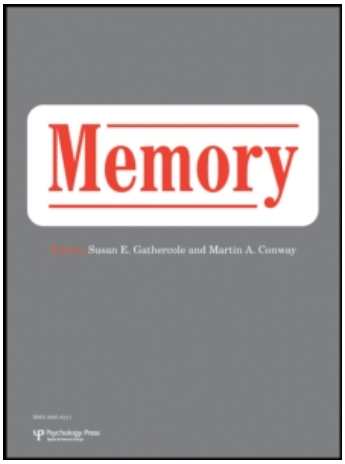

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The influence of face age on identification from a video line-up: A comparison between older and younger adults

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The influence of face age on identification from a video line-up: A comparison between older and younger adults

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A group of young-adult (aged 18–35 years) and older-adult witnesses (aged 61–83 years) viewed films of two similar staged thefts, one that depicted a young culprit and the other an older culprit. After a short delay of 40–60 minutes participants were presented with two separate video line-ups, one for each target. In one line-up the target was present (TP) and the other the target was absent (TA). Older adults performed more poorly in target present and absent line-ups, and showed no own-age bias, however young adults showed an own age advantage for the TA line-ups.

Keywords: Eyewitness identification; Video line-ups; Older adults; Own-age bias.

As the population of older adults (over 65 years) in a number of countries continues to rise, senior citizens will remain active in society for longer and will be witnesses to crimes and accidents more frequently. In 2001–2, there were 19,400 cases of distraction burglary in England and Wales where the victims were aged 60 or over (Thornton et al., 2003). A growing number of older adults are taking part in identification parades in the UK, as confirmed by a recent field study (Wilcock, 2009). Moreover, elder abuse and neglect is increasingly acknowledged as a social problem. In such cases an older adult's testimony may be the only information available in court cases. The increase in the older adult population has not been accompanied by a large increase in research on the facial identification ability of older adults relative to other groups such as children (Brank, 2007). In recent years a small number of research groups have begun to examine the accuracy of older adult witnesses (see Bartlett & Memon, 2007, for a review).

Studies comparing the identification ability of young and older adults typically examine whether they can identify a single target individual from a staged event. Some of this research has reported that when the target is present in a line-up (TP), older adults can correctly identify the target as accurately as young adults (Memon, Bartlett, Rose, & Gray, 2003a; Memon & Gabbert, 2003; Memon, Hope, Bartlett, & Bull, 2002; Yarmey & Kent, 1980). However, when presented with a line-up where the target is absent (TA), older adults are significantly more likely to falsely choose someone from the line-up as compared to younger adults (Memon et al., 2003a; Memon & Gabbert, 2003; Memon et al., 2002; Rose, Bull, & Vrij, 2003, 2005; Searcy, Barlett, Memon, & Swanson, 2001; Wilcock, Bull, & Vrij, 2005; Yarmey & Kent, 1980). This was further confirmed by Searcy, Bartlett, and Memon (1999) who reviewed 12 face recognition experiments, and Bartlett and Memon (2007) who examined 19 line-up datasets: they found no age differences for

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correct recognition (hits); however there was a much higher false alarm rate (i.e., falsely saying a foil had been seen before) for older adults.

There are two main accounts of why older adults might perform poorly on TA line-ups. One compelling account comes from the cognitive ageing domain. Normal ageing is associated with an impaired ability to recall contextual features of past events such as colour, modality (seen or heard; McIntyre & Craik, 1987), and location (Chalfonte & Johnson, 1996). Behavioural studies and neuroimaging data point to an age-related binding deficit, a disruption in the processes by which multiple distinct features (such as colour and location) of objects are associated or bound with one another in memory (see Lyle, Bloise, & Johnson, 2006). This in turn results in problems in discriminating between similar events and in recalling contextual and perceptual details that specify the ''source'' of retrieved information (Johnson, Hashtroudi, & Lindsay, 1993; McDaniel, Lyle, Butler, & Dornburg, 2008; Spencer & Raz, 1995). The ability to accurately identify source is critical in an eyewitness situation where the task is to determine whether or not a face has been previously encountered and to make a decision based on a recollection of the context in which the face was previously encountered. A by-product of this age-related reduction in contextual recollection is that easily accessible information may be mistaken for a memory (Jacoby & Rhodes, 2006). Drawing on the dual-process model of memory ageing, a decline in effortful recollection is accompanied by an increased reliance on ''automatic'' processes and non-analytic strategies such as familiarity and fluency (Jacoby, 1999; Mandler, 1980). The tendency in older adults in face recognition tasks is to base decisions on feelings of perceived familiarity, as opposed to recollection of more diagnostic information (Bartlett, 1993; Bartlett, Strater, & Fulton, 1991; Dywan & Jacoby, 1990; Jennings & Jacoby, 1993; Koutstaal, Schatcher, Galluccio, & Stofer, 1999). The consequence in an eyewitness task is an age-related increase in false alarms (Bartlett, 1993; Searcy et al., 1999). For example, an older adult may see someone in the line-up who looks like a person they have seen earlier in the day. If the feeling of familiarity is misattributed to having seen that face at the scene of a crime, it could result in a false identification. In a laboratory simulation of an eyewitness event, Memon and colleagues (2003a) reported that community-dwelling older adults (aged 60–80 years) were more likely to make false identifications on line-up tasks where the culprit was absent from the line-up. The same group also performed more poorly on a face-source monitoring task relative to younger adults (college students aged 18–32).

A second account of age differences is a meta-cognitive and social one, and draws on the understanding of the line-up task and the context in which the identification occurs, including instructions to the witness. Eyewitnesses have a strong expectation that the culprit is going to be among the set of faces they are shown (Memon, Hope, & Bull, 2003). In order to examine whether this belief that the culprit is present is stronger among older adults, Memon, Gabbert, and Hope (2004) devised a post-line-up questionnaire to examine younger and older participants' post-identification cognitions regarding the line-up identification task. The results across four studies indicated that 90% of younger and older witnesses assumed the culprit was present in the line-up. More recent studies suggested that older adults in particular may not attend to, or may ignore, the instruction that typically accompanies a line-up—namely that ''the person may or may not be there''—as compared to younger adults (Rose et al., 2003, 2005; Wilcock et al., 2005). A meta-analysis of 18 studies using young adult witnesses found that if witnesses are given biased instructions (i.e., not told that ''the person may or may not be present'') then this promotes a high level of choosing (Steblay, 1997). Older adults may be even more prone to high levels of choosing if they do not recall the non-biased instructions and therefore assume that if they are shown a line-up, the culprit is present (Wilcock & Bull, in press). 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 maximising eyewitness identification performance. In order to get a better understanding of the factors influencing choosing behaviour, we will collect data on post-identification cognitions from our witnesses using a post-line-up questionnaire.

