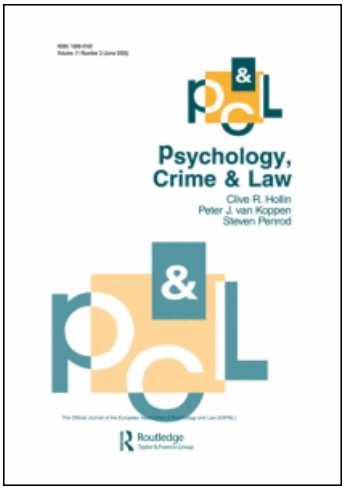

Psychology, Crime & Law
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713647155

A field evaluation of the VIPER system: a new technique for eliciting eyewitness identification evidence

Amina Memon[a]; Catriona Havard[a]; Brain Clifford[a]; Fiona Gabbert[b]; Moray Watt[c]
[a] University of Aberdeen, Aberdeen, UK [b] University of Abertay, Dundee, Scotland, UK [c] Grampian Police, Scotland, UK

First published on: 01 February 2011

To cite this Article Memon, Amina , Havard, Catriona , Clifford, Brain , Gabbert, Fiona and Watt, Moray(2011) 'A field evaluation of the VIPER system: a new technique for eliciting eyewitness identification evidence', Psychology, Crime & Law,, First published on: 01 February 2011 (iFirst)
To link to this Article: DOI: 10.1080/10683160903524333
URL: http://dx.doi.org/10.1080/10683160903524333

Psychology, Crime & Law
2011, 1–19, iFirst

A field evaluation of the VIPER system: a new technique for eliciting eyewitness identification evidence

Amina Memon[a]*, Catriona Havard[a], Brian Clifford[a], Fiona Gabbert[b] and Moray Watt[c]

[a]*University of Aberdeen, Aberdeen, UK;* [b]*University of Abertay, Dundee, Scotland, UK;* [c]*Grampian Police, Scotland, UK*

(Received 9 June 2009; final version received 2 December 2009)

Advances in technology have led to a new system for gathering facial identification evidence from eyewitnesses with accompanying changes in legislation in the UK. The current paper presents the responses of 1718 real witnesses and victims who attempted an identification from a video parade in Scotland in 2008. The witnesses comprised a large subset who were classified as 'vulnerable' due to their age, ability or the nature of the incident. Suspect identifications averaged 44%, a figure comparable to the rate reported in other field studies conducted in the UK. The foil identification rate at 42% is higher than other field data. The paper discusses the effects of witness age, vulnerability, perceived emotional state, crime type, delay and procedural aspects of the video procedure on suspect identifications.

Keywords: adult witnesses; eyewitness identification accuracy; eyewitness memory; eyewitness testimony; face recognition

Introduction

One of the most important recent developments in the UK legal system has been in the manner in which evidence is gathered from eyewitnesses. Until recently, all formal eyewitness identification evidence was obtained from live lineups. Live parades have now been largely replaced by video parades, an innovation that has been made possible by development of sophisticated computer systems used to compile video images from a standardized database of moving video clips. The current paper presents the responses of 1718 real witnesses and victims who attempted an identification from video parades in Scotland in 2008. It is the first study to document suspect identification rates using the new procedures for gathering eyewitness evidence in the UK.

Two different IT systems are in widespread use in British police forces to provide video identification: VIPER (Video Identification Parade Electronic Recording) and PROMAT (Profile Matching). Each system has its own database of images. The present study investigates the VIPER system. The clips consist of a head and shoulders view. The basic descriptors of the suspect are entered into the database, the best matches to the description are displayed on a screen and the operator can then

*Corresponding author. Email: amina.memon@rhul.ac.uk

ISSN 1068-316X print/ISSN 1477-2744

DOI: 10.1080/10683160903524333
http://www.informaworld.com

select foils on the basis of general resemblance to the suspect. In Scotland, lineups have between five and eight foils so the number of lineup members varies between six and nine. VIPER lineups are prepared in a standardized format comprising approximately 15-second clips of each person shown in sequence one after another. The sequence starts with a head and shoulders shot of the person looking directly at the camera, who slowly turns their head to present a full right profile followed by a full left profile. Finally the person returns to looking directly into the camera in a full-face pose. Each image is checked for quality control by the centralized National VIPER Bureau in Wakefield, West Yorkshire before a final recording is made.

Drawing upon data supplied by the National VIPER Bureau, Pike, Brace, and Kynan (2002) reported that VIPER parades produced a slightly higher rate of suspect identifications than live parades (39% as compared to 35%). Valentine and Heaton (1999) compared the fairness of VIPER and live parades from real criminal cases. Using a mock witness procedure Valentine and Heaton (1999) found 25% of mock witnesses selected the suspect from 25 photographs of live line-ups, compared to 15% who selected the suspect from video identifications. The video parades were thus fairer than live parades. A subsequent study revealed that the VIPER parades are equally fair to Caucasian and Afro-Caribbean suspects (Valentine, Harris, Colom Piera, & Darling, 2003a). The correct identification rates of adult mock witnesses do not differ when VIPER lineups are compared to static photographs (Darling, Valentine, & Memon, 2008; Valentine, Darling, & Memon, 2007). In terms of protecting 'innocent' suspects from false identification, VIPER lineups afford an advantage in culprit absent situations by reducing false identifications for adult witnesses (Valentine et al., 2007) and adolescent witnesses (Havard, Memon, Clifford, & Gabbert, 2008).

The aim of the current research was to see how effective VIPER is with real witnesses in terms of the field measure of 'hit' rates, namely suspect identifications,[1] and to document procedural, witness and case variables that might impact this measure. This field study was timely given the Vulnerable Witnesses (Scotland) Act 2004 which enables the prosecution to submit a report from a video parade and use this as identification evidence at trial if it is not challenged by the accused (defendant). Under the 2004 Act, all child witnesses (under 16 years) regardless of the seriousness of the offence may be subject to a video parade in cases where identification is an issue. Importantly, one of the major changes under the 2004 Act is an increase in the number of child witnesses being subject to formal identification parades. While there is an extensive literature on how child witnesses fare in laboratory studies (see Pozzulo & Lindsay, 1998 for a review and meta-analysis) this is the first study that includes a reasonable sample of young witnesses who fall into the vulnerable witness category (aged 16 years and younger).

A small number of prior field studies have documented rates of identification from various types of identification procedures allied to a number of estimator and system variables (Wells, 1978; see Wells, Memon, & Penrod, 2006 for a review of these variables). There have been three field studies conducted in the UK to date. Slater (1994) recorded the identification attempts of 843 witnesses who inspected 302 live lineups in England. Suspect identifications were made by 36% of witnesses, a foil was identified by 22% and 42% made no positive identification. Wright and McDaid (1996) examined the identification attempts by 1561 witnesses who inspected 616 live lineups in the London area during 1992 either at one of two specialist suites or at individual police stations. Suspect identifications were 39% with foil identifications at 20% and

41% made no positive identification. There was a decrease in accuracy over a delay as indicated by an increase in foil identifications although the delay period reported was only one–two weeks. White suspects were less likely to be identified than suspects from ethnic minorities and this did not interact with race of witness. One possible explanation for this finding, suggested by Valentine, Pickering, and Darling (2003b), is that identity parades involving ethnic minorities are more likely to be biased against the suspect because of the difficulty in finding suitable foils in live parades.

