FACE RECOGNITION:  
AN OWN AGE BIAS

by

Tory Spokane

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This thesis was prepared under the direction of the candidate’s thesis advisor, Dr. Julie L. Earles, and has been approved by the members of her supervisory committee. It was submitted to the faculty of the Harriet L. Wilkes Honors College and was accepted in partial fulfillment of the requirements for the degree of Bachelor of Arts in Liberal Arts and Sciences.

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This study provides evidence for an age bias in face recognition. Younger adults viewed short video clips of young actors or of actors over the age of 60 performing everyday actions. One week later, participants were tested on their memory for these events. Recognition event types included same, completely new, and conjunction items. In conjunction items, a familiar actor performed a familiar action that had actually been performed by someone else during encoding. Participants performed well at picking out the new and old events, but had more difficulty distinguishing between the conjunction events. Younger adults were significantly worse at recognizing the conjunction items when the age of the actor was different from encoding to retrieval. This study supports the hypothesis that people are better able to recognize and distinguish others within a similar age range compared to people outside that range.
To: Dr. Julie Earles and Dr. Alan Kersten
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Introduction

Eyewitness testimony can have a large influence in convincing a jury of a suspect’s guilt. In some countries a person can be convicted solely on the testimony of an eyewitness (Wright & Stroud, 2002). Over the years there have been improvements in DNA analysis. This has shown false convictions are largely because of mistakes in eyewitness testimony. Understanding the process that eyewitnesses go through and when they are most likely to make errors is crucial to improving the overall process and knowing how accurate the eyewitness testimony is likely to be. Eyewitness evidence usually comes from police lineups where the witness must choose the suspect among several fillers and does not know if the suspect is actually in the lineup. In a survey of lineups the witness chooses someone other than the suspect twenty percent of the time (Wright & McDaid 1996). Older adults (over the age of sixty) seem to make errors more often due to age related declines in the hippocampus of the brain that lead to poorer memory functioning (Kersten et al, 2008). Understanding these memory errors and age related differences could lead to important findings with eyewitness testimony.

Binding Errors

The ability to recognize a variety of stimuli as part of a whole involves complex visual processes. Binding is a method of taking the different features of the stimulus and correctly organizing the different parts into an accurate arrangement (Treisman, 1998). An example would be if a person saw a girl riding a bike. The person will not remember each individual feature of the girl and the bike, but rather a complex memory of the whole event. It is necessary for binding to occur because the different features of stimuli are represented in different parts of the brain. This creates a need for the separate features
of the brain to be able to communicate with each other through feature maps. However, this process can cause errors when features from different maps do not correspond correctly (Treisman & Schmidt, 1982). A person may misremember two different features being part of the same event that were actually part of two separate events. Everyone is prone to occasionally make these errors, but the number of errors seems related to the functioning of the prefrontal cortex and hippocampus. These are two areas affected by aging, so it seems that older adults are more likely than younger adults to be susceptible to these types of binding errors (Kersten et al, 2008).

Conjunction Errors

Conjunction errors are a form of memory illusion in which a new stimulus is recognized as old. However, it is actually part of two or more old stimuli put together. For someone to have an accurate memory of an event, he or she is required to remember all the different aspects of the event and how they went together. For example, if a person sees a man walking his dog and then later that day sees a robbery at an ATM. The person may later remember the man walking his dog as the man involved with the robbery. This can be particularly difficult when an event such as a crime involves a knife, gun, or other weapon because the suspect will likely focus on the object rather than other surroundings such as specific people. This could lead to an innocent bystander being accused of committing the crime when he or she was merely another bystander who later looks familiar to the witness. Often times conjunction errors are more likely to take place in these types of situations due to distracting objects where the witness is unable to put the various components together accurately. Instead the witness takes parts from separate events and puts them together into a composite that is not accurate to a single previously experienced event (Hannigan & Reinitz, 2000).
One example of this type of error in a memory test is when people are presented with a series of words at encoding and asked to remember all of them. If two of these words are bluebird and school house then during the recognition phase of the memory test where the participant is asked to choose which words from a new list were on the original list, participants are likely to believe that bird house was previously presented (Reinitz, et al 1996). Memory conjunction errors are commonly found in both recall and recognition memory tests (Reinitz et al, 1992). During a recall task the participant must remember previous information without being prompted and on a recognition test they must pick out the old stimuli from new stimuli. There has been much research done in this area, including the likelihood that people will make these types of memory errors due to age differences.

