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The effect of evidence type, identification accuracy, line-up presentation, and line-up administration on observers' perceptions of eyewitnesses

Jennifer L. Beaudry[1]*, Roderick C. L. Lindsay[2], Amy-May Leach[3], Jamal K. Mansour[4], Michelle I. Bertrand[5] and Natalie Kalmet[2]

[1]Faculty of Life and Social Sciences, Swinburne University of Technology, Hawthorn, Victoria, Australia
[2]Department of Psychology, Queen's University, Kingston, Ontario, Canada
[3]Faculty of Social Sciences and Humanities, University of Ontario Institute of Technology, Oshawa, Ontario, Canada
[4]Department of Psychology, Queen Margaret University, Edinburgh, UK
[5]Faculty of Arts, University of Winnipeg, Manitoba, Canada

Purpose. People tend to believe eyewitness testimony and have difficulty assessing the accuracy of eyewitness identifications. This study examines observers' perceptions of eyewitness identifications made under various line-up presentation and administration conditions. We also investigate whether observers' ability to discriminate between accurate and inaccurate identifications is enhanced by viewing video-recorded identification decisions rather than eyewitness testimony.

Methods. Each participant (N = 432) viewed a video of an accurate or inaccurate eyewitness providing testimony and/or making an identification decision. Identifications were obtained from simultaneous or sequential line-ups conducted under double-blind, single-blind, or post-identification feedback administration conditions.

Results. Exposure to eyewitness testimony was associated with a bias to believe the evidence; exposure to the identification decision eliminated the response bias, however, it did not improve observer sensitivity to identification accuracy. Viewing the identification decision resulted in greater belief of accurate than inaccurate identifications when eyewitnesses chose from simultaneous – but not sequential – line-ups. Regardless of evidence type or identification accuracy, observers were more likely to believe eyewitnesses who received confirmatory post-identification feedback compared to the non-feedback conditions.

Conclusions. Presenting a video record of the identification decision neither improved observers' ability to discriminate between accurate and inaccurate eyewitness identifications nor reduced belief of identifications obtained from suggestive procedures. Further research is warranted before presenting video-recorded identification procedures in court.

*Correspondence should be addressed to Jennifer L. Beaudry, Faculty of Life and Social Sciences, Mail H24, P.O. Box 218, Hawthorn, Victoria 3122, Australia (email: jbeaudry@swin.edu.au).

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Obtaining reliable identifications from eyewitnesses is a priority for the criminal justice system (e.g., Beaudry, Lindsay, & Dupuis, 2006; Garrett, 2011; Technical Working Group for Eyewitness Evidence [Technical Working Group], 1999) because this evidence is compelling, but not always accurate (Boyce, Beaudry, & Lindsay, 2007). Indeed, the majority of wrongful conviction cases included mistaken eyewitness identifications (Innocence Project, 2013). Mistaken identifications are especially problematic because people evaluating eyewitness evidence have difficulty determining whether the eyewitness correctly identified the perpetrator or mistakenly identified an innocent line-up member (e.g., Wells, Lindsay, & Ferguson, 1979).

Best practice recommendations for obtaining eyewitness evidence endorse audio- or video-recording the entire identification procedure to preserve the integrity of the evidence (Cory, 2001; Kassin, 1998; Technical Working Group, 1999). Some police forces in Canada (Beaudry & Lindsay, 2006), the United States (e.g., North Carolina General Assembly, 2007), Australia (e.g., New South Wales Police Force, 2012), and the United Kingdom (Police & Criminal Evidence Act, 2011) are already video-recording the line-up members presented to eyewitnesses; in certain situations, the interaction between the line-up administrator and eyewitness are also being video-recorded. Recently, Wilford and Wells (2013) suggested that video-recording identification procedures could be considered one of a few 'system-diagnostic variables' that may help triers of fact determine the likelihood that an identification is accurate. Little is known, however, about how this type of evidence is evaluated in court and how it will influence perceptions of eyewitnesses. One exception is the study by Reardon and Fisher (2011) in which observers were better able to discriminate between accurate and inaccurate identifications when a video record of the identification procedure accompanied the eyewitness testimony. This study extends Reardon and Fisher's study by investigating how line-up presentation (simultaneous vs. sequential) and line-up administration (double-blind, single-blind, and post-identification feedback) influence observers' perceptions of eyewitnesses based on video-recorded testimony and/or identification decisions. In addition, better approximating real-world conditions, eyewitnesses in this study received unbiased line-up instructions and a 'not there' option to reduce any pressure they may have felt to choose from the line-up (cf. Reardon & Fisher, 2011). Furthermore, this study examines whether evidence type affects observer scepticism (i.e., leads to a general disbelief of identifications) and whether exposure to the identification procedure increases observer sensitivity (i.e., their ability to discriminate between accurate and inaccurate identifications). Courtroom interventions, such as presenting a video record of the identification procedure or including expert testimony, are worthwhile if they increase sensitivity rather than scepticism (Cutler, Penrod, & Dexter, 1989).

Perceptions of line-up presentation

Understanding how lawyers, judges, and jurors perceive different line-up procedures is important for improving evaluations of eyewitness identifications. Thus far, studies examining people's perceptions of sequential and simultaneous line-up presentation have produced mixed results. On the one hand, sequential line-ups were rated as more suggestive than simultaneous line-ups by judges who read a trial transcript (Stinson, Devenport, Cutler, & Kravitz, 1997) and public defenders who viewed a simulated identification procedure (Stinson, Devenport, Cutler, & Kravitz, 1996). On the other hand, mock jurors rated sequential line-ups as fairer, but not less suggestive, than simultaneous line-ups; nonetheless, line-up presentation did not affect their verdicts or

ratings of defendant culpability (Devenport, Stinson, Cutler, & Kravitz, 2002). Similarly, Wright (2007) found that people were more willing to convict if the eyewitness selected the suspect rather than a filler or no one, regardless of whether the line-up was simultaneous or sequential.

Although there is a shift towards the use of sequential line-ups, police in the United States (Wogalter, Malpass, & McQuiston, 2004) and Canada (Beaudry & Lindsay, 2006) still employ both sequential and simultaneous line-up procedures. As such, it is important to determine how line-up presentation affects people's perceptions of identifications. To date, this issue has been examined using a simulated testimony paradigm, which has two important limitations. First, the evidence is fabricated and cannot be presumed to represent genuine eyewitness behaviour. Second, simulated testimony research cannot provide information regarding people's ability to discriminate between accurate and inaccurate identifications. This study extends previous work by investigating observers' perceptions of identifications made by genuine participant-eyewitnesses from simultaneous and sequential line-ups and how these perceptions are influenced by exposure to the eyewitness' video-recorded identification decision and/or testimony.