Valentine et al. (2003b) collected data from one of four identification suites in the London area using a database of 640 witnesses who attempted to identify suspects in 314 lineups (56 witnesses knew the suspects, a fairly critical consideration when analysing lineup identification – but not always indicated by researchers). The data were obtained via a questionnaire completed by the investigating officer and comprised a number of explanatory variables divided into witness characteristics (e.g. age, gender, race, role), suspect characteristics (e.g. gender, height, race, build), variables about the eyewitness situation (e.g. viewing conditions), the incident (e.g. offence, presence of weapon), the eyewitness's description (e.g. completeness, match to suspect's appearance) and variables associated with the identification attempt (e.g. delay, witness decision speed). In line with Wright and McDaid's findings, approximately 40% of witnesses identified a suspect and 40% made no identification. Suspects known to the witness were, not unsurprisingly, more often identified than unknown suspects. The age of the witness had a significant effect on the number of identifications. While 48% of witnesses under the age of 20 identified the suspect only 28% in the 40-plus group did so. Wright and McDaid's sample were younger than those classed as older adults in other studies but laboratory findings typically report an increase in mistaken (foil) identifications in older (60–80-year-old) participants (see Bartlett & Memon, 2007 for a review of the laboratory studies). Females were more likely to choose from a lineup but no more likely to identify a suspect. Lighting quality, obstructions and viewing distance had perhaps surprisingly, no notable effects. In terms of identification by offence type, the data were complex due to the small number of cases falling into some categories (e.g. Rape). For *Grievous Bodily Harm* the rates were 45% as compared to 32% for theft and this presumably reflects differences in the quality of contact with the suspect at the time of the incident as well as other variables such as the delay in reporting the crime and identification. Lineups organized within a week of the offence yielded a higher (65%) suspect identification rate although statistical analyses are not reported. There was little difference in identifications rates from one month to six months.

Turning to field data from North America, Tollestrup, Turtle, and Yuille (1994) carried out a detailed archival analysis of 98 Fraud and Robbery cases in a district of Vancouver, Canada. There were 170 identification attempts in the cases of which 90% used photo lineups. A distinction could not be made in this study between identification of a foil and no identification. Usefully, some data were available on hit rates based on confessions in 35 cases and analysis of this subset indicated that 85% of robbery victims identified the suspect as compared to 23% of fraud victims, although the identification of robbery victims occurred after a shorter delay. Tollestrup et al. noted a monotonic decrease in identification accuracy of Fraud suspects over a delay (from 72 days, 132 days and 200 days) and in robbery suspects over a delay (of four days, 19 days and 120 days). Regrettably Tollestrup et al. did not statistically analyse this delay effect.

Behrman and Davey (2001) analysed the identification attempts from what were predominantly armed robberies ($n = 271$) conducted between 1987 and 1998 in California. Several types of eyewitness identification procedures were examined including 258 field showups, 289 photographic lineups (containing five lineup members), 58 live lineups and 18 single photo showups. The authors were able to split cases into those for which there was independent incriminating evidence (and by strength of that evidence) and cases where there was no independent incriminating evidence. Approximately 48% of the witnesses who observed a photographic lineup identified the suspect. Delay in identification affected identification rates with 55% suspect identification within a 0–7-day delay and 45% after a delay of greater than seven days. The disparity between delay groups was particularly evident when the analysis was broken down into cases that included independent evidence of the potential guilt of the suspect with a higher rate of identification over the 0–7-day delay in those cases. There was no difference in identification rates of crimes involving a weapon and those that did not involve a weapon. The 55 live identification attempts took place at the Sacramento Police Department and revealed a rate of 50% for suspect identifications, 24% for foil identifications and 26% for non-choices.

Many of the field studies point to methodological confounds and the limitation of field research and several of the same problems apply to the current study. The first factor is equating suspect identification with correct identification rates due to the absence of 'ground truth'. Some studies do not distinguish between foil identifications and lineup rejections or no identifications (e.g. Pike et al., 2002; Tollestrup et al., 1994). The present study however reports all identification decisions made by witnesses. A further problem with field data as pointed out by Ross and Malpass (2008) is that it could be ambiguous in the face of recording lapses and both investigator and witness criterion issues on which little if any information is available. Selection factors may have led police officers to collect evidence from one type of witness, for example, vulnerable witnesses or witnesses who are seen to be more competent for whatever reason. Such factors may have inflated identification rates in certain categories of witnesses. As with other field studies, we were unable to get an indication of whether such factors were operating in the current study and it would have been inappropriate given our assurances of confidentiality to probe for this type of information. Possible recording lapses on the part of investigators in the current study could also make it impossible to establish response or compliance rates with this field study despite care being taken to ensure full recording.

The current study collected the decisions made by real witnesses and victims during VIPER parades which were conducted throughout Scotland during 2008. The major variables of interest were the nature of the identification choices made as a function of characteristics of the witness (vulnerability status in particular), offence type, delay since incident, aspects of the VIPER procedure (such as, the position of suspect, number of foils and the number of times the witness viewed the identification parade). We also collected some preliminary data on perceptions of witness anxiety as rated by the lineup administrator.

Method

A questionnaire was developed for VIPER operators to complete, to obtain information pertaining to the variables of interest. A briefing meeting was held at

a national meeting of the Scottish Police VIPER users group and representatives of that group commented on the first draft of our questionnaire. Questions for local police forces and reminders to return questionnaires were channelled through the designated coordinator for each force. Sampling was conducted over a full 12-month period from 1 January to 31 December 2008 and every police force in Scotland participated.

Sample and number of returns

The police forces and the number of VIPER parade questionnaires returned in parentheses were as follows: British Transport Police (BTP) ($n = 31$); Central ($n = 94$), Dumfries and Galloway ($n = 147$); Fife ($n = 101$); Grampian ($n = 154$); Lothian and Borders ($n = 790$); Northern ($n = 46$); Strathclyde ($n = 276$) and Tayside ($n = 80$). A total of 1719 questionnaires were returned to the University with one questionnaire containing missing data on identification outcome. It was not possible to ascertain a response rate because we had no indication of the number of occasions on which a questionnaire would not have been completed. The instruction to the forces was to complete the questionnaire every time a parade was conducted. We assumed that instructions were followed and that on most occasions where a VIPER parade was conducted in 2008, our questionnaire was completed. A further factor to note is that we were not provided with crime reference numbers so we did not have any way of tracking the number of witnesses in a given case, as such there is no record of multiple witnesses to the same incident. For coding purposes we are assuming our sample represents 1718 independent witnesses or victims, however it is inevitable that some of the identification parades were viewed by multiple witnesses. It is also possible that a given witness may have viewed more than one identification parade either on the same day or on separate days. It is also possible the witness may have been subject to an alternative identification procedure such as a photographic lineup (photoboard). Again, we did not have a way of tracking this. Finally, following earlier research (Valentine et al., 2003b) the analysis of the data focuses largely (but not solely) on cases where the identity of the suspect was unknown to the witnesses.