*Unconscious Transference*

Unconscious transference is a form of binding error which can be caused by source monitoring. Source monitoring is when an error occurs because inaccurate or suggested events are described. A person might be introduced to two different people at separate functions and then later mistake one of the people for being at the wrong function. They could recognize both people, but confuse which source they are from. This often happens because people are much better at recognizing that a face is familiar, but have more difficulty determining why it is familiar. The two different attributions for unconscious transference are identity confusion during encoding or source retrieval errors. Identity blending is when a witness mistakes a person for somebody else who may have been seen sequentially, resembles that person, or if the witness did not have enough time to fully process the features of the person he or she witnessed (Perfect and Harris, 2003). Several studies have supported this hypothesis.
In an experiment by Ross et al. (1994) three different videos were shown to participants. The first video was a male teacher, the second was of a female teacher, and the third was of another male robbing the female teacher. Only five minutes after the videos were viewed, the participants were presented with a lineup of four new faces and the male teacher and asked to pick the perpetrator out of the lineup if he was present. The majority of participants chose the teacher as the perpetrator stealing the purse clearly demonstrating unconscious transference.

The second possible explanation for unconscious transference errors is poor source retrieval. Sometimes when a witness is trying to choose from a lineup, one or more people are likely to look familiar to them. Even if these people are not the perpetrator, the witness might choose them because of the familiarity effect, although the witness fails to place the person in the correct context (Read et al, 1990). Both of these sources of unconscious transference cause the number of binding errors to increase.

**Familiarity Effect**

Often witnesses choose a suspect incorrectly because the decision was made on the basis of familiarity. Seeing a suspect after a crime has occurred makes a person much more likely to identify the suspect as the criminal later on due to the effect of familiarity. Another problem with memory is that when two features are together which have both been seen separately it can create a sense of familiarity about the new event or item. When this occurs a person is much more likely to incorrectly identify the new event as being old. This has been demonstrated in studies where participants view actors and actions and then later have to identify the events that they have previously seen. People have more difficulty with the events in which either the actor or action is the same and
are also more likely to claim that they have previously seen the event (Kersten et al, 2008).

**Brain Functioning**

There have been many studies exploring the possible reasons for older adults having a poorer memory than younger adults. Most of these studies have examined the differences in hippocampus and prefrontal cortex functioning which declines naturally with age. Both of these areas of the brain appear to be related to memory. Aggleton and Shaw (1996) examined memory in amnesic patients with lesions to the hippocampus or other brain structures. Patients performed fairly well on tests where they were able to solely rely on familiarity. These patients did significantly worse on tasks that required recollection. Aging has been shown to affect recollection more than familiarity so older adults seem to have greater difficulty doing tasks when they are unable to rely on familiarity (Bastin and Linden, 2003).

During another experiment where brain activity was monitored while participants were completing a memory task the hippocampus seemed to be the key area of the brain being utilized when binding information. The hippocampus is believed to store the aspects of the event individually while the parahippocampal region blends and encodes the various features (Eichenbaum & Bunsey, 1995). As more information is discovered about how the brain functions, there is a better understanding of the complexity of memory and causes for decline in older adults. Our current understanding of the brain supports that differences in memory ability is connected to the brain and its functioning.

Kroll et al. did a study with three types of participants, right hippocampal damage, left hippocampal damage, or no damage. He performed two experiments using three lists of common two syllable words which fit into one of the following categories: first time,
syllable-repeat, true repetition, or conjunction. Participants were shown the first two lists in session one and then the third list in session two, a couple weeks later where they were asked to choose all of the old words. The results showed that high false alarm rates are specifically related to left hippocampal malfunction. The second experiment had seven different sets of visual stimuli including abstract figures, circle faces, cartoon faces, complex line sketch faces, egg faces, and simple drawings of male and female faces. There was a study phase for the different types of faces, followed immediately by a study phase for three different groups of stimuli. The abstracts were used as practice which participants found to be the most difficult. While experiment one only showed a high false alarm rate in participants with left hippocampal damage, experiment two showed that people were more likely to make false alarms to new faces composed of previously viewed components if they had either right or left hippocampal damage compared to the subjects without any damage. This study demonstrates the crucial role of the hippocampus plays in memory.

