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Source: *Law and Human Behavior*, Vol. 33, No. 1 (Feb., 2009), pp. 70-82
Published by: Springer
Stable URL: http://www.jstor.org/stable/30219011
Accessed: 01-12-2015 06:12 UTC

Law Hum Behav (2009) 33:70–82
DOI 10.1007/s10979-008-9136-x

ORIGINAL ARTICLE

Instruction Bias and Lineup Presentation Moderate the Effects of Administrator Knowledge on Eyewitness Identification

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Published online: 2 July 2008

Abstract Pairs ($N = 234$) of witnesses and lineup administrators completed an identification task in which administrator knowledge, lineup presentation, instruction bias, and target presence were manipulated. Administrator knowledge had the greatest effect on identifications of the suspect for simultaneous photospreads paired with biased instructions, with single-blind administrations increasing identifications of the suspect. When biased instructions were given, single-blind administrations produced fewer foil identifications than double-blind administrations. Administrators exhibited a greater proportion of biasing behaviors during single-blind administrations than during double-blind administrations. The diagnosticity of identifications of the suspect in double-blind administrations was double their diagnosticity in single-blind administrations. These results suggest that when biasing factors are present to increase a witness's propensity to guess, single-blind administrator behavior influences witnesses to identify the suspect.

Keywords Double-blind · Eyewitness identification · Lineups · Memory

Recent developments in DNA testing have enabled a number of convicted felons to demonstrate their innocence. Analyses of these cases revealed that prosecutors obtained the majority of these wrongful convictions using evidence based on mistaken eyewitness identifications (Connors, Lundregan, Miller, & McEwan, 1996; Wells et al., 1998). There are a number of factors that increase the probability that witnesses will make false identifications, including improperly chosen foils (Lindsay, Wallbridge, & Drennan, 1987; Lindsay & Wells, 1980; Luus & Wells, 1991), biased instructions that suggest the culprit is in the lineup (Clark, 2005; Malpass & Devine, 1981a; Steblay, 1997), and simultaneous lineup presentation (Cutler & Penrod, 1988; Lindsay, Lea, & Fulford, 1991; Lindsay et al., 1991; Lindsay & Wells, 1985; Steblay, Dysart, Fulero, & Lindsay, 2001). Although scholars have long argued that a lineup administrator's knowledge of the suspect's identity may influence lineup administration (e.g., Buckhout, 1975), little research has been conducted on how a lineup administrator's knowledge might bias identification accuracy. Investigator bias may occur when a lineup administrator with knowledge of the suspect's identity either intentionally or unintentionally communicates to the witness which lineup member is the suspect.

To protect against the possible influence of investigator knowledge of the suspect's identity on eyewitnesses' identification behaviors, Wells (1988) suggested the use of a double-blind lineup procedure in which the person administering the lineup is kept blind to the suspect's identity. Since the introduction of the concept of a double-blind lineup 20 years ago, reformers have advocated its adoption as a best practice in lineup administration based on the extensive research on experimenter expectancy effects in areas other than lineup administration (e.g., Rosenthal, 1976, 2002). There is substantial evidence that post-identification feedback to witnesses regarding whether they have identified the suspect has detrimental effects, including confidence malleability and changes in witness reports of the quality of event viewing conditions (for a meta-analytic review of this literature, see Douglass &

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Steblay, 2006). In part, based on the undesirable effects of post-identification feedback, there has been much public policy discussion of the benefits of double-blind lineup administration, with some states (e.g., New Jersey, North Carolina) now requiring the use of double-blind procedures. Although the benefits of double-blind procedures for eliminating the negative effects of post-identification feedback have been documented, there has been little research investigating the effects of double-blind procedures on the accuracy of eyewitness decisions and the research that does exist has yielded mixed results.

PSYCHOLOGICAL RESEARCH ON INVESTIGATOR BIAS

Wells and Luus (1990) proposed a useful way of conceptualizing the potential biases that can be present during lineup administrations. These scholars argued that the same principles that scientists use to conduct a valid experiment can be used by lineup administrators to conduct a fair and unbiased identification procedure. Like an experimenter, a lineup administrator has a hypothesis (i.e., the suspect is the perpetrator) and the lineup is constructed to test that hypothesis. The police gather stimulus materials (e.g., a photo of the suspect and of other people), provide instructions to the participant (i.e., the eyewitness), execute the procedure (e.g., show the photos to the eyewitness), and collect data (i.e., record the eyewitness's decision).

The same factors that introduce systematic bias into experiments can bias the lineups conducted by police (Wells et al., 1998). For example, demand characteristics can be present during a lineup if the investigator pressures an eyewitness to make an identification. Investigators may fall prey to confirmation bias, asking the witness questions that will confirm that the suspect resembles the perpetrator but not questions that will disconfirm this hypothesis. Investigators may introduce response bias by encouraging the witness to adopt a less stringent criterion for a positive identification. The police may make judgments based on small sample sizes (e.g., assume that a positive identification of the suspect is very reliable even though it is based on the memory of only one witness) and without utilizing proper controls (e.g., failure to determine whether people who did not witness the event would also identify the suspect). Finally, police officers may leak their hypotheses by consciously or unconsciously communicating to witnesses which lineup member is the suspect. Two of these sources of bias, confirmation bias and hypothesis leaking, can be eliminated by using a double-blind procedure when administering the lineup. That is, these biases cannot operate if the administrator of the lineup does not know which lineup member is the suspect.

