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The Mystery Man Can Help Reduce False Identification for Child Witnesses: Evidence from Video Line-ups

CATRIONA HAVARD[1]* and AMINA MEMON[2]

[1]*Department of Psychology, The Open University, UK*
[2]*Department of Psychology, Royal Holloway College, University of London, UK*

Summary: It is well established that children (as young as 5 years) can correctly identify a target from a target present (TP) line-up as accurately as adults; however, when shown a target absent (TA) line-up, children make more false identifications. In the present study, children aged 5–7 and 8–11 years viewed a film of a staged theft, then 1–2 days later were shown either a TP or TA video line-up. Half of the witnesses viewed line-ups that included a 'mystery man' (a black silhouette with a white question mark), which they could select if they did not recognise anyone from the line-up. When the 'mystery man' was present in the line-up, there were significantly fewer false identifications for the TA line-ups. This study shows that including a silhouette in a video line-up can help reduce false identifications for children as young as 5 years of age, without reducing correct identifications. Copyright © 2012 John Wiley & Sons, Ltd.

INTRODUCTION

Eyewitness identification often plays a crucial role in criminal investigations, and in many cases, children are the only witnesses (Pike, Brace, & Kynan, 2002; Pozzulo, 2007). A recent field survey of identification parades conducted in Scotland during 2008 found that one-third were viewed by witnesses younger than 16 years (Memon, Havard, Clifford, & Gabbert, 2011). Of the witnesses in this age group, 56% identified the suspect from the parade, a third identified a known innocent from the line-up and just over 10% did not make any identification. Therefore, the survey data suggested that children younger than 16 years make a false identification a third of the time, and possibly more as we cannot always be sure that the suspect is guilty. The consequences of false identifications can be extremely serious. The Innocence Project (at the time of writing) has been involved in 289 exonerations based on DNA evidence in the USA: of these cases, approximately 75% were cases of mistaken identity (Innocence Project, 2012). Several similar organisations have been developed worldwide such as the UK Innocent Network, the Australian Innocence Network and the Innocence Project New Zealand, all with the aim of overturning the convictions of those who have been wrongfully imprisoned.

Laboratory studies investigating how children perform on line-up tasks confirm the field research. When a culprit or 'target' is present (TP) in a line-up, children older than 5 years can perform as accurately as adults (Goodman & Reed, 1986; Lindsay, Pozzulo, Craig, Lee, & Corber, 1997; Parker & Carranza, 1989; Parker & Ryan, 1993; Pozzulo & Balfour, 2006; Pozzulo & Lindsay, 1998). However, when faced with a culprit or 'target' absent (TA) line-up, children are significantly more likely to make a false identification than are adults (Beal, Schmitt, & Dekle, 1995; Dekle, Beal, Elliot, & Huneycutt, 1996; Lindsay *et al.*, 1997; Parker & Carranza, 1989; Parker & Ryan, 1993; Pozzulo & Balfour, 2006; Pozzulo & Warren, 2003). A meta-analysis of eyewitness

*Correspondence to: Catriona Havard, Faculty of Social Sciences, The Open University, Walton Hall, Milton Keynes, MK17 6AA, UK.
E-mail: catriona.havard@open.ac.uk

studies also reported that children were less likely to correctly reject TA line-ups compared with adults (Pozzulo & Lindsay, 1998).

There are a number of explanations as to why children perform more poorly on TA line-ups than adults. Performance differences may not necessarily be due to differences in encoding and storage but may relate to the social demands of the retrieval process (Ceci, Ross, & Toglia, 1987; Pozzulo & Lindsay, 1998, 1999). The high choosing rates by children may also be a result of task demands (Pozzulo & Lindsay, 1997) and the assumption that the perpetrator must be within the line-up (Gross & Hayne, 1996). If children are more likely to choose from a line-up then they may be more likely to guess, and therefore use a more liberal decision criterion, compared with adults (Parker & Carranza, 1989). Researchers have argued that simply being presented with a line-up places implicit pressure on the witness to choose, even though they are instructed that 'the person may or may not be present', and adults may be more able to resist this pressure than children (Beal *et al.*, 1995; Ceci *et al.*, 1987).

Another issue is that the responses for making a correct identification and a correct rejection are very different. One involves recognising a previously seen face, whereas the other involves recalling a face and determining that the face is not present in the line-up. When making a correct identification, often the witness just points to the line-up member saying 'that's him or her', whereas when making a rejection the witness has to say 'I don't think the person is there'. Therefore, when making a correct identification for a line-up the response is positive, whereas when making a correct rejection the response is negative. It has been suggested that children view giving positive responses as being more favourable than giving negative responses (Zajac & Karageorge, 2009).

In an attempt to increase correct rejection rates, some studies have changed the way a line-up is presented by encouraging absolute judgements or by asking the witness to eliminate all the line-up members that are not the target (Humphries, Holliday, & Flowe, 2011; Pozzulo & Balfour, 2006; Pozzulo & Lindsay, 1999; Pozzulo, Dempsey, & Crescini, 2009). Another approach has been to introduce a training session to help children resist the social demands to choose from a

line-up by including a practice TA line-up where it is made obvious that the target is not present (Goodman, Bottoms, Schwartz-Kenney, & Rudy, 1991; Parker & Ryan, 1993). There are also studies that have provided children with an additional or alternative choice within the line-up so that they can select a line-up member without falsely identifying someone (Beal et al., 1995; Davies, Tarrant, & Flin, 1989; Karageorge & Zajac, 2011; Zajac & Karageorge, 2009).

