

Hard to Believe:
The Unreliability of Eyewitness Testimony

by

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A thesis submitted to the Faculty of Graduate and Postdoctoral
Affairs in partial fulfillment of the requirements
for the degree of

Master of Arts

in

Philosophy

Carleton University
Ottawa, Ontario

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Abstract

At the turn of the century, psychologists started to discover that eyewitness testimony was not as reliable as once thought. The findings have largely remained unincorporated into the legal process, resulting in miscarriages of justice. Drawing on the psychological research, and a reliabilist framework of doxastic justification, the author derives a sample set of epistemic norms to replace our unscientific colloquial norms; arguing that empirically backed norms, in addition to addressing legal injustices, would also go a long way towards addressing epistemic injustices.

Acknowledgements

For Mom & Dad.

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Chapter 1: Issues in Eyewitness Testimony

University of Berlin, 1902: the famous criminologist, Franz Von Liszt, is delivering his weekly lecture. The scene is routine and unremarkable. At one point during the lecture, Von Liszt mentions a book, and this sparks a debate between two students. One of the students shouts, “I wanted to throw light on the matter from the standpoint of Christian morality!” Another student pipes up, “I cannot stand that!” The first student rises to his feet and accuses the other student of insulting him. The second student, visibly angry, replies “If you say another word ...” At once the first student draws a concealed revolver. The second student rushes towards him. In a desperate attempt to gain control of the wildly escalating situation, Professor Von Liszt places himself between the two men and as he grabs the first student’s arm, a gunshot reverberates throughout the lecture hall.

This entire scenario was a carefully choreographed and well-rehearsed bit of theatre. The two students involved in the altercation were confederates, and the pistol had been loaded with blank cartridges. The altercation had been set-up in order to study the accuracy of eyewitness testimony. After Von Liszt restored order to the classroom, he divided the students into three groups. The first group would immediately write an eyewitness account of the events that had just transpired. The second group would write their accounts a day later, and the last group, a week later. Some of the students in each group were asked to give their testimony under cross-examination.

After the students had submitted their reports, Von Liszt divided the performance into fourteen parts, with some parts referring to words and some referring to actions (i.e., in this part he *does* this, in this part he *says* that). What counted as mistakes were omissions, incorrect additions, and alterations. *Von Liszt found that every single eyewitness report contained mistakes.* Of the reports that contained the *fewest* mistakes, he found that the error rate was 26. The reports with the *highest* number of mistakes had an error rate of 80. Furthermore, the reports about the second, more emotionally charged, half of the performance contained 15 more errors than reports about the first half (E. Loftus, 1996). The results of the Von Liszt experiment and others conducted around the turn of the 20th century would reveal serious flaws in the traditional, common-sense view of eyewitness testimony that held that as long as a witness was not lying, truth would be the main result of their testimony. For the first time, there was solid empirical evidence that even witnesses who were not trying to be deceptive could produce false testimony.

Emerging psychological evidence ignored

Clearly these results should have serious implications for the way criminal cases are prosecuted within a legal system that heavily relies on eyewitness testimony; however, this newly emerging evidence did little to push the Western legal tradition towards adopting a more skeptical view of eyewitness testimony. Lawyers and judges were content to hold onto a set of traditional assumptions about eyewitnesses that greatly inflated the perceived accuracy and overall reliability of eyewitness testimony. In his 1908 book, *On the Witness Stand*, psychologist Hugo Munsterberg laments the

disconnect between the legal profession and cutting-edge empirical work on eyewitness testimony. He writes about a legal system composed of judges, juries, and lawyers that seems to willfully ignore the findings of modern psychologists, preferring instead to cling to legal instinct and common sense (Munsterberg, 1908). For example, the gold standard within the legal system for determining the veracity of eyewitness statements was cross-examination (and still is to this day). During this process, each side is given the opportunity to call upon witnesses to give testimony about certain facts in question and the opposing side is given the opportunity to probe their testimony for inconsistencies. Cross-examination is supposed to function as a lie detector test of sorts based on the fundamental assumption that only liars, mentally deficient, or immoral people utter false statements. If the witness is none of these, her testimony must accurately represent the events in question as they happened. Yet a recent study conducted in 2011 suggests that the process of cross-examination actually reduces the accuracy of eyewitness testimony (Valentine & Maras, 2011).

The courts also tended to show special preference to the physical sciences over psychology. In his book, Munsterberg points out that the legal system would happily bring in experts to painstakingly examine a drop of dried blood or a sample of the defendant's handwriting, but when the evidence to be examined is a "mental product" they are content to rely on the "unscientific and haphazard methods of common prejudice." The result, he points out, is an absurd state of affairs where jurors would never be asked to use common sense to determine whether, say, blood found on the defendant's clothes was pig's blood or the victim's blood. But when it comes to deciding

whether the memories of a witness are true representations of events as they happened, or the results of association and suggestion, they are content to permit jurors to rely on their general impressions (Munsterberg, 1908).