Composition of the questionnaire

The questionnaire was compiled with the workload of the identification officer in mind and hence a fixed response format was used and the number of items was kept to a minimum. Moreover, for reasons of confidentiality, no identifying personal details of the witness or suspect were recorded.

The questionnaire was divided into sections: Witness details, Suspect details, Crime Group, Procedural requests, Identification data and Witness manner during the parade. The section on witness and suspect details requested demographic details (Gender, Age, Ethnicity). Additional information was sought on the background of the witness: whether the witness was a Vulnerable Witness (aged under 16 years). The witness section also asks if the witness was a victim, if the suspect was known to the witness, if a Support person was present and who that person was. Finally the operator was asked to specify if any provisions were made for special needs.

The crime group category was based on the classification indices used by Scottish Police in reporting statistical data to Scottish Government: Group 1 (Crimes of Violence); Group 2 (Crimes of Indecency); Group 3 (Crimes of Dishonesty); Group 4 (Fireraising); Group 5 (Other Crimes); Group 6 (Miscellaneous offences); Group 7 (Offences relating to motor vehicles). Groups 4, 5, 6 and 7 were collapsed into one group for analyses due to low numbers of such crimes. Procedural issues pertaining to the actual VIPER parade included information about the delay (days/weeks) since the incident, number of people in the parade and the position of the suspect in the parade.

The Scottish Guidelines (Lord Advocate's Guidelines, 2007) as well as the legislation in England and Wales (Police and Criminal Evidence Act, 1984) require each witness to view the entire parade twice before making a decision. Witnesses also have the option to view the entire parade or part of the parade again and can request that the operator freezes the video on one image. Such requests were recorded.

The identification decision was set out as would be the case on a standard police identification form with an indication as to whether the witness made a positive (suspect) identification, a negative (foil) identification and there is an option to record whether the witness stated if any image resembled the suspect or any other person. If no identification was made this was also recorded together with any remarks made by the witness. Finally, we asked for some basic information about the witness's apparent emotional state (as perceived by the operator). The operators rated how the witness appeared before, during and after the parade (nervous, anxious, calm, upset, other). The various categories were collapsed into a dichotomous classification (nervous–calm) during analysis due to the overlap in this grouping.

Results

Witness demographics

The data was collected for a total of 1718 lineups, 825 (48%) of witnesses were female, 893 (52%) were male; 97% of witnesses were classified as Caucasian, 1% was Afro-Caribbean and 2% Asian.

Witness ethnicity was not subject to statistical analysis because the vast majority of witnesses and suspects fell into the White European category. We were thus unable to explore any cross race identification effects in this study. The same applied to age of suspect, most of the suspects fell into the young adult category (see Table 1) so own age biases (an advantage in recognizing same-age as compared to other-age faces) were not explored.

Six hundred and ninety-five witnesses were classified as being vulnerable. Under the Vulnerable Witnesses (Scotland) Act 2004 application may be made to a Court for a witness to be declared as vulnerable on the basis of age, intellectual/psychological impairment, trauma, intimidation, cultural differences including language, religion and race, subject matter of the evidence and relationship to any party in the proceedings. Most of the vulnerable witnesses in the current study were children. Table 1 presents a breakdown of witness and suspect demographics, relationship of suspect to victim and crime type for vulnerable and other witnesses.

Table 1. Breakdown of witness and suspect demographics, relationship of suspect to victim, and crime type for vulnerable (<16) and other witnesses

	Vulnerable witnesses	Other witnesses
Gender of witness		
Female	49.7% (396)	50.3% (400)
Male	34.6% (299)	65.4% (564)
Age of witness		
<16	100% (570)	0
16–25	12.8% (51)	87.5% (348)
26–40	9.4% (31)	90.6% (298)
41–60	5.3% (14)	94.7% (252)
>61	30.5% (29)	69.5% (66)
Role of witness		
Victim	56.3% (366)	43.7% (284)
Bystander	32.9% (295)	67.1% (603)
Suspect known	64% (397)	36% (223)
Suspect unknown	28.4% (285)	71.6% (717)
Crime suspect is charged with		
Violence	36.6% (393)	63.4% (681)
Indecency	74.3% (165)	25.7% (57)
Dishonesty	22.6% (37)	77.4% (127)
Other crimes	51.6% (99)	48.4% (93)
Support person present	97.9% (523)	2.1% (11)
No support person present	13.2% (139)	86.8% (911)

Of the total number of witnesses 632 knew the suspect prior to the incident. It was interesting to note that a higher percentage of female witnesses knew the suspect than male witnesses (58% as compared to 41%).

Identification choices

The outcome of the lineup produces nominal data with three possible outcomes (suspect identification, foil identification and no identification). Due to the lack of information on the number of witnesses who inspected each lineup we restricted our analysis to cross tab analyses. As would be expected where the suspect was known to the witness this made a difference in identification ($\chi^2(2) = 397.3$, $p < 0.001$) with the suspect identification rates dropping from 92.5% where the witness knows the suspect to 43.6% in the identification of unknown persons (see Table 2, part A).

The analysis of data focuses on the outcome of identification attempts for those witnesses and victims who did *not* know the suspect[2] ($N = 1044$ lineups) as this allows comparison with laboratory data and is of more theoretical interest given the questions being addressed in the study. Table 2, part B, presents the responses of this category of witnesses with the data presented in terms of witness variables. A look at the various witness variables revealed no significant effects of gender of witness ($\chi^2(2) = 3.05$, $p = 0.21$). There was an effect of age of witness ($\chi^2(8) = 54.67$,

Table 2. (A) The outcome identification attempts expressed as the percentage of witnesses for suspects known and unknown to the witness. (B) The identification outcomes for witness variables (number of witnesses in parentheses) for the 1044 witnesses who did not know the suspect.

	Suspect ID	Foil ID	No ID
(A)			
Known (632)	92.5%	6.1%	1.4%
Unknown (1044)	43.6%	41.9%	14.5%
All (1718)	62%	28.4%	9.6%
(B)			
Gender of witness			
Female	40.6% (177)	43.6% (190)	15.8% (69)
Male	45.9% (277)	40.6% (245)	13.6% (82)
Age of witness			
<16	55.8% (129)	33.3% (77)	10.8% (25)
16–25	49.1% (134)	40.7% (111)	10.3 (28)
26–40	41.5% (97)	45.3% (106)	13.2% (31)
41–60	36.7% (77)	43.3% (91)	20% (45)
>61	18.3% (17)	54.8% (51)	26.9% (25)
Vulnerable witnesses	54% (154)	35.4% (101)	10.5% (30)
Other witnesses	39.2% (280)	44.4% (317)	16.4% (117)
Role of witness			
Victim	54.4% (191)	34.5% (121)	11.1% (39)
Bystander	38.4% (231)	46.1% (277)	15.5% (93)

$p < 0.001$). Younger witnesses (under 16 years) made more suspect identifications and fewer foil identifications than adults aged 26–40 years ($\chi^2(2) = 9.75$, $p < 0.01$), middle-aged adults (aged 41–60), ($\chi^2(2) = 17.46$, $p < 0.01$) and adults over the age of 61 ($\chi^2(2) = 39.60$, $p < 0.001$). The middle-aged group (aged 41–60) in turn made more suspect identification and fewer foil identifications than the adults over the age of 61 ($\chi^2(2) = 10.22$, $p < 0.01$). The two younger adult groups (under 16 and 16–25 years) did not significantly differ ($\chi^2(2) = 2.93$, $p = 0.23$).