One reason that witnesses might make a false identification from a TA line-up is that they use a relative judgement and choose the person who looks most like the culprit (Lindsay & Wells, 1985). Previous research with adults has found that one way to reduce relative judgements, and encourage absolute judgements, is to use a sequential line-up, rather than a simultaneous line-up where all the line-up members are presented in an array (Lindsay & Wells, 1985). In the sequential line-up, a witness is not told how many line-up members they will see. They are shown each person one at a time, and they have to decide if the person currently shown is the culprit before seeing the next person. The line-up stops when the witness identifies someone, or they have seen every line-up member. Once they have identified someone, they cannot see that person again. Although the sequential line-up procedure has been found to reduce false identifications made from TA line-ups for adult witnesses (Kneller, Memon, & Stevenage, 2001; Sporer, 1993), it has not been found to reduce false identifications made by children (Lindsay et al., 1997; Parker & Ryan, 1993; Pozzulo & Lindsay, 1998).

In another attempt to reduce false identifications from TA line-ups, Pozzulo and Lindsay (1999) developed a two-stage elimination line-up where children were initially asked to make a relative judgement and choose the person who looked most like the target. They were then asked to make an absolute judgement and decide if that person was the target or not. Pozzulo and Lindsay suggest that failure to make the second type of judgement may inflate children's performance on TA line-ups. In their study, Pozzulo and Lindsay found that the elimination line-up could help to significantly reduce the number of false identifications for children aged 10–14 years, without significantly reducing correct identifications for TA line-ups. The elimination line-up technique has also been successful at reducing false identifications with younger children aged 8–13 (Pozzulo & Balfour, 2006) and 3–6 years (Pozzulo, Dempsey, & Cresini, 2009).

However, Pozzulo and colleagues' research has tended to use photo line-ups where the initial display is presented simultaneously, whereas line-ups in the UK are now presented using video images that are presented one at a time. Studies that have used an elimination procedure with video line-ups have not been able to replicate the findings for photo line-ups with child witnesses. Humphries et al. (2011) found that using an elimination video line-up could reduce false identifications for adult witnesses but not children aged 5–6 and 9–10 years. Humphries et al. (2011) suggested that the reason they did not find a benefit from using elimination line-ups may have been due to methodological differences between their research and that previously conducted. For example, in Humphries et al. (2011), all the line-ups were presented with moving images and serial presentation, whereas previous research has nearly always employed static

photographic images. Beresford and Blades (2006) also found that using an elimination video line-up did not reduce false identifications for children aged 6–7 and 9–10 years, and for TP line-ups, it actually reduced correct identifications. Beresford and Blades suggest that the more complex instructions that are needed when using video elimination line-ups may have made their child witnesses more cautious when making an identification, which reduced the correct identification rate. However, if using the elimination procedure with the video line-ups made children more cautious, this should have reduced false identification rates for the TA line-ups.

Other studies have employed a different mechanism to try to reduce false identification rates by using practice line-ups, with the aim that they will help children resist the social demands of choosing from a line-up. Goodman et al. (1991) showed children aged 3–7 years a TA line-up where they were asked to choose their mother and found that this could reduce false identification for a subsequent TA line-up. However, other studies have failed to find any benefit for using practice trials to reduce false identifications for TA line-ups (Davis, Stevenson-Robb, & Flin, 1989; Parker & Myers, 2001). Parker and Ryan (1993) found that using a practice line-up could help reduce false identifications for the subsequent line-up but only when all the line-up members were shown together in a simultaneous line-up. Zajac and Karageorge (2009) argue that the reason techniques that try to reduce choosing have been unsuccessful is that the procedures for rejecting a line-up and making an identification are not comparable. They suggest choosing a line-up member involves a positive outcome, and children perceive 'yes' answers as more desirable than 'no' responses (Bruck & Ceci, 1999) and that giving an answer is preferable to not giving any answer (Waterman, Blades, & Spencer, 2000).

There are a few studies that have developed techniques to align the correct rejection decision more closely to making an identification, by giving the witnesses an additional choice within the line-up. Davies et al. (1989) provided children (aged 6–7 and 10–11 years) with an additional line-up member called 'Mr Nobody', who was a line-drawn cartoon character, and asked them to pick Mr Nobody if they did not see the person in the line-up. Surprisingly, Davies et al. (1989) showed a very high rate of correct rejections even in the control condition where there was no additional option; therefore, the addition of Mr Nobody did not significantly improve correct rejection rates. In another study, Beal et al. (1995) included the additional option of a 'not here' card and children (aged 5–7 years) were asked to point to the card if they did not see the person in the line-up. They found that the 'not here' card did reduce false identifications for the TA line-ups; however, they used very small sample sizes, so their results should be interpreted with caution.