Perceptions of line-up administration

Another factor that may affect evaluations of identification accuracy is the potential for social influence by the line-up administrator. Best-practice recommendations endorse double-blind administration in which an investigator who is unaware of the suspect's identity administers the line-up (Cory, 2001; Technical Working Group for Eyewitness Evidence, 1999) because it minimizes the risk of the line-up administrator intentionally or unintentionally influencing the eyewitness (Wells, 1993; Wells & Seelau, 1995; Wells *et al.*, 1998). In contrast, single-blind administration – the traditional practice – refers to a situation in which the administrator, but not the eyewitness, is aware of the suspect's identity and/or position in the line-up. In laboratory studies, knowledge of the suspect's identity resulted in subtle, unintended changes in administrators' verbal and non-verbal behaviour that influenced eyewitnesses' reported confidence (Garrioch & Brimacombe, 2001). Moreover, single-blind administration produced elevated false identification rates compared to double-blind administration (Greathouse & Kovera, 2009; Phillips, McAuliff, Kovera, & Cutler, 1999). Furthermore, eyewitnesses who are cognizant that the administrator has no knowledge of the suspect's identity may be buffered against confidence inflation (Dysart, Lawson, & Rainey, 2012).

An administrator with knowledge of the suspect's identity may explicitly convey to the eyewitness that the selected line-up member is indeed the suspect (e.g., 'Good, you got the guy!'). Such post-identification feedback significantly inflates eyewitnesses' reports of their confidence at the time of the identification, the amount of attention paid to the event, the ease with which they made their identification decisions, and a number of other retrospective, testimony-relevant, judgements (Wells & Bradfield, 1998). Post-identification feedback can influence eyewitnesses' confidence in selections and rejections (Semmler, Brewer, & Wells, 2004) from target-present and target-absent line-ups (e.g., Bradfield, Wells, & Olson, 2002; Lampinen, Scott, Pratt, Leding, & Arnal, 2007; Semmler *et al.*, 2004) presented simultaneously and sequentially (Douglass & McQuiston-Surrett, 2006). The post-identification feedback effect extends to earwitnesses (Quinlivan *et al.*, 2009) and persists regardless of line-up instructions (Semmler *et al.*, 2004), delay (Quinlivan, Neuschatz, Douglass, Wells, & Wetmore, 2012; Wells, Olson, & Charman, 2003), and eyewitnesses' prior expectations of having to identify the perpetrator

(Douglass & McQuiston-Surrett, 2006). Douglass and Steblay's (2006) meta-analysis established that this is a robust effect; nonetheless, obtaining confidence statements before feedback (Quinlivan *et al.*, 2009; Wells & Bradfield, 1998) and highlighting the dubious nature of the feedback (e.g., Lampinen *et al.*, 2007; Neuschatz *et al.*, 2007; Quinlivan *et al.*, 2012) can protect against confidence inflation.

There is little evidence that the damage done by suggestive procedures can be mitigated in the courtroom. In survey research, judges (Magnussen, Melinder, Stridbeck, & Raja, 2010; Wise & Safer, 2010), prosecutors (Wise, Pawlenko, Safer, & Meyer, 2009), and eligible jurors (e.g., Desmarais & Read, 2011; Kassin & Barndollar, 1992) reported limited understanding of the factors that affect eyewitnesses. In line with survey findings, information regarding administrator knowledge had no influence on mock jurors' ratings of suspect guilt (Wright, Carlucci, Evans, & Compo, 2009). Furthermore, observers rated eyewitnesses who received confirming feedback, compared to disconfirming or no feedback, more favourably in terms of identification accuracy and other testimony-relevant judgements (Douglass, Neuschatz, Imrich, & Wilkinson, 2010). Under certain conditions, however, mock jurors showed some sensitivity to confidence reports that increased from eyewitnesses' identification decisions to their testimony (Douglass & Jones, 2013; Paiva, Berman, Cutler, Platania, & Weipert, 2011).

This study used the 'real witness' paradigm (for a review, see Martire & Kemp, 2011) to examine observers' perceptions of genuine identifications made by participant-eyewitnesses under double-blind, single-blind, and post-identification feedback administration conditions as presented via video-recorded testimony and/or identification decisions.

Current study

Taken together, this study examined the direct and interactive effect of line-up presentation, line-up administration, and evidence type on observers' perceptions of genuine accurate and inaccurate eyewitness identifications. In addition, we sought to investigate how evidence type influenced observer sensitivity and scepticism. We hypothesized the following:

1. Replicating and extending Reardon and Fisher (2011), we predicted that observers would be more likely to believe eyewitness identifications in the testimony condition than in the identification (ID) condition, with ID+Testimony (presentation of both the identification and testimony videos) falling between the two. In signal detection terms, observers in the testimony condition would have a belief response bias (negative values of c) that would be reduced or eliminated in the ID+Testimony or ID condition. However, we had no basis upon which to predict whether this criterion shift would be so drastic as to produce a disbelief response bias (positive values of c); that is, scepticism of the eyewitness identifications.
2. In line with Reardon and Fisher (2011), we predicted a significant Identification accuracy × Evidence type interaction on observers' perceptions of eyewitness accuracy. Specifically, we expected that more observers would believe accurate than inaccurate identifications in the ID and ID+Testimony conditions, but not in the testimony condition. In signal detection terms, this expected pattern would result in more correct judgements (i.e., belief of accurate identifications [hits] or disbelief of inaccurate identifications [correct rejections]) in the ID and ID+Testimony conditions compared to the testimony condition; thus, exposure to the identification decision video should increase observer sensitivity (larger values of d').

3. We expected that more observers would believe identifications from simultaneous rather than sequential line-ups (Stinson *et al.*, 1996, 1997).
4. We predicted that observers would be more likely to believe eyewitnesses who received post-identification feedback compared to the non-feedback conditions (Douglass *et al.*, 2010). We also explored whether administrator knowledge would affect observers' perceptions.
5. Finally, we expected a significant Line-up administration × Evidence type interaction on feedback awareness and observers' perceptions of eyewitness accuracy, such that evidence type would affect feedback awareness and perceptions only when eyewitnesses received post-identification feedback. In the feedback condition, we predicted that observers who viewed the ID would demonstrate greater awareness that the administrator gave post-identification feedback compared to observers who viewed the testimony (Hypothesis 5a). Furthermore, we expected that observers who viewed the testimony would be more likely to believe eyewitnesses who received post-identification feedback than observers who viewed the ID decision (Hypothesis 5b). If the predicted interaction emerges, we can explore whether post-identification feedback affected observers' perceptions directly (via exposure to the feedback itself) and/or indirectly (through bolstered eyewitness confidence). Greater belief in the ID condition would suggest direct influence (i.e., seeing the administrator say, 'Good, you got the guy'; Douglass *et al.*, 2010, Experiment 2); whereas, greater belief in the testimony condition, could result from either indirect (i.e., bolstered eyewitness confidence; Douglass *et al.*, 2010, Experiment 1) or direct influence (i.e., witness testifying about feedback).

