simultaneous (difference of .23) lineups.

Overall diagnosticity ratios, regardless of culprit race, were also calculated to determine the effectiveness of the lineups. These ratios take into account both target-present and target-absent lineups, but are not dependent on whether a same- or other-race identification was made. The simultaneous lineup had the largest diagnosticity ratio (0.53) followed by the elimination lineup (0.45) and the sequential lineup (0.40).

CHAPTER IV

Discussion

The first purpose of the current study was to determine if an elimination lineup procedure, originally designed for use with children, could be effective for adults in comparison to the simultaneous and sequential lineups. The second purpose of this study was to determine which lineup procedures, if any, could moderate the cross-race effect, such that the magnitude of the discrepancy between same- and other-race identification accuracy would be reduced. In general, it was hypothesized that accuracy would differ between the lineup procedures based upon whether the culprit was present or absent, and whether a same- or other-race identification was being made. The current findings in relation to each research question and the corresponding specific hypotheses in light of other research are discussed below.

Effectiveness of the Elimination Lineup

Before the data were considered separately for same- and other-race identifications, the effectiveness of the elimination lineup regardless of culprit race was explored for both target-present and target-absent lineups. Since the research question under investigation focused on the effectiveness of each lineup under same- and other-race identifications, no a priori hypotheses were made. Collapsing across culprit race, however, may allow for a more direct comparison of the lineups to previous research based on the assumption that a portion of the participants in previous research are making a cross-race identification (when using a single culprit). This is a plausible assumption as previous research has not separated their findings by race nor has the majority of research reported the racial composition of their sample. It should be noted, however, that samples from previous research may be more homogenous than the current study's sample which may complicate the following comparisons. With this caution in mind, findings were consistent with previous research such that the simultaneous lineup produced higher correct identification rates than the sequential lineup but lower correct rejection rates than the sequential lineup. Despite this consistency, diagnosticity ratios indicated that a sequential superiority effect was not found, as the simultaneous lineup had a higher diagnosticity ratio. This unusual finding may have resulted from lower correct identification rates in the sequential lineup than what has typically been reported (20% for current research versus 44% reported in a recent meta-analysis [Steblay et al., 2011]). All other identification accuracy rates were comparable to previous research.

Further consistent with the majority of preceding research is that the elimination and sequential lineups have comparable accuracy, regardless of the presence of the target. Inconsistent with previous research that indicates the two procedures are comparable, was the finding that the simultaneous lineup had higher correct identification rates than the elimination lineup. Additionally, the comparable correct rejection rates for the simultaneous and elimination lineups is inconsistent with research that has typically found higher correct rejection rates for the elimination lineup. Findings also indicated that the elimination lineup was superior overall compared to the sequential lineup, but because no research has reported diagnosticity analyses for elimination lineups, it is challenging to know how this finding compares to previous research.

Although combining same- and other-race identifications may be more similar to past research, the focus of the current study was on how each lineup performed depending on culprit race relative to the race of the witness, thus the following discussion is divided between same- and other-race identifications. It was expected that when the target was present, all three lineup procedures would produce comparable accuracy when a same-race identification was being made. Findings, however, were not fully consistent with this expectation. Specifically, when the target was present, results showed that the simultaneous lineup procedure produced higher accuracy than the sequential lineup, and the elimination lineup produced marginally higher accuracy than the sequential lineup. The simultaneous and elimination lineups produced comparable accuracy for target-present lineups. The tendency for the simultaneous lineup to produce higher identification accuracy than the sequential lineup for target-present lineups has often been reported, and is likely a consequence of the sequential lineup resulting in fewer overall identifications compared to the simultaneous lineup (Steblay et al., 2001; Steblay et al., 2011). Conversely, the elimination lineup does not appear to suffer from a lower choosing rate based on absolute choosing rates (simultaneous = 86.40% versus elimination = 77.30%; see table 5). Furthermore, accuracy was comparable between the elimination and simultaneous lineup, which is also consistent with most of the other research that has investigated the effectiveness of the elimination lineup with adults (i.e., Humphries et al., 2012; Pozzulo & Balfour, 2006; Pozzulo et al., 2008). This suggests that although the elimination lineup may not increase the correct identification rate for adults relative to the simultaneous lineup, it is just as effective as the simultaneous lineup and is not detrimental to adults' correct identification rate.