Age related differences in memory are common, and as a general rule people believe that older adults have poorer memory performance than younger adults. This is due to the fact that younger adults generally display certain characteristics such as confidence and poise. Adams- Price (1992) found that there is not actually a significant correlation between memory and confidence and one is not a good indicator of the other. Younger adults also often display behaviors such as quicker speech that people tend to associate with accuracy, but are not actually good indicators. Older adults on the other hand have a tendency to speak slowly and less confidently so people tend to assume they are not as good of a witness (Wright and McDaid, 1996). Older adults do seem to have
poorer source retrieval skills at a variety of tasks and are more likely to base their recognition during tasks on the basis of familiarity and therefore tend to perform worse than younger adults at memory tasks (Perfect & Harris, 2003). In some cases, specifically cases where the older adult has to recognize other older adults, there is evidence that older adults are as good as or possibly better at these recognition tasks than younger adults (Wright and Stroud 2002, Anastasi and Rhodes 2006). The research on an own age bias is fairly recent and while there are some mixed results there has been some strong supportive data for the existence of an age bias.

**Race Bias**

There have been many great advances in the recent years in the area of eyewitness testimony as well as psychology as a whole. Research has led to new guidelines for interviewing eyewitnesses of crimes and improvements in how lineups are conducted (Wells et al., 2000). One major focus of this research is when the perpetrator and the eyewitness are of the same race which has become known as the own race bias (Wright & Stroud, 2002). In one experiment a male confederate approached people in shopping centers in South Africa or England. Half of the people approached were black and the other half were white. A few minutes after the confederate had approached these people and asked a couple of questions, the experimenter came up and asked the person to pick the person with whom they just interacted out of a ten person lineup. White participants were significantly better at picking the white confederate out of the lineup and the same held true for the black witnesses (Wright et al., 2001). Evidence for the race bias has become so well recognized that about 90% of experts agree it is sufficient for expert scientific testimony (Wright & Stroud, 2002). A similar grouping effect of the age bias in memory is currently being studied more systematically.
Age Bias

Much of the empirical evidence for the own-age bias has been mixed or inconclusive in the past several years. This is due to a number of reasons including the various types of test designs and different age groups being tested. Some results demonstrate older adults showing the age bias, but not the younger adults and other researchers have shown the exact opposite. It has not been until the past few years that the data has shown a more clear pattern in detecting when the age bias will be present (Anastasi & Rhodes, 2006). While some of the older research has been mixed or inconclusive, there has been increasingly data to support an age bias in all groups. In one study, it was found that older adults were three times more likely to be able to pick out another older adult compared to picking out a younger adult from a group (Perfect & Harris, 2003). One problem with looking at the differences in the past research is the variety of different methodology used, which is part of the problem in finding consistent conclusions (Anastasi & Rhodes, 2006).

Fulton and Bartlett (1991) were two of the first researchers to really try and test the bias of age in face recognition. There participants were put into two equal groups each containing younger and older adults. The first group looked at faces of younger and middle aged adults and the second group of participants looked at faces of middle aged and older adults. The faces of the middle aged adults were the same in both groups of photos. The subjects were presented with a series of faces and asked to look at the face for the full time it appeared and then rate it on a scale of one to five on pleasantness with one being the least pleasant and five being the most. Immediately following the set of faces, participants were told that they were going to see another group of faces and to classify them as the same as a previous face, changed from a previous face, or new face
on a scoring card and given examples of the classifications. All photos viewed were of head and shoulders with no visible jewelry, with a neutral or smiling expression, and only three quarters of the face was shown from either the right or the left.

The results of this study confirmed an age related bias in the number of false alarms, but not with the number of hits. The own age bias was only statistically significant with the group of younger adults, but not with the older adults. These results were supported by Wright and Stroud (2002), but other studies such as Perfect and Harris (2003) showed the opposite effect and were only able to produce an age bias in older adults. One interesting difference between Fulton and Bartlett was their distinction between two types of face variables in the way their experiment was set up. They distinguished between the variable of age within individual items and the variable of age within the set of items. Their analysis showed that the individual variable was accounted for being more important than the set of ages in the study. Fulton and Bartlett hypothesize that younger adults show better recognition for own age faces. The reason older adults do not show this effect is because similar to the race bias, younger adults are more experienced with younger faces, but older adults are more likely to be equally experienced with old and young faces. This would be a very difficult hypothesis to test.

While this study supports an age bias occurring, one major flaw is that the methodology only uses basic photos followed by a yes or no recognition task. This does not require the participant to connect the person with any particular event of action.

