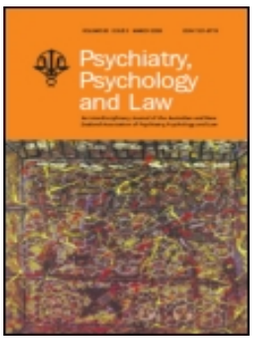

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Aiding the Performance of Older Eyewitnesses: Enhanced Non-Biased Line-Up Instructions and Line-Up Presentation

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The study examined possible methods for improving the performance of older eyewitnesses on identification line-ups. Young and old adults viewed a simulated crime event involving a young and old perpetrator, and were subsequently asked to identify these two perpetrators from line-ups that were either target present (TP) or target absent (TA). Research conducted by the present authors indicates that older adults have significant problems with remembering instructions informing them that the perpetrator may or may not be present in the line-up and this may contribute to the age deficit in line-up performance. Therefore, in the present study, prior to the line-ups, half the participants received enhanced non-biased line-up instructions. Furthermore, the performance age deficit demonstrated by older adults in previous relevant studies is largely characterised by an increase in false identifications. The sequential line-up is known to reduce false identifications. Therefore, half the participants viewed line-ups that were presented sequentially and half viewed line-ups that were presented simultaneously. Older participants were found overall to demonstrate poorer line-up performance compared to younger participants. Though enhanced line-up instructions led to significantly better memory concerning the possibility the perpetrator may or may not be present in the line-up, they had no significant effect on line-up performance. Line-up presentation (sequential vs. simultaneous) had differential effects across conditions, with sequential presentation not always being beneficial.

The population of people over the age of 65 years in many countries is increasing rapidly. Further, not only is the population ageing but older people are remaining fit, active, and healthy. Consequently, it is probable that an increasing number of elderly people are becoming crime witnesses (Bornstein, 1995), and are being asked to identify people from identification line-ups (Rothman, Dunlop, & Entzel, 2000). The limited amount of research conducted with older

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witnesses suggests that they may be less accurate (making more false identifications) than younger witnesses on identification line-ups (Memon, Bartlett, Rose, & Gray, 2003; Rose, Bull, & Vrij, 2003). It is therefore surprising that there has been so little research into possible methods for improving older witnesses' performance.

The current study examines the performance of young and old people on target present (TP) and target absent (TA) line-ups. On the basis of the existing though sparse literature on older adults' performance on identification line-ups, it is expected that older adults will show poorer performance than younger adults. However, the current study investigates two possible reasons for this age deficit. First, there is evidence to show that older adults fail to recall the (non-biased) line-up instructions (required by law in England and Wales) informing them that the perpetrator may or may not be present and this has a significant detrimental effect on their line-up performance (Rose, Bull, & Vrij, in press). In the present study half the participants will receive (non-biased) line-up instructions which have been enhanced to make them more memorable. Second, as mentioned above, older adults make more false identifications compared to younger adults and to date only one procedure has been found reliably to reduce false identifications (with younger adults); the sequential line-up. In the present study line-ups will be presented simultaneously and sequentially to investigate which might be most beneficial to improving older witnesses' accuracy.

Enhanced Line-Up Instructions

Malpass and Devine (1981) were the first to demonstrate the importance of non-biased line-up instructions (i.e., informing witnesses that the perpetrator may or may not be present in the line-up). They found that failure to warn witnesses that the culprit may or may not be in the line-up (biased instructions) resulted in 78% of witnesses making identifications from a TA line-up, whilst maintaining a high level of hits in the TP line-up. With the warning that the perpetrator may not be in the TA line-up (non-biased instructions) the false identification rate fell to 33%. More recently, Steblay (1997) conducted a meta-analysis of 18 studies which confirms that after witnesses receive biased line-up instructions a higher level of choosing ensues. Nowadays the importance of giving witnesses non-biased line-up instructions is recognised in several countries. Thus, informing the witness that the perpetrator may or may not be present in the line-up has been required of police forces in England and Wales since 1986 (Zander, 1990) and, more recently, has been recommended by the Attorney General in the USA (Wells, Malpass, Lindsay, Fisher, Turtle, & Fulero, 2000).

