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NOW PERFORMING IN A COURTROOM NEAR YOU: THE ELDERLY EYEWITNESS! TO BELIEVE OR NOT TO BELIEVE THAT IS THE QUESTION

John W. Clark III, Ph.D. and Roger Enriquez***

Introduction

In the summer of 1973, Patsy Kelly Jarrett drove from North Carolina to Utica, New York with her friend, Billy Ronald Kelly, for summer vacation.¹ On August 11, 1973, a gas station near Utica was robbed and its seventeen-year-old attendant was killed.² On August 13, 1973, elderly eyewitness, Robert Hyland, went to State Police Headquarters in Oneida, New York, and made a sworn statement to police:

I am not sure, but I believe the operator was a white female. She had long black shoulder length hair and was wearing dark clothing ... Upon moving closer to the gas pumps, I observed this female going through items in a brown hexagon type pattern pocket book ... The type of hairstyle that this person had did not allow me to see her face. The girl did have a tan.³

In March 1976, Hyland testified before the grand jury. He stated that the driver of the other car at the gas station “was combing her hair in the car” and “looked like a female.” Shown the picture of Jarrett, Hyland testified:

- A. Well, I can’t say positive about this, about the way – it was the same style, long hair.
Q. Is it safe to say then that the best you can say is that it could be the girl but you can’t say for sure?
A. Yes.⁴

At trial, Hyland identified Jarrett as the other driver he had seen at the gas station:

- Q. [District Attorney Wolff]. . . Let me ask you this: When you were in the station, on August 11th, were you sure in your own mind that it was a girl that was in the car?
A. Yes. I would stake my life on that, that it was a girl.
Q. Is Patsy Jarrett the female you saw sitting in the car in front of the Seaway gas station on August 11, 1973?
A. Yes.⁵

During re-cross examination, Hyland was quizzed about whether he received any coaching from the district attorney on the day he testified. His testimony was as follows:

- Q. Mr. Austin [counsel for Kelly]. . . Did you talk to anyone as to how you were going to testify today?
A. I talked to the fellow, here. He told

me to say what was in my mind.

- Q. Did you discuss this case with the District Attorney, today, is that correct? You discussed this case a little bit today with Mr. Wolff, did you not?

A. Yes.

* * *

- Q. Did he go over the testimony, at all, today with you? Did he tell you the kind of questions he was going to ask you?

A. He just told me to say what I thought on my mind and stick to my guns.

- Q. Stick to your guns in response to his questions?

A. No. No.

- Q. What guns have you got?

A. Well, that’s an expression.

* * *

- Q. ...Were you told to stick to your guns, in any event?

A. Well, to say what I believe, what was in my mind. I wouldn’t say any thing that wasn’t in my mind.⁶

There was no other physical or corroborating evidence offered at trial to link Jarrett to the scene of the crime besides the testimony of the elderly witness. The jury deliberated for two days.⁷ During deliberations, the jury requested a rereading of Hyland’s testimony. Ultimately, Jarrett was convicted on all counts and was sentenced to twenty-five years to life in prison.⁸

In 1986, Jarrett’s case drew the attention of a young law professor, Claudia Angelos, at New York University. Angelos negotiated a plea for Jarrett, if she would plead guilty to the robbery and the murder of the seventeen-year-old victim she would be set free.⁹ Jarrett refused to negotiate stating:

It’s just morally wrong to say you did something you know in your heart you didn’t do. I couldn’t live with myself if I did that. I saw the pictures of the young man and ... for them to want me to say that I did something so horrible just to get out of prison, I just couldn’t do it.¹⁰

Jarrett remained in jail until her first parole hearing in 2005.¹¹

American jurisprudence prides itself on equity and due process. These notions are particularly important during a trial as we expect jurors to be fair and weigh all the evidence carefully. In general, jurors place a great deal of credibility on eyewitness testimony. In fact, some scholars believe that, “[t]he criminal justice system places great trust and credibility in eyewitness accounts. In doing so, the criminal justice system insists on the ability of witnesses to accurately recall informa-

tion.”¹² However, as a person ages, various cognitive processes change. In addition, as these changes occur, many facets of cognitive ability tend to decline.¹³ While evidence shows eyewitness testimony to be speculative in general, when the witness is elderly, this escalates the probability of inaccuracy. Compounding all of this is the great weight jurors place on eyewitnesses. For a witness to point at a defendant and state “he did it! I saw him. I was so shocked I’ll never forget that face!” is extremely damaging.¹⁴