While several studies suggest that younger witnesses outperform older witnesses in identification, only a few have examined whether the age of the target face (typically a young adult) puts older adults at a disadvantage. It has been suggested that there is an own-age bias in face recognition, where faces that are the same age are

recognised more accurately than faces that are of a different age. There is some evidence supporting an own-age bias in laboratory studies of face recognition and in eyewitness simulations (Anastasi & Rhodes, 2005, 2006; Bäckman, 1991; Perfect & Harris; 2003; Perfect & Moon, 2005; Wright & Stroud, 2002). Anastasi and Rhodes (2005) asked children (aged 5–8 years) and older adults (aged 55–89 years) to categorise a series of faces into age groups, then administered a face recognition test. They found that participants were better at recognising own-age faces, as compared to other-age faces, and also more conservative in their responses to own-age faces; that is, they were less likely to make false positives to unseen faces. In another study Anastasi and Rhodes (2006) found further confirmation of the own-age bias in younger (18–25 years old) and older adults (over 55 years), who again were asked to categorise faces according to age and then 48 hours later were given a recognition test. Anastasi and Rhodes found that the younger adults did not show an own-age bias, however older adults were more accurate with older and middle-aged faces. Perfect and Moon (2005) also carried out a face recognition study and found that older adults (aged 65–80 years) and young adults (aged 20–24 years) were more likely to correctly identify own-age faces, and each group made more false positive responses to other-age faces.

The own-age bias for facial identification has also been reported in a couple of eyewitness studies. Wright and Stroud (2002) showed young (18–25 years old) and older (35–55 years old) adults four simulated crime videos. In two videos the culprit was a young adult and in two the culprit was an older adult. Wright and Stroud found that the younger adults and older adults were better at identifying the own-age culprit from a TP line-up; however, there was no effect of age for the TA line-ups. In another study Perfect and Harris (2003, Exp. 3) also found that older adults (mean age 66.6 years) were better at identifying own-age target faces from a line-up, as compared to younger target faces, but no pattern was found for young adult participants (mean age 22 years). Memon et al. (2003a) in the study described earlier showed younger-adult (16–33 years of age) and older-adult (60–82 years of age) participants videos that depicted staged crimes by older and younger criminals. Participants were then asked to identify the targets from TA and TP line-ups. Memon et al. found that overall older adults were less accurate and more prone to making false alarms as compared to the younger adults, and they were especially more likely to make false alarms with the younger adult line-ups.

Other studies have also found an asymmetrical pattern for the own-age bias in face identification studies in the opposite direction to that reported by Perfect and Harris (2003) and Memon et al. (2003a). Bartlett and Leslie (1986) compared recognition rates of young adults (aged 18 years) and older adults (mean age 74 years), and found that there was an own-age bias for face recognition, but only for young adults, whereas older adults showed no effect of age of face. Similarly Fulton and Bartlett (1991) compared face recognition abilities of young adults (aged 20–36 years) and older adults (aged 59–82 years) and also found the own-age bias for young adults, but only for correct identifications and not false alarms, whereas older adults made more false alarms regardless of age of face. In a further study by Rodin (1987), Exp. 2), younger-adult (aged 18–25 years) and older-adult (aged over 65 years) participants were tested with young-adult, middle-aged and older-adult faces. The findings were concurrent with those previously reported, as the younger participants were better at recognising own-age faces, however the older participants were equally good with the younger- and older-adult faces and significantly poorer with the middle-aged faces.

An own-age bias in face recognition has not been consistently found in eyewitness studies. Three similar studies (Rose et al., 2002, 2005; Wilcock et al., 2005) showed younger and older witnesses a videoed event with both younger- and older-adult targets, and then showed the participants TP and TA line-ups. Although for all three studies the older age-group had poorer performance than the younger age-group, none of the studies showed a significant own-age bias for either group. For one of the studies (Rose et al., 2005) a reversed age bias was reported, where the younger participants were less likely to falsely identify the older culprit from a TA line-up, as compared to the younger culprit. Rose and colleagues (2005) suggest that the older faces may have been more distinctive because of physical differences such as scars and age lines, and the young faces may have been a more homogeneous set. There is evidence from face perception research where photographs of faces have been measured for asymmetry that older faces are more asymmetrical (especially those over 80 years of age) compared to those under 45 years of age (Kobyliansky & Livshits, 1989).

Additionally, not only are older-adult (aged 79 years) faces more asymmetric than younger adults (aged 20–30 years) there is more variance in the asymmetry among older-adult male faces than of younger adults (Penke et al., in press).

Several theories have been proposed as to why there may be an advantage in recognising an own-age face. One theoretical account for the own-age bias is that it is similar to the own-race bias and may relate to amount of contact one has with same-age faces (see Brigham & Malpass, 1985; Slone, Brigham, & Meissner, 2000). According to the contact hypothesis we gain expertise in processing same-race faces, as they are more frequently encountered, leading to a processing and retrieval advantage for own-race faces. This expertise leads to a configural or holistic processing mode, where the face is processed as a whole for own-race faces. Other-race faces are processed in a less efficient manner, using a featural strategy where the features are examined in a piecemeal fashion, which can lead to poorer encoding (Hancock & Rhodes, 2008).

An alternative, yet similar, explanation for the own-age bias was offered by Anastasi and Rhodes (2005, 2006) in relation to Sporer's ingroup/outgroup model of face processing. This model suggests that ingroup faces are processed automatically and with expertise, whereas outgroup faces first need to be categorised as belonging to the outgroup and hence are not processed with the same expertise as ingroup faces. Anastasi and Rhodes (2005, 2006) suggest that they may have further promoted ingroup/outgroup categorisation due to their encoding task (categorising faces according to age), as this may have made age a more salient category. Furthermore, Rodin (1987) suggests that when encountering new people, decisions are made about whether the person is suitable for social inclusion and age can be used as a criterion to disregard an individual for social inclusion. Due to this cognitive disregard, faces categorised as belonging to the outgroup may be cognitively ignored (Rodin, 1987) and deemed as deserving less attention, leading to worse recognition of outgroup faces (Bernstein, Young, & Hugenberg, 2007). It may also be important if the faces belonging to the outgroup are perceived as positive role models, or disliked individuals, as this can in turn influence automatic attitudes (Dasgupta & Greenwald, 2001) that may influence face recognition (Meissner & Brigham, 2001). The various accounts of the own-age bias are overlapping and predict an own-age face-processing advantage. The data from laboratory studies of face recognition are fairly consistent, but the picture is less clear regarding the implications of the own-age bias for older adults in realistic eyewitnessing situations.