However, older witnesses may not actually remember being given non-biased line-up instructions prior to them making a line-up decision. Hope and Memon (2002) found that older adults were less likely than younger adults to report recalling the non-biased instructions they were given. Furthermore, younger and older participants in Rose et al. (2003) were asked if they remembered the instructions given to them that the perpetrator may or may not be present in the line-ups. There was a significant effect of age group on reported memory for line-up instructions in that 91% of young adults said they remembered the instructions compared to only 75% of the older adults. However, these results were based on a simple 'yes/no' question. In a follow up study by Rose et al. (in press) younger and older participants were asked an open question 'Please tell me as much as you can remember about the line-up instructions I gave you prior to the line-ups'. There was again a significant effect of age on recall of the line-up instructions with 68% of younger participants being able to recall them correctly compared to only 46% of older participants. Further, and more importantly, there was a significant effect of memory for line-up instructions on young and old line-up accuracy with participants who did not remember the line-up instructions demonstrating poorer performance (i.e., making more false identifications).

Therefore, older participants' performance could be improved on identification line-ups if the line-up instructions were made more prominent. In the present study half the participants were given enhanced line-up instructions (devised by the authors) making it clear that (i) it is possible that line-ups may not contain the perpetrator and (ii) that if they were to choose on a line-up that did not contain the perpetrator they would be making a mistake (see the method for details). We decided to use these additional instructions to make clear that there actually can be severe consequences of choosing a person from a perpetrator absent line-up and this may have the effect of focusing older adults' attention on the non-biased instructions.

Indeed there is evidence to show that older adults benefit both from distinctiveness at the time of encoding (Dodson & Schacter, 2002) and elaborative instructions (Schacter, Kihlslstrom, Kaszniak, & Valdiserri, 1993). It is expected that older participants in the enhanced instruction condition will better remember the non-biased line-up instructions and that they may therefore be more accurate on the line-ups. Younger participants may also benefit from the enhanced line-up instructions, though they would probably remember the basic line-up instructions without additional help. The line-up instructions will be given prior to participants viewing either sequential or simultaneous line-ups.

The Sequential Line-Up Versus the Simultaneous Line-Up

Lindsay and Wells (1985) found for young adults that sequential line-up presentation (presenting each line-up member one at a time) reduced the rate of false identifications compared to simultaneous line-up presentation (presenting all line-up members together). Furthermore, the sequential line-up maintained a similar rate of correct identifications in comparison to the simultaneous line-up. Bearing in mind that older witnesses tend to make more false identifications compared to younger witnesses, a procedure that reduces false identifications such as the sequential line-up may be especially beneficial to them. The limited published research reveals mixed findings as to whether or not sequential line-up presentation is beneficial for older adults. Searcy, Bartlett and Memon (1999) found no effect of sequential presentation compared to simultaneous presentation across both TP and TA line-ups with either young or old adults. However, they used a rather unusual design whereby participants had previously been exposed to two simultaneous line-ups, and then viewed a third line-up that was presented sequentially on videotape. As these authors suggest, participants' decision strategies possibly had been too firmly set by the time they came to view the third line-up to be shifted. A further investigation by Searcy, Bartlett and Memon (2000) found that sequential presentation did in fact reduce choosing for TA line-ups in both young and old adults compared to simultaneous presentation. The most recent investigations of line-up presentation produced yet another outcome in that Memon and Gabbert (2003) and Rose et al. (in press) found the sequential line-up to be beneficial for both young and old adults when the line-up was TA. However, when the line-up was TP the sequential line-up reduced hit rates. This is in line with recent research conducted with young adults which suggests that the sequential line-up is not in fact beneficial for both TP and TA line-ups (e.g., Ebbesen & Flowe, 2003).

As suggested by Memon and Gabbert (2003), there are at least two notions that need to be considered when thinking about sequential line-ups for older witnesses. First, it is widely accepted that people adopt different judgment strategies for simultaneous and sequential line-up presentations. With a simultaneous line-up one can examine all the faces together, compare them and adopt a relative judgment strategy. Conversely, with a sequential line-up one has to make a yes or no decision 'is this the person or not' and adopt an absolute judgment strategy (Lindsay & Wells, 1985). There is evidence to show that absolute judgment strategies are superior over relative judgment strategies in increasing accurate line-up performance (Kneller, Memon, & Stevenage, 2001). Ebbesen and Flowe (2003) suggest that with an absolute judgment strategy witnesses adopt more stringent criteria when making a decision as to whether the line-up member matches their memory of the perpetrator.

Older adults are prone to making familiarity-based judgments (Koutstaal, Schacter, Galluccio, & Stofer, 1999) and therefore sequential line-ups, which encourage witnesses to use more stringent decision criteria, may reduce this. Evidence from Memon, Hope, Bartlett and Bull (2002) suggests that older adults persuaded to use more stringent decision criteria demonstrate somewhat improved performance.