Child witnesses and vulnerability

A total of 474 children were aged 16 years and under ($M_{age} = 13.63$, SD = 2.08). Of these there were 187 cases where the suspect was unknown to the witness. The youngest child was five years ($n = 2$) and there were only 30 children aged nine and under. Thus any test of hypotheses pertaining to age differences in identification within the child and youth category was limited. In order to compare the younger and older children they were split into two categories 5–11 years ($N = 77$) and 12–15 years ($N = 397$). The classification makes sense because in Scotland, the youngest group would be in primary school and the older group would be in secondary school (high school). Again comparisons are limited due to unequal cell sizes but some preliminary analysis was undertaken. Looking first at the identification responses of the children where they do not know the suspect ($N = 187$) by this age classifications,

71% of the younger (5–11) group made a suspect identification and were less likely to make a foil identification (14%) as compared to the older (12–15) group with the rates being 57% and 34%, respectively. The non-identifications for younger and older children were 14% and 8%, respectively. Due to the small cell sizes the foil identifications and non-identifications were collapsed and a 2 (age group) by 2 (suspect identifications and other response) chi-square analysis was performed on the data. This indicated a non-significant difference between the groups, $\chi^2(1, n = 187) = 1.98$, $p = 0.16$. In terms of crime type, as with the adult sample, the most common crime category was crimes of violence and crimes of indecency, with more older children in the former category and slightly more younger in the latter. In terms of victim and witness status, looking at the entire sample of the young group, the younger witnesses were more likely to be victims of crime than the older children (66% vs 47%) $\chi^2(1, n = 446) = 8.66$, $p < 0.01$).

Table 2 (part B) shows that significantly more female witnesses were classified as being vulnerable as compared to male witnesses ($\chi^2(1) = 38.80$, $p < 0.001$; $\Phi = 0.15$). Vulnerable witnesses were significantly more likely to be victims of crime ($\chi^2(1) = 84.8$, $p < 0.001$; $\Phi = 0.23$). Vulnerable witnesses were also significantly more likely to know the suspect, as compared to those that were not classified as vulnerable ($\chi^2(1) = 199.08$, $p < 0.001$; $\Phi = 0.35$). There were also some significant differences in the type of crime the suspect was charged with and whether the witness was classed as vulnerable ($\chi^2(3) = 140.75$, $p < 0.001$; $\Phi = 0.29$). With crimes of indecency the witness was more likely to be classified as vulnerable as compared to other crimes.

In terms of identification outcome, vulnerable witnesses made more suspect identifications and fewer foil identifications as compared to witnesses who were not vulnerable ($\chi^2(2) = 18.95$, $p < 0.001$, $\Phi = 0.14$), although these findings were qualified by a separate analysis of the younger versus older vulnerable witnesses (see below).

Younger (<16) versus older (>16) vulnerable witnesses

One of the aims of this study was to see what impact the Vulnerable Witnesses (Scotland) Act 2004 has had on the number of vulnerable witnesses from different categories taking part in identification parades and the outcome. A comparison of younger versus older vulnerable witnesses revealed some differences in identification outcome. Taking into account missing data on age, there were 499 vulnerable witnesses in the under 16 and 188 witnesses in the 16 plus age category. Chi-square analysis looking at younger versus older vulnerable witnesses showed a higher rate of suspect identifications for the younger group (81% and 67%, respectively) and lower rate of foil identifications (15% and 24% younger and older, respectively), $\chi^2(2) = 12.52$, $p < 0.01$, $\Phi = 0.13$. In terms of crime category, there were more younger vulnerable witnesses in the crimes of violence category (60% vs 48% for younger and older). There were more older than younger vulnerable witnesses in the crimes of indecency category (33% vs 20.4%, respectively). This suggests that some of the older vulnerable witnesses were placed in the vulnerable category due to the nature of the crime (possibly falling into the intimidated witness category).

Finally, the younger vulnerable witnesses had a support person present, 98% of the time while the older adult vulnerable witnesses had a support person present 5% of the time. Under the Vulnerable Witnesses (Scotland) Act (2004), a vulnerable witness can have a support person present so it may be that the older group had

declined this option or were not made aware of this option by their legal advisor. We asked the investigating officers to record who the support person was and the following information was given to us: a Parent (71%), a Guardian (4%), a Friend (4.5%), a Colleague (0.4%) and Other (19%). Where the suspect was known to an individual the parent was somewhat less likely to be the support person (63%) as compared to cases where the suspect was classed as not known (83%). Identification officers were more likely to record another person being present using the 'Other' category in cases where the suspect was known. Quite often in cases involving children, and for that matter vulnerable adults, the support person (referred to as 'Appropriate Adult' in Scotland) would tend not to be a family member due to a potential conflict of interest.

Victim status and crime type

Victim status also had an effect on identification outcome with a higher suspect and lower foil identification rate for those who were bystander witnesses, as compared to victims of crime ($\chi^2(2) = 22.96$, $p < 0.001$, $\Phi = 0.15$). The largest group of witnesses were in the crime of violence category and it was in this grouping that the number of witnesses compared to victims was much higher (74% and 56% of cases involved witnesses or victims of violent crime). Given the small number of crimes in some groups (e.g. fire raising, offences relating to motor vehicles) the categories were collapsed and put in with 'Other' resulting in four groupings (Crimes of Violence, Indecency, Dishonesty and Other, see Table 1). Most of the suspect and foil identifications were in the category of violent crime, giving a significant effect of crime type on identification outcome ($\chi^2(3) = 40.57$, $p < 0.001$, $\Phi = 0.20$). Follow-up chi-square analyses indicated that there were no significant differences between crimes of violence and crimes of indecency in identification outcome, the number of suspect identifications was 43% and 46%, respectively and foil identifications were 43% and 39%, respectively ($\chi^2(2) = 0.38$, $p = 0.82$). There was a higher rate of suspect identifications in crimes of violence as compared to crimes of dishonesty (43% vs 28%) but a lower rate of foil identifications in the violence than the dishonesty category, 43% versus 53%, ($\chi^2(2) = 12.52$, $p < 0.01$, $\Phi = 0.12$). Similarly, crimes of indecency were associated with more suspect identifications than crimes of dishonesty (46% vs 28%) and fewer foil identifications, 39% versus 52% ($\chi^2(2) = 6.68$, $p < 0.05$, $\Phi = 0.17$).