Not content to ignore and downplay the new science of eyewitness testimony, the legal profession also openly mocked it. In April 1909, a satirical court case against Munsterberg was published in the *Illinois Law Review* (Wigmore, 1909). The bar of the Supreme Court had filed suit, alleging that his recently published book, *On the Witness Stand*, contained libelous, false, and damaging assertions about their association. They argued that Munsterberg effectively claims that there are widely accepted, and precise experimental methods that can “determine the testimonial certitude” (Wigmore, 1909, p. 401) of witnesses; that these methods have been known for a long time; that they are superior to the methods used by the courts; and that the bar of the Supreme Court should have known about them, and nevertheless chose to ignore them. Thus, they insisted, Munsterberg’s book, and the false claims contained therein, had brought disrepute upon them. The plaintiffs sought damages against Munsterberg in the sum of \$1.

In response to these allegations, Munsterberg testified that he had never intended to damage anyone’s reputation, but that he merely wanted to inform the public about the existence of extremely precise methods for probing the accuracy of eyewitness testimony that the legal profession had obstinately refused to acknowledge. Predictably, the jury in this bizarre revenge fantasy spent no time deliberating and ruled against Munsterberg, awarding the plaintiffs the \$1 in damages they were seeking.

Psychology of eyewitness testimony

Despite the indifference from the legal community, psychologists pressed on, and a large body of research has grown over the past century that has been gradually building a case against the accuracy of eyewitness testimony. In the 1970s Elizabeth Loftus emerged as one of the leading figures in the field of eyewitness research. In her 1979 book, *Eyewitness Testimony*, Loftus explains testimony in terms of a three-stage psychological process involving perception, retention, and retrieval (E. Loftus, 1996).

In order to testify to something as an eyewitness, we must first *perceive* it through one or more of our senses. Then we must store or *retain* that perceptual information until we are called upon to *retrieve* it on the witness stand or when giving a statement to the police. The problem, however, is that the reliability of an individual's testimony can be compromised by various factors that may be present during any of these stages.

For instance, at the *perception stage* one factor that affects reliability is exposure time: the less time you spend perceiving an event, the less likely you will be to remember certain details of that event. In a 1971 study, researchers presented participants with a series of four photos of an individual's face taken from different angles. The participants in the first group had two and a half seconds to look at each photo, while those in the second group had eight seconds to look at each photo. The results showed that the more time participants spent looking at the faces, the better they were at recognizing them later (Laughery et al., 1971).

Research has also uncovered a link between cultural expectations and eyewitness accuracy. In 1947, Allport and Postman conducted an experiment where they showed one

person an illustration depicting a well-dressed black man speaking to a balding white man who is carrying a razor. Then, in something like a game of “telephone,” this person would describe the scene to a second participant, who would—based on that description—describe it to another, and so on. This chain would terminate at around six or seven participants. After repeating this experiment several times, they found that the final reports would often be racially biased, with the final participant claiming that the black character (who was holding nothing) was wildly brandishing the razor. Allport and Postman stop short of claiming that the results suggest a specifically anti-black bias within their sample population, but they do claim that the results show people’s perceptions are coloured by their expectations (Allport & Postman, 1947).

The next stage where things can go wrong is the *retention stage*. At this point in the process, a pernicious phenomenon known as *post-event information* can profoundly impact the accuracy of eyewitness testimony. In a 1975 study, Elizabeth Loftus showed a three-minute video to 40 participants. In the video, a group of protestors are seen marching into a classroom and causing a commotion. Immediately after watching the video, half of the subjects were asked “Was the leader of the *four* demonstrators who entered the classroom a male?” and the other half were asked “Was the leader of the *twelve* demonstrators who entered the classroom a male?” One week later, the participants were asked a second question: “How many demonstrators did you see entering the classroom?” What they found was that the students who were asked about the “twelve” demonstrators reported seeing an average 8.9 people whereas those who were asked about the “four” demonstrators reported seeing an average of 6.4 people. These results provide evidence that, in some cases, when witnesses are exposed to

counterfactual information about an event, that information can be incorporated into their memory, ultimately leading to false testimony (E. Loftus, 1975).

The unsettling implication of the existence of the post-event information effect is that it provides investigators with a way to deliberately influence a witness' testimony. In one study a subject group of mock witnesses watched a slide show depicting a fight in which the defendant, "Zemp," struck the plaintiff, "Adams," on the head with a bottle. The witnesses were told that they would be called in a week later to testify in a mock trial to what they had seen in the slide show. However, during the time between watching the slideshow and the trial, some of the witnesses were interviewed by a student playing the role of attorney for the defendant, Zemp, and some by an attorney for the victim, Adams.