The most successful study for reducing false identification rates using an additional option was by Zajac and Karageorge (2009). They used a simultaneous photo array where a silhouette with a question mark was placed between two rows of three cards. They called this silhouette the 'wildcard' and asked child witnesses (aged 8–11 years) to point to this special photo if they did not see the person in the line-up. Zajac and Karageorge (2009) found that in the control condition, correct rejections were made on 46% of occasions, but when there was

the option of the wildcard, correct rejections were made 71% of the time. Using the wildcard also did not reduce correct identifications when the target was present in the array. Importantly, Karageorge and Zajac (2011) in a further study also found that the wildcard was effective at increasing correct rejections for younger children (aged 5–7 years) from 29% to 84%. These studies appear to show that using an additional line-up member (who is obviously not the target) can, in some circumstances, reduce false identifications from TA line-ups by allowing children to make a positive selection from the line-up without falsely identifying someone.

The majority of studies described thus far that have successfully reduced false identifications for TA line-ups, have used static photographic line-ups presented simultaneously. However, in England and Wales photo line-ups and live identification parades have now been replaced by video line-ups (Police and Criminal Evidence Act (PACE) 1984, Code D, 2011), whereas in Scotland, every witness younger than 16 years is asked to make an identification from a video line-up (Vulnerable Witness Act Scotland, 2004). There are two different systems currently operating in the UK: Video Identification Parades by Electronic Recording (VIPER) and Profile Matching Identification (PROMAT ID). It is estimated that there are a minimum of 80 000 video parades in total taking place each year in the UK (Valentine, Hughes, & Munro, 2009). Although research has shown that video parades can reduce false identifications when a culprit is absent from a line-up for adults (Valentine, Darling, & Memon, 2007) and adolescents (Havard, Memon, Clifford, & Gabbert, 2010), children are more likely to make a false identification, regardless of whether the parade is a video or photo line-up (Beresford & Blades, 2006; Havard *et al.*, 2010).

When a witness is presented with a video parade in the UK, they are presented with a series of moving images, one at a time. Each clip begins with a head-and-shoulders view of a person looking straight at the camera. They then move their head over to the right and then to the left, so that both profiles are visible, before returning to full face. Each clip has a number in the left hand corner, and on average, a witness would view nine clips, with one being the suspect. According to the Police and Criminal Evidence Act (1984) Codes of Practice D (2011), in England and Wales, a witness 'should be asked not to make any decision as to whether the person they saw is on the set of images until they have seen the whole set at least twice' page 49. In Scotland, the Lord Advocate's guidelines on the Visual Identification Parades (Angiolini, 2007) state that 'the witness should normally view the whole set of images at least twice before confirming that he or she wants to view the images or any part of them again. Only where the identification is unequivocal at the first viewing, and further viewing is likely to cause distress to the witness, should this practise be departed from' (Appendix C). After viewing the line-up twice, witnesses are usually asked if they want to see any person again, before being asked to make an identification decision. This differs greatly from the strict sequential procedure advocated by Lindsay and Wells (1985), where a witness has to make an absolute decision ('is that the culprit?') to each line-up member, and the line-up is stopped as soon as either a person is identified, or all the line-up members have been viewed.

The aim of the current study was to determine whether using a moving silhouette within a video line-up could reduce false identifications for TA line-ups. Previous research that placed a silhouette in a simultaneous photo line-up reduced children's false identification rates from an average of 70% to 30% (Karageorge & Zajac, 2011; Zajac & Karageorge, 2009). However, so far these results have not been replicated for video line-ups. As previously mentioned, elimination line-ups have successfully reduced false identification rates for simultaneous photo line-ups (Pozzulo & Lindsay, 1999); however, this has not been the case for video line-ups (Beresford & Blades, 2006; Humphries *et al.*, 2011), therefore we could not guarantee that using an additional option in a line-up would reduce false identifications, as no previous research has employed an additional option with a video line-up.

In the present study, younger children aged 5–7 years and children aged 8–11 years were presented with a video line-up where each line-up member was viewed one at a time. These age ranges were selected as there have been cases where children as young as 5 years of age have been asked to identify suspects from video line-ups (Memon *et al.*, 2010). Research also suggests that there are developmental differences in memory (see Schneider, 2011 for a review) and attention (Betts, McKay, Maruff, & Anderson, 2006), which may result in differences in face recognition between younger and older children (Crookes & McKone, 2009). Older children have also been shown to be less susceptible to suggestion when being interviewed than younger children (Ceci & Bruck, 1993; Gordon, Baker-Ward, & Ornstein, 2001), which may well influence identification decisions. Furthermore, although the majority of research suggests that there are few differences in accuracy between these two age groups, there is some research that has identified potential accuracy changes as a function of children's age. Karageorge and Zajac (2011) reported that children aged 5–7 years were less accurate on TP line-ups than those aged 8–11 years, whereas Humphries and colleagues found that 5- to 6-year olds were less accurate on TA line-ups compared with 9- to 10-year olds. It is therefore of interest to investigate whether there are any differences in performance between these two age groups.

When performing the line-up task, children were asked to make their identification or rejection decision by giving a verbal response, rather than pointing to a line-up member. By requiring a verbal response, either selecting a line-up member (e.g. 'it's number 4') or saying that the person is not there, this study follows the standard procedure of line-up identification in the UK (PACE codes of Practice 1984). The main justification for making all of the responses verbal was to ensure that making a selection (choosing a number) and a rejection (for the 'mystery man' condition choosing a number) were as similar as possible. Previous studies that have used the simultaneous line-up procedure usually involve a witness pointing to make a selection and using a verbal response when rejecting the line-up. Therefore, in those studies, making a selection and rejection required different modes of responses, whereas using the present procedure both line-up rejections and selections required the same mode of response.