At present, eyewitness testimony of the elderly is a growing concern in American Jurisprudence. Scholars argue that, “despite the recognition among psychologists, judges, lawyers, and legislators that human perception and memory is far from reliable, eyewitness accounts continue to play a major role in criminal justice.”¹⁵ Unfortunately, it is not altogether certain how many jurors are aware of problems unique to eyewitness identification by the elderly. For example, research indicates that elderly persons are less accurate in recalling previously witnessed events,¹⁶ such that they are more likely to believe a non-famous name or face is famous,¹⁷ and have difficulty in distinguishing between descriptions of events that have never occurred.¹⁸

Today, courts are split on whether expert testimony can be offered to explain problems or inconsistencies with respect to eyewitness identification.¹⁹ Typically, courts have cited two reasons for not allowing the proffered testimony. First, expert testimony would not be helpful to the jury.²⁰ Second, the court fears that the jury might be misled by the expert.²¹ Today, the Third Circuit remains the proverbial “voice in the wilderness” by holding that “experts who apply reliable scientific expertise to juridically pertinent aspects of the human mind and body should generally, absent explanatory reasons to the contrary, be welcomed by federal courts.”²² As courts continue to grapple with the issue of permitting expert testimony to explain inconsistencies with respect to eyewitness testimony, it would appear that elderly eyewitnesses present a unique problem for jurors because the effects of aging on the acquisition, retention, and retrieval of an event are not typically within the purview of a juror. Therefore, expert testimony should be admissible under both Rule 702 and Rule 403 to assist the trier of fact.²³

Due to twenty-first century medical advances which have extended human life, it is likely that most elderly persons will one day be witnesses to crimes. According to the United States Department of Commerce data, in 2003, the number of adults over sixty-five encompassed 35.9 million.²⁴ This equates to 12% of the total United States population. Moreover, according to Census Bureau's projections, the population of elderly will double to approximately 72 million in the year 2030; in other words by 2030 one out of every five adults will be elderly.²⁵ As for life expectancy, a person was expected to live an average of forty-seven years in 1890. In contrast, in the year 2000, life expectancy was 76.9.²⁶ In 2000, nine states, California, Florida, New York, Pennsylvania, Texas, Ohio, Illinois, Michigan and New Jersey, had more than 1 million elderly.²⁷ With respect to housing “most senior citizens are active community dwellers, thus there is a high probability that some will be victim-witnesses or bystander-witnesses to a crime, a traffic accident, or another incident that will bring them into

contact with the law.”²⁸

The accuracy of witnesses is a concern for the justice system. If one accepts the error rate that scholars have calculated at .5% in wrongful convictions, then 7,500 innocent persons are incarcerated each year due in part to false identifications.²⁹ Moreover, other scholars state that, “reliable estimates of the number of wrongful convictions in the United States alone in a single year are staggering – exceeding eight thousand.”³⁰ Recently, the United States Justice Department published a report which discussed twenty-eight cases of wrongful convictions.³¹ Interestingly, twenty-three of the cases were based on eyewitness testimony.

Even the United States Supreme Court has devoted attention to eyewitness testimony. Accordingly, the Court has imposed regulations on procedures (predominantly line-ups) utilized by law enforcement officers and prosecutors.³² Scholars maintain that, “the court has focused on two constitutional approaches in this effort: the Sixth Amendment right to counsel and the due-process guarantees of the Fifth and Fourteenth Amendment.”³³ Through these amendments, the Supreme Court attempts to ensure there will be no miscarriage of justice. Moreover, “the Supreme Court has held that all identification procedures are subject to review to ensure that they were not unnecessarily suggestive or untrustworthy.”³⁴ However, it should be noted that even though the Supreme Court holds this view, many innocent people are still convicted of crimes that they did not commit.

General Theory of Memory

An individual's memory is not comparable to a home video recorder. When an event or experience occurs, the process or situation is far more complex. An accepted view in the study of memory is the concept that the successes and failures of human memory are attributable to a three stage model.³⁵ The model is as follows:

First, there is the acquisition stage – the perception of the original event – in which information is encoded, laid down, or entered into a person's memory system. Second, there is the retention stage, the period of time that passes between the event and the eventual recollection of a particular piece of information. Third, there is the retrieval stage during which a person recalls stored information.³⁶

This three stage process is the cornerstone to the concept of human memory. Moreover, there are numerous factors which occur at each stage that affect the accuracy of the eyewitness. A distinction must be made between factors that influence the accuracy of identification, but are beyond the control of the criminal justice system – estimator variables – and those that can be controlled – system variables.³⁷ Furthermore, “many of the factors that affect accuracy at the acquisition stage, such as the violence of the event, are estimator variables, whereas many of the factors occurring at the retrieval stage, such as question wording, are system variables.”³⁸ This paper's focus now examines the three stage model as it applies to elderly eyewitnesses.