In terms of same-race, target-absent lineups, it was predicted that the elimination lineup would produce a higher correct rejection rate than the other two lineup procedures, and that the sequential lineup procedure would also produce higher accuracy than the simultaneous lineup. Current findings did not support this hypothesis as all three lineup procedures had comparable accuracy. These findings are generally inconsistent with studies comparing the elimination and simultaneous lineups with adults, but are consistent with studies comparing the sequential and elimination lineups. In general, the majority of research has found that the elimination lineup produces higher correct rejections than the simultaneous lineup (Humphries et al., 2012; Pozzulo & Balfour, 2006; Pozzulo et al., 2008), and that the sequential and elimination lineups are comparable (Humphries et al., 2012; Pozzulo et al., 2008). Although one previous study has found the elimination lineup to have higher accuracy than the sequential lineup (Pozzulo et al., 2010), it should not be surprising that the elimination and sequential lineups are comparable as their methodology is based on the same theoretical background. Specifically, both lineups were designed to require an absolute judgment and thus should produce comparable accuracy, unless there was an added benefit of having witnesses make both a relative and absolute judgment–a theory that is not supported by the current study.

These results, however, are inconsistent with the majority of research that has found the sequential lineup to have a higher correct rejection rate than the simultaneous lineup (Steblay et al., 2001; Steblay et al., 2011). Possible reasons that could account for this include the way the stopping rule was used, having a fair lineup, and the single racial composition of the sample. First, as mentioned in the introduction, there is variability in the way the sequential lineup can be employed in terms of multiple identifications, and whether to stop after the first identification. In the 45 experiments that McQuiston-Surrett, Malpass, and Tredoux (2006) reviewed, 28 of the experiments involved a sequential lineup that presented the photographs until all of the photographs had been shown regardless of an identification. However, researchers for 18 of the 28 experiments did not report how they handled multiple identifications, whereas one reported analyzing the first identification only, four reported excluding the participants, two reported coding the identification as a foil identification (incorrect), and three reported having no participants make more than one identification. Although the current study allowed for participants to make more than one identification, only the first identification was considered as this would be equivalent to stopping the lineup after an identification (which 8 of the 45 experiments reported doing). Furthermore, researchers for three experiments report having no witnesses make multiple identifications, and Lindsay and Wells (1985) reported that only 2.5% of their participants made multiple identifications. In contrast, 13.5% of participants made multiple identifications in the current study. Both the review by McQuiston-Surrett et al. and the meta-analysis by Steblay et al. (2011) indicate that the stopping rule does not affect the difference between the simultaneous and sequential lineups; however, since the majority of researchers do not report how they handle multiple identifications, it is difficult to know if the stopping rule may be affecting the current findings in comparison to past research. This research, along with research by Levi (1998), McQuiston-Surrett et al. and Steblay et al. (2011), show that multiple identifications with the sequential procedure is a notable issue that requires resolution in future research.

Second, some researchers (e.g., Carlson, Gronlund, & Clark, 2008; Clark et al., 2008) have suggested that the sequential lineup may only be beneficial when the lineup is biased. For example, Carlson et al. (2008) found that the sequential advantage for target-absent lineups occurred only if the lineup was biased (based on effective size). Whereas, Steblay et al. (2011) found that the sequential lineup advantage was not moderated by whether researchers had done a manipulation check on their stimuli using the mock witness paradigm. However, the assumption was made by Steblay et al. that researchers who used a mock witness paradigm to assess lineup fairness had an unbiased lineup, and those who did not had a biased lineup. Furthermore, McQuiston-Surrett et al. (2006) found that 76% of researchers did not report whether they did a mock witness lineup to determine if their lineups were biased. Thus, it is possible that the sequential lineup advantage is more likely to occur when the lineup is biased, hence why no sequential advantage was found in the current study. However, this possibility cannot be determined if researchers fail to report measures of lineup fairness.