After making a line-up decision, our participants were asked to make a confidence judgement. An eyewitness's

confidence can often influence other people's (e.g. police, jurors and judges) perceptions of the reliability of their identification (Brewer & Palmer, 2010). However, psychologists are not always in agreement as to whether eyewitness's confidence is a precise indicator of identification accuracy. Some researchers recommend that a clear statement of confidence is taken from the witness at the time of the identification (Valentine *et al.*, 2007). Other researchers suggest that confidence is not necessarily a good indicator of accuracy (Leippe, Eisenstadt, & Rauch, 2009) and that confident inaccurate witnesses can often appear to be as believable as accurate witnesses (Leippe *et al.*, 1992). Additionally, research has suggested that there is only a confidence-accuracy relationship with correct identifications from TP line-ups and no relationship with correct rejections from TA line-ups (Brewer & Palmer, 2010).

Although some researchers have suggested that high confidence judgements recorded immediately after identification (prior to any feedback) can often indicate correct identifications (e.g. Brewer, 2006), this has not been thought to extend to children younger than 12 years (Brewer & Palmer, 2010). Nonetheless, there has been research that found children aged 6–8 years had higher confidence ratings for correct identifications for TP line-ups, than those who did not correctly identify a culprit (Havard, Memon, Laybourn, & Cunningham, 2011). These findings suggest that there may be situations under which a child's confidence can be a reliable indicator of accuracy. This study aimed not only to investigate whether correct identifications were associated with higher confidence ratings, but additionally, whether the presence of a 'mystery man' would influence post-decision confidence ratings, as this area has not been previously explored.

In light of the previous research, several hypotheses were tested. First, it was predicted that using the silhouette or 'mystery man' would help to reduce false identifications for the TA line-ups, as children would be able to choose a person from the line-up without making a false identification. Secondly, it was predicted that using the silhouette in the line-up would have no adverse effect on correct identifications for the TP line-ups and that they would be similar to responses for the control line-ups. Thirdly, it was predicted that if the 'mystery man' reduced false identification rates for TA line-ups without compromising accuracy for TP line-ups, then performance on TA line-ups would be equal to that of TP line-ups. For the control condition, it was predicted that responses would be more accurate for the TP line-ups than for the TA line-ups.

METHOD

Participants

A total of 268 children were recruited from state-run primary and secondary schools in Aberdeen, Scotland. There were 129 children aged 5–7 years (57 girls and 72 boys) and 139 aged 8–11 years (81 girls and 58 boys): see Table 1 for mean ages. Consent to carry out the research was obtained from both the head teachers of the schools and the children's legal guardians.

Materials

A short film was created using a young Caucasian man aged 27 years as the target (actor). A man of this age was used as the results of a recent field study found that the majority of suspects placed in VIPER parades were men and aged between 16 and 34 years (Havard, Memon, Chaudhry, Clifford, & Gabbert, 2008). The film began with the target walking along a corridor towards the camera and trying the handles of doors, until one opened. The next scene was of the target entering an office, looking around and picking up a wallet from a table, then a laptop from another desk. The target then looked through several drawers and also picked up a mobile phone. The target took one final look around the room before leaving. The last scene was of the target walking back up the corridor with the laptop bag over his shoulder. The total duration of the film was 1 minute and 30 seconds. The target was seen in full-face frontal and profile views during the film.

Eight 9-person line-ups were created, according to VIPER specifications. Half of the line-ups were target present (TP) and half target absent (TA), and half contained the 'mystery man' and half did not. The line-ups were created by an experienced VIPER operator, in the same manner as a real identification parade, and foils were chosen from the VIPER database using the same procedure as reported by Havard *et al.* (2010) and Valentine *et al.* (2007). The VIPER database was searched by entering keywords of the suspect's description (e.g. white, male, 27 years old, short brown hair, medium build). The search results were thumbnail images from which foils who matched the suspect on the relevant criteria (age and general appearance) were selected.

The same foils were used for TP and TA line-ups, apart from a designated target replacement foil that was used in the TA line-ups. The target was filmed at a VIPER suite at a local police station in order that the line-up met the standard specifications for VIPER line-up members. The positions of both the designated target replacement foil (TA line-up) and target (TP line-up) were manipulated so that for half of the

Table 1. Mean ages for participants for each condition (standard deviations are in parentheses)

Age group	Control		Mystery man	
	Target present	Target absent	Target present	Target absent
Younger age group mean age (*SD*)	6.06 (0.82)	6.09 (0.70)	5.73 (0.64)	5.68 (0.75)
Older age group mean age (*SD*)	9.8 (1.30)	9.53 (1.18)	9.67 (1.19)	9.74 (1.36)

Note: Between subjects analyses of variance found that participants in the younger age group were significantly younger in the 'mystery man' condition than those in the control condition ($F(1, 264) = 8.08$, $p = .005$), but no differences were found for the older age group ($p = .8$).