Wright and Stroud (2002) used a more elaborate study which actually has the participants viewing video clips of younger and older adults committing minor crimes. In experiment one, the participants were each shown four videos of younger and older adults
committing minor crimes in a random order. Immediately after viewing the videos participants filled out a crime questionnaire. The participant then returned either one day or one week later to identify the culprit from a lineup. Each lineup consisted of seven photographs, six fillers and the culprit in a random order. Each participant was told to select the culprit from the lineup and asked to rate their confidence if a culprit was chosen. Both groups performed better at identifying the own age culprits after a one day delay, while the older adults performed more poorly at selecting the younger culprits. When an odds ratio was performed, Wright and Stroud found that the younger adults were more likely than older adults to correctly identify the culprit in their same age group. The one day delay for younger adults was the most robust results, but the age bias was present in all four conditions.

The main difference from experiment one to experiment two was some of the lineups did not include the culprit. This condition was thought to increase the chance that an innocent person would be accused. Participants saw the same four videos and one day later were asked to give a description for each of the culprits. This was to make their procedure more similar to a real eyewitness situation. After the description, the participant saw four lineups in the same order which the videos were presented. It was random if the culprit was in each lineup or additional filler. The results showed that participants were ten percent less likely to choose filler when the lineup was of their own age group. Odds of choosing the correct suspect are 1.68 times higher when the culprit is in the same age group and people were 1.5 times more likely to choose incorrectly if the suspect was in a different age group in culprit present lineups. The number of overall errors increases greatly for the culprit absent lineups and the results for an age bias were
not significant. Since the results were replicated for the culprit present lineups, that is a strong indication that an age bias does exist. The results from this particular study were not as strong as some of the statistics supporting an own race bias.

Anastasi and Rhodes used a different methodology with multiple-photograph presentation to try and find greater statistically significant results for an own age bias in face recognition. Each participant viewed 24 photos, with 8 photos from three age groups, younger adults, middle aged adults, and older adults. While the participant was looking at the photo they also had to score the subject on an attractiveness scale. Immediately after taking a 15 minute distraction quiz, participants were given the recognition portion of the test where they saw 48 photographs and had to circle “yes” or “no” on a scoring sheet to indicate if they had seen the photo in the previous session. The results from the first experiment indicated that younger, middle-aged, and older adults all showed confirmation of having an own age bias. The results were actually less strong for the younger adults who did well at recognizing faces in all three age groups. Experiment two was designed with some changes from the first experiment to hopefully further support their findings.

In experiment two, Anastasi and Rhodes decided to use pictures with the actors in two different poses. The encoding task in the first experience was to rate the attractiveness of each individual in the photograph and in the second experiment the participant actually guesses the age of the individuals in the photographs. This allowed for the subjective age guessing of each participant to be evaluated instead of it being done in some type of pretest which does not account for individual differences. During the recognition task two days later, the participant saw 48 photographs and had to determine
whether the photograph had been seen during session one or not. Based on the chronological age, younger adults performed better overall, but did not demonstrate an age bias. However, the older adults did show an age bias. When the data was analyzed based on the participants subjective age guess both the older and younger adults confirmed the age bias. The younger adults even showed a stronger bias than the older adults. Experiment two did not reproduce the same results as experiment one when using the chronological age of the actors. This could suggest important implications for the types of encoding tasks used in face recognition studies.

There used to be strong evidence in favor of the idea that younger adults had better memories than older adults and made fewer errors. As more research is done, it seems that memory is much more complicated and there are any number of factors that contribute to how well a person will remember a particular event. Younger adults generally could significantly outperform older adults during face recognition tests, but when older adults are used as the actors in the videos or photos the differences between younger and older adults diminishes significantly (Perfect and Harris, 2003). As more research is being done in the field, there is more evidence in support of an age bias occurring when people try to remember faces. Early studies showed a possible bias for one group or another, but there seems to be strong support that all age groups exhibit this bias even if the reasons are still not completely clear. Some theories which have been used to explain the own race bias have the potential to help explain why an age bias would exist as well.

The perceptual learning hypothesis proposes that individuals differ in the amount of expertise they have for same-race and other-race faces. Because the people in most of
the previous studies have been recruited from retirement communities and colleges, it is likely that they have a large amount of experience with people of their own age (Levin 1996). This would also help in explaining individual differences for people who demonstrate the own age bias. Another possibility is that people use different processing strategies for own-age or other age faces. In regard to eyewitness testimony described earlier, these biases have extremely important implications which should be considered for the age of the witness as well as the age of the subject.