Third, including participants who were of all the same race may also have contributed to the inconsistent findings. Previous research likely involved participants of various races, hence these heterogeneous samples likely included both same- and other-race identifications. Although the current study only used a single race for participants, when data were collapsed across both same- and other-race identifications the findings were consistent with previous research. This suggests that the results may be dependent on whether the sample is composed of a single race making a same-race identification, or multiple races, in which some participants would be making a cross-race identification when there is only one culprit used.

Finally, in addition to examining correct identification and rejection rates, diagnosticity ratios, which take into account both target-present and target-absent lineups, were calculated to assess the overall effectiveness of the lineups. Diagnosticity ratios indicate that the elimination lineup is more diagnostic of guilt than the simultaneous lineup, which was also more diagnostic than the sequential lineup. In other words, although the elimination lineup resulted in fewer correct identifications than the simultaneous lineup, it also resulted in fewer false identifications. Additionally, the elimination lineup resulted in more false identifications than the sequential lineup, but also resulted in more correct rejections. Overall, this suggests that the elimination lineup may be superior to the simultaneous and sequential lineups, and that when a lineup member is selected using an elimination lineup, he or she is more likely to be guilty than a member selected using the simultaneous or sequential lineup. The finding that the sequential lineup has lower diagnosticity in comparison to the simultaneous lineup is inconsistent with most of the current research, possibly due to the reasons mentioned above, but because no diagnosticity involving the elimination lineup has been reported, it is difficult to know whether the sequential lineup having lower diagnosticity relative to the elimination lineup is consistent with previous research.

In regards to other-race identifications, it was hypothesized that for target-present lineups the simultaneous lineup would produce higher accuracy than accuracy produced by either the sequential or the elimination lineups. Results supported this hypothesis and the theory that insufficient encoding of other-race faces would lead to a decrease in correct identification when the target is present. In other words, because other-race faces are weakly encoded, a relative judgment (simultaneous lineup) would result in a higher correct rejection rate than an absolute judgment (sequential and elimination lineups) because the weak memory trace would not be sufficient enough to make a correct absolute judgment. It should also be noted that both the sequential and elimination lineups were found to be comparable.

Conversely, when the target is absent, weak encoding of other-race faces and the requirement of an absolute judgment would hinder witnesses from selecting someone who closely resembles their memory, thus resulting in the witnesses correctly rejecting the lineup. Consequently then, it would be expected that for target-absent lineups, the sequential and elimination lineups would both produce higher accuracy than accuracy produced by the simultaneous lineup. Findings from the current study indicate that there was a trend for the sequential lineup to produce higher accuracy than the simultaneous lineup; and found no difference between the elimination and simultaneous lineups. Furthermore, as might be expected, although not predicted a priori, the elimination lineup produced similar accuracy to the sequential lineup. Overall, with respect to target-absent lineups, these findings suggest that witnesses are equally likely to correctly reject a lineup regardless of the lineup procedure used, although they may be more likely to correctly reject a sequential lineup.

It is possible that the elimination lineup did not elicit higher correct rejections than the simultaneous lineup because the elimination lineup required both types of judgments. Perhaps, the initial requirement of a relative judgment for other-race faces minimizes the impact or effect of subsequently requiring participants to make an absolute judgment. After being asked to make a relative judgment, it is possible participants identify the member because they could not adequately conduct an absolute judgment–possibly because of the insufficient memory trace–so they decided to choose the lineup member instead of rejecting the lineup altogether. Put another way, after having difficulty making the absolute judgment because of the insufficient memory trace, the witness decides that because she/he picked the photo as resembling someone in their memory, that lineup member must be the culprit and thus they select the member instead of rejecting the lineup. This decision process would not occur in the sequential lineup because witnesses could not be misled by a relative judgment and would thus be more inclined to reject the lineup.