All of the studies mentioned thus far have used static photographs of faces, and relatively few studies have investigated identification from dynamic images. In the UK, video (VIPER and PROMAT)[1] line-ups have now replaced live identification parades. To date there is little research on how effective they are as a means of suspect identification. Research with young adults has found that video parades can reduce the rate of false identifications from target absent (TA) line-ups (Cutler & Fisher, 1990, Valentine, Darling, & Memon, 2007) as compared to static photographic parades. Havard, Memon, Clifford, and Gabbert (in press) also found that video line-ups improved correct rejections from TA line-ups for adolescents (aged 13–15 years), an age-group that usually has high false identifications rates (Lindsay, Pozzulo, Craig, Lee, & Corber, 1997; Pozzulo & Warren, 2003), but not for children (aged 7–9 years). The primary aim of the current research was to examine the effects of face-age on eyewitness identification as a factor that might account for age differences in line-up performance. We used an ecologically valid line-up procedure, the VIPER parade.

In the current study young-adult (18–35 years of age) and older-adult (61–83 years of age) witnesses were presented with two short films, one depicting a young adult and the other an older adult both carrying out identical staged thefts. In addition to completing the line-up task, participants in the current study were asked to make a confidence judgement in relation to how sure they were of their answer. Witness confidence can be a persuasive factor in court, and witnesses who appear confident are more likely to be viewed as creditable and believed, as compared to unconfident witnesses (Cutler, Penrod, & Stuve, 1988). However research has shown that witnesses who appear confident are not always accurate (Bothwell, Deffenbacher, & Brigham, 1987; Leippe, Eisenstadt, & Rauch, 2009; Sporer, Penrod, Read, & Cutler, 1995; but see Sauer, Brewer, Zweck & Weber, in press). Older-adult witnesses in particular can often have high levels of confidence when recalling false

[1] VIPER = Video Identification Parades by Electronic Recording; PROMAT = Profile MATching.

information (Dodson, Bawa, & Krueger, 2007a; Dodson, Bawa, & Slotnick, 2007b; Dodson & Krueger, 2006). However, studies where line-up identification was a dependent variable have found that older adults can be less confident in their post line-up decisions, as compared to younger adults (Memon et al., 2002; Searcy et al., 2001). Numerous factors may influence a witness's confidence (see Brewer, 2006; Lieppe et al., 2009). Memon et al. (2002) found that both pre and post line-up confidence was related to accuracy but only for the younger participants, whereas Searcy et al. (2001) found that false identifications were made with equal confidence as correct identifications.

METHOD

Participants

A total of 88 participants were recruited to take part in the study. There were 45 younger adults aged between 18 and 35 years (29 females and 16 males) and 43 older adults aged between 61 and 83 years (37 females and 6 males). The participants were recruited through poster advertisements in local community centres in Dundee, Scotland, and paid £10 for their participation. The participants were predominantly Caucasian (85%). For the younger group 71% were Caucasian, 7% were Afro-Caribbean, and 22% were South Asian. For the older age group 100% were Caucasian. Demographics for the two samples can be seen in Table 1.

All participants completed a self-report measure assessment of their current state of health on a scale of 1 to 7 (1 = not very good at all, 7 = very good). The younger age-group rated themselves higher on the health scale as compared to the older age-group, $t(83) = 2.17$, $p = .029$. The older age-group had significantly fewer years education than the younger age group, $t(86) = 6.30$, $p < .001$. The older adults completed the Mini Mental State Exam (MMSE) as a screening evaluation (Folstein, Folstein, & McHugh, 1975). The MMSE provides a reliable measure for cognitive impairment and the cut-off limit of < 24 was used, which has a good sensitivity for dementia in older adults (Chayer, 2002). Initially 49 older adults took part in the study; however 4 participants were dropped from the analyses as their score on the MMSE was below 24, and 2 participants did not want to answer some of the questions so their data were discarded. The remaining older adults had a significantly lower score on the MMSE as compared to the younger adults, $t(86) = 2.41$, $p = .18$.

Materials

Two short films were created with two male Caucasian actors; one was 26 years of age (younger target) and the other was 67 years of age (older target). The films were identical except that one starred the young adult and the other the older adult. Each film begins with the target walking along a corridor towards the camera and trying the handles of several doors, until one opens. The next scene is of the target entering the door of an office and looking around, picking up a wallet from the table, then a laptop from another desk. The target then looks through several drawers and also picks up a mobile phone. The target takes one final look around the room before leaving. The last scene is of the target walking back up the corridor with the laptop bag over his shoulder. The total time for the film is 1 minute and 30 seconds. Both targets are seen in full face frontal and profile views throughout the film.

Four 9-person line-ups were created, half target present (TP) and half target absent (TA) according to VIPER specifications for each actor. The targets (actors) were filmed at a VIPER suite

TABLE 1
Mean and standard deviations for both age groups

	Young adults		*Older adults*	
Variable	*M*	*SD*	*M*	*SD*
Age	24.96	5.84	72.63	5.15
Years of education	15.91	2.94	11.85	3.12
Subjective physical health	5.89	0.91	5.35	1.31
MMSE	28.44	1.18	27.78	1.41

at a local police station in order that the line-up met the standard specific content. The positions of the target and target replacement (TA line-up) were manipulated so that for Line-up A they appeared at position 4 and for Line-up B position 6. In other words, there was a 15-second video clip of the person looking straight to the camera and then turning their head to the right and then to the left. All the VIPER files contained the head and shoulders and were filmed under the same lighting conditions against a grey background. Once the film had been made it was sent to the VIPER headquarters for quality control purposes before being approved. The quality check ensures that every VIPER film is identical, for example in image quality, lighting, colour, and the speed of the head rotation; anything that might make one clip more salient than another. The line-ups were constructed by an experienced VIPER operator and a researcher following standard police procedures described in Valentine et al. (2007). To select the line-up foils the database was searched using keywords of the suspect's description, e.g., male, Caucasian, age, hair colour and length, and physical build. The search resulted in a number of thumbnail images from which foils who matched the targets general appearance were selected. One of the foils was chosen to be the target replacement. The VIPER clips are then shown sequentially to the witness.

Design

The study employed a split plot design; 2 (Target: young vs old) × 2 (line-up type: TP vs TA) were within-group factors and 2 (Age: young adult vs older adult) was the between-group factor. Each participant saw one TP and one TA line-up, which were counterbalanced so that they could appear first or second and could be either the old or young target.