*Overview of Experiment*

The purpose of this experiment is to test for an age bias in face recognition. For this experiment, the only two age groups were younger adults (18-25) and older adults (60+). This should eliminate any subjective age assessments since there is such a large gap between the two groups. Based on the previous research, one would expect the younger adults will perform well overall, but have more difficulty with conjunction items when age is not constant. The younger adults viewed a series of video clips containing younger and older adults performing basic actions such as putting on a name tag or watering a plant. Participants then came back one week later and viewed more videos which were either old, new, or conjunction where either the same actor or action was the same in the video clip. The participant then had to determine which videos had been seen one week previously. The test was to see if the younger adults showed greater difficulty recalling the clips when the age group changed from encoding to retrieval. It was also important to test if the number of conjunction errors is the same with the different age groups.
Method

Participants

Participants in this study were 49 undergraduate students between the ages of 18 and 25 from Florida Atlantic University. Each participant received course credit in their general psychology class for participating.

Materials

Sixty-four video clips were filmed using a JBC digital camcorder. Each video clip involved a female actor performing a basic action such as pouring a soda or putting on lipstick. There were 32 younger actors who each performed three to four actions and 32 older actors who each performed three to four different actions. All of the actions were performed sitting down at a desk in front of a neutral background. Each video was then imported into a computer and edited using Adobe Premier Software. The video clips each lasted from 4 to 12 seconds. See the Appendix for a list of the actions.

The actual break down of videos during retrieval is as follows. There were 16 old events which were the exact same clip as viewed during encoding. Eight of these clips were with older adults and eight of the clips were with younger adults. There were 16 conjunction items, four with a young actor who was the same as the actor at encoding, four younger actors who were different age than the actor at encoding, four older actors who were the same age as the actor during encoding, and four older adults who were a different age than the actor during encoding. For example, they would view an actor pouring a soda into a cup, but a different actor had poured a soda into a cup during encoding, but that actor had been seen doing a different action such as playing the guitar.

The 16 new actor clips were four younger actors who were the same age at encoding, four younger actors who were different age from encoding, four older actors who were
same age as encoding, and four older actors who were different age during encoding. An example of a new actor clip would be a previously seen clip such as watering a plant again during retrieval, but performed by an actor that was not seen during encoding. The 16 new action clips were made up of eight younger actors and eight older actors. In these clips the participant saw a new action that was not seen during encoding performed by an actor that was seen in the first session. For counterbalancing purposes there were four encoding lists which were paired with one of four retrieval lists and rotated to control for order effects. Half of the events actions were performed by older actors and half the actions were preformed by younger actors. Half of the conjunction and new actor events were with same age actor and half contained a different age actor. The participant was asked to give a confidence rating for each of his or her answers.

Procedure

During encoding, the participant saw 48 events, 24 with younger actors and 24 with older actors. These events were viewed on a computer screen, and the participant was asked to press a button on the screen between events to continue. Each participant was informed that they were viewing the clips for the purpose of a memory test. After viewing the 48 encoding events, a demographics questionnaire was administered on the computer. Participants were asked to provide their date of birth, gender, racial and ethnic background, years of education, a rating of health status on a scale of 1 (poor) to 5 (excellent), and asked if they could see all of the clips clearly. After completing the questionnaire and a 40 item multiple-choice vocabulary test, the participant was thanked and asked to schedule a time for the follow up appointment one week later.

 Participants were instructed that they would be viewing a number of video clips and asked to pick out which video clips were exactly the same as in the first session of
the experiment. Participants were instructed that they should only respond “Yes” to a video clip if an action was performed by the same actor who had performed that action in the first session of the experiment. They were told that they might see some repetitive actors doing different actions or the same action being performed by a new actor. Forty-eight retrieval events were then presented. After each video, participants were presented with the question, “Did you see this person perform this action in the first part of the experiment?” They were asked to click either the “yes” or “no” option that appeared on the screen. After making their choice, the participant was asked to rate it on a confidence scale, which said, “How confident are you in your answer?” and their choices were “absolutely sure,” “pretty sure,” and “just guessing.”

Design

There are three different independent variables in the study. One is the age of the actor which could be either the same or different during recognition. Another is the type of event which was old, conjunction, new actor, or new action. The third independent variable was the age of the actor which was either young or old. The dependent variable was their number of “yes” responses.