relevant line-ups (TP or TA) they appeared at position 4, hereafter referred to as Line-up A and for the other half at position 6, hereafter referred to as Line-up B. This manipulation was to try to detect any bias for choosing early or late in the sequence of faces. Each line-up member appeared as a standard VIPER film clip: a 15-second video of the person looking straight to the camera, turning their head to the right, then to the left, before returning to full face. All the VIPER files showed the head and shoulders and were filmed under the same lighting conditions against a consistent grey background. Once the study's suspect had been filmed, the clip was sent to the VIPER headquarters for quality control purposes to be approved. This involved checking the head turn timings, motion, facial movements, positioning and ensuring that the clip was not distinctive in any other way from other VIPER films. In the VIPER line-ups, each member of the line-up was presented sequentially. The entire line-ups were shown twice before the witness was asked to make a decision. This procedure followed the codes of practice as laid down by the Lord Advocate's Guidelines for the Conduct of Visual Identification Parades (Angiolini, 2007) in Scotland, and the code of practice (2011) required by the Police and Criminal Evidence Act (PACE 1984) in England and Wales.

To ensure that the line-up was unbiased and the target did not differ significantly in appearance from the other line-up members, two additional measures were taken. Firstly, to control for factors that might affect identification accuracy, such as facial distinctiveness of the images used in the line-ups (including the target), the faces were rated by 31 individuals who did not participate in the identification part of the study. There were two groups of raters: 12 were aged 6–9 years (mean = 8.25 years) and 19 were aged 21–55 years (mean = 32.1 years). Each face was rated on a 1–7 scale for distinctiveness, operationalised by the question 'if you had to pick this person out of a crowd at a railway station, how easy would it be?' The ratings indicated no significant differences between the target and foils ($F(9, 261) = 1.57$, $p = .12$).

Secondly, a further five individuals who were the same age and ethnicity as the target were asked to give a description of the target after viewing a full-face image for 10 seconds. These descriptions were used to generate a modal description of the target. The final description was, 'Caucasian male, early 30s, average build, short dark hair, dark eyes.' The line-ups were pre-tested for functional size using a mock witness paradigm. Thirty mock witnesses, who had not taken part in previous tasks, were provided with the modal description of the target and asked to select the person from the line-up who they thought was the best fit to the description. The proportion of mock witnesses who identified the target from the line-up

was .10, which was not found to be significantly different to the proportion expected by chance alone for a 9-person line-up, that is .11 ($\alpha = .01$ level).

For the 'mystery man' line-up, a black mask with a white question mark was created using *Adobe After Effects* software that gave the illusion that the line-up member was a silhouette. The mask was animated so that it moved with the image, and the profiles were also presented as silhouettes (Figure 1). The silhouette had no distinguishing features, and there was no visible hairstyle or specific feature shapes. The 'mystery man' was always located at position 5 (the middle of the line-up) to reflect the design of the Zajac and Karageorge (2009) study, as they presented a silhouette (wildcard) in the middle of the array.

Design

The study employed a 2 (witness age: 5–7 years versus 8–11 years) × 2 (line-up: control versus 'mystery man') × 2 (line-up type: TP versus TA) between subjects design. A total of 63 children aged 5–7 years and 68 aged 8–11 years viewed the TP line-ups, and 66 children aged 5–7 years and 71 aged 8–11 years viewed the TA line-ups. The dependent variables were the line-up identification decisions. For the TP line-ups, there were three possible responses: a correct identification (hit), a foil identification (false positive) or an incorrect rejection (miss). For the TA line-ups, responses were either a correct rejection or a false identification. Data from the TP and TA line-ups were analysed separately.

Procedure

The study took place in two phases, both in the children's schools. In the first phase, groups of children (ranging in number from 10 to 25) were shown, by a researcher, the film of the staged theft. In the second phase, 1–2 days later, a different researcher carried out the identification task individually with each child. The participants were asked if they remembered the film as a memory prompt to ensure they knew which film the researcher was talking about; however, recall data was not recorded. The exact instructions were

Do you remember on [X day] someone showed you a film with a man in it? What do you remember about the film? Today I am going to show you some faces on the laptop and one of them might be the man from the film, but then again he might not be there. We will look at all the faces twice. Then if you see the man from the film I want you to tell me what number he is,

Figure 1. The mystery man: in full face initially, then looking right and left

For the control condition, there was the additional instructions:

If you don't see the man from the film you can say I don't think he's there.

For the experimental condition, there were the additional instructions:

There is also a 'mystery man' who looks like this [they are shown a card with the silhouette] and if you don't see the man from the film I want you to tell me the number of the 'mystery man'.

Then for all conditions, the witnesses were asked

Do you understand? So what should you do if you see the man from the film? And what do you do if you haven't seen him? If you want to pause the video at any time, or you want me to go back and show you a picture again just say so.

The silhouette was called the 'mystery man' as pilot testing had found that children understood the task instructions when the silhouette was given a name—the term 'mystery man' actually came from one of the children tested in the pilot study.

The children viewed the line-up twice and after the second viewing they were asked if they wanted to view any part of the line-up again. They were then asked if the person they saw in the film was in the line-up. If they identified a person they were shown the line-up member and asked, 'is this the person you saw?' This procedure is used throughout the police forces in Scotland and follows the Lord Advocate's Guidelines (Angiolini, 2007) and is very similar to the procedure used in England and Wales under the current PACE codes (2011). All the responses were recorded in writing by the researcher.