In the late 1990s, a panel of distinguished experts on eyewitness identification recommended four rules that police should follow to increase the reliability of evidence provided by eyewitness identifications (Wells et al., 1998). These experts made only one recommendation without knowledge of any eyewitness identification research to support their position. Specifically, these experts argued that the person who conducts the lineup should be kept blind to the identity of the suspect. These authors argued that research on experimenter expectancy effects (e.g., Rosenthal, 1976, 2002; Rosenthal & Rosnow, 1991) demonstrates that a lineup administrator with knowledge of the suspect's identity may exhibit subtle nonverbal behaviors that lead the witness to choose a particular lineup member. In addition, the literature on confirmation bias in hypothesis testing (e.g., Klayman & Ha, 1987; Snyder, 1984) suggests that knowledgeable administrators may ask the witness questions about the lineup members that will confirm the administrators' hypothesis that the suspect is the culprit. Administrators may or may not be aware of their suggestive behavior. The recommendation for a double-blind lineup procedure protects against both intentional and unintentional investigator bias.

Since double-blind procedures were first recommended as a safeguard (Wells, 1988), only a handful of empirical studies have examined the effect of investigator knowledge on eyewitness identification decisions. Results from related previous eyewitness identification research suggested that experimenter knowledge may influence the behaviors that officers exhibit (Fanselow & Buckhout, 1976, Wells & Seelau, 1995). Thus far, however, the results from studies directly testing the influence of administrator knowledge on eyewitness decisions have produced mixed results, with studies suggesting different conclusions about the conditions under which effects of administrator knowledge are observed or even whether effects are observed at all.

The first study to empirically examine administrative influence paired student investigators with student witnesses who had previously viewed a live, staged crime involving two perpetrators (Phillips, McAuliff, Kovera, & Cutler, 1999). During the lineup task the investigators presented two target-absent lineups to each witness; the administrator was informed of the suspect's identity for one of the lineups but not for the other. Administrator knowledge, the type of lineup presented, as well as the presence of an observer during the lineup task were also manipulated. Under certain circumstances, knowledge of the suspect's identity increased the rate of false alarms. Specifically, administrator knowledge influenced witnesses to choose the innocent suspect when a sequential lineup was administered and an experimenter–observer was present during the lineup task but not in the other conditions.

Other support for experimenter expectancy effects in the context of eyewitness identification tasks was observed in research manipulating the level of contact between administrators and witnesses (Haw & Fisher, 2004). In the high contact condition, administrators were permitted direct contact with the eyewitness when administering the lineup. In the low contact condition witnesses were provided with instructions, photos, and an identification form to complete individually; the administrator did not have direct contact with the witnesses and sat behind the witnesses out of their direct view. When high contact administrators presented target absent, simultaneous lineups, witnesses were more likely to identify the innocent suspect than in any other condition. So in contrast to the results from the Phillips et al. study, investigator knowledge effects were more likely to be seen in simultaneous rather than sequential lineups.

Although these studies have begun to demonstrate the importance of double-blind lineup administration for safeguarding the reliability of witness identifications, there is still little research on the conditions under which double-blind lineups serve a greater protective function and what research exists on the moderating effects of lineup presentation has produced mixed results (Haw & Fisher, 2004; Phillips et al., 1999). Moreover, there are several studies that have failed to find effects of lineup administrator knowledge on the accuracy of witness identifications (Haw, Mitchell, & Wells, 2003; Russano, Dickinson, Greathouse & Kovera, 2006).

CURRENT RESEARCH

The previous research on investigator bias leaves many questions unanswered about the role of lineup administrator knowledge on the accuracy of eyewitness identification decisions. The effect of investigator knowledge does not seem to be particularly robust, with some studies finding an effect and others failing to do so. It is also problematic that for studies that have found an effect of administrator knowledge, the conditions under which the effect has been observed have not been consistent. Some studies observed an influence of administrator knowledge when simultaneous lineups were presented (Haw & Fisher, 2004) whereas other studies have only found the effect to be present under a subset of sequential lineup presentation conditions (Phillips et al., 1999). In both of these studies, instructions to the witness were based on the unbiased model instructions recommended in the NIJ guidelines. Thus, there is still a need for thorough investigation of the moderating effects of different lineup procedures on the influence of administrator knowledge on identification decisions.

In consideration of the difficulty in observing an effect of experimenter knowledge and the variability of the effects obtained in earlier studies, we hypothesized that lineup procedures that increase choosing rates may increase the effects of administrator knowledge of the suspect's identity on identification accuracy. Lineup administrators who know the identity of a suspect may steer the witness to the suspect, either intentionally or unintentionally, but only under conditions that promote guessing among witnesses. The lineup setting is different from the traditional setting in which experimenter expectancy effects have been observed. Teachers' high expectations for future student performance may alter their behavior toward their students in a manner that elicits better performance from the students. Graduate students who believe that their rats will learn to run a maze quickly or slowly may produce a behavior change in the rats (Rosenthal, 1976). In both of these situations, however, the target of the expectancy has the capacity to change in the expected ways. It is possible that the degree of ecphoric similarity between the suspect and the perpetrator (Charman & Wells, 2006) may moderate whether external influences such as administrator behavior will influence witnesses' decisions in a lineup task.

In the eyewitness situation, the witness has a memory for the perpetrator. Perhaps that memory is imperfect; perhaps it is very accurate. What is important is that this memory may limit the ability of the investigator to influence the witness toward a particular suspect, if that suspect does not closely resemble the witness's memory for the perpetrator. If witnesses are certain that the perpetrator is not in the lineup, then they may not be influenced by the non-blind administrator to choose the suspect because the suggestion does not comport with their memory. Similarly, some witnesses who choose foils are certain in their identifications, although wrong, and the non-blind administrator's cues to the suspect may be similarly uninfluential. Some witnesses who choose foils are merely guessing and do not have certain memories for the perpetrator. It is our hypothesis that these are the witnesses who can be shifted from guessing a foil to guessing a suspect. Thus, we predict that differences between the pattern of identification decisions between double-blind and single-blind lineup administration conditions will be the result of fewer foil identifications and more identifications of suspects in the single-blind conditions as compared to the double-blind conditions. We predict that rejection rates will remain relatively unchanged between the two conditions.

If the effects of administrator knowledge are seen primarily with guessing witnesses, we should also see that the effects of double-blind administration are greatest under conditions that promote guessing (e.g., conditions that encourage the adoption of a lower response criterion).