Results

The proportions of “yes” responses by younger adults for all item types can be found in Table 1. Younger adults performed very well at recognizing the old items when the actor was either young or old. They were correct over 80 percent of the time with these items. The mean for the conjunction items was lower which was expected since these items would look familiar making it likely for them to mistake conjunction items for old items. Younger adults also performed poorly with the new actor items especially if the age group of the actor changed from encoding to retrieval. It is interesting to note
on this table the conjunction items for young retrieval actor and young encoding actor is 
.49 which is very similar to the conjunction items for old retrieval actor old encoding 
actor. Also when the conjunction item had an old retrieval actor and young encoding 
actor this mean was significantly lower than the other three conjunction items. Possible 
reasons for these findings will be discussed further in the discussion.

A 2 (conjunction or new actor) x 2 (age match or no match) Analysis of Variance 
(ANOVA) was conducted. The mean for the conjunction match items was .48 with a 
standard deviation of .21 which is significantly higher than the conjunction no age match 
which was .40 with a standard deviation of .21. This same pattern was found for the new 
actor items when age match was compared. When the age matched the mean was .32 
with a standard deviation of .23, but when the age did not match the mean was only .21 
with a standard deviation of .20. There was a significant effect of item type, $F (1, 48) = 
47.36, MSE = .029, p < .001$. This demonstrates that the participants performed better 
when the age of the actor during the encoding session matched the age of the actor at the 
retrieval session. All of these numbers are significant.

Three t-tests were performed to analyze the significance of the data. For the first 
pair it was conjunction items matching in age and conjunction items not matching in age. 
For these items $t (48) = 2.59, p = .01$. The second pair was new actor items matching in 
age compared to new actor items not matching in age. In this comparison $t (48) = 3.8, p < 
.001$. The last comparison was of conjunction items and new actor items where $t (48) = 
6.88, p < .001$. All of these t-tests confirm a significant effect for the variables which was 
expected.
Discussion

The goal of this study was to test for an own-age bias in face recognition. While additional research needs to be done to see if the effect is replicated in older adults (60-80 years old); there is strong evidence for an own-age bias in younger adults (18-25 years old). Of the different event types used, younger adults appear to have very good memories overall. The younger adults performed especially well when recognizing the old events when the same actor performs the same action. This was expected because there was only a one week delay between encoding and retrieval and the old events should have seemed the most familiar to the participants. This is most likely why there is not a significant difference between memory for older and younger actors in the old videos.

However, when the participants saw a conjunction event they did not perform as well especially if the age of the actor changed from encoding to retrieval. For example the participant may have viewed a younger actor at encoding watering a plant and an older actor at retrieval performing the same action. This change in age made the participant more likely to incorrectly believe that they had seen the older actor at encoding (See Figure A). In addition the new actor events also created a significant decrease in accuracy when the age of the actor was different from encoding to retrieval (See Figure B). These results demonstrate that age was a crucial variable directly related to the accuracy of the participants.

One interesting effect found was that younger adults did better with the conjunction items when the age changed from young at encoding to old at retrieval, rather than when the age reversal went in the opposite direction. This result did not occur with the new actor items. The participants most likely performed better with the new
actor items because the new actors would not look familiar so there would be less chance of making an incorrect identification. One possibility could be that the younger adults were more focused on the actor when viewing the younger adults and therefore performed worse at retrieval when they saw a familiar action. It will be interesting to see if any similar pattern develops with the older adults when they are tested.

Perfect and Harris (2003) as well as others have found that conjunction or binding errors are likely to occur because a suspect looks familiar, was seen in a close time frame, or the witness did not fully have time to process the event. Familiarity clearly had a strong impact on the number of errors made by participants, however, this study shows that errors actually increased when the age of the actor in the video changed from encoding to retrieval. Since it is likely the older and younger actors in the video would look less similar this study supports that two people may not have to look similar in order for binding errors to take place. This is consistent with the findings of Kersten et al (2008).

These findings for the younger adults support that an own-age bias may exist. There were clear differences in the proportion of yes responses when the age of the actor from encoding to retrieval was the same (young at encoding and young at retrieval) or different (young at encoding and old at retrieval). There could be several possibilities for why this effect is occurring. It is possible the participants possibly used different techniques to remember faces within their own age group compared to faces outside the group. If this theory is correct it would be similar to what might be occurring with the own race bias (Wright & Stroud, 2002). One would not expect that the own-race bias is present for everyone, but often because students are surrounded by people their own age
in school or older adults might live in a retirement community this bias is likely to develop. Another hypothesis is that the brain is responsible for processing in-group and out-group faces differently therefore leading to more errors with out-group faces (Sporer 2001). In either case, this evidence should be taken into serious consideration when dealing with eyewitness testimony.