As no previous research has explored the use of lineup procedures with other-race identifications it is difficult to know how these results would compare. Nonetheless, with caution they can be compared to research that has studied the differential effects of lineup procedures when the culprit undergoes a change in appearance. A witness viewing a culprit who has undergone a change in appearance may have difficulty matching his or her perception of the culprit to his or her memory, similar to how a witness making a cross-race effect will have difficulty matching their perception of the culprit with their weakly encoded memory of the culprit. In other words, the witness, identifying a culprit who has changed appearance, cannot directly compare the culprit's new appearance to the appearance he or she has stored in memory, just as a witness making a cross-race identification cannot fully compare the other-race culprit to their memory as they have an insufficient memory trace. Based on the assumption that these two manipulations result in similar difficulties with matching perception to memory, for target-present lineups these results are similar to Memon and Gabbert (2003) who found that the simultaneous lineup resulted in higher accuracy than the sequential lineup, but are inconsistent with Pozzulo and Balfour (2006) who found that the simultaneous lineup was comparable to the elimination lineup. Conversely, these results are consistent with Pozzulo and

Balfour's findings that the simultaneous and elimination lineups are comparable for target-absent lineups. It is possible that these results are not completely consistent because there are differences between cross-race identifications and identifications involving changes in appearance, thus more research is needed to replicate these effects.

Finally, as was done with same-race identifications, diagnosticity was calculated to measure overall effectiveness of each lineup. Diagnosticity ratios indicate that the simultaneous lineup is more diagnostic of guilt than the sequential and elimination lineups, which where both found to be very similar in their effectiveness. As mentioned before, since no research has examined the effectiveness of different lineup procedures with other-race identifications, it is difficult to know how these findings compare with other research. The effectiveness of these lineup procedures when other-race identifications are involved, however, is not consistent with what has been routinely found with same-race identifications (i.e., that the sequential lineup is superior). The finding that lineup procedures result in different accuracy for same- and other-race identifications highlights the importance of not promoting or recommending the use of one lineup procedure over another when its robustness has not been fully explored. Furthermore, these results may suggest that other-race identifications are less influenced by absolute judgments compared to same-race identifications, as the simultaneous lineup was found to be superior for other-race identifications. This aligns with Smith et al.'s (2001) finding that an absolute judgment strategy is not related to accuracy for other-race identifications.

Moderating the Cross-Race Effect

As very little research has examined factors that could moderate the cross-race effect at the time of identification, the second purpose of this study was to determine if any of the lineup procedures could moderate the cross-race effect. As this portion of the study was exploratory, no specific a priori hypotheses were made regarding which lineup procedure would be most protective against the cross-race effect. Findings indicated that the cross-race effect was replicated, and that for both target-present and target-absent lineups, both the simultaneous and sequential lineups were able to moderate the cross-race effect. In other words, participants were equally likely to correctly identify the culprit, or correctly reject the lineup, regardless of whether they were making a same- or other-race identification. This suggests that the magnitude of the cross-race effect is smaller by presenting either a simultaneous or sequential lineup. However, it should be noted that the difference in accuracy between same- and other-race identifications for the simultaneous, target-present lineup was approaching significance, and with more participants it is possible that the simultaneous lineup would no longer moderate the cross-race effect. Conversely, findings indicated the elimination lineup did not moderate the cross-race effect for target-present lineups, and there was also a trend for it to not moderate the cross-race effect for target-absent lineups. This suggests that when presented an elimination lineup, witnesses are more likely to be accurate when making same-race identifications than when making other-race identifications. Furthermore, the elimination lineup experiences the largest decrease in diagnosticity between same-race and other-race identifications relative to the other two lineups, whereas the simultaneous lineup undergoes the smallest decrease in diagnosticity when shifting to an other-race identification. In other words, the simultaneous lineup provides the best buffer against the cross-race effect, whereas the elimination lineup provides the least.

More research is needed to determine why one lineup procedure may moderate the cross-race effect and another may not, although some of the explanations mentioned above may also apply to the current findings. For example, the sequential lineup may be protective because it has a lower overall choosing rate, whereas the elimination lineup may be more vulnerable to other-race identifications because of the explicit two judgment requirement. Regardless of why some lineups moderate the cross-race effect and others do not, this is the first study that has shown that the cross-race effect can be moderated at the time of retrieval–a finding that has the potential for important applied applications.