The second notion that should be taken into account when considering older adults performance on sequential line-ups is the literature on ageing and inhibition. This suggests that ageing interferes with the inhibitory mechanism that normally controls suppression of related but irrelevant information (Hasher & Zacks, 1988). This could lead us to suggest that sequential testing may not be helpful for older adults if they fail to inhibit responses to familiar-looking foils who are (and should be) shown prior to the perpetrator in a

sequential TP line-up. For a TP sequential line-up the ageing and inhibition literature would suggest older adults' performance will be dependent on where in the line-up the target is placed, if the target is in position one they will be likely to be correct, but if the target is placed in later positions it is likely they will have been unable to inhibit a false identification to an earlier familiar looking foil. Memon and Gabbert (2003) presented their perpetrator only in position four of the line-up and clearly position of the perpetrator in this instance is crucial. The current study presents the perpetrator in all line-up positions. For a TA sequential line-up the ageing and inhibition literature would similarly suggest that older adults' performance would be poorer because they will be unable to inhibit a false identification to a familiar looking foil.

Own Age Bias

The present study uses an older and younger perpetrator to investigate the possible existence of an own age bias. List (1986) and Wright and Stroud (2002) found that older and younger adults were more accurate when identifying people of their own age group. However, other studies have found that while young adults exhibit such an own age bias, older adults do not (Backman, 1991; Fulton & Bartlett, 1991). Thus far the eyewitness studies that have investigated own age bias have mostly used middle-aged participants as the older group. Most recently, Memon, Bartlett, Rose and Gray (2003) used older participants (60–82 years) and they found no own age accuracy bias for either age group. The present study also uses an older age group and, given this, it was expected that no own-age bias would exist for older participants. The current study used a realistic crime event similar to those used by List (1986) and Wright and Stroud (2002) and therefore it is expected that an own-age bias would exist for younger participants.

In sum, the current study examines three main issues. First, it is hypothesised that older participants will demonstrate poorer line-up performance compared to younger participants. Second, it is hypothesised that participants (particularly older participants) who receive enhanced line-up instructions will be more likely to remember these non-biased instructions and will consequently make fewer false identifications on the line-ups than participants in the standard non-biased line-up instruction condition. Third, it is hypothesised that line-up presentation (sequential vs. simultaneous) will have differential effects depending upon target presence/absence, specifically simultaneous line-up presentation will be advantageous for TP line-ups and sequential line-up presentation will be advantageous for TA line-ups. Additionally, it is hypothesised that an own-age bias will exist for young participants.

Method

Participants

The participants consisted of 48 university students aged between 18 to 31 years (M = 21.23, SD = 2.86) and 48 older adults aged between 62 to 83 years (M = 71.40, SD = 6.15) recruited from retirement clubs and day care centres. All older participants completed the Mini Mental Status Examination Test (Folstein, Folstein, & McHugh, 1975) to screen out any older participants with dementia. Participants (young and old) completed the Geriatric Depression scale (GDS; Yesavage, Brink, Rose, & Lum, 1983) because it is known that depression can have an adverse effect on memory. All participants completed the National Adult Reading Test (NART; Nelson, 1982) to check for differences between the two age groups in IQ. Table 1 shows participants' mean scores on these screening measures. All participants underwent a brief eye test using the Snellen eyechart to ensure that people could see the video event and the line-ups adequately. No participants showed worse than 20.30 vision and none reported serious health problems.

Design

Age group (young or old), line-up instruction (enhanced or control), and line-up presentation (sequential or simultaneous) were between-participant factors. The within-participant factors were line-up presence (TP or TA) and age of perpetrator. All participants viewed a simulated crime involving a young perpetrator (22 years) and an older perpetrator (54 years); though the older perpetrator was 54 years, he had grey hair and many age lines on his face and was judged in a pilot study involving young and old participants to look older than his chronological age (age estimates included 60 years). The main dependent variable was line-up performance (hits, false alarms, and incorrect rejections for the TP line-up, and correct rejections and false alarms for the TA

Table 1

Mean Scores on the MMSE (Older Participants Only), the GDS, and the NART (Standard Deviations Are Shown in Brackets)

	Young participants	Old participants
MMSE*	N/A	29.52 (1.15)
GDS	5.25 (4.29)	6.25 (4.25)
NART	120.08 (3.09)	121.66 (4.04)**

Note: *All participants gained a score of 26 or above except for one participant who scored 24. (While Lezak [1995] recommends a cut off point of 24.6, all other scores were checked for this participant and were not in any way abnormal.)