Method

Design

This study used a 2 (identification accuracy: accurate vs. inaccurate) × 2 (line-up presentation: simultaneous vs. sequential) × 3 (line-up administration: double-blind, single-blind, feedback) × 3 (evidence type: ID, testimony, ID+Testimony) between-subjects factorial design. Identification accuracy refers to whether the eyewitness made an accurate or inaccurate line-up selection, line-up presentation and administration refer to the conditions under which the eyewitness made the identification, and evidence type refers to whether observers viewed videos of the identification procedure, testimony, or both the identification procedure and testimony.

Participants

Observer participants ($N = 432$) were recruited from a large Canadian University through the Introductory Psychology subject pool and the Department of Psychology's participant calling list. Participants were randomly assigned to conditions for a total of 12 participants in each of the 48 conditions.[1] Participants ranged in age from 16 to 51 years ($M = 18.65$, 95% CI [18.42, 18.88], $SD = 2.45$) and 75.23% were female. Most participants classified

[1] *We were primarily interested in the three-way interactions, rather than the higher order four-way interaction. This sample size resulted in 36 participants per cell to test the 2 (line-up presentation) × 2 (identification accuracy) × 3 (evidence type) interaction and 24 per cell for 3 (line-up administration) × 2 (identification accuracy) × 3 (evidence type) interaction.*

their racial backgrounds as white (66.90%) or Asian (26.62%). Participants were compensated with course credit or cash; type of remuneration varied across conditions.

Materials

Observers viewed participant-eyewitnesses making genuine selections from a line-up and/or providing authentic testimony regarding their exposure to a criminal event and their identification decision. These videos were filmed as part of a larger project to collect genuine eyewitness identification stimuli under various conditions.

Eyewitness identification stimuli

To increase stimulus sampling (Wells & Windschitl, 1999), we used 48 eyewitnesses who made selections from the line-up (4 in each of the 12 line-up presentation and administration conditions). Naïve eyewitness participants viewed a video-taped mock crime of a man stealing money from a woman's unattended purse (four mock crime versions depicted four different targets). After a short delay, we video-recorded the eyewitnesses while they attempted to identify the perpetrator from a six-person line-up (yoked to target). The final stimuli set contained 48 eyewitnesses selected from the larger stimuli pool on the basis that they made positive identifications (half accurate identifications from target-present line-ups and half inaccurate identifications from target-absent line-ups) under the relevant line-up presentation and administration conditions. The larger pool of eyewitnesses not used in this study contained non-choosers as well as those who participated in different line-up procedures for use in other studies (e.g., biased line-ups).

The line-ups contained either the target and five foils (target-present) or six foils (target-absent), all of whom matched the target's description. Based on an independent sample of mock witness participants (N = 20), the mean Tredoux's effective size (E') for the four line-ups was 3.39 (SD = .67; range = 2.63–4.26; Tredoux, 1998). Eyewitnesses either viewed all line-up members at once (simultaneous procedure) or individually (sequential procedure). In the sequential procedure, eyewitnesses could see each photograph only once and they had to make a choice before proceeding to the next photograph, all line-up members were shown even if the eyewitness made a choice, and the line-up was back loaded with six additional blank cards (Lindsay, Mansour, Beaudry, Leach, & Bertrand, 2009). Prior to administering the line-up, a research assistant provided unbiased line-up instructions (Malpass & Devine, 1981) and informed the eyewitness of the 'Not there' option.

Line-up administration occurred under one of three conditions: (1) double-blind, in which the administrator was unaware of the suspect's identity; (2) single-blind, in which the administrator was aware of the suspect's identity and position in the line-up; and (3) post-identification feedback, in which the administrator was aware of the suspect's identity and provided post-identification feedback to the eyewitness ('Good, you got the guy') prior to obtaining a verbal confidence statement. After making a decision – and receiving feedback if applicable to that condition – eyewitnesses verbally reported their identification confidence in their own words. The entire eyewitness–administrator interaction was video-recorded from an angle that captured their upper bodies in profile. The average length of the ID videos was 1 min, 37 s (range = 38 s–3 min, 21 s).

Testimony stimuli

Approximately 5 min after the identification procedure, all eyewitnesses testified. The first author – blind to condition – acted as a lawyer and asked the eyewitnesses a series of questions about the crime (e.g., the person and event, lighting conditions, exposure duration), their memory for the event and level of attention, the identification procedure (e.g., line-up presentation, instructions, and comments from line-up administrator), and their decision (e.g., selection from line-up, confidence). The testimony was video-recorded such that the eyewitness could be seen head-on from approximately the waist up with courtroom-like panelling behind them. Using the 'real witness' paradigm, rather than scripts, produced testimonies of varying length (M = 5 min, 5 s; range = 3 min, 41 s–9 min, 25 s) as a result of eyewitnesses' natural verbosity or lack thereof. After testifying, the video-recording stopped and the eyewitnesses completed post-testimony measures of certainty, administrator influence, and decision strategy. Of particular importance to this study are the eyewitnesses' ratings of their confidence on a scale from 0% (*not at all confident*) to 100% (*extremely confident*).

Observer measures

Observers reported their belief of the eyewitness identification by answering 'yes' or 'no' to the question: 'Do you think the witness selected (from the line-up) the person they saw commit the crime?' Confidence in this decision was reported on a scale from 0% (*not at all confident*) to 100% (*extremely confident*). In addition, observers completed questions regarding their perceptions of the eyewitness and the identification. Two measures are of particular relevance to this article.[2] First, observers estimated the eyewitness' identification confidence on a scale from 0% (*not at all confident*) to 100% (*extremely confident*), which we refer to as *perceived eyewitness confidence*. Second, we measured observers' awareness of the post-identification feedback by asking: 'Based on what you saw, did the line-up administrator say anything to the witness about their decision/choice?' Observers could choose one of three response options: (1) administrator did not comment; (2) I did not notice; or (3) administrator did comment.

Procedure

Observer participants, randomly assigned to condition, completed the study on computers equipped with MediaLab (Jarvis, 2006). They read the letter of information, consented electronically, and answered demographic questions. Participants were informed that they would watch one or more videos of an eyewitness (same instructions regardless of condition) and would evaluate the accuracy of the eyewitness' identification decision. Each observer was exposed to the ID and/or testimony video(s) for one eyewitness. Video order in the ID+Testimony condition was counterbalanced. After watching the video(s), participants completed the dependent measures and then debriefed.

[2] *The complete results from the eyewitness post-testimony questionnaire and observer questionnaire are beyond the scope of this paper; however, the results are available from the first author.*

Results

Throughout the results, an alpha level of <.05 was considered significant, assumptions for analyses were not violated, analyses of variance (ANOVAs) used type III sums of squares, and 95% confidence intervals (CI) are reported in square brackets.