The dependent variables were the line-up identification decisions. For the TP line-ups there were three possible responses, a correct identification (hit), a foil identification (false positive), or an incorrect rejection (miss). For the TA line-ups responses were either a correct rejection or a false identification. Data from the target present (TP) and target absent (TA) line-ups were analysed separately, after analysing the total performance on both line-ups. Additional dependent measures were recorded from the post line-up questionnaire and confidence ratings.

Procedure

Initially, groups of adults viewed the two videoed events. The participants were asked to watch the videos carefully and were told they would be asked some questions about the films, and to fill in a questionnaire. Participants watched either the film of the young adult or older adult first, and then the other film second. After viewing the films the participants were given a booklet containing a number of different questionnaires that they were asked to complete; they were given no time limits for this. If they had any questions relating to any of the information in the booklet they were able to ask the researcher. The booklet began with a personal history questionnaire; this included information about their previous or current occupation, how many years they spent in full-time education, and information about their health and hobbies (see Table 1). Then the participants completed the Vividness of Visual Imagery Questionnaire (VVIQ; Marks, 1973). Next the participants completed the Need for Cognitive Closure questionnaire (Webster & Kruglanski, 1994).[2] Once they had completed all this information they were asked to return the booklet to the researcher who carried out the Mini Mental State Exam MMSE (Folstein et al., 1975).

In the second phase (40–60 minutes later) participants were tested individually and carried out the identification task. They were shown one line-up first and told that either the young man or older man "may or may not" be present. Then, in accordance with the Scottish Lord Advocate's Guidelines (2007), participants were shown the line-up at least twice. They were told that they could pause the video at any time and they could go back and see any picture again. After the second viewing the participants were asked if they wanted to view any part of the line-up again. They were then asked if the young man (or older man) they had seen in the film was in the line-up. If they identified a person, they were shown the line-up member and asked, "Is this the person you saw?" If they did not identify any line-up member, they were asked if any of the line-up members looked like the person they had seen previously and if so which person, and in what

[2] Mean scores from the VVIQ and Need for Cognitive Closure did not differ significantly between the young and older adults, or correlate to performance on the identification task (all $ps > .1$).

TABLE 2
Performance overall on both line-ups (frequencies in parentheses)

Age-group	*Neither correct*	*TP correct*	*TA correct*	*Both correct*
Young adults	24.4% (11)	17.8% (9)	24.4% (11)	31.1% (14)
Older adults	55.8% (23)	11.6% (5)	23.3% (10)	11.6% (5)

way did they look like him. After they had made a decision they were asked how confident they felt they were correct, on a 1 to 7 scale (1 = very unsure, 7 = very sure). Then the participants were given a post line-up questionnaire. There was a different sheet for choosers as compared to non-choosers,[3] but both contained several questions, examples of which were: Did you feel under pressure to make a choice? To what extent did you expect the person to be in the line-up? Do you remember the experimenter saying the person may or may not be there? Immediately after filling in the sheet for the first line-up, the second line-up was shown and this followed the same procedure as the first. After completing both line-ups the participants were thanked for helping with the research and debriefed.

RESULTS

Effect of age group on total line-up performance

Following Memon et al. (2003a), the accuracy rates were combined for both line-ups and a measure of line-up performance for each participant was made (0 = neither correct, 1 = TP correct, 2 = TA correct, 3 = both line-ups correct). As Table 2 shows, younger participants outperformed older adults and were more likely to have correct responses for both line-ups and less likely to have incorrect responses for both line-ups as compared to the older adults, $\chi^2(4, N = 88) = 10.2, p = .037, \Phi = .34$. An additional analysis examined overall performance for both line-ups (0 = neither correct, 1 = one correct, 2 = both line-ups correct). It confirmed the previous analysis that older adults were less likely to be correct on both line-ups, or even one line-up, as compared to younger adults, $\chi^2(2, N = 88) = 10.1, p = .006, \Phi = .34$.

[3] There were no differences in responses for chooser and non-choosers on the post-line-up questionnaire.

Target present line-ups

Overall for the TP line-ups 36% of participants correctly identified both of the targets (correct ID), 39% incorrectly chose a foil from the line-up (foil ID), and 25% incorrectly rejected the line-up saying the target was not present. Table 3 shows the percentage of responses for both age groups for the older and younger targets. A hierarchical loglinear analysis (HILOG) was conducted with witness age (young adult, older adult), target age (young adult, older adult), and response (correct ID, foil ID and incorrect rejection) as factors. The likelihood ratio of the model was $\chi^2(2) = .46, p = .79$; there was a significant interaction for witness age and response, $\chi^2(2) = 7.8, p = .021$, but no other significant interactions or main effects. In line with predictions, there was a significant effect of witness age on the response given, which was confirmed by a subsequent chi-squared test, $\chi^2(2, N = 88) = 7.4, p = .025, \Phi = .29$, however there was no effect of target age, $\chi^2(2, N = 88) = 1.9, p = .39, \Phi = .15$. Younger adults made more correct IDs and fewer foil IDs as compared to older adults. Although it appears from Table 3 that the younger age group made more correct identifications (IDs) and fewer foil IDs for the target the same age, the interaction was found to be non-significant, $\chi^2(2, N = 88) = .46, p = .79$.

Target absent line-ups

For the TA line-ups, 47% of participants correctly stated the target was not present (correct rejection) and 53% chose a member from the line-up (false ID). Table 4 shows the percentage of participants' responses for both age-groups for the older and younger targets. A hierarchical loglinear analysis (HILOG) was conducted with witness age (young adult, older adult), target age (young adult, older adult), and response (correct rejection, false ID) as factors. The likelihood ratio of the model was $\chi^2(2, N = 88) = .89, p = .64$; there was a significant interaction for witness age and

TABLE 3
The percentage of responses for the target-present line-ups (frequencies in parentheses)

	Young-adult target			*Older-adult target*		
Age-group	*Correct ID*	*Foil ID*	*Incorrect rejection*	*Correct ID*	*Foil ID*	*Incorrect rejection*
Young adult	54.5 (12)	18.2 (4)	27.3 (6)	43.5 (10)	34.8 (8)	21.7 (5)
Older adult	22.7 (5)	45.5 (10)	31.8 (7)	23.8 (5)	57.1 (12)	19 (4)

response, $\chi^2(2,\ N=88)=4.96,\ p=.026$, and for target age and response, $\chi^2(2,\ N=88)=10.77$, $p<.001$. This was confirmed by subsequent chi-squared tests, which found that the younger adults made more correct rejections and fewer false identifications for the younger (same-age) target, as compared to the older-adult target, $\chi^2(1,\ N=88)=4.54,\ p=.035,\ \Phi=.32$, but no own-age bias was found for the older adults. Additionally, there was an overall effect of witness age: this was confirmed by a subsequent chi-squared test, $\chi^2(1,\ N=88)=4.6,\ p=.031,\ \Phi=.23$. The younger age-group made more correct rejections than the older age-group (57.8% vs 34.9%) and also fewer false identifications (42.2% vs 65.1%). There was also an overall effect of target age, $\chi^2(1,\ N=88)=10.3,\ p<.001,\ \Phi=.34$, with more correct rejection responses for the young-adult target as compared to the older-adult target (63.6% vs 29.5%) and fewer false identifications (36.4% vs 70.5%).