**There was a significant difference between the two age groups with older participants demonstrating better performance compared to younger participants, $t = (93) = 2.14$, $p < .05$.

line-up). Additional measures were taken for recall of the non-biased line-up instructions.

Event

The to-be-remembered event consisted of a 110-seconds-long coloured video clip (no sound) of the young man and old man breaking into a house. The young and old man were chosen by the experimenter to be visually similar in all respects other than their apparent ages. The reason for doing this was so that any difference in accuracy of identification of the two men should be attributable to their difference in age and not due to their being encoded differently because, for example, one had a more distinctive appearance than the other. The older man went upstairs in the house while the younger man remained downstairs. This meant that when participants were asked to examine the line-ups the two men could each be specified by something other than age. The upstairs and downstairs of the house were similar with no distinctive objects in either. Full exposure of each man's face was for six seconds in the case of the young man and seven seconds for the older man. The order in which the young and old man were shown was alternated across participants. (It was possible to edit the video so for one tape the young man in the downstairs room was seen first and the older man in the upstairs room was seen second and vice versa.)

Line-Ups

There were four line-ups altogether, a TP line-up and a TA line-up for each of the young and the old perpetrator. Each participant was shown a TP line-up and a TA line-up (i.e., the first participant saw a TP line-up for the young perpetrator, followed by a TA line-up for the old perpetrator, the second participant saw a TA line-up for the young perpetrator and a TP line-up for the old perpetrator). The line-ups were presented in the same order as the perpetrators had been viewed on the video recording.

The TP line-ups contained the perpetrator and five foils. The TA line-ups contained a target replacement and five foils. The targets and target replacements were placed in all positions of the line-ups. The line-up photos comprised six 20cm × 25cm coloured head shots of the face. Development of the line-ups was based on the match to description of culprit method of constructing line-ups (see Tunnicliff & Clark, 2000). It was impractical to construct line-ups individually for each witness as Luus and Wells (1991) suggest. Therefore, for the purposes of the present study, a procedure based on that used by Lindsay, Martin, and Webber (1994) was adopted. Ten older persons (64 to 85 years) and ten younger persons (18 to 22 years) were asked to watch the video event and describe the older and younger perpetrator. The descriptions given were analysed to give a 'modal' description for each perpetrator. For young and old faces separately, six other older persons and six other younger persons were asked to rank in order a pool of 12 photographs regarding best fit to the modal description. Kendall's coefficient of concordance was performed to check that there was significant agreement between the rankers.

Line-Up Presentation

Participants either viewed two sequential line-up or two simultaneous line-ups. Participants in the simultaneous line-up condition were shown each line-up in a simultaneous three-by-two array. For participants in the sequential line-up condition they were shown each member of the line-ups one at a time and, as recommended by Lindsay, Lea and Fulford (1991), they saw each line-up member once only and they were not aware of the number of faces that were in the line-up. (The line-up photographs were concealed from participants in a folder so they were unaware of how many photos there were.) Once participants had chosen a face the sequential line-up was stopped and they did not see any of the remaining line-up members.

Enhanced Line-Up Instructions

Participants in the enhanced line-up instruction condition were told:

> This is a silly example, but imagine a crime of serious assault has been committed and the victim said that the person who committed the crime was a white female of appearance 24 years with long brown hair (this description matches the experimenter). I do not have an alibi for the time that the crime was committed and the police think it may have been me that committed the crime. So they put me in a line-up and the victim picks me out. On the basis of the victim picking me out I could go to prison, and the person that really committed the crime would be free. So just because the police have a suspect that person may not always be the perpetrator. It's really important that you realise that line-ups do not always contain the actual perpetrator of the crime. Do you understand this?
>
> There have been real life cases where a person has been picked out in a line-up and just because of that they have been sent to prison. However, later it has been found out from other evidence (such as samples of hair and skin, i.e., DNA) that they were not guilty of the crime. It's really important that you do not pick a face unless you are certain the face belongs to the perpetrator.

Participants in the enhanced line-up instruction condition also received the standard/basic line-up instructions as did the participants in the control condition. These instructions were:

> Please look at each photo carefully and tell me which if any, of the faces belong to the man you saw break into the house and go upstairs/downstairs. Just as in a real line-up the culprit may or may not be present.