Before reporting results from the observers, we present eyewitness confidence because observers' perceptions of eyewitness identifications can be significantly influenced by eyewitness confidence (e.g., Cutler, Penrod, & Dexter, 1990).

Eyewitness confidence

We examined eyewitness confidence with an Identification accuracy × Line-up presentation × Line-up administration ANOVA. A significant main effect of identification accuracy indicated that eyewitnesses who made accurate identifications (M = 85.29%, SD = 11.94) were more confident than those who had made inaccurate identifications (M = 74.88%, SD = 15.25), $F(1, 36) = 8.36$, $p = .006$, $d = .78$. Line-up administration also had a significant main effect, $F(2, 36) = 4.78$, $p = .01$, $\eta_p^2 = .21$. *Post-hoc* tests with the Scheffé adjustment revealed that eyewitnesses who received feedback were significantly more confident in their identification (M = 87.88%, SD = 9.11) than those in the double-blind condition (M = 75.19%, SD = 15.59), $p = .02$, $d = .99$. The difference between confidence ratings in the feedback and single-blind conditions (M = 77.19%, SD = 15.38) was marginally significant, $p = .06$, $d = .85$; whereas double- and single-blind administration were not significantly different from one another, $p = .85$, $d = .13$. The marginally significant difference between the single-blind and feedback condition could raise a concern regarding the effectiveness of the feedback manipulation; however, this may be an artefact of our unique procedure that required eyewitnesses to report their confidence in their own words to the line-up administrator and in the testimony before providing their numerical confidence rating in the post-testimony questionnaire. Discussing the criminal event, the identification procedure, and their identification decision in detail may have dampened the effect of the post-identification feedback on their final numerical confidence rating.[3] Nonetheless, the mean difference between the two conditions produced an effect size (d = .85) similar to that reported in the post-identification feedback meta-analysis (d = .79; Douglass & Steblay, 2006). Line-up presentation did not significantly affect eyewitness confidence, $F(1, 36) = .86$, $p = .36$, $\eta_p^2 = .02$, nor were there any significant interactions, Fs < 2.18, ps > .13. Eyewitness confidence correlated significantly with identification accuracy, $r(48) = .36$ [.08, .59], $p = .01$, at a level similar to that found in previous studies (r = .41; Sporer, Penrod, Read, & Cutler, 1995).

Observer perceptions

The majority of observers (60%) believed that the line-up member selected by the eyewitness was indeed the perpetrator. To examine how line-up presentation and administration conditions influenced observers' perceptions of the identification, we conducted a binary logistic regression with the main effects and all possible interactions of evidence type (testimony [reference]), identification accuracy (inaccurate [reference]),

[3] *We thank an anonymous reviewer for this potential explanation.*

Table 1. Proportion of observers who believed the eyewitness identification according to evidence type, line-up presentation, line-up administration, and identification accuracy (N = 432)

	Simultaneous line-ups		Sequential line-ups		Collapsed across line-up type		
	Accurate ID	Inaccurate ID	Accurate ID	Inaccurate ID	Accurate ID	Inaccurate ID	Overall
Testimony							
Double-blind	.83 (10)	.33 (4)	.58 (7)	.75 (9)	.71 (17)	.54 (13)	.63 (30)
Single-blind	.67 (8)	.42 (5)	.58 (7)	.67 (8)	.63 (15)	.54 (13)	.58 (28)
Feedback	.75 (9)	.92 (11)	.83 (10)	.75 (9)	.79 (19)	.83 (20)	.82 (39)
Overall	.75 (27)	.56 (20)	.67 (24)	.72 (26)	.71 (51)	.64 (46)	.67 (97)
Identification+Testimony							
Double-blind	.58 (7)	.33 (4)	.42 (5)	.58 (7)	.50 (12)	.46 (11)	.48 (23)
Single-blind	.42 (5)	.50 (6)	.67 (8)	.75 (9)	.54 (13)	.63 (15)	.58 (28)
Feedback	.58 (7)	.75 (9)	.83 (10)	.83 (10)	.71 (17)	.79 (19)	.75 (36)
Overall	.53 (19)	.53 (19)	.64 (23)	.72 (26)	.58 (42)	.63 (45)	.60 (87)
Identification							
Double-blind	.83 (10)	.17 (2)	.58 (7)	.67 (8)	.71 (17)	.42 (10)	.56 (27)
Single-blind	.33 (4)	.25 (3)	.58 (7)	.50 (6)	.46 (11)	.38 (9)	.42 (20)
Feedback	.42 (5)	.42 (5)	.83 (10)	.58 (7)	.63 (15)	.50 (12)	.56 (27)
Overall	.53 (19)	.27 (10)	.67 (24)	.58 (21)	.60 (43)	.43 (31)	.51 (74)
Collapsed across evidence type							
Double-blind	.75 (27)	.28 (10)	.53 (19)	.67 (24)	.64 (46)	.47 (34)	.56 (80)
Single-blind	.47 (17)	.39 (14)	.61 (22)	.64 (23)	.54 (39)	.51 (37)	.53 (76)
Feedback	.58 (21)	.69 (25)	.83 (30)	.72 (26)	.71 (51)	.71 (51)	.71 (102)
Overall	.60 (65)	.45 (49)	.66 (71)	.68 (73)	.63 (136)	.56 (122)	.60 (258)

Note. Frequencies are reported in parentheses.

line-up presentation (simultaneous [reference]), and line-up administration (double-blind [reference]). The overall model was significant, $\chi^2(27, N = 432) = 59.24$, $p < .001$, Nagelkerke $R^2 = .17$, and correctly classified 68% of the cases (see Table 1). Evidence type was a significant predictor of observer belief, Wald $(2, N = 432) = 7.23$, $p = .03$. As predicted, the odds of observers believing that the eyewitness made an accurate identification were five times higher if observers viewed the testimony (.67) rather than the ID video (.51), $B = -1.64$, $SE = .69$, Wald $(1, N = 432) = 5.63$, $p = .02$, OR = .20 [.05, .75]. A follow-up z-test for proportions indicated that the ID+Testimony condition (.60) was not significantly different from the other two conditions, zs < 1.54, ps > .12.

Line-up administration was also a significant predictor of belief, Wald $(2, N = 432) = 6.90$, $p = .03$; as predicted, the odds that observers would believe the identification were approximately six times higher if the eyewitness had received feedback (.71) than if the identification was obtained under double-blind (.56), $B = -1.83$, $SE = .76$, Wald $(1, N = 432) = 5.84$, $p = .02$, OR = .16 [.04, .71], or single-blind administration conditions (.53), $B = -1.71$, $SE = .75$, Wald $(1, N = 432) = 5.19$, $p = .02$, OR = .18 [.04, .79]. Observer belief did not significantly differ across double- and single-blind administration, $z = .47$, $p = .32$.