Choosers versus non-choosers

The data for the target-present and target-absent line-ups were collapsed to investigate the overall choosing behaviour. As mentioned in the introduction, older adults may have a stronger expectation that the target is present and, according to earlier studies (Memon et al., 2003a), there may be an increased tendency to make a choice. A chooser was defined as someone who made a choice from the line-up whether it was a correct ID or false ID, whereas a non-chooser did not choose a line-up member. This was collapsed across the two line-ups, therefore responses were: did not choose, chose on one line-up, chose on both line-ups. Older adults (58.1%) were just as likely to choose on one line-up as younger adults (62.2%). Although it appeared that older adults (39.5%) were choosing more on both line-ups as compared to younger adults (26.7%), and older adults (2.3%) were less inclined to make two no-choice decisions as compared to younger adults (11.1%), these differences were non-significant, $\chi^2(2,\ N=88)=3.66$, $p=.16$. Order effects were also examined to see whether participants were more likely to choose from the first or second line-up. Overall participants were more likely to choose from the first line-up, as compared to the second line-up (39.8% vs 20.5%: $\chi^2(1,\ N=88)=22.27,\ p<.001$).

Confidence scores

A univariate ANOVA was performed using the post line-up confidence scores as the dependent measure, first for the TP line-ups with participant age (young adult, older adult), target (young adult, older adult), and response (hit, foil ID, incorrect rejection) as between-participants factors. The analysis revealed a significant main effect for response, $F(2,\ 76)=3.88,\ p=.025$, $n_p^2=.09$, but no significant interactions or other main effects (all $ps>.1$). Post-hoc Bonferroni *t*-tests revealed that the post line-up confidence ratings were significantly higher for correct identifications ($M=5.36,\ SD=1.72$) than incorrect rejections ($M=4.26,\ SD=1.24$), but not foil identifications ($M=4.5,\ SD=1.7$). The same analysis was carried out for the post confidence ratings for the TA line-ups; however there were

TABLE 4
The percentage of responses for the target-absent line-ups (frequencies in parentheses)

	Young-adult target		*Older-adult target*	
Age-group	*Correct rejection*	*False ID*	*Correct rejection*	*False ID*
Young adult	78.3 (18)	21.7 (5)	36.4 (8)	63.6 (14)
Older adult	47.6 (10)	52.4 (11)	22.7 (5)	77.3 (17)

no significant effects or interactions between any of the factors (all $ps > .1$).

Post line-up questionnaires

One of the questions asked in the post line-up questionnaire was whether the participants could remember the non-biased instructions. Only the responses given to the first line-up were analysed, as it was assumed they would have been remembered for the second line-up. Although younger adults (75.6%) were more likely to remember the experimenter saying the ''person may or may not be present'' as compared to the older adults (73.2%), this difference was non-significant, $\chi^2(1, N = 88) = .064$, $p = .8$.

After making the decision to a line-up, participants were asked whether they felt under pressure to choose a person from the line-up. Responses were analysed separately for the first and second line-ups. For the first line-up, younger adult participants were more likely to say they felt under pressure to choose, as compared to older adults (42.2% vs 14%): $\chi^2(1, N = 88) = 9.33$, $p = .009$, $\Phi = .33$. However, for the second line-up there were no significant differences in responses for the younger and older adults (29.5% vs 23.3%): $\chi^2(1, N = 88) = 1.5$, $p = .47$. Participants who did not make a choice from the first line-up were no more likely to say they felt under pressure to choose from the second line-up than those who did make a choice from the first line-up, $\chi^2(1, N = 88) = 3.1$, $p = .21$.

Participants were also asked to rate on a 1–7 scale to what extent they expected the person to be in the line-up (1 = expected he would not be there, 7 = expected he would be there). A mixed-factor ANOVA was performed on the ratings with line-up (first, second) as the within-group factor and witness age (younger adults, older adult) the between-group factor. There was no significant effect of witness age, $F(1, 86) = 1.9$, $p = .17$, or line-up, $F(1, 86) = 1.3$, $p = .71$, and no significant interaction, $F(1, 86) = .96$, $p = .33$.

DISCUSSION

The main aim of this study was to investigate the own-age bias in older and younger adult witnesses using an ecologically valid line-up task, the video identification parade. In a design where each eyewitness (younger and older) was asked to identify two targets (young and old) from two different events in successive line-ups, we obtained partial support for an own-age bias. Our sample of young adults made numerically more correct identifications when the target was the same age and significantly more correct rejections with own-age faces, as compared to other-age faces. There was no own-age effect for the older participants who performed comparably for both the own-age and other-age faces in TA and TP line-ups. Bartlett and Leslie (1986) and Fulton and Bartlett (1991) both found results consistent with the present study, where the own-age bias was only apparent for the young adults and older adults did not show an effect of face age. Similarly our results are compatible with Rodin (1987), suggesting an advantage in recognition of own-age faces for our younger adults due to their social interest in their in-group. However, our results are at odds with other studies that have reported an own-age bias for both younger participants and older participants (Anastasi & Rhodes, 2005; Perfect & Moon, 2005; Wright & Stroud, 2002), although methodological differences and the use of different populations may account for the discrepancy in findings between our study and earlier studies. The current study employed an eyewitness paradigm with a single target of each age and a video event and a separate line-up for each of the two targets, whereas Anastasi and Rhodes (2005) and Perfect and Moon (2005) presented multiple faces and adopted an old–new face recognition test. Wright and Stroud (2002) did use a paradigm similar to the current research, however they used middle-aged participants (aged 40–55 years), whereas the current research used older adults (aged 61–83 years).