Eyewitness identification researchers have identified several variables that may lower participants' response criterion or level of certainty that they need to make an identification, including simultaneous presentation of lineup members and biased instructions. Some researchers have suggested that simultaneous lineups cause witnesses to adopt lower criterion levels and that sequential lineups shift the witness's criterion level to a higher degree of certainty necessary to make an identification (Flowe & Ebbesen, 2007). Signal detection research comparing sequential and simultaneous lineups demonstrated that simultaneous lineups produce lower criterion levels than sequential lineups (Meissner, Tredoux, Parker, & MacLin, 2005).

Biased instructions also appear to lower a witness's criterion level for making an identification (Clark, 2005; Malpass & Devine, 1981a, b). Biased instructions that insinuate that the suspect is in the lineup may lower witnesses' criterion levels, prompting them to guess even when they are unsure that the lineup member that they are choosing is indeed the perpetrator. This willingness to choose in the absence of a certain match between their memory of the perpetrator and the lineup memory may make them more susceptible to behavioral cues exhibited by a single-blind administrator. That is, if witnesses lack certainty about whether the perpetrator is in the lineup based on internal information derived from their memory of the perpetrator but are encouraged to choose a lineup member anyway, they may look for external cues when making their identification decision. In this way, biased instructions may lead unsure witnesses to attend more to the investigator's behavior, allowing single-blind investigators to wield more influence when biased instructions are given to witnesses. Therefore, we predicted that the effects of administrator knowledge would be greatest under conditions that promote guessing by reducing response criterion levels, specifically when simultaneous lineups are presented in combination with biased instructions.

We also sought to examine the types of administrator behaviors that are associated with administrator knowledge. Previous research infers investigator bias from decreases in identifications of suspects under double-blind as opposed to single-blind conditions. Because no one has videotaped the interaction between the participant administrators and participant witnesses, it is unknown what administrators did to increase identifications of suspects under the single-blind conditions. Wells et al. (1998) suggested two mechanisms through which investigators could bias single-blind lineups. First, experimenter expectancy effects could cause knowledgeable investigators to emit nonverbal cues that communicate the identity of the suspect to the witness. Second, investigators may ask witnesses hypothesis-confirming questions that lead the witness to identify the suspect. Research is needed to determine which of these processes is responsible for the investigator bias effects seen in earlier studies.

In addition to uncovering the behavioral processes underlying the investigator bias effect, it is practically important to determine whether the use of double-blind administration adversely affects correct identifications. Double-blind administration appears to reduce false identifications in some culprit-absent photospreads. However, it is unclear whether double-blind administration will negatively impact the number of correct identifications made in culprit-present photospreads because all of the photospreads in the Phillips et al. (1999) study were culprit-absent. It is possible that some correct identifications are merely lucky guesses by witnesses (Penrod, 2003). If so, then it is also possible that an investigator with knowledge of the suspect's identity might influence a witness with a poor memory of the perpetrator to choose the perpetrator rather than a filler. Presumably double-blind procedures would eliminate that portion of correct identifications that resulted from steering the witness, perhaps unintentionally, toward the perpetrator. Because the police may be reluctant to adopt a procedure without reassurance that the procedure does not influence the rate of correct identifications (Wells et al., 1998), we varied whether our participants saw a target-absent or target-present lineup to examine whether the double-blind procedure reduces correct identifications as well as false ones. Moreover, the orthogonal manipulation of target presence and administrator knowledge of the suspect's identity will allow for the calculation of diagnosticity of the identifications made using single- and double-blind lineup administrations.

METHOD

Design

The study had a 2 (Target Presence: Target Present vs. Target Absent) × 2 (Administrator Knowledge: Single-Blind vs. Double-Blind) × 2 (Lineup Presentation: Simultaneous vs. Sequential) × 2 (Instruction Bias: Biased vs. Unbiased) factorial design.

Participants

Four-hundred-sixty-eight undergraduate psychology students from a large public southeastern university participated in exchange for course credit. Half of the participants served as lineup administrators (141 women, 92 men, M age = 19); the remaining participants served as the eyewitnesses (158 women, 75 men, M age = 20). Witness-administrator pairs (N = 234) served as the unit of analysis.

Videotapes

Lineup Administrator Training Video

To instruct the lineup administrators on the procedures to use when administering a photo lineup, a training video was created. A police officer on the university campus force narrated the video. The video included an explanation of the basic procedures to use when administering a photo lineup. At the end of the video, the police officer conducted a mock lineup with a mock witness. The mock lineup contained several instances of bias on the part of the administrator. For example, when the witness seemed to stop on a photo that was not the suspect, the administrator asked the witness if she was sure that was the suspect, and when she faltered, he suggested she take another look. These examples were included to simulate real world situations in which a new police officer learns to administer lineups by observing a more experienced police officer doing so. If the more experienced police officer exhibits biased techniques, the new police officer may learn to do so as well. Two separate videos were made. One version contained instructions for administering a simultaneous lineup and a demonstration of a simultaneous lineup administration and the other version contained an explanation and demonstration of a sequential lineup. The videos were edited to make them identical except for the type of lineup presented.

Witnessed Event

Eyewitnesses came to the experiment under the guise of evaluating a videotaped speech. The speech was given by a young woman who was using a projector to give her speech in a classroom. Halfway through the speech, a young man entered the room stating that he was with media services and needed to take the equipment. The young woman asked if he could wait until she was finished with the speech, and he agreed; the young woman then finished her speech. The intruder was visible for about 20 s. and could be seen from both frontal and profile views. To ensure that the findings were not specific to a specific perpetrator, two versions of the tape were created so that the young man that came in to take the projector varied across participants. The young men were similar in coloring, height, and stature. The videotapes were originally created for use in an earlier study (Haw & Fisher, 2004).