Procedure

Participants were tested individually. On arrival they were randomly assigned to one of the four experimental conditions. On arrival they were directed to sit in clear view of the television screen and were then instructed to watch the video clip of the break in. After watching the video clip, participants were asked to fill in a sheet with their personal details. At this point all the participants were asked to complete the GDS, and have their eyes tested. All participants then completed the IQ test and all older participants completed the MMSE.

At the end of the 30-minute delay from the time participants viewed the video recording, half the participants were given enhanced line-up instructions followed by the basic line-up instructions. The remaining half of the participants received the basic line-up instructions only. After viewing both the line-ups participants were asked about their memory for the line-up instructions given to them prior to the line-ups. Specifically they were asked: 'Please tell me as much as you can remember of the line-up instructions I gave to you before you viewed the line-ups'.

Results

Effect of Age Group on Total Line-Up Performance

Each participant viewed two line-ups so to look at total line-up performance each participant was given a score of either 0 (both line-ups incorrect), 1 (one line-up correct), or 2 (both line-ups correct). From Table 2 one can see that older participants overall demonstrate poorer performance compared to younger participants. A one-tailed chi-square test revealed this effect to be significant, $\chi^2(4, N = 96) = 5.21$, $p < .05$.

Hierarchical Loglinear Analysis (HILOG)

Four separate hierarchical loglinear analyses (HILOG) were conducted for the four line-ups (i.e., young TA, old TA, young TP, Old TP) to examine the effects of age group, line-up instructions (enhanced or control), and line-up presentation (sequential or simultaneous) on line-up performance (correct/incorrect). Since TA performance is especially poor in older witnesses the data for the TA line-ups are reported first.

Performance on Target Absent Line-Ups

The data for the young and old TA line-ups are presented in Table 3 in proportions of participants

Table 2

Performance Overall on Both Line-Ups.

	Young participants	Old participants
Both line-ups correct	.39(19)	.21(10)
One line-up correct	.46(22)	.50(24)
Both line-ups incorrect	.15 (7)	.29(14)

Note: Data are shown in proportions of responses (frequency data are shown in brackets).

Table 3

Performance on the Target Absent Young and Old Line-Up.

		Young participants	Old participants
Young line-up	Correct rejection	.54(13)	.50(12)
	False alarm	.46(11)	.50(12)
Old line-up	Correct rejection	.67(16)	.42(10)
	False alarm	.33(8)	.58(14)

Note: Data are shown in proportions of participants making either false identifications or correct rejections (frequency data are shown in brackets).

making correct rejections or false identifications. For the young TA line-up neither age group nor line-up instructions had a significant effect on line-up performance. The only variable significantly contributing towards the final model was line-up presentation, $\chi^2(10, n = 48) = 1.45, p = .99$; see Table 4. Line-up presentation did indeed have a significant effect on young TA line-up performance, $\chi^2(1, n = 48) = 7.06, p < .01$. Follow-up chi square analyses indicated that on the young TA line-up sequential presentation lead to significantly fewer false identifications and more correct rejections than simultaneous presentation, χ^2 (4, $n = 48$) = 6.76, $p < .01$ but when this effect was investigated for each age group separately it only remained significant for young participants, χ^2 (4, $n = 24$) = 4.20, $p < .05$.

For the old TA line-up none of the variables contributed significantly towards the HILOG final model but the goodness-of-fit statistic revealed this model did not fit the data adequately. Chi square analysis indicated that older participants made significantly more false identifications and fewer correct rejections compared to younger participants across simultaneous and sequential line-up presentation, χ^2 (4, $n = 48$) = 3.02, $p < .05$, for a one-tailed test. There was no main effect of line-up presentation, although for young participants the sequential line-up was more beneficial in that they made significantly more correct rejections and fewer false identifications, χ^2 (4, $n = 24$) = 6.75, $p < .01$. There was no significant effect of enhanced line-up instructions for the old TA line-up.

Table 4

Performance on Sequential Versus Simultaneous Target Absent Young and Old Line-Ups.

		Sequential	Simultaneous
Young line-up	Correct rejection	.71(17)	.33(8)
	False alarm	.29(7)	.67(16)
Old line-up	Correct rejection	.63(15)	.46(11)
	False alarm	.37(9)	.54(13)

Note: Data are shown in proportions of participants making either false identifications or incorrect rejections or hits (frequency data are shown in brackets).