The contact hypothesis may account for not only the lack of own-age bias in our older age-group in the current study, but also the lack of consistency in findings from previous research relating to own-age bias. As discussed earlier, the own-age bias may vary with the levels of contact or expertise that individuals have with own-age and other-age faces. Additionally the type of contact may also influence perceptual bias, for example Brigham, Brooke Bennet, Meisnner, and Mitchel (2007) suggest it should be quality rather than quantity. Bartlett and Leslie (1986) recruited their older adults from local church groups and community projects. They maintain that the reason that young people show an own-age bias is due to an increased exposure to young faces, whereas older adults tend to have experience with both young and older adult faces. Our older adult sample were

healthy active community-dwelling people who presumably had contact with people of different age-groups. This may have contributed to the absence of an own-age bias. However, Anastasi and Rhodes (2005) found an own-age bias for their older adults who were recruited from retirement communities where there would probably be less contact with young people. Future studies should employ an objective measure of contact with other age groups to examine the hypothesis that the degree and nature of contact with other-age faces may contribute to different levels of expertise with own-age and other-age faces.

The combined line-up performance across both targets was in line with previous studies: our younger adults outperformed older adults. The differences between the younger and older adult participants were most marked in the line-ups where the target or culprit was absent and where the correct decision was not to choose. Older adults showed poor levels of performance in this situation and only correctly rejected a line-up 30% of the time, (regardless of whether the target was the same age or younger). The younger adults correctly rejected culprit-absent line-ups 63% of the time. More importantly from an eyewitness point of view is that older adults falsely chose a line-up member 70% of the time, whereas younger adults only did so 37% of the time. These findings corroborate those of previous studies and indicate that older adults are more likely to incorrectly choose on a TA line-up, as compared to younger adults (Memon et al., 2002, 2003a; Memon & Gabbert, 2003; Rose et al., 2003, 2005; Searcy et al., 2001; Wilcock et al., 2005; Yarmey & Kent, 1980). For the line-ups where the target was present, older adults also performed less accurately than the younger adults and only correctly identified one of the culprits 23% of the time, as compared to an accuracy rate of 49% for younger adults. Older adults were much more likely to identify a foil (51%), as compared to younger adults (25%). These findings contrast with earlier studies in which older adults were as accurate as younger adults in target-present line-ups (Memon et al., 2002, 2003a; Memon & Gabbert, 2003; Yarmey & Kent, 1980). However, our findings corroborate other research in which older adults show lower rates of correct identification (Rose et al., 2003) and are also supported by a recent UK field study of the identification rates of real eyewitnesses (Valentine, Pickering, & Darling, 2003). Moreover, the results reported here strongly support the cognitive ageing account of age differences in eyewitness identification. In other words, they are consistent with an age-related deficit in recollection of source-specifying details and binding (Lyle et al., 2006), and the reliance on familiarity as a diagnostic cue may account for the increase in foil choices in older adults (Jacoby, 1999). In line with this cognitive ageing hypothesis, laboratory studies of face recognition have consistently found that older adults show reduced levels of accuracy on old–new recognition tasks as compared to younger adults (Crook & Larrabee, 1992; Lamont, Stuart-Williams, & Podd, 2005; Old & Naveh-Benjamin, 2008).

One of the mechanisms underlying age-related increases in identification errors that we set out to investigate here is the effect of witnesses' expectations about the line-up task (meta-cognitive beliefs) on their identification decisions. Drawing on the work of Memon et al. (2004), a post-line-up questionnaire was used to examine post-identification beliefs about the line-up decision. Following the work of Wilcock (née Rose) and colleagues we wondered whether the reason older adults may choose from a target-absent line-up more often is that they forget the unbiased instructions informing them that the person may or may not be there (Rose et al., 2003, 2005; Wilcock et al., 2005). Our self-report data from the post-line-up questionnaire indicated that younger adults (75.6%) and older adults (73.2%) had similar rates for remembering the non-biased instructions. However, our self-report data might be subject to demand characteristics: a witness would not appear credible if they admitted to forgetting the line-up instructions. Previous studies have used different instructions to test whether their participants have remembered the non-biased instructions. Rose et al. (2005) and Wilcock et al. (2005) asked the participants to tell them as much as they could remember about the line-up instructions given prior to viewing the line-ups, whereas the current study simply asked, ''Do you remember the experimenter saying the person may or may not be there?'' Future studies should use an open-ended format, as this will provide a more valid check of whether a witness has understood and retained the instructions they have been given. It should also be noted that memory for line-up instructions is an important practical issue. The Police and Criminal Evidence Act (1984) Codes

of Practice (2008), which apply in England and Wales require identification officers to give witnesses unbiased line-up instructions, but it appears there is no consistency in the way these are communicated to the witness (Hughes, 2005). False choosing in target-absent situations is a particular cause for concern brought to light by DNA-exoneration case studies where innocent people were wrongly accused on the basis of eyewitness evidence (see Clark & Godfrey, 2009, for a comprehensive analysis of innocence risk). Research that is directed towards interventions for reducing false identifications is particularly important in this regard.

One of the reasons eyewitness evidence is so powerful is that a confident witness is a compelling witness. Age differences in line-up confidence were examined to test the hypothesis that younger participants might be more confident in their post line-up decisions, as compared to older adults in the post line-up judgements (Memon et al., 2002; Searcy et al., 2001). However our findings did not reveal any age differences, and also run counter to research that older adults can have high confidence when recalling false information (Dodson et al., 2007a,b; Dodson & Kreuger, 2006). However, the confidence scores did indicate that witnesses who made correct identifications for TP line-ups were more confident, and this replicates previous findings (Lindsay, Read, & Sharma, 1998; Memon et al., 2003b; Read, 1995). Thus there may be situations under which confidence may be a reliable indicator of accuracy (see also Brewer, 2006; Sauer et al., in press). We would endorse the recommendation made by others (Valentine et al., 2006) that a clear statement of confidence be taken from the witness at the time of the identification.

To conclude, the findings from this study have shown that even with new technological advancements in identification, namely the VIPER line-up, older adults are still at a disadvantage compared to younger adults, and are more likely to falsely identify a line-up member from a target-absent line-up. Our findings do not appear to show an own-age bias for identification for older-adult eyewitnesses, although younger adults were less likely to falsely identify a young adult from a target-absent line-up.

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REFERENCES

Anastasi, J. S., & Rhodes, M. G. (2005). An own-age bias in face recognition for children and older adults. *Psychonomic Bulletin & Review*, *12*, 1043–1047.

Anastasi, J. S., & Rhodes, M. G. (2006). Evidence for an own-age bias in face recognition. *North American Journal of Psychology*, *8*, 237–253.

Bäckman, L. (1991). Recognition memory across the adult life span: The role of prior knowledge. *Memory & Cognition*, *19*, 63–71.