After making a decision in response to the line-up, the participants were asked how sure they were of their answer (i.e. that the man was there or not there). They were shown a card that had 'very sure' 'sure' 'in the middle' 'unsure' and 'very unsure'; this was also read out to the children by the researcher, and they were asked to point to where they felt they were. All the responses were recorded and converted into a 5-point rating scale (1 = *very unsure* to 5 = *very sure*).

RESULTS

Total accuracy scores

Responses for both line-ups were analysed looking at correct and incorrect responses. There was no difference in accuracy between viewing the line-up 1 or 2 days later (χ^2 ($N = 268$, 1) = .19, $p = .66$). Accuracy for TP line-ups was 57.3%, and for TA line-ups, it was 41.6%. A hierarchical loglinear analysis (HILOG) was conducted with 'mystery man' condition (control, 'mystery man'), line-up type (TP, TA) and accuracy (correct, incorrect) as factors. There was a significant interaction between 'mystery man' condition, line-up type and accuracy (χ^2 (1, $N = 268$) = 5.6, $p = .018$). To explore this interaction, separate χ^2 tests for accuracy (correct, incorrect) and line-up type (TP, TA) were performed on the data for control and 'mystery man' line-ups. For the control line-ups, there were more correct responses for the TP line-ups than the TA line-ups (54.4% vs 25.4% ; χ^2 (1, $N = 139$) = 12.27, $p < .001$, $\Phi = .3$). However, for the 'mystery man' line-ups, there were no significant differences in correct responses for either the TP or TA line-ups (60.3% vs 59.1%; χ^2 (1, $N = 129$) = .02, $p = .89$).

Target present line-ups

Overall, for the TP line-ups, 56.5% of participants (74 out of 131) correctly identified the target (correct ID), 29% incorrectly chose a foil from the line-up (foil ID) and 14.5% incorrectly rejected the line-up saying the target was not present.

Table 2 shows the percentage of responses for both age groups for the line-ups. A HILOG was conducted with age (5–7 years, 8–11 years), 'mystery man' condition (control, 'mystery man') and response (correct ID, foil ID and incorrect rejection) as factors. The likelihood ratio model was χ^2 (6, $N = 131$) = 5.1, $p = .531$. No significant effects were present and subsequent χ^2 tests confirmed this (all $ps > .1$).

As an additional measure, the responses for line-up A (target position 4) and line-up B (target position 6) were also analysed to see if there was any influence of the target's position in the line-up on identification decision. This was also found to be non-significant (χ^2 (2, $N = 131$) = 1.96, $p = .38$).

Table 2. The percentage of responses as a function of line-up composition (TP, TA), witness age (younger, older) and 'mystery man' condition (mystery man, control)

Line-up response	Younger children			Older children		
	Control	Mystery man	Total	Control	Mystery man	Total
Target present						
Correct ID	45.5 (15)	53.3 (16)	49.2 (31)	62.9 (22)	63.6 (16)	63.2 (38)
Foil ID	39.4 (13)	16.1 (5)	28.6 (18)	28.6 (10)	30.3 (10)	29.4 (20)
Incorrect rejection	15.2 (5)	30.0 (9)	22.2 (14)	8.6 (3)	6.1 (2)	7.4 (5)
Target absent						
Correct rejection	28.6 (10)	67.7 (21)	47.0 (31)	22.2 (8)	51.4 (18)	36.6 (26)
False ID	71.4 (25)	32.3 (10)	53.0 (35)	77.8 (28)	48.6 (17)	63.4 (53)

Note: Frequencies are in parentheses.

Target absent line-ups

For the TA line-ups, 41.6% of participants (57 out 137) correctly stated the target was not present (correct rejection) and 69.4% chose a member from the line-up (false ID). Table 2 shows the percentage of participants' responses for both age groups for the line-ups.

A HILOG was conducted with age (5–7 years, 8–11 years), 'mystery man' condition (control, 'mystery man') and response (correct rejection, false ID) as factors. The likelihood ratio model was χ^2 (4, $N = 137) = 2.5$, $p = .65$. There was a significant interaction between 'mystery man' condition and response (χ^2 (1, $N = 137) = 14.22$, $p > .001$), which was confirmed by a subsequent χ^2 test (χ^2 (1, $N = 137) = 16.03$, $p < .001$; $\Phi = .35$). There were more correct rejections for the 'mystery man' line-up (59.6%) than the control line-up (25.4%).

The responses for the TA line-ups A and B were also analysed to examine whether there were any differences according to the position of the line-up members. There were no significant differences in responses for either line-up (χ^2 (1, $N = 137) = .20$, $p = .65$).

Errors analysis

To investigate whether the 'mystery man' had any influence on the types of identification errors children made, we analysed the error data in the same manner as Zajac and Karageorge (2009). Error responses for the TP and TA line-ups are shown in Table 3. Data for the TP and TA line-ups were analysed separately. For the TP line-ups, there are two types of errors that can be made: the witness can make a foil identification by picking someone other than the target, or they may make an incorrect rejection, if they say the target is not present and reject the line-up. An analysis of response errors for the TP line-ups found that there were no significant differences in responses for errors for the 'mystery man' or control line-ups (χ^2 (1, $N = 56) = 2.04$, $p = .15$). For the TA line-ups, there are also two types of errors that can be made: the witness can identify a known innocent or foil, or they may identify the designated target replacement, which is analogous to falsely identifying an innocent suspect in a real line-up. An analysis of errors for the TA line-ups found that there were no significant differences in error responses for either the 'mystery man' or control line-up (χ^2 (1, $N = 80) = .002$, $p = .97$).