Performance on Target Present Line-Ups

HILOG revealed for the young TP line-up no significant effect of age group, line-up presentation, or line-up instructions on line-up performance (see Table 5).

For the old TP line-up, age group and line-up instructions had no significant effect on line-up performance. The HILOG final model included only line-up presentation, χ^2 (1, $n = 48$) = 3.16, $p = .977$ (see Table 6), and a significant effect of line-up presentation on line-up performance was indeed found, χ^2 (1, $n = 48$) = 11.71, $p < .001$. Chi square analyses revealed that participants who viewed the simultaneous TP line-up were significantly more likely to make correct identifications of the perpetrator than participants who viewed the sequential line-up, χ^2 (4, $n = 48$) = 4.04, $p < .01$. When this effect was examined for each age group independently the effect still remained for young, χ^2 (4, $n = 24$) = 4.89, $p < .05$, one-tailed test, and old participants, χ^2 (4, $n = 24$) = 9.06, $p < .01$ respectively.

Table 5

Performance on the Target Present Young and Old Line-Up.

		Young participants	Old participants
Young line-up	Hits	.54(13)	.38(9)
	False alarm	.08(2)	.25(6)
	Incorrect rejection	.38(9)	.38(9)
Old line-up	Hits	.75(18)	.54(13)
	False alarm	.08(2)	.29(7)
	Incorrect rejection	.17(4)	.17(4)

Note: Data are shown in proportions of participants making either false identifications or incorrect rejections or hits (frequency data are shown in brackets).

Table 6

Performance on Sequential Versus Simultaneous Target Present Young and Old Line-Ups.

		Sequential	Simultaneous
Young	Hits	.50(12)	.42(10)
line-up	False alarm	.17(4)	.17(4)
	Incorrect rejection	.33(8)	.42(10)
Old	Hits	.42(10)	.87(21)
line-up	False alarm	.25(6)	.13(3)
	Incorrect rejection	.33(8)	.00(0)

Note: Data are shown in proportions of participants making either false identifications or incorrect rejections or hits (frequency data are shown in brackets).

Memory for Non-Biased Line-Up Instructions

HILOG analysis was also conducted to investigate the effect of line-up instructions (enhanced or basic) and age group on memory for the non-biased line-up instructions (i.e., that the line-up may or may not contain the perpetrator). Both line-up instructions and age group contributed to the final model, χ^2 (2, N = 96) = 1.17, p = .556. There was a significant effect of age group on memory for the instruction that the perpetrator may or may not be in the line-up, χ^2(1, N = 96) = 9.13, p < .01. Chi-square analysis revealed that overall older participants were less likely to remember this instruction (whether enhanced or not) compared to younger adults, χ^2(1, N = 96) = 8.93, p < .01. However, there was also a significant effect of line-up instruction on memory for this instruction, χ^2(1, N = 96) = 6.67, p < .01. 77. One per cent of participants in the enhanced instruction condition remembered the non-biased line-up instruction compared with only 52.1% in the control instruction condition. Chi-square analyses revealed that participants in the enhanced condition were significantly more likely to remember the non-biased line-up instruction compared to participants in the control condition, χ^2(4, N = 96) = 6.56, p < .01. This association existed both for young participants — 91.7% versus 66.7%, χ^2(4, n = 48) = 4.55, p < .05, and for old participants — 62.5% versus 37.5% a one-tailed χ^2 test, χ^2(4, n = 48) = 3.0, p < .05.

We also used HILOG of the old TA line-up to examine the effects of age group and memory for non-biased line-up instruction (i.e., that the line-up may or may not contain the perpetrator) on line-up performance (correct/incorrect). The only variable contributing to the final model was memory for this instruction, χ^2 (4, n = 48) = 3.28, p = .512) and there was a significant effect of such memory on line-up performance, χ^2(1, n = 48) = 13.53, p < .001. Of those who remembered the non-biased line-up instruction 24 were correct and 10 were incorrect, compared with two participants who were correct and 12 who were incorrect of those who failed to remember the non-biased line-up instruction. Chi-square analyses revealed that participants who remembered the non-biased line-up instruction were significantly more likely to be correct than those who did not, χ^2 (4, n = 48) = 12.66, p < .001. This was further investigated by age group and this significant association existed for younger and older participants, χ^2 (4, n = 24) = 6.20, p < .05; χ^2 (4, n = 24) = 5.53, p < .05. For the old and young TP line-up and young TA line-up there was no association between memory for non-biased line-up instruction and accuracy.