Bartlett, J. C. (1993). Limits on losses in face recognition. In J. Cerella, J. M. Rybash, W. Hoyer, & M. Commons (Eds.), *Adult information processing: Limits on loss* (pp. 351–379). New York: Academic Press.

Bartlett, J. C., Strater, L., & Fulton, A. (1991). False recognition and false fame of faces in young adulthood and old age. *Memory & Cognition*, *19*, 177–188.

Bartlett, J. C., & Leslie, J. E. (1986). Aging and memory for faces versus single views of faces. *Memory & Cognition*, *14*, 371–381.

Bartlett, J. C., & Memon, A. (2007). Eyewitness memory in young and older adults. In R. Lindsay, R. Ross, D. Read, & M. Toglia (Eds.), *Handbook of eyewitness psychology: Memory for people* (Vol. 2, pp. 309–338). Mahwah, NJ: Lawrence Erlbaum Associates Inc.

Bernstein, M. J., Young, S. G., & Hugenberg, K. (2007). The cross-category effect: Mere social categorization is sufficient to elicit an own-group bias in face recognition. *Psychological Science*, *8*, 518–525.

Bothwell, R. K., Deffenbacher, K. A., & Brigham, J. C. (1987). Correlation of eyewitness accuracy and confidence: Optimality hypothesis revisited. *Journal of Applied Psychology*, *72*, 691–695.

Brank, E. M. (2007). Elder research: Filling an important gap in psychology and law. *Behavioral Sciences and the Law*, *25*, 701–716.

Brewer, N. (2006). Uses and abuses of eyewitness identification confidence. *Legal and Criminological Psychology*, *11*, 3–23.

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* (Vol. 2, pp. 201–218). Mahwah, NJ: Lawrence Erlbaum Associates Inc.

Brigham, J. C., Brooke Bennet, L., Meisnner, C. A., & Mitchel, T. L. (2007). The influence of race on eyewitness memory. In R. Lindsay, R. Ross, D. Read, & M. Toglia (Eds.), *Handbook of eyewitness psychology: Memory for people* (Vol. 2, pp. 309–338). Mahwah, NJ: Lawrence Erlbaum Associates Inc.

Brigham, J. C., & Malpass, R. S. (1985). The role of experience and context in the recognition effaces of own- and other-race persons. *Journal of Social Issues*, *4*, 139–155.

Chalfonte, B. L., & Johnson, M. K. (1996). Feature memory and binding in young and older adults. *Memory & Cognition*, *24*, 403–416.

Chayer, C. (2002). The neurological examination: Brief mental status. *The Journal of Geriatric Care*, *1*, 265–267.

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

Crook, T. H., & Larrabee, G. J. (1992). Changes in facial recognition memory across the adult lifespan. *Journal of Gerontology: Psychological Sciences*, *47*, 138–141.

Cutler, B., Penrod, S., & Stuve, T. (1988). Juror decision making in eyewitness identification cases. *Law and Human Behavior*, *12*, 41–55.

Cutler, B. L., & Fisher, R. P. (1990). Live line-ups, videotaped line-ups, and photoarrays. *Forensic Reports*, *3*, 439–448.

Dasgupta, N., & Greenwald, A. G. (2001). On the malleability of automatic attitudes: Combating automatic prejudice with images of admired and disliked individuals. *Journal of Personality and Social Psychology*, *81*, 800–814.

Dodson, C. S., Bawa, S., & Krueger, L. E. (2007a). Aging, metamemory, and high-confidence errors: A misrecollection account. *Psychology and Aging*, *22*, 122–133.

Dodson, C. S., Bawa, S., & Slotnick, S. D. (2007b). Aging, source memory and misrecollections. *Journal of Experimental Psychology: Learning, Memory and Cognition*, *33*, 169–181.

Dodson, C. S., & Krueger, L. E. (2006). I misremember it well: Why older adults are unreliable eyewitnesses. *Psychonomic Bulletin & Review*, *13*, 770–775.

Dywan, J., & Jacoby, L. (1990). Effects of aging on source monitoring: Differences in susceptibility to false fame. *Psychology and Aging*, *5*, 379–387.

Folstein, M. F., Folstein, S. E., & McHugh, P. R. (1975). ''Mini-mental state'': A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research*, *12*, 189–198.

Fulton, A., & Bartlett, J. C. (1991). Young and old faces in young and old heads: The factor of age in face recognitions. *Psychology and Aging*, *6*, 623–630.

Hancock, K. J., & Rhodes, G. (2008). Contact, configural coding and the other-race effect in face recognition. *British Journal of Psychology*, *99*, 45–56.

Havard, C., Memon, A., Clifford, B., & Gabbert F. (in press). The advantage of video line-ups: A comparison between child and adolescent witnesses. *Applied Cognitive Psychology.*

Hughes, C. (2005). *Making the best use of video film identification parades and providing a fair and consistent approach to witnesses.* MSc dissertation, University of Portsmouth, UK.

Jacoby, L., & Rhodes, M. G. (2006). False remembering in the aged. *Current directions in Psychological Science*, *15*, 49–53.

Jacoby, L. L. (1999). Ironic effects of repetition: Measuring age-related differences in memory. *Journal of Experimental Psychology: Learning, Memory and Cognition*, *25*, 3–22.

Jennings, J. M., & Jacoby, L. L. (1993). Automatic versus intentional uses of memory: Aging, attention, and control. *Psychology and Aging*, *8*, 283–293.

Johnson, M. K., Hashtroudi, S., & Lindsay, D. S. (1993). Source monitoring. *Psychological Bulletin*, *114*, 3–28.

Kobyliansky, E., & Livshits, G. (1989). Age dependent changes in morphometric and biochemical. *Annals of Human Biology*, *16*, 237–247.

Koustaal, W., Schacter, D. L., Galluccio, L., & Stofer, K. A. (1999). Reducing gist-based false recognition in older adults: Encoding and retrieval manipulations. *Psychology & Aging*, *14*, 220–237.

Lamont, A. C., Stuart-Williams, S., & Podd, J. (2005). Face recognition and aging: Effects of target age and memory load. *Memory & Cognition*, *33*, 1017–1024.

Leippe, M. R., Eisenstadt, D., & Rauch, S. M. (2009). Cueing confidence in eyewitness identifications: Influence of biased line-up instructions and pre-identifications memory feedback under varying line-up conditions. *Law and Human Behavior*, *33*, 194–212.

Lindsay, D. S., Read, J. D., & Sharma, K. (1998). Accuracy and confidence in person identification: The relationship is strong when witnessing conditions vary widely. *Psychological Science*, *9*, 215–218.