General Discussion

Once again these results highlight the importance of not assuming that what works under one condition will work under a different condition, particularly when it comes to other-race identifications. For example, while research has shown that the elimination lineup is robust when there is a clothing bias (Pozzulo et al., 2010), the current study found that the elimination lineup was not robust against the cross-race effect, suggesting that the elimination lineup may have limited effectiveness. These differential results, both currently found and compared to previous research, indicate, in accordance with McQuiston-Surrett and colleagues (2006), that researchers should be cautious about making any policy recommendations, as many unanswered questions about lineups remain. Furthermore, the current findings suggest that cross-race identifications do not always operate in the same manner as same-race identifications. This is consistent with previous research that has found that some manipulations will improve same-race accuracy, but will not affect other-race accuracy (e.g., context reinstatement Evans et al., 2009), or that types of judgments used to make an identification can postdict accuracy for same-race but not other-race identifications (Smith et al., 2001). And although these results are consistent with the theory that the cross-race effect is an encoding problem, they do suggest that mediating the problem is not hopeless, and that it is possible to minimize the cross-race effect at the time of retrieval. This is a positive finding as Wells and Olson (2001) suggested that it may be impossible to know the mechanisms underlying the cross-race effect, and as such it would be more productive to try and minimize the effect rather than eradicate the cause.

Although the current study highlights the fact that more research is warranted before policy recommendations can be made, the current findings suggest that if the legal system were to consider race when choosing a lineup procedure, then the simultaneous and elimination lineup should be chosen for same-race identifications, and the simultaneous lineup should be the only lineup selected for use with other-race identifications. If the goal is to have one lineup procedure that can be used across all situations, with race of the culprit and witness being ignored, then the simultaneous lineup should be selected as it produced the highest diagnosticity in the current study. Overall, these results suggest that the simultaneous lineup should not be denunciated without more research.

A few limitations should be considered in drawing conclusions from the current study. First, the time delay between presentation of the video and presentation of the lineup was relatively short compared to what might occur in a real eyewitness situation. Research has suggested that periods of delays of up to one week do not affect accuracy (e.g., Laughery, 1974; Mauldin & Laughery, 1981; Yarmey, 2004), however, some research has suggested that eyewitnesses making other-race identifications become more liberal in setting their decision criterion as the delay increases (Meissner & Brigham, 2001). The second limitation involves only using Caucasian participants, which prohibited the current study from having a full cross-over design and from validating the Chinese stimuli. It is possible that the current cross-race effect was a result of the Chinese stimuli being generally more difficult to distinguish than the Caucasian stimuli. However, both lineups were determined to be fair during the mock witness paradigm, and the cross-race effect is a reliable finding (Meissner & Brigham, 2001), thus it is unlikely that the findings were a result of the Chinese stimuli being difficult to distinguish. Relatedly, a third limitation of the study is its applicability to minority groups. Research has shown that the cross-race effect is stronger for majority groups than it is for minority groups (Meissner & Brigham, 2001). Thus it is possible that these findings will not extend to lineups involving a witness of a minority group and a suspect of a majority group. Research involving minority groups should be a focus of future research.

Finally, although the sample size was determined based on recommendations by (Peng et al., 2002), the sample size was relatively small, especially since some chi-square analyses had expected cell counts of less than five. Some effects likely would have been detected had the sample size, and consequently power, been larger. Post hoc power analyses indicate an average level of power equal to approximately 0.38.

As this was the first study to explore the use of lineups with cross-race identifications, more research is needed to replicate the results found in the current study. Furthermore, more research using lineup paradigms to explore the cross-race effect is needed as very few studies have done so, and no research has used the traditional sequential lineup for cross-race identifications. As Meissner and Brigham (2001) found in their meta-analysis that the cross-race effect is larger in magnitude for hits in lineup paradigms than in old-new recognition paradigms, it is important for generalizing results and making policy recommendations that more research explores the cross-race effect using lineups.

Along similar lines, further researcher is needed to determine what types of factors can moderate the cross-race effect at the time of retrieval, as this was the first study to show that the cross-race effect can be moderated by lineup procedures (and that it can be moderated at all at retrieval). Current recommendations (see Wells & Olson, 2001; Wilson, Hugenberg, & Bernstein, 2013) for cross-race identifications largely involve suggestions for creating fair lineups, using a *blank lineup control procedure* that does not include the suspect, in order to weed out witnesses inclined to make an identification, and suggestions to train police officers to become better at individuating other-race individuals. Although some of these recommendations are likely to be effective and considered best-practices, it would be best to know if lineup procedures perform differently under other-race identifications, especially since the sequential lineup is often recommended, and many jurisdictions are using the sequential lineup over the simultaneous lineup (Carlson et al., 2008).