Contrary to our hypotheses, neither identification accuracy, $B = .48$, $SE = .84$, Wald $(1, N = 432) = .32$, $p = .57$, OR = 1.61 [.31, 8.31], nor line-up presentation were significant predictors of belief, $B = .56$, $SE = .51$, Wald $(1, N = 432) = 1.20$, $p = .27$, OR = 1.75 [.64, 4.77]; however, unexpectedly, their interaction was significant,

$B = -1.44$, $SE = .61$, Wald (1, $N = 432$) = 5.55, $p = .02$, OR = .24 [.07, .79]. Follow-up chi-square analyses indicated that significantly more observers believed accurate than inaccurate identifications when the line-up was presented simultaneously (.60 vs. .45 respectively), $\chi^2(1, n = 216) = 4.76$, $p = .03$, OR = 1.82 [1.06, 3.12], but not sequentially (.66 vs. .68 respectively), $\chi^2(1, n = 216) = .08$, $p = .77$, OR = .92 [.52, 1.62]. This two-way interaction of identification accuracy and line-up presentation was qualified by a significant Identification accuracy × Line-up presentation × Evidence type interaction, Wald (2, $N = 432$) = 6.81, $p = .03$. As depicted in Figure 1, more observers believed accurate than inaccurate identifications in one condition – when they viewed identifications from simultaneous line-ups via the ID video, $B = 2.83$, $SE = 1.19$, Wald (1, $N = 432$) = 5.64, $p = .02$, OR = 16.87 [1.64, 173.55]; all other Bs < 2.15, Walds < 3.28, ps > .07.

Observer sensitivity to eyewitness accuracy

Overall, collapsing across accurate and inaccurate identifications, 53.24% of observers made a correct judgement (i.e., believed accurate identifications [hit] or disbelieved inaccurate identifications [correct rejection]), reflecting chance performance (50%), $z = .95$, $p = .17$, OR = 1.13 (see Table 2). In contrast to our prediction, exposure to the ID video did not produce more correct judgements compared to the ID+Testimony or testimony conditions, $\chi^2(2, N = 432) = 3.14$, $p = .21$.

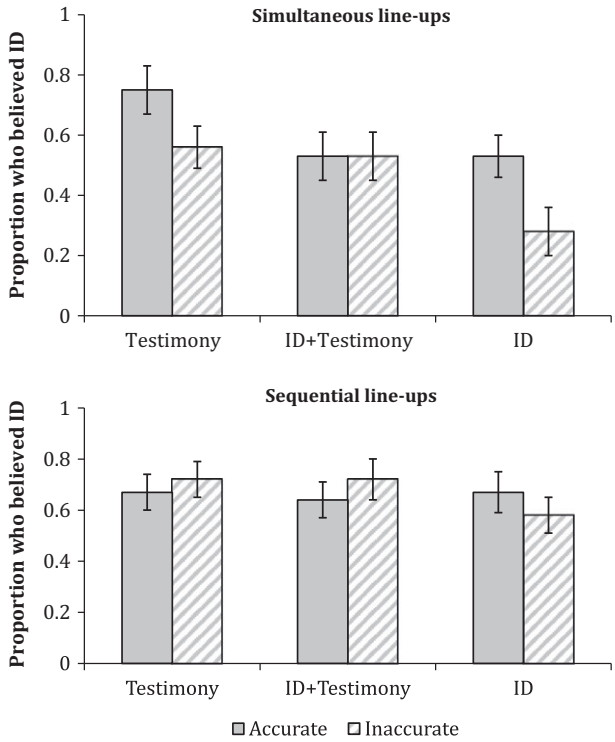

Figure 1. Proportion of observers who believed accurate and inaccurate eyewitness identifications made from simultaneous (top) and sequential line-ups (bottom) presented via testimony, ID+Testimony, and identification videos ($N = 432$). Error bars represent standard error.

Table 2. Accuracy of observers' belief of accurate and inaccurate eyewitness identifications according to evidence type conditions ($N = 432$)

Evidence type	Accurate eyewitness identification	Inaccurate eyewitness identification	Overall accuracy
Testimony	.71	.36	.53
ID+Testimony	.58	.37	.48
ID	.60	.57	.58

Note. Numbers represent the proportion of observers who made accurate decisions; inaccurate decisions are simply 1 minus the value presented.

Modelled after Martire and Kemp (2009), we calculated signal detection measures of sensitivity and scepticism for the three evidence type conditions (see MacMillan & Creelman, 2005). Observer sensitivity to identification accuracy was measured with d'; a value of zero indicates no ability to discriminate between accurate and inaccurate identifications whilst larger values represent greater discrimination. Observer scepticism or response bias was measured by criterion (c); a value of zero indicates no response bias whereas negative values indicate bias towards believing the evidence and positive values

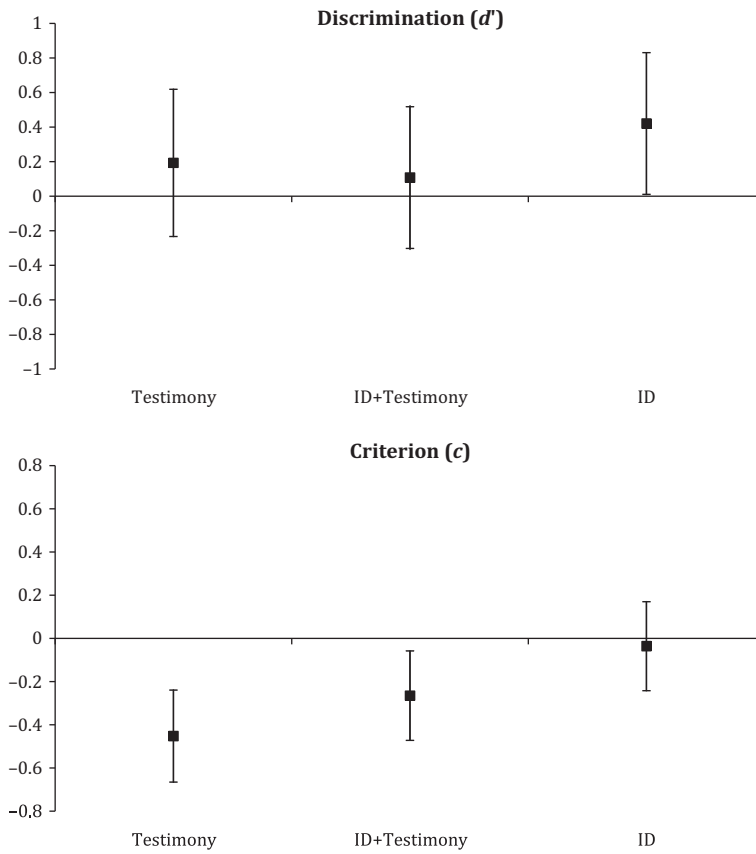

Figure 2. Discrimination (d', top) and criterion measures (c, bottom) for each evidence type ($N = 432$). Error bars represent 95% confidence intervals.

indicate a tendency to be sceptical and disbelieve the identification. An examination of the 95% CI revealed no reliable difference in sensitivity between the two most discrepant evidence conditions: testimony (d' = .19 [−.23, .62]) and ID (d' = .42 [.01, .83]). In contrast, evidence type did result in a slight, but reliable criterion shift. As illustrated in Figure 2, exposure to the identification decision reduced observers' tendency to believe the eyewitness (c = −.04 [−.242, −.170]) compared to the testimony condition (c = −.45 [−.665, −.239]). It is worth noting that the criterion value for the ID condition hovered around zero, suggesting a lack of response bias rather than general scepticism.