Acquisition

For a witness to recall a past event, the event must be perceived and encoded in memory. The event could last seconds, minutes, or hours. According to researchers in the field:

At its most basic level, the perception of an incident involves the encoding of information hitting sensory receptors and being transformed into memory codes. As people age, changes are most evident in the senses of hearing and sight. Hearing loss is common with advanced age especially for high frequency sounds. The perception of speech is often adversely affected with age. In particular, although few older people experience difficulty in understanding speech in quiet environments, the elderly have difficulty when listening occurs with background noise, or with distortions caused from poor acoustics or an amplification system.³⁹

Importantly, if a person or event is not perceived because of a physiological change in vision, such as increased rigidity of the iris and lens, then information cannot be acquired.⁴⁰ Furthermore, “[a] decrease in ability to perceive depth, increased susceptibility to glare, deterioration in night vision, and longer periods required for dark adaptation are all part of the aging process.”⁴¹

Memory researchers commonly label the type of memory involved in initial acquisition as sensory memory. The sensory organs receive information and store it for only a few tenths of a second. Information that is visually received is often called iconic memory and information that is auditory is called echoic memory.

Iconic memory is affected by physical changes in the structures of the eye that occur with age. Research clearly shows that the incidence of visual impairments increases with age.⁴² However, there is a great degree of variability among individuals. Studies on the prevalence of visual impairments indicate that approximately 19% of people age seventy and older have significant visual impairments.⁴³ Visual impairment is defined by the Center for Disease Control as “vision loss that cannot be corrected by glasses or contact lenses alone.”⁴⁴ The most common causes of visual impairments are cataracts, age-related macular degeneration (AMD), glaucoma, and diabetic retinopathy.

With respect to echoic memory, it is estimated that approximately one-third of people age seventy and older have a hearing impairment which is defined as “deaf or trouble hearing with one or both ears.”⁴⁵ These impairments have been linked to physical changes in the structures of the ear as well as environmental and personal health factors.⁴⁶

While it is obvious that minimal sensitivity in the receptors of elderly persons inhibit the accuracy of eyewitness testimony, they are just one explanation. Changes in the central nervous system may also account for some of the changes in sensory memory. For example, elderly people are often unable to comprehend and interpret changing events as effectively as younger people due to central processing deficiencies.

Another important factor in the acquisition stage is

attention. According to researchers:

Attention is a topic of overriding concern in cognitive psychology. Attention is assumed to transfer information from sensory to short-term memory and is also assumed to be a critical mental resource necessary for the operation of any conscious or partly conscious process. All theories that discuss attention assume that it is a limited mental resource and that the upper limits of this resource pool determine how many separate processes can occur simultaneously.⁴⁷

A study examining the problem of attention in eyewitness testimony was conducted in 1978.⁴⁸ The researchers studied crime seriousness as a determinant of eyewitness accuracy.⁴⁹ Subjects witnessed a planned theft where an inexpensive and expensive object were stolen. The authors hypothesized that the subjects’ attentional resources would be greater when the object stolen was expensive.⁵⁰ Results indicate their hypothesis was correct. “When motivation to attend is not enhanced by perceived seriousness, the few seconds of exposure to the transgressor may be insufficient for enough processing to permit recognition memory on such a task.”⁵¹

An individual driving in an unfamiliar area is another example of a problem of attention in eyewitness identification. Due to unfamiliarity, this person must devote a great amount of attention to the roads, signs, utility poles, and traffic lights, while operating his or her vehicle at the same time.⁵² How accurate will the person be if he or she witnesses a car jacking, murder, or purse snatching? According to other researchers, not very well.⁵³ In separate field experiments, these researchers found the accuracy rate ranged from 7.8% to 47.8%.⁵⁴

A third factor that is detrimental to the accuracy of an eyewitness is depth of processing. Research from 1972 suggests a stimulus may be analyzed at different levels of information.⁵⁵ The level or depth of the encoding also determines how long a memory of an event lasts.⁵⁶ Semantic memory is therefore greater than phonemic or structural memory. Researchers Bower and Karlin illustrated this point by conducting experiments on face recognition. Their findings demonstrate that memory of a face is better if individuals process the information at a deep level.⁵⁷ In addition, researchers Leippe, Wells, and Ostrom found that “a witness to a serious crime might engage in greater depth of processing of the criminal’s facial features and be more highly motivated to rehearse in memory what he or she has witnessed.”⁵⁸

Retention

When a person witnesses a crime, a number of factors, including sensory reception, attention, and depth of processing, affect the accuracy of what is perceived and stored in memory.⁵⁹ Furthermore, the time difference between the experience and the witness’s recollection is crucial, and the length of the difference, as well as any events that take place during it, can affect a witness’s testimony.⁶⁰