Procedural variables

There are a number of procedural aspects of the VIPER procedure that have to be strictly adhered to in Scotland. Following the Lord Advocate's Guidelines, lineups are made up of the suspect and a minimum of five but up to eight foils, and the position of the suspect will be varied if there are multiple witnesses for the same lineup – or at the request of the solicitor for the accused (suspect). The lineup operator will always know the position of the suspect. The entire lineup is viewed twice but a witness can ask to view any portion of the lineup again. We examined the impact of these procedures on lineup outcome.

Number of foils, position of suspect and requests to view the lineup again

Looking first at number of foils in the lineup, there was an overall effect on the distribution of suspect identifications, foil identifications and no identifications, $\chi^2(6) = 23.43$, $p < 0.01$, $\Phi = 0.17$. Just looking at the difference between six versus nine lineup members showed a significant association, $\chi^2(2) = 20.31$, $p < 0.01$, $\Phi = 0.16$, with more suspect identifications and fewer foil identifications when there were six people in the lineup. There was no significant difference in identification outcome as a function of whether there were seven or eight members in the lineup, $\chi^2(2) = 1.39$, $p = 0.50$. Note that the majority of lineups (87%) contained nine persons and only 7.2% contained six members.

Suspects were rarely placed in the first or last position (<2%), the most popular position for the suspect was either position 3 (15.6%), 4 (20.5%), 5 (19.5%) or 6 (15.6%). With respect to position of lineup members in the parade, for the nine-person lineups, there was a significant effect, $\chi^2(16) = 27.88$, $p < 0.05$, $\Phi = 0.17$. A comparison of positions 8 and 9 also revealed a non-significant trend for fewer suspect identifications and more non-identifications and foil identifications (these measures were combined due to small cell sizes) when the suspect was placed last in the lineup $\chi^2(1) = 3.08$, $p = 0.08$. There was no significant association between identification outcome and suspect placing for lineups that were made up of six members, $\chi^2(10) = 9.25$, $p = 0.50$.

As indicated earlier, under the VIPER procedure the entire lineup is shown twice and it is only after two viewings that the witness can make a decision. Thus the VIPER lineup is different from a conventional sequential lineup (see Lindsay, Lea, & Fulford, 1991; Lindsay & Wells, 1985). The only exception to twice viewing would be if there is an unequivocal identification and showing the witness the lineup again would cause distress to the witness. Witnesses also have the option of viewing any part of the lineup again. In 6.3% of lineups witnesses requested to view the identification parade or part of it again. On those occasions, there appeared to be fewer suspect identifications and more foil identifications as compared to the majority of occasions where the lineup was not viewed an additional time, $\chi^2(2) = 14.21$, $p < 0.01$, $\Phi = 0.12$.

The effects of delay

Turning to the effects of delay on identification outcome, these effects are rather complex given that we classified our data according to eight different delay periods (using the same categories as per Valentine et al., 2003b). The most common delay was less than one month (35.8% of our sample), so this period was compared in separate chi-squares with the other retention intervals each representing 15% of the lineups sampled here. Comparing the one-month period with the one-week period there were no significant differences, $\chi^2(2) = 0.71$. There was a significant difference between the less than one-month and less than two-month periods, with more suspect identifications at the shorter delay, $\chi^2(2) = 11.08$, $p < 0.01$, $\Phi = 0.16$. There was a significant association between the one-month retention and six-month plus interval with more suspect identifications in the one-month period $\chi^2(2) = 12.35$, $p < 0.01$, $\Phi = 0.15$. An odd finding was a non-significant tendency for fewer correct identifications and more foil identifications at the less than one-month as compared

to the *less than* six-month delay, $\chi^2(2) = 5.23$, $p = 0.071$, $\Phi = 0.11$. Consistent with the expectation that choosing rates would be lower after six months (see Dysart & Lindsay, 2007), there were twice as many non-identifications at the six-month plus delay interval as compared to the less than one-month delay period.

Perceptions of witness anxiety – before, during and after the lineup

The identification officers were also asked to provide an indication of their perception as to the emotional state of each witness before, during and after the lineup. There were several overlapping categories to choose from but most of the responses fell into two categories, anxious or calm, so these responses were compared. Given the limitations of these data not too much weight can be put on the impressions of the investigators, but they do provide some indications of how witnesses appeared to others based on gender, vulnerability status, witness/victim status and presence of support person. It should be noted however, that the investigators reported the majority of witnesses (over 80%) to be calm during all phases of the parade, before, during and after, so the numbers falling into the anxious category only comprise a minority of the current sample.

Did perceived anxiety influence lineup outcome? Looking at the before ratings, witnesses who appeared calm before the parade made more foil identifications, $\chi^2(2) = 6.25$, $p < 0.05$, and there was a non-significant trend in the same direction for foil identifications for those who appeared calm during the parade, $\chi^2(2) = 5.44$, $p = 0.06$, but no differences in those who appeared calm after the lineup. Victims of crime also reported being more anxious and less calm than bystander witnesses before, during and after the crime: Before $\chi^2(1, n = 1545) = 28.95$; During $\chi^2(1, n = 1549) = 58.86$ and After $\chi^2(1, n = 1554) = 50.97$, all $ps < 0.001$.

Looking at vulnerability status, those witnesses falling into the under 16 category were seen to be more anxious and less calm, before, during and after the parade: Before, $\chi^2(1, n = 1617) = 32.05$; During $\chi^2(1, n = 1620) = 34.89$; After $\chi^2(1, n = 1626) = 27.08$, all $ps < 0.001$. For vulnerable witnesses only, the impact of having a support person present on the investigators' ratings of anxiety revealed a significant effect of anxiety such that witnesses were seen to be less anxious and more calm when a support person was present during the parade, $\chi^2(1, n = 648) = 9.99$, $p < 0.01$, and after the parade, $\chi^2(1, n = 648) = 23.80$, $p < 0.001$. There was also a non-significant trend in the same direction before the parade, $\chi^2(1, n = 646) = 3.16$, $p = 0.075$.

Discussion

The primary aim of this study was to see how effective the new video identification technology introduced in the UK is with real witnesses in terms of the field measure of 'hit' rates, namely suspect identifications. Drawing upon the distinction between system and estimator variables (Wells, 1978) we also set out to document procedural, witness and case variables that might impact this measure. A particular focus of our research was on the impact of the new technology and changes in legislation on the number of vulnerable witnesses taking part in identification parades and the outcome of their participation.