Observer confidence

Although we did not have specific hypotheses about observer confidence, we were interested in whether the various manipulations influenced observers' confidence in their judgements. Observer confidence was similar regardless of their decision to believe (M = 68.12%, SD = 18.14) or not believe (M = 66.28%, SD = 16.88) the eyewitness identification, $t(430) = 1.06, p = .29, d = .10$. Likewise, observer confidence was similar regardless of the accuracy of their belief judgement (accurate: M = 68.36%, SD = 16.18; inaccurate: M = 66.26%, SD = 19.17), $t(430) = 1.23, p = .22$ $d = .12$.

We analysed observer confidence with an Evidence type × Line-up presentation × Line-up administration × Identification accuracy ANOVA. The only significant effect was a three-way Line-up presentation × Line-up administration × Identification accuracy interaction, $F(2, 396) = 5.19, p = .006, \eta_p^2 = .03$. Follow-up pairwise comparisons with a Bonferroni adjustment indicated that in the double-blind simultaneous condition, observers were significantly more confident about accurate (M = 69.94%, SD = 12.01) than inaccurate identifications (M = 61.42%, SD = 15.97), $F(1, 396) = 4.15$, $p = .04$, $d = .06$, whereas in the single-blind, sequential condition observers were significantly less confident about accurate (M = 64.39%, SD = 19.96) than inaccurate identifications (M = 72.86%, SD = 14.77), $F(1, 396) = 4.10$, $p = .04$, $d = -.49$. No significant differences were found in the feedback condition, regardless of line-up presentation or identification accuracy, ps > .07.

Perceived eyewitness confidence

Perceived eyewitness confidence correlated positively with observers' decisions to believe the identification, $r_{pb}(432) = .22$ [.13, .31], $p < .001$, and observer confidence in that decision, $r(432) = .31$ [.22, .39], $p < .001$. We analysed perceived confidence ratings with an Evidence type × Line-up presentation × Line-up administration × Identification accuracy ANOVA (see Table 3). A significant main effect of line-up administration revealed that observers rated eyewitnesses who received feedback as more confident than those who made their identification under double- ($p < .001$, $d = .48$), or single-blind conditions ($p = .002, d = .38$), $F(2, 396) = 9.63, p < .001, \eta_p^2 = .05$. Significant Line-up administration × Line-up presentation, $F(2, 396) = 10.63, p < .001, \eta_p^2 = .05$, and Line-up administration × Identification accuracy interactions, $F(2, 396) = 7.03$, $p = .001$, $\eta_p^2 = .03$, were qualified by a higher order Line-up presentation × Line-up administration × Identification accuracy interaction, $F(2, 396) = 11.35, p < .001, \eta_p^2 = .05$. We explored this higher order interaction using follow-up pairwise comparisons with a Bonferroni adjustment. For inaccurate identifications obtained under double-blind administration, perceived confidence ratings were significantly lower when the line-up was presented simultaneously rather than sequentially, $F(1, 396) = 13.80$, $p < .001$,

Table 3. Perceived eyewitness confidence ratings provided by observers according to identification accuracy, line-up presentation, and line-up administration ($N = 432$)

	Accurate identifications			Inaccurate identifications			
	Simultaneous	Sequential	Overall	Simultaneous	Sequential	Overall	Overall
Double-blind	72.06% (13.97)	79.64% (15.40)	75.85% (15.09)	56.81% (14.53)	71.18% (13.43)	64.29% (15.81)	70.07% (16.45)
Single-blind	78.94% (15.29)	61.89% (23.72)	70.42% (21.60)	69.42% (17.12)	74.39% (19.93)	71.90% (18.62)	71.16% (20.10)
Feedback	75.03% (20.08)	79.83% (19.33)	77.43% (19.72)	84.61% (12.85)	73.39% (15.28)	79.00% (15.12)	78.22% (17.52)
Overall	75.34% (16.74)	73.79% (21.34)	74.56% (19.15)	70.28% (18.69)	73.19% (16.33)	71.73% (17.57)	73.15% (18.41)

Note. Standard deviations are reported in parentheses.

d = 1.09; a similar, but marginally significant, pattern emerged for accurate identifications, $F(1, 396) = 3.54$, $p = .06$, $d = .52$. In contrast, for single-blind administration, perceived confidence ratings for accurate identifications were significantly higher when the line-up was presented simultaneously rather than sequentially, $F(1, 396) = 17.91$, $p < .001$, $d = .88$; ratings for inaccurate identifications did not differ significantly, $F(1, 396) = 1.52, p = .22, d = -.27$. Another pattern emerged in the feedback condition such that perceived confidence ratings for inaccurate identifications were significantly higher in the simultaneous compared to the sequential presentation condition, $F(1, 396) = 7.76$, $p = .006$, $d = .81$; however, this difference was not found for accurate identifications, $F(1, 396) = 1.42, p = .23, d = -.25$. This interaction and pattern of results was not found for eyewitnesses' own confidence reports; thus, differences in observers' confidence ratings are attributable to their perceptions of the procedural manipulations. There were no other significant effects (ps > .09).

Feedback awareness

Of the eyewitnesses who received feedback, 87.50% (14 of 16) testified that the officer told them that they made the correct choice. We conducted a multinomial logistic regression to investigate how line-up administration and evidence type affected observers' awareness of the feedback. The model included feedback awareness as a dependent variable ('the officer did not comment' [reference]) and the main effects and interaction of line-up administration and evidence type as predictors. The Line-up administration × Evidence type interaction did not contribute to the fit of the model, $G^2(8, N = 432) = 13.06$, $p = .11$. After removing the interaction, the final model was significant, $\chi^2(8, N = 432) = 211.67$, $p < .001$, Nagelkerke $R^2 = .44$, and correctly classified 67% of the cases (see Figure 3). When comparing the 'I did not notice' response to the 'officer did not comment' response, line-up administration was not a significant predictor, ps > .72, ORs < 1.17, but evidence type was significant. The odds of observers indicating that the officer did not comment were 3.63 times higher if they viewed the testimony, $B = -1.29$, $SE = .34$, Wald $(1, N = 432) = 14.85$, $p < .001$, OR = .27 [.14, .53], rather than the ID, and 1.88 times higher if they viewed the ID+Testimony rather than the ID, $B = -.63$, $SE = .31$, Wald $(1, N = 432) = 4.14$, $p = .04$, OR = .53 [.29, .98].