People are less accurate in their testimony as retention

period increases. Research conducted in 1885, “is probably the most often cited study dealing with the loss of retention with the elapse of time.”⁶¹ The 1885 research study developed the “forgetting curve” to explain its findings. “[T]he ‘forgetting curve’ illustrates that we forget a good deal of new information shortly after learning it, and that forgetting then becomes more gradual.”⁶²

Research conducted approximately 100 years later reveals the same pattern.⁶³ For example, one study found that “[i]dentification rates fell from 100% after two hours to 93% after three days, 92% after one week and 57%. . . after four months.”⁶⁴ With these findings, a reasonable person would ask “why do eyewitnesses forget past events”? According to Loftus and Doyle:

Sometimes we forget information because we never store it in the first place. We do not pay enough attention to it, and therefore, it is lost from our memory system in a matter of seconds. But even in cases where we may have seen something quite clearly, we are sometimes unable to remember it later.⁶⁵

One recognized reason people forget is interference. “[I]nterference is an explanation for forgetting of some target information, in which related or recent information competes with or causes the loss of the target information.”⁶⁶ This is easily inferred since most people encounter countless events and people each day. Another cause of forgetting is decay. “[D]ecay is the simple loss of information across time, due presumably to some fading process.”⁶⁷ For example, a person who observes a traffic accident will lose his or her memory of that event unless he or she traces it periodically. Even then, there exists the possibility of inaccuracy.

The last factor to be addressed in retention is post-event information. According to Loftus and Doyle:

Forgetting is caused in part by what goes on during the passage of time. Often, after witnessing an important event, a witness is exposed to new information about it. For example, a person sees an automobile accident and then learns from the newspaper that the driver had been drinking before the accident. Or a person witnesses an argument between a man and a woman, and then overhears a friend talk about the argument. Evidence has been accumulating that post event experiences such as these can dramatically affect our memory of the original event.⁶⁸

Certain activities have the capability of distorting a person’s memory. Some researchers have demonstrated that the accuracy of eyewitness testimony is compromised by exposure to post-event information.⁶⁹

Retrieval

Eyewitnesses to crimes retrieve information from memory in various manners. Researchers Burke and Light suggest that retrieval is a major explanation for diminished performance among the elderly.⁷⁰ While attorneys often cross-examine witnesses in search of answers favorable to their client, they are often not aware of the importance of couching their

questions properly. For example, according to Loftus and Doyle, “small changes in wording can result in dramatically different answers.”⁷¹ The authors provide the following illustration:

The question, “Did you see the broken headlight?” led to more erroneous yes responses than the question “Did you see a broken headlight?” Similarly, as we saw earlier, the question “How fast were the cars going when they smashed into each other?” led to higher estimates of speed than “How fast were the cars going when they hit each other?” The “smashed” subjects were wrong more often.⁷²

Another important factor in retrieval is the view that retrieval is either based on recall or recognition. “In recall, a person is provided with some request to generate verbally or pictorially the stimulus in question. In recognition, the stimulus or some similar substitute is provided and the person’s task is to retrieve context information.”⁷³ Research suggests that recognition is superior to recall. Various experiments demonstrate age related differences in recognition memory for pictures of faces.⁷⁴ Other researchers have also discovered that young adult subjects are superior to elderly subjects when subjected to single views of faces.⁷⁵

As research demonstrates, the retrieval of information is extremely important in eyewitness testimony. Law enforcement officers, prosecutors, and defense attorneys all share in the goal of accurate retrieval and strategies that may follow. One retrieval strategy is cognitive interview.⁷⁶ In cognitive interviews, four methods are utilized to improve a witness’s memory.⁷⁷ They are:

1. Reconstruct the circumstances: In this method the investigator instructs the witness to reconstruct the incident in general. Think about what the surrounding environment looked like at the scene, such as rooms, location of furniture, vehicles, the weather, lighting, and nearby people or objects.
2. Report everything: The investigator explains some people hold back information because they are not quite sure that the information is important. The witness is asked not to edit anything, even things that may not be important.
3. Recall events in a different order: The instruction may be: It is natural to go through the incident from beginning to end. However, try to go through the events in reverse order.
4. Change perspectives: In this method, witnesses try to recall an incident from different perspectives that they may have had at the time or adopt the perspective of others who were present during the incident.⁷⁸

Research conducted by Fisher, Geiselman, and Amador demonstrate the effectiveness of cognitive interviewing. Police officers were examined before and after instructions in cognitive interviewing.⁷⁹ Results indicate that police officers who utilized their training received an additional 47% more information.⁸⁰ Other researchers have validated the usefulness of cognitive interviewing.⁸¹ “The evidence for increases in false identifications and incorrect information is not total-

ly absent, but it is truly minimal in comparison to the really substantial evidence for enhanced memory for correct details following the cognitive interview.”⁸² With an end to the discussion of a general theory of memory, this paper's focus now shifts to source memory as it applies to eyewitness testimony.