More research is needed to determine if the elimination lineup is a suitable lineup procedure for adults. Having one lineup procedure that can be used with both children and adults has important implications for the legal system. In particular, in may be difficult to determine at which age the police should start using the simultaneous or sequential lineup and stop using the elimination lineup. Having one lineup that is effective for all ages would eliminate this concern, and prevent lawyers from being able to question the police's choice of lineup procedure. Additionally, as the elimination lineup procedure has had limited amounts of research on it, more research should be done to determine the robustness of the lineup across different situations.

Finally, future work should investigate the reasons why individuals decide to identify or not identify a lineup member. This may be particularly important for the sequential lineup, in which witnesses sometimes make multiple identifications. It would be interesting and insightful to know the thought process behind a witness identifying more than one lineup member when there is only one culprit. Discovering individual's reasons for making or not making an identification may have important implications for developing lineup procedures that focus on increasing the accuracy of eyewitness identifications.

In conclusion, the elimination lineup is effective for adults making same-race identifications, although performance relative to the other lineups depends on the presence of the target. For other-race identifications, the elimination lineup fails to be effective relative to the other lineups, but, similar to same-race identifications, the effectiveness of the elimination lineup relative to the other lineups depends on the presence of the target. Finally, the elimination lineup does not appear to moderate the cross-race effect and its diagnosticity suffers the largest decrease when moving from same- to other-race identifications. In comparison, both the simultaneous and sequential lineups appear to moderate the cross-race effect, although the simultaneous lineup undergoes the smallest reduction in diagnosticity. Overall, findings suggest that the elimination lineup may be a suitable lineup for use with adults making same-race identifications, but that adults making cross-race identifications may require the simultaneous or sequential lineup procedures in order for accuracy to remain comparable to same-race identification accuracy.

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Appendix A

Photographs Used to Construct the Lineups

Appendix B

Simultaneous Lineup Form

Now I am going to show you some pictures. The culprit's picture may or may not be present. To start off, think back to what the culprit looks like. If you see the culprit, place a checkmark in the box corresponding to the culprit's picture location. If you do not see the culprit, place a check mark in the "not here" box.

1	**2**	**3**
☐	☐	☐
4	**5**	**6**
☐	☐	☐

Not here

☐

Please rate how confident you are in your decision:

0	10	20	30	40	50	60	70	80	90	100
not confident at all					confident					completely confident

Appendix C

Sequential Lineup Form

Now I am going to show you some pictures. The culprit's picture may or may not be shown. You will see each picture once. You need to make an identification decision each time I show you a picture. Once you have made an identification decision, you will not be able to see that picture again. You will not be able to move ahead or back in the sequence. To start off, think back to what the culprit looks like, and compare your memory of the culprit's face to each picture. If the picture shown is the culprit place a checkmark beside "yes." If the picture shown is not the culprit, place a checkmark beside "no."

Is photo #1 a picture of the culprit? ☐ **Yes** ☐ **No**

Please rate how confident you are in your decision:

0	10	20	30	40	50	60	70	80	90	100
not confident at all					confident					completely confident

Is photo #2 a picture of the culprit? ☐ **Yes** ☐ **No**

Please rate how confident you are in your decision:

0	10	20	30	40	50	60	70	80	90	100
not confident at all					confident					completely confident

Is photo #3 a picture of the culprit? ☐ **Yes** ☐ **No**

Please rate how confident you are in your decision:

0	10	20	30	40	50	60	70	80	90	100
not confident at all					confident					completely confident

Is photo #4 a picture of the culprit? ☐ **Yes** ☐ **No**

Please rate how confident you are in your decision:

0 10 20 30 40 50 60 70 80 90 100

0	10	20	30	40	50	60	70	80	90	100
not confident at all					confident					completely confident

Is photo #5 a picture of the culprit? ☐ **Yes** ☐ **No**

Please rate how confident you are in your decision:

0	10	20	30	40	50	60	70	80	90	100
not confident at all					confident					completely confident

Is photo #6 a picture of the culprit? ☐ **Yes** ☐ **No**

Please rate how confident you are in your decision:

0	10	20	30	40	50	60	70	80	90	100
not confident at all					confident					completely confident

Is photo #7 a picture of the culprit? ☐ **Yes** ☐ **No**

Please rate how confident you are in your decision:

0	10	20	30	40	50	60	70	80	90	100
not confident at all					confident					completely confident

Is photo #8 a picture of the culprit? ☐ **Yes** ☐ **No**

Please rate how confident you are in your decision:

0	10	20	30	40	50	60	70	80	90	100
not confident at all					confident					completely confident

Is photo #9 a picture of the culprit? ☐ **Yes** ☐ **No**

Please rate how confident you are in your decision:

0	10	20	30	40	50	60	70	80	90	100
not confident at all					confident					completely confident

Is photo #10 a picture of the culprit? ☐ **Yes** ☐ **No**

Please rate how confident you are in your decision:

0	10	20	30	40	50	60	70	80	90	100
not confident at all					confident					completely confident

Is photo #11 a picture of the culprit? ☐ **Yes** ☐ **No**

Please rate how confident you are in your decision:

0	10	20	30	40	50	60	70	80	90	100
not confident at all					confident					completely confident

Is photo #12 a picture of the culprit? ☐ **Yes** ☐ **No**

Please rate how confident you are in your decision:

0	10	20	30	40	50	60	70	80	90	100
not confident at all					confident					completely confident

Is photo #13 a picture of the culprit? ☐ **Yes** ☐ **No**

Please rate how confident you are in your decision:

0	10	20	30	40	50	60	70	80	90	100
not confident at all					confident					completely confident

Is photo #14 a picture of the culprit? ☐ **Yes** ☐ **No**

Please rate how confident you are in your decision:

0	10	20	30	40	50	60	70	80	90	100
not confident at all					confident					completely confident

Is photo #15 a picture of the culprit? ☐ **Yes** ☐ **No**

Please rate how confident you are in your decision:

0	10	20	30	40	50	60	70	80	90	100
not confident at all					confident					completely confident

Appendix D

Elimination Lineup Form

Now I am going to show you some pictures. The culprit's picture may or may not be present. To start off, think back to what the culprit looks like. Please look at the pictures and pick out the person that looks most like the culprit.

Lineup member #:____________

This may or may not be a picture of the culprit. Think back to what the culprit looked like. Now, compare your memory to this photograph. Then make a decision. If this is a picture of the culprit, place a checkmark beside "Yes, this is a picture of the culprit." If this is a picture of someone else, place a checkmark beside "No, this is not a picture of the culprit."

☐ **Yes,** this is a picture of the culprit

☐ **No,** this is not a picture of the culprit

Please rate how confident you are in your decision:

0	10	20	30	40	50	60	70	80	90	100
not confident at all					confident					completely confident

Appendix E

Demographic Questionnaire

Participant ID: __________

1. Age: ____________

2. Gender: ____________

3. Race (please circle one):

   White
   Black
   Latin American
   Arab
   Chinese
   Korean
   Japanese
   Filipino
   South Asian (e.g., East Indian, Pakistani, Sri Lankan, etc.)
   Southeast Asian (e.g., Vietnamese, Cambodian, Malaysian, Laotian, etc.)
   West Asian (e.g., Iranian, Afghan, etc.)
   Other – Specify

4. Have you ever taken a psychology and law course, forensic psychology course, or any course in which eyewitness identification or lineup methodology were discussed?.
   YES / NO

5. If yes, please explain: (e.g., which course and when)

6. Have you ever had to identify a suspect in a police lineup? YES / NO

VITA AUCTORIS

Lisa Pascal was born in 1988 in Calgary, Alberta. She graduated from Bishop O'Byrne High School in 2006. From there she attended the University of Calgary where she obtained a B.Sc. Honours in Psychology in 2011. Her Honours thesis focused on improving preschoolers' source monitoring abilities. She is currently in the M.A. program in the Child Clinical track at the University of Windsor.