Own-Age Bias

The McNemar change test allows examination of differences in the performance of young/old participants as a function of line-up age. There was a significant effect of line-up age for young participants, χ^2 (1, n = 48) = 3.68, p < .05. However, in this instance younger participants were more likely to be correct on the old line-up rather than the young line-up, thus not reflecting an own age bias. For older participants there was no significant effect of age of line-up, χ^2 (1, n = 48) = .04, p > .05. Thus no own age bias existed for either age group.

Discussion

Findings from the current study support the growing literature that older witnesses are less accurate on line-ups compared to younger witnesses (Memon et al., 2003; Rose et al., 2003). There was a significant effect of participant age on total line-up performance (both line-ups collapsed across conditions) and on the old TA line-up with older participants significantly less likely to be correct compared to younger participants. However, the main aim of the study was to investigate reasons for this age deficit. A possible factor contributing to the age deficit could relate to older witnesses' failure to remember non-biased line-up instructions given prior to them viewing a line-up (Rose et al., 2003; Rose et al., in press). In the present study young and old participants in the enhanced line-up instruction condition were significantly more likely to remember that the perpetrator may or may not be present

in the line-up compared with those in the standard instruction condition. As such, the enhanced line-up instructions were 'enhanced sufficiently' to cause participants to better remember that the line-up may or may not contain the perpetrator. However, there was no significant beneficial effect of such enhanced line-up instructions for either young or old participants on overall line-up performance. It is perhaps not surprising that young participants did not benefit from the enhanced line-up instructions since they are more likely to remember the standard non-biased line-up instructions anyway. Regarding older participants, even though in the enhanced line-up instruction condition they were significantly more likely to recall that the perpetrator may or may not be present in the line-up, only 62.5% of them remembered such instructions (a higher percentage than older participants in the control line-up instruction condition [37.5%]). However, 62.5% is still a lower percentage than young participants in the control line-up instruction condition (66.7%). Possibly the enhanced instructions we used were too complex/long for some older participants to recall successfully. Perhaps a more effective method is needed. Dysart and Lindsay (2001) found that if young adult participants were asked 'if they believed they would be able to correctly reject a TA line-up' this resulted in a higher than normal correct rejection rate. This question could make more of the older witnesses aware (for TA line-ups especially) that the task may actually involve rejecting a line-up rather than identifying a member of the line-up. However, Memon and Gabbert (2003) used the same questions as Dysart and Lindsay (2001) with older witnesses and younger witnesses but did not find any beneficial effect. We are therefore still looking for a more effective method.

What is clear from this study is the importance of remembering non-biased line-up instructions. For the old TA line-up we replicated the finding of Rose et al. (in press) that those participants who remembered instructions that the line-up may or may not contain the perpetrator (collapsed across line-up instruction conditions) were significantly more likely to be accurate, thus reaffirming that non-biased line-up instructions are crucial for increasing eyewitness accuracy. Furthermore, despite receiving enhanced line-up instructions, many older participants failed to remember the standard non-biased line-up instructions compared to younger participants. Practically, the police need to be made aware that older witnesses may not remember the warning that the perpetrator may not be present. In light of this finding the police should emphasise such instructions, but researchers need to investigate other possible methods for increasing older witnesses' memory of non-biased line-up instructions.

The second factor investigated in the current study was line-up presentation. Sequential line-up presentation is a well-known method for reducing false identifications. This is obviously beneficial for line-ups in which the target is absent, but for line-ups in which the target is present sequential presentation may lead to a reduction in correct identifications of the perpetrator. Indeed, results from the present study provide some evidence to support this. There were significant effects of line-up presentation though this was moderated by target presence. On the young line-up when the target was absent sequential presentation led to a reduced rate of false identifications, however, on the old TP line-up sequential presentation led to a reduced rate of correct identifications. Steblay et al. (2001) noted that the effect of target presence (i.e., sequential presentation is more beneficial when the line-up is TA and simultaneous presentation more beneficial when the line-up is TP) is less likely to appear if real-world conditions such as non-biased line-up instructions are used as they were in the present study. In the present study, despite real-world conditions being adopted, line-up presentation still had differential effects for TP and TA line-ups. When line-up was TP, simultaneous presentation was advantageous and when the line-up was TA sequential presentation was advantageous. Clearly, in the real world police do not know whether or not the suspect in the line-up is actually the perpetrator, which makes it difficult for researchers to suggest one line-up presentation method over another.