An examination of the outcome of the identification attempts of 1044 witnesses who did not know the suspect showed that they made suspect identifications on 44%

of occasions and foil identifications on 42% of occasions. A comparison of these rates with earlier field studies conducted in the UK indicates these rates are similar to those reported previously. For example Valentine et al. (2003b) who collected data from live parades in London with a much smaller database of witnesses than we have here, report a 41% suspect identification rate. Wright and McDaid (1996) reported a 39% suspect identification rate for known and unknown suspects again from live parades held in London. Thus it appears that video parades and live parades are not producing any differences in the rate of suspect identifications, a conclusion that was also reached in the laboratory studies with the more valid measure of correct identification (Valentine et al., 2007, Darling et al., 2008). In terms of foil identifications, which give some indication of the false alarms, the Valentine et al. (2003b) and the Wright and McDaid studies report rates of approximately 20%, which are lower than found in the current data set. This suggests witnesses may be more compelled or feel more inclined to make a choice in a video lineup as compared to a live parade. Our laboratory data (e.g. Valentine et al., 2007) led us to expect a lower rate of false choosing in video parades as compared to a photo lineup. However, in the laboratory studies, we experimentally manipulated presence of the culprit in the lineup and we only saw a reduction in false choices in the culprit absent lineups. In the field data we cannot know whether the suspect is the culprit so we do not know if we are dealing with culprit present or absent situations here, a point we will return to later. There are a couple of reasons why foil identifications may have been higher with VIPER. One is that the entire lineup is viewed twice before a witness is asked for their decision. We have some evidence from the laboratory that twice viewing (as compared to a single viewing of the entire lineup) can increase choosing rates and in a lineup where the target is not present, it increases false choosing rates (Havard, Memon, Clifford, & Gabbert, 2008). A second factor that may account for a higher rate of foil identifications is that VIPER has an extensive database of foils from which to choose when constructing a lineup. Thus it is possible that the foils may bear a stronger resemblance to the suspect than the stand-ins that were previously recruited for live parades. Laboratory research suggests where the foils look very similar to each other, a witness is more likely to pick someone (Luus & Wells, 1991). For this reason, it has been argued that foils should be selected on the basis of a fit to a verbal description of the suspect, a point we will return to later in our discussion of *lineup fairness.*

Of the most important estimator variables under investigation was witness age. We classified our groups in two ways. One was by looking at the younger (5–11 years) and older children (12–15 years) to explore any differences in response patterns. The other was to examine how the under 16 group compared with older young adults, middle-aged groups and older adults. In terms of the performance of our child witnesses we did not see any differences between our younger children (5–11-year-olds) and older children (12–15-year-olds) in the rate of suspect identifications and if anything there was a tendency for more suspect identifications among the younger children. There are a number of factors which may explain this including victim status, crime type and retention interval. The younger children were more likely to be victims of crime and with a couple of exceptions the children always had a support person present at the lineup. However, due to the limitations of the dataset we were not able to perform the sophisticated analyses to enable us to explore the data in more depth. The comparison of the younger and older children was based on very

small numbers of children under the age of nine years so most of our children were older children. As a whole this group (the 5–15-year-olds) did not differ from the 16–25-year-olds in the distribution of their lineup responses. The 11–15-year-old group made more suspect identifications and fewer foil identifications than the 41–60 age group. The 11–15-year-old group and the middle-aged adults (aged 41–60) made more suspect identifications and fewer foil identifications than the older adults (ages 61 plus). The children and young adults (the 5–25-year-olds) were the best witnesses in terms of identification outcome in the current sample, displaying more suspect identifications and fewer foil choices.

The results reported here compare favourably with Valentine et al. (2003b) who also noted a higher suspect identification rate in his young adults (compared with a 40-plus group). However, Valentine et al. (2003b) did not note any difference in foil identification rate as a function of age. The laboratory findings using simulated events and photo lineups show a higher false identification rate in older adults (see Bartlett & Memon, 2007). This is characterized as an age-related increase in false choosing among older adults (aged 60–80) as compared to young adults (aged 18–32). The foil identifications are referred to as false identifications in the laboratory studies of target-absent lineups where the lineup is made up of innocent foils. The laboratory studies have also reported (although less consistently) that younger adults are more likely to correctly identify a culprit (when present) while older adults make more foil identifications (see Bartlett & Memon, 2007). The theoretical explanation for this is an age-related increase in familiarity as a basis for recognition (e.g. Searcy, Bartlett, & Memon, 1999) as opposed to recollection of relevant information (for example remembering details about source such as why the face is familiar and where it was seen before). Another important factor with older adults is to make sure that witnesses are aware of, and recall instructions that form part of the Lord Advocate's Guidelines and PACE. These instructions should be given to every witness and state that the person who committed the offence may or may not appear in the images shown. Research suggests that it is important that older witnesses recall and act upon these instructions (Rose, Bull, & Vrij, 2005).

In terms of procedural variables associated with the lineup there were some minor effects of number of foils. Lineups comprising six persons were rare but tended to be associated with more suspect identifications and fewer foil identifications. In the literature, increasing the nominal or actual size of the lineup does not increase choosing rates or false choices provided the foils are good (see Lindsay, Smith, & Pryke, 1999; Nosworthy & Lindsay, 1990). The functional size or the number of plausible foils in the lineup (i.e. lineup foils who resemble the suspect) is deemed most critical because lineups biased against the suspect because s/he stands out can lead to mistaken identifications and miscarriages of justice (Malpass, Tredoux, & McQuiston -Surrett, 2007). When there is only one plausible individual in the lineup functional size is low and if the lineup is a target-absent lineup, then the likelihood of false identification is high. In addition, as pointed out by Lindsay et al. (1999), in a court of law it is not the actual size of the lineup that an expert may be asked to comment on but the probability of identifying the defendant given the lineup used, the description of the defendant and the likelihood that the defendant is innocent. In the current research, we could not examine any of the video lineups to address the issue of lineup composition and fairness. In theory, VIPER parades should be fairer as the foils are selected from a much larger database than the one officers had to rely

on for live parades (Pike et al., 2002). In terms of the selection of foils for the lineup, VIPER parades follow the Lord Advocates' Guidelines on the conduct of visual identification procedures which state the following:

> The set of images will include the suspect or accused person and others who, so far as possible, resemble the suspect or accused in terms of age, build, dress and general appearance. It is more important that the other persons resemble the suspect or accused than that they should be like any descriptions previously given by witness(es). [Appendix C].

These guidelines differ from the United States where the Technical Working Group (Wells et al., 1998) state foils or fillers should generally fit the witness's description of the suspect. When there is a limited/inadequate description of the suspect or when the description differs from the suspect, the recommendation is that fillers should resemble the suspect in significant features. Laboratory research suggests that match to verbal description allows for more variation in the appearance of lineup members, reducing the likelihood of false identifications (Luus & Wells, 1991). The heterogeneity of lineups can increase correct identifications (Wells, Rydell, & Seelau, 1993). Not all researchers agree however, and some studies have found no differences in identification rates when lineups are constructed using a witness's verbal description as compared to a suspect resemblance strategy (see Darling et al., 2008; see Clark & Godfrey, 2009 for a thoughtful discussion on foil selection strategy). Perhaps the most important factor is to ensure guidelines are adhered to in the constructions of lineups and to avoid lineups that are biased towards the suspect.

As alluded to in the introduction, in the absence of any corroborative evidence or details about case outcome we have no measure of mistaken identifications of an innocent suspect from a lineup in which the perpetrator is absent (target-absent lineups). Such mistaken identifications can have important consequences in the legal system in terms of miscarriages of justice not withstanding the failure to identify the actual perpetrator of the crime (Clark & Godfrey, 2009). We also have to assume in those cases where witnesses did not make a choice (referred to as a 'non-identification' in the current study), that there is a possibility that this is actually a correct rejection because the suspect is not the perpetrator. In other words, we can not be sure what the real proportion of incorrect rejections is in the current data set. Nevertheless it is interesting to examine factors that may lead witnesses to choose or not choose from the lineup.