Photospread

For this study, we used two photo arrays constructed by Haw and Fisher (2004) to be used in conjunction with the videotaped events described above. Haw and Fisher constructed these arrays using the two-part procedure described in Koehnken, Malpass, and Wogalter (1996), with lineup members chosen first for their match to description and then their similarity to one another. Lineup members were photographed wearing the same shirt to eliminate clothing bias (Lindsay et al., 1987). Haw and Fisher conducted pilot tests to determine the effective size (Tredoux's *e*; Tredoux, 1998) and the functional size of the two lineups. The effective size of both lineups was 5.0; the functional size of one lineup was 4.17 and the other was 5.47 ($M = 4.82$). The target-present photo array for each target served as the target-absent photo array for the other target. A complete description of the construction of these two photo arrays can be found in Haw and Fisher (2004).

Lineup Instructions

Administrators read one of the two versions of instructions to the witnesses. The unbiased version of the instructions was adapted from the U.S. Department of Justice guidelines (Technical Working Group for Eyewitness Evidence, 1999). They reminded witnesses that the suspect may or may not be in the lineup, that certain features may have changed over time, and instructed witnesses to take their time and study each photograph carefully. The biased instructions were based on the biased instructions used in Lindsay et al. (1991) and read, "We have the suspect in custody and would like to show you a photo lineup to see if you are able to identify him." The biased instructions implied that the suspect was present and the witness only needed to pick him out of the lineup.

Dependent Measures

Following an identification decision by the eyewitness, administrators indicated which photo, if any, the eyewitness had chosen. This information was used to determine whether the participant made an identification of the suspect, identified a foil, or rejected the lineup. Participants rated their confidence on a 7-point scale with 1 = not at all confident and 7 = extremely. Then, the administrator and the witness each completed separate questionnaires assessing their perceptions of bias present in the photo array administration. The specific questions asked of the witnesses and of the administrators are listed in Table 1. Participants made their ratings on 7-point Likert-type scales (1 = strongly disagree; 7 = strongly agree). When necessary, items were recoded so that higher numbers indicated stronger agreement with statements suggesting that the lineup administration was biased.

Procedure

Participant witnesses signed up to participate in a study examining perceptions of speeches and participant

Table 1 Statements rated by witnesses and administrators

Witness statements
1. The instructions provided to me by the administrator of this lineup were complete and unbiased (R)
2. The administrator encouraged me to identify someone in this lineup
3. The lineup administrator encouraged me to identify a specific person in the lineup
4. The instructions given to me during this lineup were biased in favor of me choosing someone in particular
5. The administrator appeared to be doing his or her best to be fair and impartial throughout the lineup administration (R)
6. The administrator wanted me to pick a certain person from the lineup
7. I made my identification without any input from the lineup administrator (R)
8. I believe the administrator's behavior probably influenced my decision in this lineup
Administrator statements
1. The instructions that I provided to the witness were complete and unbiased (R)
2. I encouraged the witness to identify someone from this lineup
3. I tried my very best to be fair and impartial throughout the lineup administration (R)
4. I encouraged the witness to pick a specific person in the lineup
5. The eyewitness made an identification without any influence from me (R)

Note: Items marked with an (R) were recoded so that higher numbers indicated stronger agreement with statements that suggested that the lineup administration was biased

administrators signed up to participate in a study of eyewitness memory; they were restricted to participating in only one of the studies. The scheduling of the two studies was staggered so that the participants would not arrive at the laboratory at the same time. Participant witnesses arrived first, were instructed that they would watch a video of a person giving a speech and then evaluate the effectiveness of the speaker, signed a consent form, and then watched the video. At the completion of the video, they completed a filler task in which they rated the effectiveness of the speaker's communication.

In the meantime, participant administrators arrived at the lab. They were taken to a separate room where they were told that some media equipment had been stolen, that a suspect was in custody, and that we needed their help in administering a photo array to a person who had seen a person who was suspected of stealing the equipment. After signing a consent form, the experimenter played the training video for them and then gave them a set of instructions, which varied depending on the instruction bias condition, to read to the participant witness. The experimenter told all participants that they would receive a bonus of $20 if their witness successfully identified the suspect from the photospread. Only half of the participants were told the identity of the suspect: the perpetrator seen by the witness for the target-present arrays and the target substitute for the target-absent arrays. The other half of the participants were not told who the suspect was but were told that they would be told whether the witness had chosen the suspect at the conclusion of the experiment.

When witnesses had completed their filler questionnaire, the experimenter introduced the administrator and told the witness that the person who interrupted the speech was suspected of stealing the LCD projector after the speech was over and that the administrator would be showing them a photo array. At that time, the experimenter left the witness with the administrator with the instruction that they should open the door when the administration of the photoarray was complete. The interaction between the administrator and the witness was surreptitiously videotaped. After the witness and the administrator had completed their respective post-identification questionnaires, the participants were informed of the deception regarding the videotape and were offered the opportunity to erase the tape or to sign a consent form allowing us to use the videotape for research purposes. These procedures were approved by the university's Institutional Review Board. Before being dismissed, administrators completed paperwork to receive their $20 if their witness had in fact identified the designated suspect.

RESULTS

Identification Decisions

We tested whether our manipulations influenced the rate of identifications of the suspect by conducting logistic regressions with the main effects and all possible interactions of target presence, administrator knowledge, lineup presentation, and instruction bias as predictors. Using a backward stepwise procedure, only two of the predictors were significant. There was a main effect of target presence, $B = 2.32$, S.E. $= .34$, Wald's χ^2 $(1, N = 234) = 46.12$, $p < .001$, $\exp(B) = 10.19$, 0.60 for target-present and 0.14 for target-absent lineups. When the target was present in the

lineup, the odds that the witness would identify the suspect was 10 times greater than the odds that the witness would identify the suspect from a target-absent lineup. A three-way interaction of Administrator Knowledge × Lineup Presentation × Instruction Bias was also observed $B = 1.42$, S.E. = .48, Wald's χ^2 (1, N = 234) = 8.62, $p = .003$, exp(B) = 4.13. The effect of administrator knowledge on identifications of the suspect was greatest when administrators conducted a simultaneous lineup using biased instructions in comparison to all other conditions. See Table 2 for the proportion of participants making different identification decisions (i.e., identifications of the suspect, foil identifications, and rejections) by condition.