Because older adults make more false identifications on line-ups compared to younger adults, we were particularly interested in their performance on sequential line-ups which are known to reduce false identifications with young adults (Lindsay & Wells, 1985). As described above, there were significant effects of line-up presentation but when we examined this for the two age groups separately on the old TA line-up, sequential presentation remained beneficial for young participants only. Furthermore, although there was no main overall effect of sequential presentation for the young TA line-up, when we examined

each age group separately there was a beneficial effect of sequential presentation only for the young participants. From these results it would appear that sequential presentation of TA line-ups is not as beneficial to older adults as it is to younger adults. This differs from the results of Memon and Gabbert (2003) and Rose et al. (in press) who found that sequential presentation of TA line-ups was beneficial both to their younger and older participants. We could look to the literature on ageing and inhibition to explain the present results. Older adults may not benefit from sequential presentation because they are unable to inhibit responses to a similar looking foil (i.e., a face that looked familiar to them). The finding that on the old TP line-up older participants were less likely to identify the perpetrator when the line-up was presented sequentially rather than simultaneously can also be understood in terms of the ageing and inhibition literature. Older participants in this condition made more false identifications than they did incorrect rejections. Possibly they were unable to inhibit responses to similar looking foils. Obviously the positioning of the perpetrator in the line-up would have an effect on accuracy and therefore we placed our perpetrator in all available positions. For the old line-up across young and old adults more false identifications were made to earlier foils when the perpetrator was in position 5 and 6 of the sequential presentation than when he was placed in earlier positions. A larger sample size would be needed to investigate fully the effect of this with younger and older adults separately. Perpetrator positioning may also be important in relation to the decision criteria adopted by witnesses when viewing a sequential line-up. Ebbeson and Flowe (2003) suggest that decision criteria may alter throughout the course of a sequential line-up in that a witness may adopt very high decision criteria at the beginning of the line-up but reduce their criterion throughout the course of the line-up. This is important in terms of older witnesses because higher decision criteria may lead to greater identification accuracy (Memon et al. 2002). Further research is required to fully understand the impact of perpetrator positioning in sequential presentation on identification accuracy. In terms of practical applications we should be clear that sequential line-up presentation is not beneficial under all circumstances, that is, when the perpetrator is present. Furthermore, evidence from the current study suggests that sequential presentation may not be appropriate for all age groups of the population.

Additionally, we investigated the possibility of an own age bias occurring. No own-age bias was found for either younger participants or older participants. The fact that an own-age bias did not exist for older participants is not too surprising and is in accordance with the results of Memon et al. (2003). List (1986) and Wright and Stroud (2002), who both found an own-age bias, used a much 'younger' older age group compared to the present study and to Memon et al. (2003). In practical terms the police need to be aware that this older age group (i.e., over 60) are as likely to be poorer on line-ups composed of older adults as of younger adults. In the current study younger participants also failed to show an own-age bias and this is also in accordance with the results of Memon et al. (2003). These eyewitness studies that have failed to find an own-age bias for young adults use a different methodology compared to studies that have found such a bias. For example, Fulton and Bartlett (1991) used a classic face-recognition paradigm and a pool of target faces rather than the one or two target faces typically used in eyewitness studies.[1]

In summary, the present study investigated older witnesses' poorer performance on line-ups and methods for improving this. The novel approach of enhanced line-up instructions designed to reduce false identifications was unsuccessful despite them increasing to an extent memory for the fact the perpetrator may or may not be present. Unfortunately, memory for the standard non-biased instructions among our older participants in the enhanced instruction group did not reach even the level of memory our young participants had in the control instruction group. Possibly we need to turn the instruction on its head and make older adults aware that it is as likely their task will be to reject a line-up as it is to make an identification from a line-up. The other main approach we took to reduce false identifications by older witnesses was to use sequential line-ups. On the basis of the results of the current study, the recent and ongoing vociferous debate (Ebbesen & Flowe, 2003; Wells, 2001) over the utility of sequential line-up presentation is justified. The beneficial effect of sequential presentation on TA line-ups does not extend to older adults. In light of this finding, and together with the lack of a beneficial effect of enhanced line-up instructions, we are

still urgently looking for interventions that will aid the performance of older witnesses on identification line-ups.

Endnotes

1 It must be noted that stimulus sampling (i.e., of the target faces) was not conducted in the present study and only one exemplar of a young and old face was used. In such situations Wells and Windschitl (1999) recommend that generalising too much to young and old faces is not advisable.

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