Source Memory

Each day an elderly eyewitness has to testify to an event or crime they observed, to recall the event, the witness must “recapture such aspects of the experience as time, place, what was said and by whom, and so forth.”⁸³ A person's ability to recall the source of a memory is important to cognitive competence.⁸⁴ However, research demonstrates that elderly people are often misleading about the source of an event. In fact, “misleading post event experiences that occur in the period between the observation of the criminal incident and the final identification of a suspect can interfere with the accuracy of eyewitness memory.”⁸⁵ Misleading post event exposure is well documented in the area of eyewitness testimony.

Many researchers have found that people can be manipulated into remembering events differently than they originally remembered.⁸⁶ For example, researchers Cohen and Faulkner hypothesized “that elderly subjects would make more errors than younger subjects in remembering the source of actions they had either performed, watched, or imagined.”⁸⁷ Their results indicate that elderly subjects had problems “recalling whether they had performed an action themselves or whether they had watched someone else perform it.”⁸⁸ Within the same study, the authors also hypothesized that older subjects would have difficulty in a misinformation experiment. Sixty-four subjects were shown a three-minute film of a kidnapping. After a short delay, subjects read a short story of the events. However, one story contained misleading events. After another short delay, all subjects were administered an exam of 18 questions. The exam was a multiple-choice test. Results indicate misleading information is harmful to elderly eyewitness.⁸⁹

Researchers Zaragoza and Lane also measured the effect of misinformation.⁹⁰ The researchers conducted five experiments in which subjects were asked specific questions concerning their memory for the source of suggested items. Results demonstrated that “misled subjects do sometimes come to believe that they remember seeing items that were merely suggested to them.”⁹¹

Lastly, researchers Loftus, Miller, and Burns documented another example of misleading suggestibility.⁹² In this study, approximately 200 subjects viewed thirty slides involving an auto-pedestrian accident. The automobile, a red Datsun, was shown to be traveling toward a yield sign for half the subjects and a stop sign for the other half. When subjects were asked if they had seen a yield or stop sign at the accident, results indicate that “[w]hen the question contained misleading information, only 41% of the subjects accurately responded. If subjects had been simply guessing, they would have been correct about half the time, or 50%, so the misleading questions reduced their accuracy below that which would have been expected from a person who was merely guessing.”⁹³

With the above evidence, prosecutors, law enforcement officers, and defense attorneys should be careful not to mislead the testimony of an elderly eyewitness. The *Jarrett* case provides a

good illustration of what can go wrong when a jury is not provided expert testimony on the effects of aging and reliability of witnesses. On many occasions attorneys ask leading or misleading questions to eyewitnesses. Research reveals elderly eyewitnesses are more susceptible to these types of questions than younger witnesses. As a result, inaccurate information is obtained and a miscarriage of justice is an all too likely possibility.

Conclusion

Eyewitness testimony remains a dominant component of the criminal justice system. Evidence demonstrates that elderly eyewitnesses are more likely than younger witnesses to be deficient in the acquisition, retention, and retrieval of an event. Elderly witnesses are also highly susceptible to misleading information. If the goal of the criminal justice system is fairness, then expert testimony can provide the trier of fact with important information on the effects of aging and the potential complexity of elderly eyewitness' testimony. In other words:

Given the importance of eyewitness testimony to jurors, the importance of eyewitness testimony in criminal cases, and the dramatic scientific evidence that eyewitness testimony is systematically fallible in ways that lead away from truth and towards unjust verdicts, something should be done to protect against such errors. In particular, experts who understand the systematic problems in memory and cognition can explain the effects of these problems on eyewitness testimony.⁹⁴

¹ See *Jarrett v. Headley*, 802 F.2d 34, 36 (2d Cir. 1986) (illustrating the facts of the case that led to the arrest of the defendant).

² *Id.*

³ *Id.*

⁴ *Id.* at 37.

⁵ *Id.* at 38.

⁶ *Id.* at 39.

⁷ *Id.*

⁸ See *Frontline: The Plea: Four Stories – Patsy Kelly Jarrett*, PBS, June 17, 2004, available at <http://www.pbs.org/wgbh/pages/frontline/shows/plea/four/jarrett.html> (describing the story of Patsy Kelly Jarrett).

⁹ *Id.*

¹⁰ *Id.*

¹¹ See *id.* (recounting Kelly Jarrett's story of her time in prison for a crime she claimed she did not commit).

¹² Fredrik H. Leinfelt, *Descriptive Eyewitness Testimony: The Influence of Emotionality, Racial Identification, Question Style, and Selective Perception*, 29 CRIM. JUST. REV. 317 (2004).