We ran a similar logistic regression with foil identifications as the dependent variable. This analysis revealed a main effect for target, $B = -1.92$, S.E. = .30, Wald's χ^2 (1, $N = 234$) = 40.58, $p < .001$, exp(B) = .14. Witnesses in the target present condition were less likely to choose a foil (.30) than participants in the target absent condition (.73). A significant two-way interaction of administrator knowledge and instruction bias indicated that foil identifications were less common when administrator knew the suspect and gave the witness biased instructions (.40) than in the other three cells of the interaction (double-blind/biased = .63; double-blind/unbiased = .57; single-blind/unbiased = .47), $B = -1.18$, S.E. = .44, Wald's χ^2 (1, $N = 234$) = 7.38, $p = .007$, exp(B) = .31.

We conducted a logistic regression with target presence, administrator knowledge, instruction bias, and lineup presentation and their interactions as predictors of lineup rejections. Using a backward step procedure, none of the predictors remained in the model.

Our analyses showed that rejections of the lineup are not affected by administrator knowledge. In contrast, administrator knowledge did interact with other variables to influence both identifications of the suspect and foil identifications. Specifically, it appears as if some foil identifications made under double-blind administration conditions, perhaps those produced by guessing, are redistributed to identifications of the suspect under single-blind administration conditions. Figure 1 provides a visual depiction of this phenomenon for simultaneous photospreads paired with biased instructions, where we found the greatest effect of investigator knowledge.

Diagnosticity

We calculated diagnosticity scores for double-blind and single-blind lineup administrations. These scores indicate the extent to which an identification is likely to occur given

Table 2 Proportion of identification decisions by target presence, instruction bias, lineup presentation, and administrator knowledge

	Target-present		Target-absent		Collapsed across target presence	
	Simultaneous	Sequential	Simultaneous	Sequential	Simultaneous	Sequential
Identifications of suspects						
Biased Instructions						
Single-blind	.86 ($n = 14$)	.57 ($n = 14$)	.33 ($n = 15$)	.21 ($n = 14$)	.60 ($n = 29$)	.39 ($n = 28$)
Double-blind	.64 ($n = 14$)	.50 ($n = 14$)	.00 ($n = 15$)	.07 ($n = 15$)	.32 ($n = 29$)	.28 ($n = 29$)
Unbiased Instructions						
Single-blind	.47 ($n = 15$)	.79 ($n = 14$)	.14 ($n = 14$)	.13 ($n = 15$)	.31 ($n = 29$)	.46 ($n = 29$)
Double-blind	.43 ($n = 14$)	.56 ($n = 16$)	.19 ($n = 16$)	.07 ($n = 15$)	.31 ($n = 30$)	.32 ($n = 31$)
Foil identifications						
Biased Instructions						
Single-blind	.14 ($n = 14$)	.36 ($n = 14$)	.47 ($n = 15$)	.64 ($n = 14$)	.31 ($n = 29$)	.50 ($n = 28$)
Double-blind	.29 ($n = 14$)	.43 ($n = 14$)	.87 ($n = 15$)	.93 ($n = 15$)	.59 ($n = 29$)	.69 ($n = 29$)
Unbiased Instructions						
Single-blind	.27 ($n = 15$)	.14 ($n = 14$)	.79 ($n = 14$)	.67 ($n = 15$)	.52 ($n = 29$)	.41 ($n = 29$)
Double-blind	.43 ($n = 14$)	.38 ($n = 16$)	.81 ($n = 16$)	.67 ($n = 15$)	.63 ($n = 30$)	.52 ($n = 31$)
Rejections of the lineup						
Biased Instructions						
Single-blind	.00 ($n = 14$)	.07 ($n = 14$)	.20 ($n = 15$)	.14 ($n = 14$)	.10 ($n = 29$)	.11 ($n = 28$)
Double-blind	.07 ($n = 14$)	.07 ($n = 14$)	.13 ($n = 15$)	.00 ($n = 15$)	.10 ($n = 29$)	.03 ($n = 29$)
Unbiased Instructions						
Single-blind	.27 ($n = 15$)	.07 ($n = 14$)	.07 ($n = 14$)	.20 ($n = 15$)	.17 ($n = 29$)	.14 ($n = 29$)
Double-blind	.14 ($n = 14$)	.06 ($n = 16$)	.00 ($n = 16$)	.27 ($n = 15$)	.07 ($n = 30$)	.16 ($n = 31$)

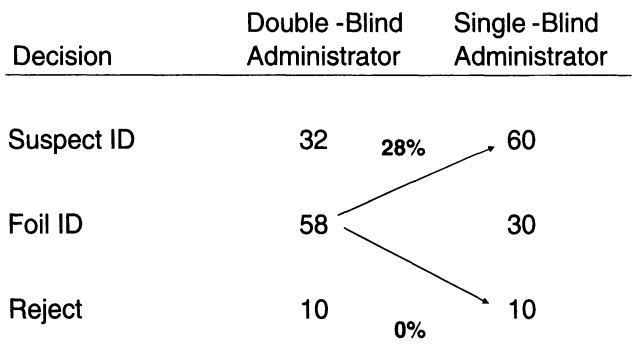

Fig. 1 Identification decisions in Biased Instruction, Simultaneous Photo Spreads as a Function of Administrator Knowledge

one hypothesis (i.e., that the suspect is the perpetrator) versus another hypothesis (i.e., that the suspect is not the perpetrator) and provide information about how much one should rely on an identification of the suspect under different conditions. Diagnosticity was calculated by dividing the proportion of identifications of the suspect in target-present lineups by the proportion of identifications of the suspect in target-absent lineups (Wells & Lindsay, 1980), with higher scores indicating greater diagnosticity. Identifications of the suspect made under double-blind conditions were twice as diagnostic as those made under single-blind conditions (single-blind = 3.25; double-blind = 6.66).