These findings have implications for procedures in the courtroom. Just as the race-bias has been taken into account when dealing with eyewitness testimony, the age bias should also be taken into consideration. Even under ideal conditions, eyewitness testimony does not seem to be very reliable (Wright & Stroud, 2002). Through DNA evidence, it is beginning to be discovered how often mistakes are made when testimony is used. An eyewitness can be very convincing when he or she believes she is correct, but often pieces of the memory are not remembered accurately. For example, a person may have been present during the crime and a witness remembers them as being the perpetrator since he or she may look familiar. For any number of reasons people may misremember an event and who was involved. This is particularly true for complex events such as the scene of a crime. Further understanding of memory and the age-bias could help to make eyewitness testimony more reliable.

There continues to be growing evidence for an age bias in face recognition and there are several possible directions for future research to go in. One would be to examine why this bias occurs; whether it be from processing strategies for in-group and out-group faces, differences in the brain, or other possible explanations. Another possible study would be to examine the extent to which this bias exists in different age groups, such as what difference in age the participant has to be to the actor for this age bias to occur.
Other studies have included a young adult, middle age, and older age group of actors, but did not find consistent results as to when the bias will be present. It would also be interesting to see what other brain functions are being used when processing faces and ages. The current findings demonstrate that the age of a witness and perpetrator are important factors when evaluating eyewitness testimony and further research can lead to great improvements in these areas.
References


People are better with their own age. *Law and Human Behavior, 26*, 641-654.
Table 1

Final Recognition Test Performance

<table>
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<tr>
<th>Item type</th>
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<th>Mean</th>
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<th>Standard deviation</th>
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<td>.03</td>
<td>.18</td>
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<tr>
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<td>.80</td>
<td>.02</td>
<td>.16</td>
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<tr>
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<td>49</td>
<td>.49</td>
<td>.04</td>
<td>.29</td>
</tr>
<tr>
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<td>.44</td>
<td>.05</td>
<td>.32</td>
</tr>
<tr>
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<td>49</td>
<td>.48</td>
<td>.03</td>
<td>.23</td>
</tr>
<tr>
<td>Conjunction item old retrieval actor young encoding actor</td>
<td>49</td>
<td>.35</td>
<td>.03</td>
<td>.23</td>
</tr>
<tr>
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<td>.32</td>
<td>.04</td>
<td>.26</td>
</tr>
<tr>
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</table>
Figure Captions

*Figure 1.* Proportions of Yes Responses to Conjunction Events

*Figure 2.* Proportions of Yes Responses to New Actor Events
Conjunction Events

![Bar chart showing proportion of yes responses for different event types: Yg to Yg, Old to Old, Old to Yg, Yg to Old. The chart displays a comparison of proportions with error bars for each event type.]
New Actor Events

![Bar chart showing the proportion of yes responses for different event types.]

- Yg to Yg
- Old to Old
- Old to Yg
- Yg to Old

Proportion of Yes Responses
Appendix A – List of Action Items

1. Count money
2. Put on gloves
3. Open box
4. Pour soda into cup
5. Shuffle cards
6. Punch hole in paper
7. Stretch rubber band
8. Spray cleaner in air
9. Put on scarf
10. Smell flowers
11. Lick lollipop
12. Flip pages in book
13. Shake baby bottle
14. Put on party hat
15. Polish apple
16. Dial phone
17. Drop pen on table
18. Open medicine bottle
19. Wipe brow with tissue
20. Check wristwatch
21. Remove batteries from flashlight
22. Unravel yarn
23. Put on bracelet
24. Wave flag
25. Open stapler
26. Put on sunglasses
27. Remove pipe cleaners from package
28. Strike match
29. String beads
30. Crumple paper towel
31. Rub lotion on hands
32. Inflate balloon
33. Iron shirt
34. Shake maraca
35. Put on lei
36. Honk horn
37. Take off eyeglasses
38. Take crayon out of box
39. Drink from water bottle
40. Put on sweater
41. Bounce ball on paddle
42. Water plant
43. Fan face
44. (Pretend to) brush teeth with toothbrush
45. Ring bell
46. Play with slinky
47. Tie shoe
48. Play with stuffed bear
49. (Pretend to) put on lipstick
50. Open jar
51. Shake can of shaving cream
52. Comb hair
53. Put on headphones
54. Blow soap bubbles
55. Fold cloth
56. Remove light bulb from box
57. Cut string
58. Tear paper
59. Staple papers
60. Squeeze water from sponge into a cup
61. Type on keyboard
62. Put pants on doll
63. Play guitar
64. Light flashlight
65. Blow nose
66. Play with toy car
67. Stack Lego pieces
68. Take picture with camera
69. Put rubber band around magazine
70. Throw paper airplane
71. Spray air freshener in air
72. Juggle balls
73. Dust table with feather duster
74. Bang sticks together
75. Butter bread
76. Put on name tag
77. Flip coin
78. Mash Play-Doh
79. Insert paper into folder
80. Shake snow globe
Appendix B – Demographics Questionnaire