In a recent review on the role of theory in eyewitness research, Brewer, Weber, and Semmler (2007) point out that controlling choosing behaviour is the key to maximizing eyewitness identification performance. They provide some pertinent examples of why a focus on choosing behaviour is critical. First, instructions which warn witnesses of the possibility that a culprit may be absent from a lineup show differences in choosing patterns as compared to lineups which give biased instructions (Malpass & Devine, 1981; Rose et al., 2005). Another example, is that a sequential presentation of lineups (i.e. showing one face at a time) reduces false identification in part because it reduces a participant's willingness to make any identification, including a correct identification (Memon & Gabbert, 2003). It is not only procedural factors that influence choosing but cognitive factors such as the quality of the image and the representation that a witness holds in memory as well as the meta-cognitive beliefs that a witness holds about their ability to be able to

identify the culprit. These beliefs could be based on their perceptions of the witnessing situation and/or how various factors (such as delay) are likely to affect memory (Brewer et al., 2007). Applying these findings to the current study it is clear that our field data has only provided us with a limited set of information about the factors that may have influenced witness's decisions. With respect to choosing rates, however, bearing in mind the ambiguity of 'non-identification' we did note two factors. Firstly, there was a clear effect of delay on choosing such that witnesses were less likely to choose at the longer delay (six months) as compared to the shorter (less than one month) delay period. The other notable finding with respect to choosing is that replicating laboratory findings, we found older adults (aged 61 plus) were more likely to choose than the children, young adults and our middle-aged sample. Turning to the relevant research literature, it is likely that the age-related increases in choosing are due to a combination of cognitive factors and meta-cognitive beliefs (see Bartlett & Memon, 2007; Searcy, Bartlett, & Memon, 2000; Wilcock, Bull, & Vrij, 2005, 2007).

One of the advantages of video parades over live parades is their potential to reduce witness anxiety through reducing the need for a witness to confront a suspect, thereby reducing the perception of any intimidation (Pike et al., 2002). We were able to collect some data on how a witness appeared to the investigating officer before, during and after the parade. While investigator ratings may be subjective and subject to their own expectations about how a witness may be feeling, the data provide some indication of how different categories of witness felt and the relationship of perceived emotional state to identification outcome. The most important finding to note is that approximately 80% of witnesses were perceived to be 'calm' during the VIPER parade. Looking at the smaller sample of those who appeared to be anxious, there were some effects of victim status such that victims rated as more anxious were more likely to be vulnerable witnesses. In terms of perceived anxiety on lineup performance, there was one significant association between anxiety and rate of foil identifications, suggesting those seen as anxious had fewer foil identifications. However, given the small cell sizes in the 'anxious' category caution should be exercised in interpreting these data as indicating anxiety impairs performance. In fact the literature suggests a complex relationship between anxiety and eyewitness memory (Deffenbacher, Bornstein, Penrod, & McGorty, 2004) with the research tending to focus on anxiety manipulations at encoding as opposed to at retrieval or at test. Moreover, it is apparent from the comments made by a few of the lineup administrators that some witnesses were visibly upset during the parade. Other witnesses may not have expressed their anxiety. Future studies should explore the possibility of collecting self-reports from the witnesses as to how they felt during a VIPER parade and explore procedures for reducing anxiety. One practical intervention in Scotland is to provide vulnerable witnesses with a guidance booklet (Scottish Executive, 2005a) before they attend a video parade.

The manner in which an identification parade is compiled and executed is critical to ensure that miscarriages of justice based on faulty eyewitness evidence are kept to a minimum. The current research is the first systematic study of new technology made possible as the result of a large video database developed by West Yorkshire Police (UK). The video identification parade is now common practice throughout the UK, reducing the amount of time it takes to put together an identification parade and reducing witness anxiety. Recent changes in legislation in Scotland

namely the Vulnerable Witnesses (Scotland) Act 2004 have instituted special measures for vulnerable witnesses. A guidance pack (Scottish Executive, 2005b) produced by the Scottish Government provides practitioners with information about the use of special measures for vulnerable adult and child witnesses. It also provides information about applying for special measures and some examples of circumstances where the use of each special measure may be most helpful. It is reassuring to see some evidence that the vulnerable witnesses legislation is being implemented (for example, the provision of a support person). It remains to be seen what impact the changes will have on the prosecution of cases based on video identification evidence.

Overall, while the policy of VIPER parades was introduced on the basis of little or no empirical evidence, such evidence that is now starting to appear concerning this mode of identification elicitation indicates that the technique has certain benefits and few contra-indications concerning its utilization.

Acknowledgements

This research was supported by funds from the Scottish Institute of Policing Research. We would like to thank the Scottish VIPER user group for assisting us with our research and all the police forces and identification officers who took the time to complete our questionnaire. We would also like to thank Fraz Chaudhry for his assistance with the data entry.

Notes

1. In the current field study, as in most field studies, we had no way of verifying whether the suspect is the culprit in the absence of supporting case information.
2. We asked investigators to indicate whether or not the suspect was 'known' to the witness but we do not know how this was interpreted. It may have been the case that known was used when the suspect was a family member, a friend, a distant acquaintance, a friend of family and so on. There are different levels of familiarity and also a witness may know someone who has not been seen for many years or claim not to know for the same reason.

References

Behrman, B.W., & Davey, S.L. (2001). Eyewitness identification in actual criminal cases: An archival analysis. *Law and Human Behavior*, *25*, 475–491.

Bartlett, J.C., & Memon, A. (2007). Eyewitness memory in young and older adults. In R. Lindsay, R. Ross, D. Read, & M. Toglia (Eds.), *The handbook of eyewitness psychology, Volume II: Memory for People* (pp. 309–338). Mahwah, NJ: Lawrence Erlbaum.

Brewer, N., Weber, N., & Semmler, C. (2007). A role for theory in eyewitness identification research. In R. Lindsay, R. Ross, D. Read, & M. Toglia (Eds.), *Handbook of eyewitness psychology: Memory for people* (pp. 201–218). Mahwah, NJ: Lawrence Erlbaum.

Clark, S., & Godfrey, R.D. (2009). Eyewitness identification evidence and innocence risk. *Psychonomic Bulletin & Review*, *16*, 22–42.

Darling, S., Valentine, T., & Memon, A. (2008). Selection of lineup foils in operational contexts. *Applied Cognitive Psychology*, *22*, 159–169.

Deffenbacher, K.A., Bornstein, B.H., Penrod., S.D, & McGorty, E.K. (2004). A meta-analytic review of the effects of high stress on eyewitness memory. *Law and Human Behavior*, *28*, 687–706.

Dysart, J.E., & Lindsay, R.C.L. (2007). The effects of delay on eyewitness identification accuracy: Should we be concerned? In R.C.L. Lindsay, D. Ross, J.D. Read, & M. Toglia (Eds.), *The handbook of eyewitness psychology, Volume II: Memory for people* (pp. 361–376). Mahwah, NJ: Lawrence Erlbaum.