Table 3. The percentage of error responses for the TP and TA and line-ups

Line-up condition	TP		TA	
	Foil ID	Incorrect rejection	Foil ID	Innocent suspect ID
Control	74.2 (23)	25.8 (8)	77.4 (41)	22.6 (12)
Mystery man	56.0 (14)	44.0 (11)	77.8 (21)	22.2 (6)

Note: Frequencies are in parentheses.
TP, target present; TB, target absent.

Confidence scores

After making a line-up decision, the witnesses were asked to rate how confident they were in their identification decision. Children were asked how sure they were that either the man was there or not there and asked to say how confident they were by pointing to a card that had 'very sure' 'sure' 'in the middle' 'unsure' and 'very unsure' written on it. The rating was converted into a 1–5 point scale (1 = *very unsure* to 5 = *very sure*). A univariate analysis of variance was performed using the post-line-up confidence scores as the dependent measure, first for the TP line-ups, with participant age (5–7 years, 8–11 years), 'mystery man' condition (control, 'mystery man'), and response (hit, foil ID, incorrect rejection) as between-participants factors. The analysis revealed a significant main effect of response, $F(2, 119) = 8.3$, $p > .001$, $n_p^2 = 0.12$ but no significant interactions or other main effects (all $ps > .1$). Post-hoc Bonferroni t-tests revealed that the post-line-up confidence ratings were significantly higher for correct identifications ($M = 4.15$, $SD = 0.95$) than incorrect rejections ($M = 3.12$, $SD = 0.97$) but not foil identifications ($M = 3.69$, $SD = 0.96$). The same analysis was carried out for the post-line-up confidence ratings for the TA line-ups; however, there were no significant main effects or interactions (all $ps > .1$).

Additional viewing

The children were given the opportunity to view a line-up member again after the second viewing; however, only 11 children took this offer. Of the children who asked for a third viewing, all were in the control condition, seven viewed target absent line-ups and four viewed target present line-ups. Although these data are too few to conduct any statistical analyses, it does suggest that majority of children do not feel it necessary to view a line-up again or any part of it after seeing it twice.

DISCUSSION

The aim of this research was to determine whether using a silhouette (the 'mystery man') would reduce false identifications for TA video line-ups, without reducing correct identifications for TP line-ups. Our first hypothesis, that false identifications would be reduced in TA line-ups, was supported. The addition of the 'mystery man' reduced false identifications from 75% to 40% for witnesses as young as 5 years of age, despite the younger children in the 'mystery man' condition being significantly younger than those in the control condition. The 'mystery man' provides an option to reject the line-up without making a negative response, and therefore children are still able to choose from the line-up. Including the 'mystery man' in the TA line-up also makes the response to reject the line-up comparable to correctly identifying the target. In both cases, the witness says the number of the line-up member they are choosing, whereas in the control condition, the witness has to say the person is not there.

Our findings extend the research of Zajac and Karageorge (2009) and Karageorge and Zajac (2011), who found that

the use of a silhouette could reduce false identifications for simultaneously presented photo line-ups. Zajac and Karageorge tested children aged 8–11 years and found that the silhouette (wildcard) could increase correct rejections from 46% to 71% for TA arrays. In their later study, Karageorge and Zajac (2011) replicated these findings and also extended their sample to include children aged 5–7 years. Again, they found that the addition of the silhouette could increase correct rejections in this age group (in this case from 29% to 84%). Zajac and Karageorge (2009) suggest that their findings show that there is a social component in rejecting a line-up and that providing a silhouette in the line-up validates the option to reject the line-up. In line with prior work, we found no differences in accuracy for the younger age group as compared with the older age group (Beresford & Blades, 2006; Pozzulo & Lindsay, 1997).

The present study has illustrated that a technique that was initially designed for static photo line-ups that are presented simultaneously (Zajac & Karageorge, 2009) can also be effective for video line-ups using moving images that are presented serially. Furthermore, in the present study, witnesses were asked to make a verbal response, whereas previous studies have asked children to point to the alternative choice (Beal et al., 1995; Karageorge & Zajac, 2011; Zajac & Karageorge, 2009). Previous research that has tried to use techniques to reduce false identifications (such as the elimination line-up procedure) have been successful for photo line-ups that are presented simultaneously (Pozzulo & Balfour, 2006; Pozzulo & Lindsay, 1999; Pozzulo et al., 2009) but not video line-ups where moving images are presented serially (Beresford & Blades, 2006; Humphries et al., 2011). However, as discussed earlier in this paper, the video line-ups used in those studies did not follow the strict sequential procedure advocated by Pozzulo and Lindsay (1999), rather they adhered to the procedures used by police forces in the UK (PACE, 1984, Code D 2011).