Witness Confidence

We conducted a 2 (Target Presence) × 2 (Administrator Knowledge) × 2 (Lineup Presentation) × 2 (Instruction Bias) analysis of variance (ANOVA) with witnesses' ratings of their confidence in their identification as the dependent variable. There was a nonsignificant trend for a main effect of administrator knowledge on witness confidence, $F(1, 217) = 3.57$, $p = .06$, partial $\eta^2 = .02$. Witnesses who were administered the lineup by a double-blind administrator expressed more confidence in their decision ($M = 5.20$) than witnesses who were exposed to a single-blind administration ($M = 4.89$).

Witnesses Ratings of Administration Bias

We conducted a 2 (Target Presence) × 2 (Administrator Knowledge) × 2 (Lineup Presentation) × 2 (Instruction Bias) multivariate analysis of variance (MANOVA) with witnesses' ratings of their agreement with a series of statements about the bias present in the lineup procedure as the dependent variables (see Table 1 for a list of the statements). The only significant effect was a three-way interaction of administrator knowledge, lineup presentation, and instruction bias, multivariate $F(8, 210) = 2.27$, $p < .03$, partial $\eta^2 = .08$. However, follow-up univariate analyses revealed no significant effects for any of the individual items.

Administrator Ratings of Administration Bias

We also conducted a 2 (Target Presence) × 2 (Administrator Knowledge) × 2 (Lineup Presentation) × 2 (Instruction Bias) MANOVA with administrators' ratings of their agreement with a series of statements about the lineup procedure as the dependent variables (see Table 1 for a list of the statements). A main effect of lineup presentation was observed, multivariate $F(5, 211) = 2.26$, $p = .05$, partial $\eta^2 = .05$. Follow-up univariate analyses revealed that administrators were more likely to say that they had encouraged the witness to identify someone from the lineup when they administered a simultaneous lineup ($M = 4.63$) than when they administered a sequential lineup, $M = 3.95$, $F(1, 211) = 5.93$, $p < .02$, partial $\eta^2 = .03$.

There was also a significant three-way interaction of Administrator Knowledge, Instruction Bias, and Target Presence, multivariate $F(5, 211) = 2.83$, $p < .02$, partial $\eta^2 = .06$. The only significant interaction in the follow-up univariate tests was for the statement that the administrator tried to be fair and impartial during the lineup administration, $F(1, 211) = 9.53$, $p = .002$, partial $\eta^2 = .04$. Administrators indicated that they were less likely to have been fair and impartial when they knew who the suspect was ($M = 2.00$) than when they did not ($M = 1.21$), but only when they administered biased instructions for a target-absent lineup. This effect of administrator knowledge did not obtain for the other combinations of instruction bias and target presence.

Administrator Behavior During the Photoarray Administration

Two doctoral-level students blind to the condition as well as to the hypotheses of our study coded the videotaped lineup administrations for verbal and nonverbal cues that might influence witnesses to choose a particular lineup member. Due to technical difficulties with the recordings (e.g., camera malfunctions, administrators moving outside of camera range) that were not systematically associated with particular experimental conditions, 179 administrations were available for coding and were included in the analyses. The raters coded for the presence of a variety of administrator behaviors such as asking witnesses whether they are sure after failing to make an identification or to take another look at the photos after making an identification. See Table 3 for a full list of behaviors. Concordance rates between the two coders were calculated using the formula $C = 2(C_{1,2})/(C_1 + C_2)$ where $C_{1,2}$ = number of identical categories assigned by both

Table 3 Proportion of administrators engaging in different behaviors as a function of administrator knowledge or lineup presentation

	Administrator knowledge		Lineup presentation	
Administrator behavior	Double-blind	Single-blind	Sequential	Simultaneous
Smile at identification	.21	.19	.12	.29
Frown at identification	.02	.01	.01	.02
Raise eyebrows	.04	.05	.06	.03
Tell witness to change behavior	.03	.06	.06	.02
Tell witness to look carefully	.10	.26	.14	.22
Tell witness to take time	.21	.25	.20	.26
Think of perp from new angle	.22	.21	.32	.11
Compare two photographs	.07	.05	.05	.08
Say know who suspect is	.03	.14	.10	.07
Say do not know who suspect is	.23	.01	.13	.11
Ask witness to describe suspect	.13	.18	.20	.12
Ask if sure after identification	.41	.48	.39	.51
Ask if sure after non-identification	.20	.26	.36	.09
Remove picture slowly after non-ID	.00	.04	.04	.00
Call attention to specific photo	.05	.07	.05	.07
Ask to look again after non-ID	.21	.36	.45	.12
Ask to look again after identification	.31	.28	.28	.31
Repeat choice with questioning tone	.03	.00	.02	.01

coders, and C_1 and C_2 = total number of categories assigned by the first and second coders, respectively. The overall concordance rate between the two coders was .80. Disagreements between the two raters were resolved by a third doctoral student who was also blind to the administration condition and the hypotheses of the study.

The coders also rated the level of pressure the administrator exerted on the witness to choose any photograph on a 5-point Likert type scale, with higher numbers indicating greater bias. The intraclass correlation for ratings of pressure to choose a photograph indicated reasonable interrater reliability (.70). The ratings of the two coders were averaged to create a single measure of pressure to choose.

We subjected the blind observers' ratings of administrator pressure to choose a photo to a 2 (Target Presence) × 2 (Administrator Knowledge) × 2 (Lineup Presentation) × 2 (Instruction Bias) ANOVA. This analysis revealed a main effect of administrator knowledge, $F(1,162) = 8.23$, $p = .005$, partial $\eta^2 = .05$. The blind coders rated single-blind administrators as placing more pressure on the witness to choose a photograph ($M = 3.47$) than double-blind administrators ($M = 3.20$).