¹³ See Fergus Craik & Mark Byrd, *Aging and Cognitive Deficits: The Role of Attentional Resources*, in 8 AGING AND COGNITIVE PROCESSES, 191, 191-211 (F.I.M. Craik & Sandra Trehub eds. 1982) (explaining studies which support the theory that cognitive abilities decrease as age increases).

¹⁴ See ELIZABETH LOFTUS, EYEWITNESS TESTIMONY, at v (1996) (showing that eyewitness testimony can be some of the most damaging evidence used in a court of law).

¹⁵ Judith A. List, *Age and Schematic Differences in the Reliability of Eyewitness Testimony*, 22 DEVELOPMENTAL PSYCHOLOGY 50, 50 (1986).

¹⁶ See *id.* (summarizing and discussing research showing that age changes the completeness and accuracy of memories of recent events).

¹⁷ See James C Bartlett, et al., *False Regency and False Fame of Faces in Young Adulthood and Old Age*, 19 MEMORY AND COGNITION 177, 177 (1991) (citing study suggesting that older individuals rely more on perceived familiarity than younger individuals).

¹⁸ See Gillian Cohen & Dorothy Faulkner, *Age Differences in Source Forgetting: Effects on Reality Monitoring and on Eyewitness Testimony*, 4 PSYCHOLOGY AND AGING 10, 13-19 (1989) (relaying test in which many elderly subjects were unable to choose a written description to match events they saw).

¹⁹ See Henry F. Fradella, et al., *The Impact of Daubert on the Admissibility of Behavioral Science Testimony*, 30 PEPP. L. REV. 403, 427 (2003) (detailing courts' standards in admitting behavioral science testimony).

²⁰ United States v. Crotteau, 218 F.3d 826, 833 (7th Cir. 2000); United States v. Hall, 165 F.3d 1095, 1101 (7th Cir. 1999); United States v. Smith, 156 F.3d 1046, 1052 (10th Cir. 1998); United States v. Walton, 122 F.3d 1075, 1075 (9th Cir. 1997); United States v. Smith, 122 F.3d 1355, 1358 (11th Cir. 1997); United States v. Kime, 99 F.3d 870, 884 (8th Cir. 1996); United States v. Brien, 59 F.3d 274, 277 (1st Cir. 1995); United States v. Rincon, 28 F.3d 921, 923 (9th Cir. 1994).

²¹ Walton, 122 F.3d at 1075; Smith, 122 F.3d at 1358; Kime, 99 F.3d at 884; United States v. Burrous, 934 F. Supp. 525, 526 (E.D.N.Y. 1996); Brien, 59 F.3d at 277; Rincon, 28 F.3d at 923.

²² United States v. Mathis, 264 F.3d 321, 340 (3d Cir. 2000).

²³ FED. R. EVID. 403 (stating that relevant evidence may be excluded in certain circumstances); FED. R. EVID. 702 (providing the qualifications of witnesses that may present expert testimony).

²⁴ U.S. DEPARTMENT OF COMMERCE ECONOMICS AND STATISTICAL ADMINISTRATION, sixty-five plus in the United States (2005) available at <http://www.census.gov/population/socdemo/stat-briefs/agebrief.html>.

²⁵ *Id.*

²⁶ *Id.*

²⁷ *Id.*

²⁸ Daniel Yarmey, *The Elderly Witness*, in PSYCHOLOGICAL ISSUES IN EYEWITNESS IDENTIFICATION 259, 259 (Sporer, Malpass, Koehnken eds. 1996).

²⁹ See C. Ronald Huff, *Wrongful Conviction: Societal Tolerance of Injustice*, in 4 RESEARCH IN SOCIAL PROBLEMS AND PUBLIC POLICY 99, 99-115 (Miller & Lewis eds. 1987) (commenting that society allows individuals who are wrongfully convicted to stay imprisoned by overlooking professional incompetence and dishonesty in the criminal justice system).

³⁰ Loftus, *supra* note 14, at vi.

³¹ See generally UNITED STATES DEPARTMENT OF JUSTICE, CONVICTED BY JURIES, EXONERATED BY SCIENCE: CASE STUDIES IN THE USE OF DNA EVIDENCE TO ESTABLISH INNOCENCE AFTER

TRIAL (1996), available at <http://www.ojp.usdoj.gov/nij/pubs-sum/161258.htm> (reviewing cases of wrongfully convicted persons later found innocent through the use of DNA).

³² See Simmons v. United States, 390 U.S. 377, 383 (1968) (recognizing that improper use of photographs by police may sometimes cause witnesses to err in identifying criminals).