There are a number of reasons why using an additional option of a silhouette may be beneficial in reducing false identifications from TA line-ups. As mentioned previously, it aligns the decision to reject a line-up more closely with the decision to identify someone from a line-up by allowing the witness to choose a member of the line-up. It also allows a child witness to conform to the implicit pressure to choose from a line-up (Beal et al., 1995; Ceci et al., 1987), but by choosing the silhouette, a witness is not making a false identification. It also allows the witness to make a positive response, rather than saying 'no, I don't think the person is there', and it has been suggested that children view positive responses as being more favourable than negative responses (Zajac & Karageorge, 2009).

The second hypothesis was that using the 'mystery man' in the TP line-ups would not reduce the correct identification rates. The results showed that using the silhouette not only helped to reduce the false identifications for the TA line-up but also appeared to have no adverse effect on correct identifications for TP line-ups. Previous studies that have used an additional choice within the line-up have also reported no detrimental effect on correct identifications (Beal et al., 1995; Davies et al., 1989; Karageorge & Zajac, 2011;

Zajac & Karageorge, 2009). These studies, and the findings presented within this paper, appear to illustrate that witnesses are not more likely to reject a line-up and choose the alternative option when a target is present in a line-up, and therefore the insertion of an additional line-up member is not detrimental to performance.

The third hypothesis was that using the 'mystery man' in the line-up might improve performance on the TA line-up so that it equalled performance on the TP line-up, whereas responses for the control condition would be significantly more accurate for the TP line-ups, as compared with the TA line-ups. This was also found to be the case, as there were no significant differences in correct responses between the TP line-ups (60.3%) and the TA line-ups (59.1%) for the 'mystery man' condition. However, in the control condition, there were significantly more correct responses for the TP line-ups (54.4%) than for the TA line-ups (25.4%). This pattern was also found by Zajac and Karageorge (2009), who showed that when a silhouette was used, accuracy was similar for the TP line-ups (71%) and the TA line-ups (76%); however for the control condition, responses were significantly more accurate for TP line-ups (75%) than for TA line-ups (46%). Zajac and Karageorge's accuracy rate was higher than in the present study, which could reflect the mode of presentation. The children in Zajac and Karageorge's study saw a live presentation, where they were taken to a local police station and a confederate was seen entering the room and asking for some keys. In contrast, in the current study, the children saw a film of an actor enter an office and steal several items. It may be that seeing a novel live event in an unusual place, such as a police station, makes the event more distinctive and leads to deeper encoding and therefore better accuracy rates for identification. Although research has failed to find any differences in identification accuracy for live versus video-recorded events (Pozzulo, Cresini, & Panton, 2008), there is evidence that recognition memory is better for novel or distinctive events (Hunt, 1995; Tulving & Kroll, 1995).

The current study also investigated the effect that the 'mystery man' had on the types of errors that were made in response to the line-ups. Overall, the 'mystery man' manipulation did not increase incorrect rejections or foil identifications for the TP line-ups and did not increase innocent suspect (designated target replacement) identifications or foil identifications for the TA line-ups. Therefore, these results do not replicate the findings of Zajac and Karageorge (2009), as they found that using the wildcard marginally reduced the number of innocent suspect identifications. However, Zajac and Karageorge's methodology was different to the current study, as they employed a target replacement that was very similar to the actual target, thereby potentially biasing the line-up. In the study, the foils and target replacement were chosen so as to ensure that the line-ups were not biased in any way.

After completing the line-up task, children were asked to rate how confident they were in their decision. A witness's confidence can often influence other people's perceptions (e.g. the police, judges or jurors) about the reliability of an eyewitness identification. The ratings were analysed to explore whether the witnesses were more confident when they made an accurate identification, as has been suggested

by previous research (Brewer, 2006; Brewer & Palmer, 2010). Furthermore, these data were also analysed to investigate whether the presence of the 'mystery man' influenced the confidence ratings. For the TP line-ups, confidence ratings for correct identifications were significantly higher than for incorrect rejections, although there was no effect of the 'mystery man' or the children's age. For the TA line-ups, there was no effect of response accuracy, the 'mystery man' or the children's age. These findings replicate previous research which has found that correct identifications are often associated with higher confidence ratings for both adult witnesses (Havard & Memon, 2009; Lindsay, Read, & Sharma, 1998) and child witnesses (Havard *et al.*, 2011), and that there is no relationship between confidence and making a correct rejection. Therefore, these findings lend strength to the suggestion that there may be situations where confidence can be a reliable indicator of accuracy, if taken directly after an identification and prior to any feedback (see also Brewer, 2006; Sauer *et al.*, 2010). However, practitioners should also be aware that confident responses are not always accurate (see Leippe *et al.*, 2009) and that confident inaccurate witnesses can often appear as believable as accurate witnesses (Leippe *et al.*, 1992).

To conclude, the aim of this study was to determine whether a technique that was designed to reduce false identifications for photo line-ups, would also extend to video line-ups. Our findings showed that using a silhouette or 'mystery man' in the line-up can help reduce false identification rates for children as young as 5 years of age for TA video line-ups, without any detriment to correct identifications in TP line-ups. As video line-ups are the main method of identification in the UK, using the silhouette in the line-up is a simple measure that could be easily implemented by police forces and could increase the chances of obtaining reliable evidence from child witnesses. Furthermore, as this technique has also previously been shown to reduce false identifications for photo line-ups (Karageorge & Zajac, 2011; Zajac & Karageorge, 2009), it is a method that could also be implemented in police forces who use photo line-up procedures, as is common throughout Europe and the USA.

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