To test which administrator behaviors differed among the conditions, we subjected coders ratings of administrator behaviors to a 2 (Target Presence) × 2 (Administrator Knowledge) × 2 (Lineup Presentation) × 2 (Instruction Bias) MANOVA, with specific behaviors as the dependent variables. This analysis revealed a main effect of administrator knowledge, multivariate $F(18,144) = 2.20, p = .006$, partial $\eta^2 = .22$. Single-blind administrators were more likely than double-blind administrators to tell witnesses to examine the lineup carefully ($F(1,144) = 6.88$, $p = .01$, partial $\eta^2 = .04$), to tell witnesses that they know who the suspect is ($F(1,144) = 7.41, p = .007$, partial $\eta^2 = .04$), to tell witnesses to take another look at the lineup if they did not make an identification ($F(1,144) = 5.54$, $p = .02$, partial $\eta^2 = .03$), and to remove a picture slowly if witnesses said no to a particular photograph, $F(1,144) = 3.91, p = .05$, partial $\eta^2 = .02$. Single-blind administrators were less likely than double-blind administrators to tell witnesses that they did not know who the suspect was, $F(1,144) = 18.37$, $p < .001$, partial $\eta^2 = .10$. See Table 3 for means.

There was also a main effect of lineup presentation, multivariate $F(18,144) = 3.51$, $p < .001$, partial $\eta^2 = .31$. Investigators presenting a sequential lineup were more likely than administrators of simultaneous lineups to ask witnesses to think about the perpetrator from another angle, $F(1,144) = 11.79$, $p = .001$, partial $\eta^2 = .07$, to ask witnesses if they were sure if the witnesses did not make an identification, $F(1,144) = 21.56, p < .001$, partial $\eta^2 = .12$, to take the picture away slowly after a non-identification, $F(1,144) = 3.91$, $p = .05$, partial $\eta^2 = .02$, and to ask witnesses to take another look if they did not make an identification, $F(1,144) = 27.79, p < .001$, partial $\eta^2 = .15$. Administrators of simultaneous lineups were more likely than administrators of sequential lineups to smile when the witness made an identification, $F(1,144) = 7.63$, $p = .006$, partial $\eta^2 = .05$. See Table 3 for means.

DISCUSSION

Although previous research has clearly shown the effects of lineup administrator feedback on witness confidence and memory for the conditions present during the witnessed event (Douglass & Steblay, 2006), the research record for the effects of lineup administrator knowledge of the suspect's identity on the reliability of eyewitness identifications has been more equivocal (Russano et al., 2006). The present research sought to answer several questions left unanswered by previous research, including whether other features of lineup procedures moderate the effects of administrator knowledge on eyewitness accuracy and whether double-blind photo array administration increases the diagnosticity of identifications of the suspect. In addition, we videotaped the photo array administrations to examine the types of behavioral cues that are associated with administrator knowledge of a suspect's identity.

Effects of Administrator Knowledge on Eyewitness Identifications

Past research showing administrator knowledge effects (Phillips et al., 1999) had tested the effects exclusively in target-absent lineups. Our study examined the effects of manipulating administrator knowledge in both target-absent and target-present lineups, which allows for the examination of the diagnosticity of identifications of the suspect in double-blind and single-blind photo array administrations. The diagnosticity of identifications of the suspect under double-blind administrations was twice that obtained under single-blind administrations, indicating that identifications of the suspect obtained when the administrator does not know the identity of the suspect in the photo array provide better information about the true guilt of the identified suspect.

The identification data also suggest that the effects of administrator knowledge are greater under some lineup procedures than others. We manipulated whether the instructions administered to the witnesses were biased or unbiased and whether the administrator conducted a simultaneous or sequential photo array. The manipulation of administrator knowledge of the suspect's identity had the greatest influence on identifications of the suspect when other factors that increase mistaken identifications were also present during the photo array administration (i.e., biased instructions; simultaneous presentation). Specifically, when presented with biased instructions and a simultaneous lineup, witnesses were more likely to make an identification of the suspect when administrators knew the identity of the suspect (single-blind administration) than when they did not (double-blind administration), irrespective of whether the suspect was the culprit. Thus it is possible that the mixed results obtained in earlier researcher were due to differences in the instructions given to witnesses, with the NIJ recommended instructions minimizing the effects of administrator knowledge on mistaken identifications of the suspect.

Moreover, simultaneous lineups and biased instructions are both lineup features that promote a lower criterion for choosing someone from the lineup (Clark, 2005; Flowe & Ebbesen, 2007; Malpass & Devine, 1981a, b; Meissner et al., 2005) and consequently increase the likelihood that witnesses will guess when making an identification decision in the absence of a clear memory of a lineup member as the perpetrator. Sometimes guesses will be correct and witnesses will guess the suspect in a target-present lineup. But guesses may also lead to incorrect choices, including identifications of the suspect in target-absent arrays or foil identifications in either type of array. Is there any evidence that guessing plays a role in the effects of administrator knowledge on witness behavior? Our findings suggest that under conditions that promote guessing such as biased instructions and simultaneous administration, single-blind lineup administration results in the redistribution of guesses from fillers to suspects.

Effects of Administrator Knowledge on Administrator Behavior

Did having knowledge of the suspect's identity change administrator behavior during the photospread administration? The answer is yes. Our trained observers who were blind to the knowledge condition of the administrators and to the hypotheses of the study were able to identify some specific behaviors that single-blind administrators exhibited at greater rates than double-blind administrators. Specifically, single-blind administrators were more likely to tell the witness to examine the lineup carefully, to take another look at the lineup after the witness failed to make an identification, and to remove a picture from consideration slowly if the witness rejected it as the suspect than were double-blind administrators. Single-blind administrators sometimes even told the witnesses that they knew who the suspect was, giving a very overt cue to the witness that the administrator had knowledge that could help them choose the suspect. The observers also judged that single-blind administrators exerted greater pressure to choose a photograph than did double-blind administrators. Although these behaviors were present across single-blind administrations, irrespective of other lineup procedures like biased instructions or simultaneous presentation, they seemed to exert the most influence on witnesses when biased instruction and simultaneous presentation were also present. Again, because these other procedures lower witnesses' criterion for choosing a member of a lineup, it is

possible that the increased guessing produced by the lower criterion increases reliance on administrator cues to inform the guesses.