³³ JAMES ACKER & DAVID BRODY, CRIMINAL PROCEDURE: A CONTEMPORARY PERSPECTIVE 415 (1999).

³⁴ *Id.* at 458.

³⁵ See GARY WELLS, EYEWITNESS IDENTIFICATION 2 (1988) (outlining the three stages of human memory failure).

³⁶ Loftus, *supra* note 14, at 21.

³⁷ Rod C. L. Lindsey & Joanna D. Pozzulo, *Sources of Eyewitness Identification Error*, 22 INT'L J. OF L. & PSYCHIATRY, 347, 347 (1999).

³⁸ ELIZABETH LOFTUS & JAMES DOYLE, EYEWITNESS TESTIMONY: CIVIL AND CRIMINAL 12 (3d ed. 1997).

³⁹ Yarmey, *supra* note 28, at 262.

⁴⁰ See *id.* (discussing how memory acquisition occurs in the elderly).

⁴¹ *Id.*

⁴² See P. BAGNOLI & W. HODOS, THE CHANGING VISUAL SYSTEM: MATURATION AND AGING IN THE CENTRAL NERVOUS SYSTEM (1991) (explaining how the visual system of primates develops throughout life).

⁴³ See Mayur Desai, et al., *Trends in Vision and Hearing Among Older Americans*, in 2 AGING TRENDS 1 (2001), available at www.cdc.gov/nchs/data/ahcd/agingtrends/02vision.pdf ("For the elderly, sensory impairments increase vulnerability and limit the quality of life.").

⁴⁴ *Id.* at 2.

⁴⁵ *Id.* at 5.

⁴⁶ See Yarmey, *supra* note 28, at 263 ("With short observation periods, errors often occur from a necessity to select and process information at too fast a pace, which presents particular difficulties for the elderly.").

⁴⁷ MARK ASHCRAFT, HUMAN MEMORY AND COGNITION 66 (2d ed. 1994).

⁴⁸ See Michael R. Leippe, et al., *Crime Seriousness as a Determinant of Accuracy in Eyewitness Identification*, 63 JOURNAL OF APPLIED PSYCHOLOGY 345, 346-47 (1978) (researching how differences in the level of seriousness of crimes determine the witnesses' perception and memory).

⁴⁹ See *id.* at 346 (conducting tests on subjects allowed researchers to determine that witnesses' perception differs based on the type of the crime).

⁵⁰ See *id.* (citing many factors that may be affected by the seriousness of the crime including how much effort a witness will put into identifying a mugshot).

⁵¹ *Id.* at 349.

⁵² See ALAN HARTLEY, THE HANDBOOK OF AGING AND COGNITION (Fergus Craick & Timothy Salthouse eds. 1996) (discussing how attention to details determines accuracy of perceptions).

⁵³ See John C. Brigham, et al., *Accuracy of Eyewitness Identification in a Field Setting*, 42 JOURNAL OF PERSONALITY AND SOCIAL PSYCHOLOGY 673, 673 (1982) (detailing various methods used to reach the conclusion that

eyewitness identification is often inaccurate); Stephanie Platz & Harmon Hosch, *Cross Racial/Ethnic Eyewitness Identification: A Field Study*, 18 JOURNAL OF APPLIED SOCIAL PSYCHOLOGY 972 (1988); Melissa Pigott, et al., *A Field Study of the Relationship Between Quality of Eyewitnesses' Descriptions and Identification Accuracy*, 17 JOURNAL OF POLITICAL SCIENCE AND ADMINISTRATION 84 (1990).

⁵⁴ See, e.g., Brigham, *supra* note 53, at 673 (finding eyewitness identifications to be correct less than half of the time).

⁵⁵ See Fergus Craik & Robert S. Lockhart, *Levels of Processing: A Framework for Memory Research*, 11 JOURNAL OF VERBAL LEARNING AND VERBAL BEHAVIOR 671, 675 (1972) (exploring stimulus at different levels of information in order to find an alternative framework for human memory research).

⁵⁶ *Id.*

⁵⁷ See Gordon H. Bower & Martin B. Karlin, *Depth of Processing Pictures of Faces and Recognition Memory*, 103 JOURNAL OF EXPERIMENTAL PSYCHOLOGY 751, 753 (1974) (using pictures of faces drawn from a college student yearbook to determine the depth of memory processing).

⁵⁸ Leippe, *supra* note 48, at 346.

⁵⁹ See Loftus, *supra* note 14, at 52 (listing factors that affect memory including exposure time, salience of the event, and witness's prior expectations).

⁶⁰ *Id.* at 52-53.

⁶¹ *Id.*

⁶² Loftus & Doyle, *supra* note 38, at 49.