1. In what year were you born?

2. How many years of education do you have?

3. Are you male or female?

4. What is your ethnic group?
   1. Hispanic or Latino
   2. Not Hispanic or Latino

5. What is your race?
   1. American Indian or Alaskan Native
   2. Asian
   3. Native Hawaiian or Other Pacific Islander
   4. Black
   5. White
   6. Other

6. How would you rate your health at the present time?
   1. Poor
   2. Fair
   3. O.K.
   4. Good
   5. Excellent

7. How many prescription medications are you currently taking?

8. Have you ever been treated for high blood pressure or cardiovascular disease?

9. Did you have any difficulty seeing any of the items during this experiment?
Appendix C – Vocabulary Test

For each of the items below, please select the word that most nearly corresponds in meaning to the word in CAPITAL LETTERS.

1. CAPSIZE: leak race grow overturn measure
2. PROLONG: prompt decrease difficult extend waste
3. SUCCULUNT: juicy raw cooked spoiled spicy
4. AGITATED: hungry excited agile tired sick
5. FRUGAL: sparing huge tasty fashionable musical
6. MOLEST: purchase muffle lowest annoy groom
7. APATHY: understanding leniency rage indifference danger
8. WEIGHTY: sly serious shabby spry innocent
9. FANATIC: follower strange untrustworthy sly zealous
10. BUSTLE: tree ornament bureau movement cluster
11. LASCIVIOUS: lustful liberal final loser inclined
12. RECAPITULATE: surrender brief rebuild relay restate
13. REMUNERATE: check count replete compensate satisfy
14. EFFECTUATE: praise accomplish dissimulate nullify pretend
15. BRAVADO: celebrity outlaw boasting turmoil salutation
16. CURSORY: hasty dilatory intrinsic profane dire
17. INDINGENT: obnoxious moody sleep nasty poor
18. LOQUACIOUS: garrulous ostentatious frivolous limpid dowdy
19. HIATUS: break swamp fence disgust flower
20. BANAL: evil trite prohibitory jovial decay
21. TEDUM: dilatory anxiety exhaustion weakening dull
22. LASSITUDE: contempt convenience permissiveness lethargy levity
23. DIAPHANOUS: nocturnal quarrelsome morbid logical ethereal
24. SPEEN: grudge caprice impetuosity melancholy malice
25. HORDE: greed bully harvest crowd content
26. HIRSUTE: woman shaggy chamber quaint sorrowful
27. CAUDAL: brutal careful posterior nervy recent
28. GUIDON:  miniature  hat  hero  flag  achiever
29. VICISSITUDE:  direction  generosity  hardship  ceremony  ferocity
30. SEVERALLY:  unkindly  respectively  continuously  abruptly  harsh
No own-age bias was found. Taken together, basic facial emotion recognition does not seem to be disrupted during puberty as compared to pre- and post-puberty. Further, research points to an own-age bias, i.e., a superior emotion recognition for peer faces. We explored adolescents’ ability to recognize specific emotions. Ninety-five children and adolescents, aged 8–17 years, judged whether the emotions displayed by adolescent or adult faces were angry, sad, neutral, or happy. We assessed participants a priori by pubertal status while controlling for age. Results indicated no pubertal dip, but decreasing reaction times across adolescence. No own-age bias was found. indicate that an own-age bias was present, since the participants demonstrated superior recognition of photographs from their own age group. Analyses of corrected recognition scores (i.e., hits minus false alarms) revealed a significant main effect of photograph age \[F(3,198) = 3.81, \text{MSe} = 0.05\] but no main effect of participant age, since recognition did not differ between the two age groups \[F(1,66) = 2.03, \text{MSe} = 0.18, p = .16\]. More important, a significant photograph age \(\times\) participant age interaction was present \[F(3,198) = 7.47, \text{MSe} = 0.05\], indicative of an own-age bias. The own-age bias observed may reflect differences in sensitivity to own and different-aged faces or may reflect a different decision criterion based on face age. In order. OWN-AGE BIAS 1045.