How do these findings map onto the types of bias that Wells and colleagues (1998) hypothesized might operate in lineup administrations? Observers' ratings of increased pressure to choose in single-blind lineups and single-blind administrators increased tendency to warn the witnesses to look at the lineup carefully suggest that demand characteristics may be operating to a greater extent in single-blind lineups than in double-blind lineups. There also seems to be evidence of hypothesis leaking in that non-blind administrators were more likely to tell the witness to take another look at the lineup after the witness failed to make an identification, and to remove a picture from consideration slowly if the witness rejected it as the suspect. Unfortunately, the camera angle did not allow us to ascertain whether these behaviors occurred more frequently when the witness failed to identify the suspect rather than a filler.

It is important to note that both the witnesses and administrators participating in the photospread administration reported few if any differences in administrator influence as a function of single-blind versus double-blind administration. This finding is particularly troubling for a number of reasons. If lineup administrators are not aware that they are exhibiting behavioral cues to the suspect's identity, they obviously will not try to inhibit them. In addition, during trial, jurors rely on the witnesses' accounts of the lineup administration procedure to judge the reliability of the identification. If witnesses are not able to convey that the administrator influenced their decision, jurors will not be able to consider this in their decision-making process.

Limitations

Student participants served as both eyewitnesses and lineup administrators in this experiment. Although we provided motivation to the lineup administrators though monetary incentives and provided them with a training video for administering lineup techniques, it is not known whether the behaviors of experienced police officers might differ from those exhibited by the mock administrators in this study. It is possible that police officers are aware of the dangers of mistaken identifications of suspects and therefore are more likely to inhibit any intentional cues to the witness to pick a particular suspect. Of course, behavioral cues may not always be intentional and it is these unintentional cues that are likely to go uncontrolled, even by experienced officers. Moreover, it is likely that police officers are highly motivated to obtain identifications of suspects in cases involving actual crimes, especially when the officer has a strong belief that the suspect is the guilty party, more motivation than we could ethically provide to our participants. In such highly motivating situations, it is possible that officers may be unconsciously emitting more cues to witnesses to choose the suspect than were emitted in the current study. Therefore, although the effect of administrator knowledge when an experienced police officer administers the lineup is not known, it is possible that the effects may be even stronger than those observed with student administrators in this study. More importantly, it is clear that the effects of the incentives and training video were minimized by using double-blind lineup administration procedures, and it is reasonable to expect that if there is motivation to obtain identifications of suspects in real lineups, double-blind administration would also minimize the effects of that motivation.

Additionally, the witnesses in this study were undergraduate students who were not aware at the time that the event they were viewing was a crime. It was only after they watched the event (i.e., the speech with the interruption by the perpetrator) that they were informed a theft had later taken place. Furthermore, the students were aware that they were participating in a psychology experiment and, therefore, may not have felt the same motivation to pick a suspect that might be felt by witnesses who were placed in danger or to be careful with their choice as there would be no consequences of their actions if they made a wrong choice. Future research should explore the role that witness motivation plays in lineup tasks and how it affects the amount of influence an investigator has on identification decisions.

Conclusion

Although our research suggests that administrator knowledge of a suspect's identity may have greater biasing influence when the administrators deliver biased instructions and simultaneous photospreads, there is still cause for concern about the effects of administrator knowledge in photospreads that lack these features. Across all lineup procedures, single-blind photospread administrations produced identifications of suspects that had lower diagnosticity than the identifications of suspects produced using double-blind procedures. The present findings suggest the importance of double-blind lineup administration. Although one high-profile field study of double-blind practices sheds doubt for some on the usefulness of double-blind lineups (Mecklenburg, Bailey, & Larson, 2008), others suggest that there are sufficient design flaws in that field study that give pause about making policy recommendations based on its findings (Schacter et al., 2008). Although field studies may be helpful in examining practice in the field, more laboratory studies, in which one can know whether an identification of a suspect is a correct or a

mistaken identification, are needed to examine the diagnosticity of identifications under double- and single-blind administration conditions and the role of other lineup procedures in moderating the effects of administrator knowledge on witness reliability.

Even double-blind lineups may not be enough to guard against administrator expectancy effects when the administrator conducts lineups with multiple witnesses, as there is evidence that the confidence of the witness who participated in the first lineup administration influences the administrator's perception of the difficulty of the lineup task. Consequently, double-blind administrators administering a second lineup may be especially likely to steer the second witness to the photo chosen by the first witness when the first witness lacks confidence in his or her identification (Douglass, Smith, & Fraser-Thill, 2005). This study illustrates that there are still many questions about the effects of administrator knowledge of a suspect's identity and double-blind lineup administration on witness behavior that remain unanswered before solid policy recommendations can be made. Although double-blind administration of lineups may not be a panacea, there is no strong empirical evidence that it would produce harmful results. A continued exploration of other variables that interact with administrator knowledge to influence witnesses' decisions (e.g., strength of the memory trace) will assist those who wish to make policy recommendations about best practices for administering lineups.

Acknowledgments This research was supported grant from the National Science Foundation (SBE #9986240) to M. B. Kovera. Portions of this research were presented at the 2004 and 2005 meetings of the American Psychology-Law Society in Scottsdale, AZ and La Jolla, CA as well as the 2006 meeting of the Association of Psychological Science in New York, NY. We would like to thank Caroline Crocker, Ryan Copple, and Katy Sothmann for their assistance with coding the administrators' behaviors.

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