Lindsay, R. C. L., Pozzulo, J. D., Craig, W., Lee., K., & Corber, S. (1997). Simultaneous line-ups, sequential line-ups & showups: Eyewitness identification decisions of adults and children. *Law & Human Behavior*, *21*, 391–404.

Lord Advocates' Guidelines. (2007). *The conduct of visual identification procedures.* Retrieved 5.10.07 from: http://www.copfs.gov.uk/Resource/Doc/13547/0000269.pdf

Lyle, K. B., Bloise, S. M., & Johnson, M. K. (2006). Age-related binding deficits and the contents of false memories. *Psychology and Aging*, *21*, 86–95.

Mandler, G. (1980). Recognizing: The judgment of previous occurrence. *Psychological Review*, *75*, 421–441.

Marks, D. F. (1973). Visual imagery differences in recall of pictures. *British Journal of Psychology*, *63*, 17–24.

McDaneil, M., Lyle, K., Butler, K., & Dornburg, C. (2008). Age-related deficits in reality monitoring of action memories. *Psychology and Aging*, *23*, 646–656.

McIntyre, J. S., & Craik, F. I. (1987). Age differences in memory for item and source information. *Canadian Journal of Psychology*, *41*, 175–192.

Meissner, C. A., & Brigham, J. C. (2001). Thirty years of investigating the other-race effect in memory for faces: A meta-analytic review. *Psychology, Public Policy, and Law*, *7*, 3–35.

Memon, A., Bartlett, J. C., Rose, R., & Gray, C. (2003a). The aging eyewitness: The effects of face-age and delay upon younger and older observers. *Journal of Gerontology*, *58*, 338–345.

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

Memon, A., Gabbert, F., & Hope, L. (2004). The ageing eyewitness. In J. Adler (Eds.), *Forensic psychology: Debates, concepts and practice.* Devon, UK: Willan, Forensic Psychology Series.

Memon, A., Hope, L., Bartlett, J., & Bull, R. (2002). Eyewitness recognition errors: The effects of mugshot viewing and choosing in young and old adults. *Memory and Cognition*, *30*, 1219–1227.

Memon, A., Hope, L., & Bull, R. H. C. (2003b). Exposure duration: Effects on eyewitness accuracy and confidence. *British Journal of Psychology*, *94*, 339–354.

Old, S. R., & Naveh-Benjamin, M. (2008). Memory of people and their actions: Further evidence for an age related associative deficit. *Psychology and Aging*, *23*, 467–472.

Police and Criminal Evidence Act (1984) Codes of Practice. (2008). Retrieved 2 April 2009 from: http://police.homeoffice.gov.uk/operational-policing/powers-pace-codes/pace-code-intro/

Pozzulo, J. D., & Warren, K. L. (2003). Descriptors and identifications of strangers by youth and adults eye witnesses. *Journal of Applied Psychology*, *88*, 3–5. 323.

Penke, L., Bates, T., Gow, A., Pattle, A., Starr, J., Jones, B. C., et al. (in press). Symmetric faces are a sign of successful cognitive aging. *Evolution and Human Behavior.*

Perfect, T. J., & Harris, L. J. (2003). Adult age differences in unconscious transference: Source confusion or identity blending? *Memory & Cognition*, *31*, 570–580.

Perfect, T. J., & Moon, H. (2005). The own-age effect in face recognition. In J. Duncan, L. Phillips, & P. McLeod (Eds.), *Measuring the mind: Speed, control, and age* (pp. 317–340). Oxford, UK: Oxford University Press.

Read, J. D. (1995). The availability heuristic in person identification: The sometimes misleading consequences of enhanced contextual information. *Applied Cognitive Psychology*, *9*, 91–121.

Rodin, M. J. (1987). Who is memorable to whom: A study of cognitive disregard. *Social Cognition*, *5*, 144–165.

Rose, R. A., Bull, R., & Vrij, A. (2003). Enhancing older witnesses' identification performance: Context reinstatement is not the answer. *The Canadian Journal of Police and Security Services*, *1*, 173–184.

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

Sauer, J. D., Brewer, N., Zweck, T., & Weber, N. (in press). The effect of retention interval on the confidence–accuracy relationship for eyewitness identification. *Law & Human Behavior.*

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

Searcy, J. H., Bartlett, J. C., Memon, A., & Swanson, K. (2001). Aging and line-up performance at long retention intervals: Effects of metamemory and context reinstatement. *Journal of Applied Psychology*, *86*, 207–214.

Slone, A. E., Brigham, J. C., & Meissner, C. A. (2000). Social and cognitive factors affecting the own-race bias in Whites. *Basic & Applied Social Psychology*, *22*, 71–84.

Spencer, W. D., & Raz, N. (1995). Effects of aging on memory for content and context: A meta-analysis. *Psychology and Aging*, *10*, 527–539.

Steblay, N. (1997). Social influence in eyewitness recall: A meta-analytic review of line-up instruction effects. *Law and Human Behavior*, *21*, 283–297.

Sporer, S., Penrod, S. D., Read, D., & Cutler, B. L. (1995). Gaining confidence in confidence: A new meta-analysis on the confidence–accuracy relationship in eyewitness identification studies. *Psychological Bulletin*, *118*, 315–327.

Thornton, A., Hatton, C., Malone, C., Fryer, T., Walker, D., Cunningham, J., et al. (2003). *Distraction burglary amongst older adults and ethnic minority communities.* London: Home Office Research Study 269. Development and Statistics Directorate.

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., Pickering, A., & Darling, S. (2003). Characteristics of eyewitness identification that predict the outcome of real line-ups. *Applied Cognitive Psychology*, *17*, 969–993.

Webster, D. M., & Kruglanski, A. W. (1994). Individual differences and the need for cognitive closure. *Journal of Personality and Social Psychology*, *67*, 1049–1062.

Wilcock, R. (2009, April). *Improving the reliability of older eyewitnesses.* Paper presented at South East Eyewitness Network, University of Greenwich, London.

Wilcock, R. A., & Bull, R. (in press). Novel line-up methods for improving the performance of older adult witnesses. *Applied Cognitive Psychology.*

Wilcock, R. A., Bull, R., & Vrij, A (2005). Aiding the performance of older eyewitnesses: Enhanced non-biased line-up instructions and line-up 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, and Law*, *13*, 305–316.

Wright, D. B., & Stroud, J. S. (2002). Age differences in line-up identification accuracy: People are better with their own age. *Law & Human Behavior*, *26*, 641–654.

Yarmey, A. D., & Kent, J. (1980). Eyewitness identification by elderly and young adults. *Law and Human Behavior*, *4*, 359–371.