⁶³ See J.W. Shephard, *Identification After Long Delays*, in EVALUATING WITNESS EVIDENCE 173 (Lloyd-Bostock & Clifford eds. 1983) (discussing studies of peoples' ability to identify individuals after different periods of time).

⁶⁴ *Id.* at 175.

⁶⁵ Loftus & Doyle, *supra* note 38, at 52.

⁶⁶ Ashcraft, *supra* note 47, at 674.

⁶⁷ *Id.* at 667.

⁶⁸ Loftus & Doyle, *supra* note 38, at 54.

⁶⁹ See Maria S. Zaragoza & Sean M. Lane, *Source Misattributions and the Suggestibility of Eyewitness Memory*, 20 JOURNAL OF EXPERIMENTAL PSYCHOLOGY: LEARNING MEMORY, AND COGNITION 934, 934-35 (1994) (finding that people can be led to report events different from those they actually witnessed and researching whether these people believe that they actually remember seeing the suggested details they report).

⁷⁰ See Deborah M. Burke & Leah L. Light, *Memory and Aging: The Role of Retrieval Processes*, 90 PSYCHOLOGICAL BULLETIN 513, 518 (1981) (suggesting that the organization of adults' memories plays an important part in their ability to recall information).

⁷¹ Loftus & Doyle, *supra* note 38, at 65.

⁷² *Id.*

⁷³ Wells, *supra* note 35, at 8.

⁷⁴ See Yarmey, *supra* note 28, at 264 (discussing study conducted by Rodin in which people of various age groups looked at pictures of individuals of all ages and tried to recall which ones they had seen previously).

⁷⁵ See James C. Bartlett & Jo E. Leslie, *Aging and Memory for Faces Versus Single Views of Faces*, 14 MEMORY AND COGNITION 371, 371 (1986) (citing study which confirms previous research showing there was a correlation between age and the ability to recognize faces).

⁷⁶ See Ronald P. Fisher, *Interviewing Victims and Witnesses of Crime*, 1(4) PSYCHOLOGY, PUBLIC POLICY & LAW 732 (1995)

(discussing the use of the "cognitive interview" and its ability to improve the quality of interview training for police personnel).

⁷⁷ *Id.*

⁷⁸ See DAVID E. ZULAWSKI & DOUGLAS E. WICKLANDER, PRACTICAL ASPECTS OF INTERVIEW AND INTERROGATION (2d ed. 2001) (stating that these techniques can be used to enhance the recollection of the victim and the witness).

⁷⁹ See Ronald P. Fisher, et al., *Field Test of the Cognitive Interview: Enhancing the Recollection of Actual Victims and Witnesses of Crime*, 74 JOURNAL OF APPLIED PSYCHOLOGY 722, 722 (1989) (finding that detectives trained in cognitive interviewing elicited 63% more information than untrained detectives).

⁸⁰ *Id.*

⁸¹ See Roy Malpass, *Enhancing Eyewitness Memory*, in PSYCHOLOGICAL ISSUES IN EYEWITNESS IDENTIFICATION 177 (Sporer, Malpass & Koehnken eds. 1996) (studying the effects that the cognitive interview has on eyewitness testimony).

⁸² *Id.* at 197.

⁸³ Susan A. Ferguson, et al., *Age Differences in Using Source-Relevant Cues*, 7 PSYCHOLOGY AND AGING 443, 443 (1992).

⁸⁴ Cohen & Faulkner, *supra* note 18, at 10.

⁸⁵ Yarmey, *supra* note 28, at 270.

⁸⁶ See Zaragoza & Lane, *supra* note 69, at 935-45 ("Whether exposure to suggestion impairs the original memory, the fact remains that subjects can be easily led to report misinformation that has been suggested to them.").

⁸⁷ Cohen & Faulkner, *supra* note 18, at 11.

⁸⁸ *Id.* at 17.

⁸⁹ See *id.* (analyzing findings that showed misleading information harmed elderly persons more than other groups when trying to recall identifications).

⁹⁰ See Zaragoza & Lane, *supra* note 69, at 936 ("The purpose of this research was to further explore the possibility that subjects do misremember seeing suggested items. . .").

⁹¹ *Id.* at 942.

⁹² See Elizabeth Loftus, et al., *Semantic Integration of Verbal Information into a Visual Memory*, 4 JOURNAL OF EXPERIMENTAL PSYCHOLOGY: HUMAN LEARNING AND MEMORY 19, 19 (1978) (finding that when a witness is exposed to information after an event, regardless of what that information is, it becomes integrated into the witness's memory of the event).

⁹³ Loftus, *supra* note 14, at 60.

⁹⁴ Edward Stein, *The Admissibility of Expert Testimony about Cognitive Science Research on Eyewitness Identification*, 2 LAW, PROBABILITY & RISK 295, 297 (2003).

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