When comparing the 'officer did comment' to the 'officer did not comment' response, both line-up administration and evidence type were significant predictors. The odds of observers indicating that the officer did comment were 31.23 times higher if the identification was obtained from post-identification feedback rather than double-blind administration conditions, $B = -3.44$, $SE = .37$, Wald $(1, N = 432) = 84.60$, $p < .001$, OR = .03 [.02, .07]. Similarly, the odds of observers indicating that the officer did comment were 23.80 times higher if the identification was obtained from post-identification feedback rather than single-blind administration conditions, $B = -3.18$, $SE = .35$, Wald $(1, N = 432) = 83.43$, $p < .001$, OR = .04 [.02, .08]. In terms of evidence type, the odds of observers indicating that the officer did comment on the eyewitness' decision were 2.70 times higher if they viewed the ID video rather than the testimony, $B = -.99$, $SE = .36$, Wald $(1, N = 432) = 7.72$, $p = .005$, OR = .37 [.18, .74]. Observers' endorsement of the 'officer did comment' response was similar in the ID and ID+Testimony conditions, $B = -.28$, $SE = .35$, Wald $(1, N = 432) = .64$, $p = .42$, OR = .78 [.38, 1.50]. Taken together, observer awareness of officers' comments regarding the eyewitness' identification decision was independently affected by evidence type (greater awareness after exposure to the ID video) and line-up administration

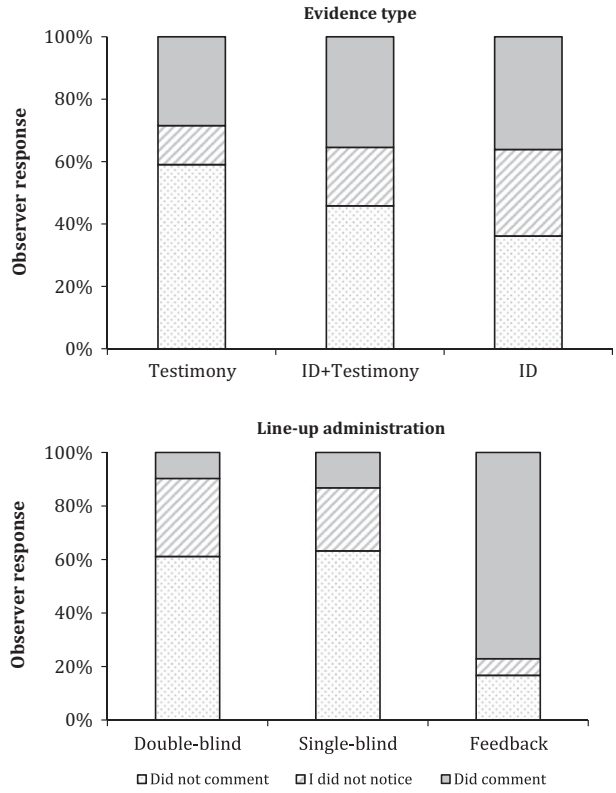

Figure 3. Observer endorsement (N = 432) of response options to the question, 'Did the officer say anything to the witness about their choice/decision?' according to evidence type (top) and line-up administration (bottom).

(greater awareness when identification procedure included post-identification feedback), but – contrary to our hypothesis – not their interaction.

To investigate whether observers who noticed the feedback were more or less likely to believe the eyewitness identification, we split observers according to their response. Observers who indicated that the officer did comment on the eyewitness' decisions were as likely to believe the eyewitness (.61) as those who reported that the officer did not comment (.58), $\chi^2(1, n = 347) = .47$, $p = .49$, OR = 1.16 [.75, 1.80].

Discussion

Replicating decades of research, observers were more likely to believe than disbelieve eyewitness evidence (for a review see Boyce *et al.*, 2007). As predicted (Hypothesis 1), the odds of observers believing an identification were five times higher if they viewed the testimony rather than identification decision. Exposure to the identification decision alone may have led to the lowest belief rate because the identification decision was seen in isolation and observers had no information about the eyewitness' reported exposure to the criminal or the thought processes underlying the identification decision. In signal detection terms, response bias, but not sensitivity, was affected by evidence type. Observers who viewed the testimony had a tendency to believe the eyewitness,

but this response bias was eliminated when observers viewed only the identification decision.

We predicted that observers would be more sensitive to eyewitness accuracy after viewing the ID than testimony (Hypothesis 2). Contrary to this prediction, observers' perceptions were similar for accurate and inaccurate identifications regardless of evidence type; that is, exposure to the identification video did not affect observer discrimination. This is in contrast to Reardon and Fisher (2011) who reported increased discrimination when observers viewed the identification-plus-testimony evidence compared to the testimony evidence alone. They provided three possible explanations as to how inclusion of the identification video increased observer discrimination: (1) observers viewed the eyewitness' actual behaviour during the identification procedure, (2) observers were exposed to additional sources of information (verbal and visual) upon which to base their judgements, and (3) diagnostic information was available in the eyewitness' description and identification decision. Further consideration of these explanations may help to shed light on the inconsistency between this study and that of their study while providing additional information regarding the factors aiding discrimination. Our findings lend little support to the first two suggestions. Observers exposed to the identification decision alone could not determine whether the identification was accurate or not even though the video preserved the actual identification behaviour of the eyewitness. Likewise, even though the identification decision video provided observers with verbal and visual behaviour, belief rates were similar regardless of identification accuracy. Thus, our results suggest that these two explanations do not fully capture how exposure to the identification video enhances observer discrimination.

Although exposure to the ID decision did not increase our observers' discrimination, we contend that the diagnosticity explanation is the most plausible. A key distinction between these two studies is that Reardon and Fisher's (2011) observers viewed four eyewitnesses to the same crime (two accurate, two inaccurate), whereas observers of this study saw only one eyewitness (who had made an accurate or inaccurate identification). Viewing the identification decisions of multiple eyewitnesses to the same crime may have sensitized observers to relevant verbal and non-verbal cues available in the identification procedure video, which may have aided in determining identification accuracy. Likewise, the same could be said for viewing descriptions from multiple eyewitnesses; however, only 8% of participants in Reardon and Fisher's study referenced the eyewitness' description as influential in their belief of the identification. Furthermore, the small description–identification relationship suggests that description information cannot be relied upon to determine identification accuracy (Meissner, Sporer, & Susa, 2008). Future research must continue to identify eyewitness behaviour that is diagnostic of accuracy (e.g., Dunning & Perretta, 2002; Smith, Lindsay, & Pryke, 2000), and determine how observers interpret and use this behavioural information.