Havard, C., Memon, A., Clifford, B., & Gabbert, F. (2008). A comparison of video and static lineups in child and adolescent witnesses. *Applied Cognitive Psychology*. Manuscript submitted for publication.

Havard, C., Memon, A., Clifford, B, & Gabbert, F. (2008, July). *Obtaining evidence from child witnesses using video parades*. Paper presented at the 18th Conference of the European Association of Psychology and Law, Maastricht, The Netherlands.

Lord Advocate's Guidelines. (2007). *Lord Advocate's Guidelines – The Conduct of Visual Identification Procedures*. Retrieved 5 October 2007, from http://www.copfs.gov.uk/Resource/Doc/13547/0000269.pdf

Lindsay, R.C.L., Lea, J.A., & Fulford, J.A. (1991). Sequential lineup presentation: Technique matters. *Journal of Applied Psychology*, *76*, 741–745.

Lindsay, R.C.L., & Wells, G.L. (1985). Improving eyewitness identifications from lineups: Simultaneous versus sequential lineup presentation. *Journal of Applied Psychology*, *70*, 556–564.

Lindsay, R.C.L., Smith, S., & Pryke, S. (1999). Measures of lineup fairness: Do they postdict identification accuracy? *Applied Cognitive Psychology*, *13*, 93–107.

Luus, C.A.E., & Wells, G.L. (1991). Eyewitness identification and the selection of distracters for lineups. *Law and Human Behavior*, *15*, 43–57.

Malpass, R.S., & Devine, P.G. (1981). Eyewitness identification: Lineup instructions and the absence of the offender. *Journal of Applied Psychology*, *66*, 482–489.

Malpass, R.S., Tredoux, C., & McQuiston-Surrett, D. (2007). Lineup construction and lineup fairness. In R. Lindsay, R. Ross, D. Read, & M. Toglia (Eds.), *Handbook of eyewitness psychology: Memory for people* (vol. 2) (pp. 155–178). Mahwah, NJ: Lawrence Erlbaum.

Memon, A., & Gabbert, F. (2003). Improving the identification accuracy of senior witnesses: Do pre-lineup questions and sequential testing help? *Journal of Applied Psychology*, *88*, 341–347.

Nosworthy, G.J., & Lindsay, R.C.L. (1990). Does nominal lineup size matter? *Journal of Applied Psychology*, *75*, 358–361.

Pike, G., Brace N., & Kynan, S. (2002). *The visual identification of suspects: Procedures and practice*. A Publication of the Policing and Reducing Crime Unit, Home Office Research, Development and Statistics Directorate.

Police and Criminal Evidence Act 1984 (s.60(1)(a)) Code of Practice (D) on identification of persons. Section 2: Identification by witnesses (2005). London: Home Office Communication Directorate.

Pozzulo, J.D., & Lindsay, R. (1998). Identification accuracy of children versus adults: A meta-analysis. *Law and Human Behavior*, *22*, 549–570.

Rose, R.A., Bull, R., & Vrij, A. (2005). Non-biased lineup instructions do matter – A problem for older witnesses. *Psychology, Crime & Law*, *11*, 147–159.

Ross, S.J., & Malpass, R.S. (2008). Moving forward: Response to 'Studying eyewitness investigations in the field'. *Law and Human Behavior*, *32*, 16–21.

Scottish Executive. (2005a). *Video Identification parades: A booklet for children and young people*. Retrieved 8 June 2009, from http://www.scotland.gov.uk/Publications/2005/10/14104300/43005

Scottish Executive. (2005b). *Special measures for vulnerable child and adult witnesses: A guidance pack*. Retrieved 8 June 2009, from http://www.scotland.gov.uk/Publications/2005/06/03104253/42559

Searcy, J.H., Bartlett, J.C., & Memon, A. (1999). Age differences in accuracy and choosing rates on face recognition and eyewitness identification tasks. *Memory and Cognition*, *27*, 538–552.

Searcy, J.H., Bartlett, J.C., & Memon, A. (2000). Relationship of availability, lineup conditions and individual differences to false identification by young and older eyewitnesses. *Legal and Criminological Psychology*, *5*, 219–236.

Slater, A. (1994). *Identification parades: A scientific evaluation.* Police Research Award Scheme. London: Police Research Group, Home Office.

Tollestrup, P.A., Turtle, J.W., & Yuille, J.C. (1994). Actual victim and witnesses to robbery and fraud: An archival analysis. In D.F. Ross, J.D. Read, & M.P. Toglia (Eds.), *Adult eyewitness testimony: Current trends and developments.* (pp. 144–160). Cambridge: Cambridge University Press.

Vulnerable Witnesses (Scotland) Act (2004). Retrieved 1 April 2009, from http://www.opsi.gov.uk/legislation/scotland/acts2004/asp_20040003_en_1

Valentine, T, Darling, S., & Memon, A. (2007). Do strict rules and moving images increase the reliability of sequential identification procedures? *Applied Cognitive Psychology*, *21*, 933–949.

Valentine, T., Harris, N., Colom Piera, A., & Darling, S. (2003a). Are police video identifications fair to African–Caribbean suspects? *Applied Cognitive Psychology*, *17*, 459–476.

Valentine, T., & Heaton, P. (1999). An evaluation of the fairness of police line-ups and video identifications. *Applied Cognitive Psychology*, *13*, S59–S72.

Valentine, T., Pickering, A., & Darling, S. (2003b). Characteristics of eyewitness identification that predict the outcome of real lineups. *Applied Cognitive Psychology*, *17*, 969–993.

Wells, G.L. (1978). Applied eyewitness testimony research: System variables and estimator variables. *Journal of Personality & Social Psychology*, *36*, 1546–1557.

Wells, G.L., Memon, A., & Penrod, S. (2006). Eyewitness evidence: Improving its probative value. *Psychological Science in the Public Interest*, *7*, 45–75.

Wells, G.L., Rydell, S.M., & Seelau, E.P. (1993). The selection of distractors for eyewitness lineups. *Journal of Applied Psychology*, *78*, 835–844.

Wells, G.L., Small, M., Penrod, S., Malpass, R.S., Fulero, S.M., & Brimacombe, C.A.E. (1998). Eyewitness identification procedures: Recommendations for lineups and photospreads. *Law and Human Behavior*, *22*, 603–647.

Wilcock, R.A., Bull, R., & Vrij, A (2005). Aiding the performance of older eyewitnesses: Enhanced non-biased lineup instructions and lineup presentation. *Psychiatry, Psychology, and Law*, *12*, 129–140.

Wilcock, R.A., Bull, R., & Vrij, A. (2007). Are older witnesses always poorer witnesses? Identification accuracy, context reinstatement, own age bias. *Psychology, Crime & Law*, *13*, 305–316.

Wright, D.B., & McDaid, A.T. (1996). Comparing system and estimator variables using data from real lineups. *Applied Cognitive Psychology*, *10*, 75–84.