Contrary to our prediction that observers would be more likely to believe identifications from simultaneous than sequential line-ups (Hypothesis 3), line-up presentation did not significantly affect observers' perceptions. Despite this non-significant finding, our investigation of the interaction between line-up presentation, evidence type, and identification accuracy on observer belief of genuine identifications contributes to the previous inconclusive literature on this topic. The most intriguing finding is that observers were able to discriminate between accurate and inaccurate identifications made from simultaneous – but not sequential – line-ups if exposed to the ID video alone. Perhaps eyewitnesses who make their identifications from simultaneous, but not sequential, line-ups provide cues that are diagnostic of accuracy. Future research should continue

exploring how line-up presentation influences eyewitness behaviour and observers' perceptions of video-recorded identifications, with particular focus on whether certain line-up procedures lead to better discrimination.

Consistent with Wright *et al.* (2009), observers' perceptions were similar regardless of whether or not the administrator was aware of the suspect's identity, which further highlights the importance of double-blind testing (Wells, Steblay, & Dysart, 2012). With regard to feedback, the extensive research into confirmatory post-identification feedback clearly demonstrates that it can boost eyewitness confidence and retrospective certainty reports (Douglass & Steblay, 2006), which, in turn, influences observers' evaluations of the identification decision (Douglass *et al.*, 2010). Our findings replicated those of Douglass *et al.* (2010) and supported our prediction that observers would be more likely to believe eyewitnesses who received feedback compared to those who did not (Hypothesis 4). Specifically, the odds of observers believing the identification were approximately six times higher if the eyewitness received feedback rather than no feedback. Thus, not only were observers unable to correct for suggestive procedures but – in the case of feedback – they were persuaded by the suggestive procedure.

Our prediction that evidence type and line-up administration would interact to influence observer awareness of feedback received partial support (Hypothesis 5a), such that the main effects, but not their interaction, were significant. Specifically, observers who viewed the identification were more likely to report that the officer commented on the eyewitness' decision than those who viewed the testimony. Likewise, observers demonstrated greater awareness of the officers' comments in the post-identification feedback condition compared to the double-blind and single-blind conditions. Contrary to our hypothesis, exposure to the identification procedure did not increase awareness of the post-identification feedback. Moreover, line-up administration and evidence type did not interact to influence observers' perceptions of the eyewitness identifications (Hypothesis 5b). Eyewitnesses who received post-identification feedback were more likely to be believed than identifications obtained under non-feedback conditions regardless of evidence type or identification accuracy. The question of how feedback affects observers – directly through hearing the administrator give the feedback or indirectly through bolstered eyewitness confidence – remains unanswered and is worthy of future consideration. We echo the call of Douglass and colleagues (Douglass & Jones, 2013; Douglass *et al.*, 2010; Wells & Bradfield, 1998) to record eyewitness confidence before any possible contamination because the effects of confirmatory feedback on the eyewitness and evaluator are consistent, widespread, and not corrected by video-recording identification procedures.

Finally, interesting results emerged in our exploration of observers' confidence in their judgements as well as their estimates of the eyewitnesses' confidence. Observer confidence in their own belief judgements was uninfluenced by the accuracy of their decisions or the accuracy of the eyewitness identifications. Notably, the higher order interaction between line-up administration, line-up presentation, and identification accuracy should be interpreted cautiously given the magnitude of some of the effect sizes. With regard to observers' estimates of eyewitness confidence, observers reported higher estimates for eyewitnesses who had received feedback than for those in the double- and single-blind conditions. This result demonstrates that observers were attuned to eyewitness confidence (indeed, this pattern matches the general eyewitness confidence results); however, when considered alongside observers' perceptions, it suggests that observers did not adjust for the non-memorial source of the feedback-eyewitnesses' inflated confidence.

Limitations and conclusions

Three limitations are worth noting. Observers did not view a complete court case with real attorneys performing direct and cross-examination of the eyewitnesses. The benefit, however, of conducting research studies with experienced prosecutors and defence attorneys who use 'lawyerese' is questionable (Lindsay, Wells, & O'Connor, 1989; Wheatcroft, Wagstaff, & Kebbell, 2004). Nonetheless, we sought to maintain ecological validity by including testimony questions representative of those typically asked in real trials.

The inaccurate identification condition included any selection from a target-absent line-up, rather than only selection of a designated innocent suspect. Although this is not uncommon in this type of research (e.g., Douglass *et al.*, 2010; Lindsay, Wells, & Rumpel, 1981; Reardon & Fisher, 2011), it may be more difficult for observers to discern eyewitness accuracy than it would be in a real trial. That said, Reardon and Fisher's results suggest that people can still discriminate between accurate and inaccurate identifications, even if the inaccurate identification is not of the innocent suspect. This question deserves additional attention, especially with regard to observers' perceptions of identifications made under single-blind conditions in which the administrator is aware that one line-up member is the suspect and may guide the eyewitness to that choice (Greathouse & Kovera, 2009).

Finally, in our stimuli, the eyewitness and administrator were in profile during the identification procedure recording, whereas the eyewitness was recorded head-on during the testimony. Extensive research in interrogations (e.g., Lassiter, 2010; Lassiter & Irvine, 1986) and social psychology in general (Taylor & Fiske, 1975) highlight the importance of salience on people's judgements and perceptions. Informed by this research, we specifically included both parties in the identification procedure so that observers could simultaneously view the behaviour of the eyewitness and administrator. We did not have the same concern about salience during the testimony because we asked structured questions of all participants and the 'lawyer' was blind to whether the line-up was target-present or target-absent. Future research should examine the role of camera perspective in eyewitness identification procedures; however, there is little reason to suspect that the difference in camera angle limits the validity of our findings.

In conclusion, our results suggest that presenting triers of fact with a video record of the identification procedure is not a panacea for the problem of eyewitness fallibility. We agree that the police identification procedures should be video-recorded and, like others, we hoped that this intervention would redress some of the problems with eyewitness identifications (Austin, Zimmerman, Rhead, & Kovera, 2013; Wilford & Wells, 2013). Given our results, however, we are hesitant to outright recommend that identification procedure videos be included as evidence in criminal cases for two main reasons (cf. Douglass & Jones, 2013). First, observers were as likely to believe identifications obtained from single-blind line-ups as those conducted under double-blind conditions; as such, we contend that video-recording procedures does not eliminate the need for independent line-up administrators. Second, and even more concerning, observer belief was highest when eyewitnesses received post-identification feedback; thereby, providing further evidence that video records may not make observers aware of procedural biases (Douglass *et al.*, 2010). More research is needed regarding the effects of evidence type on observers' perceptions of biased and unbiased identification procedures, including line-up presentation, line-up construction, and line-up instructions. Furthermore, researchers should examine how observers' perceptions are affected by evidence type and its interaction

with legal safeguards, such as cross-examination, expert testimony, and judicial instructions.

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