On the day of the mock trial, the witnesses were asked to testify to the judge about what they had seen in the original slide show. The judge's job was to determine whether the witness's testimony favored the plaintiff or the defendant. The results of the experiment showed that even though the facts of the case were heavily in favor of the plaintiff, witnesses who had been interviewed by attorneys for the defence gave statements that were biased in favor of the defendant. In their discussion of the results, the authors speculate that the defence attorneys, in an effort to increase their chances of winning, may have subtly introduced counterfactual information, thereby changing the witness's actual memory of the events (Vidmar, 1978).

Finally, in the *retrieval* stage eyewitness accuracy is sensitive to the specific investigative methods used to draw testimony out of witnesses. Research in this area tends to focus on testing the effects of different investigative techniques. For example,

when asking a witness to retrieve information from memory, an investigator uses three basic styles of question. The first type is the “narrative” or “free report” which is essentially a short-answer, or open-ended question, such as “What did the robber look like?” The second type is known as a “controlled-narrative” or multiple-choice question: “Did the suspect drive away in a sedan or a hatchback?” The last type of question is the suspect line-up procedure, which usually involves presenting a collection of mugshots to a witness and asking them to identify the perpetrator.

In a 1924 study, researchers staged three live performances before three classes of psychology students. During each performance, the professor would announce to the class that a government official would be coming to offer the students the opportunity to write an exam as part of the screening process for a job in a government office. The official arrives, explains the opportunity he is offering, hands the exams to the professor and then leaves.

Half of the exams ask students to recall, in a free-form manner, every detail of the government official’s visit, emphasizing that “no detail is too small to deserve mention.” The other half of the exams contain a series of 42 specific question about the official’s visit. The authors of the study found that the students who were asked the free-form question made fewer errors than those who were asked specific questions, demonstrating a difference in recall between the two interrogation styles (Cady, 1924).

In another study looking into the possible effects of interrogation techniques, participants were asked to guess the heights of various basketball players. Some were asked “How tall was the basketball player?” while other were asked “How short was the

basketball player?” Participants who were asked how tall the player was estimated on average a height of 79 inches. Those who were asked how short the player was estimated on average a height of 69 inches. This experiment suggests that leading questions can influence how an individual recalls information (Harris, 1973).

Justice at stake: the importance of learning the empirical lessons

Empirical research into eyewitness testimony, perception, memory, and social bias has come a long way over the past century, not only in terms of the sheer volume of empirical data, but it has also developed a rich theoretical framework. This growing body of evidence seems to point more and more to the fact that eyewitness testimony, far from being a gold standard for legal evidence, is in fact a flawed epistemological tool. This is bad news for our legal system, which continues to rely heavily on the testimony of witnesses. The depressing effect of this tendency to place so much faith in testimony is plainly apparent in the hundreds of DNA exonerations that have occurred in the United States to date.

On the morning of May 1991, two teenage sisters were preparing to go to school when an intruder entered their home and sexually assaulted them at knifepoint. Even though the sisters were unable to get a good look at their attacker, they identified him as Joseph Lamont Abbitt. Rape kits were collected from the crime scene, but the DNA evidence was inconclusive. At trial, Abbitt had a strong alibi: his employer testified that he had been at work at the time of the attack. Nevertheless, the jury found the eyewitness testimony of the girls to be sufficient for a conviction, and Abbit was sentenced to serve two life sentences plus 110 years in prison. After serving 11 years of his sentence, Abbit

finally succeeded in having the rape kits from his original trial re-tested. The evidence from the rape kits conclusively ruled him out as the perpetrator, and he was freed on September 2, 2009 (The National Registry of Exonerations, 2020).

In 1992, Beverly Monroe returned home to find her boyfriend, Roger Zygmunt de la Burde, dead from a gunshot wound to his head. The death was quickly ruled a suicide by the coroner, but a detective working on the case suspected that Monroe had murdered her boyfriend because she had discovered that he was having an affair with another woman. Over the course of three months of repeated interrogation, the detective was able to convince Monroe that she had—contrary to her own recollection—been present when Zygmunt de la Burde died. The prosecution claimed that this testimony amounted to a confession, and she was sentenced to 22 years in prison. Her conviction was overturned in 2003 when her legal team discovered that the prosecution had illegally withheld forensic reports showing that Zygmunt de la Burde’s death was a suicide (The National Registry of Exonerations, 2016).

The Innocence Project, a non-profit founded in 1992 by Barry Scheck and Peter Neufeld, has helped make possible hundreds of exonerations like these. The organization uses DNA analysis to overturn convictions of individuals who have been wrongfully convicted of serious crimes. The foundation has been involved in 187 of the 367 DNA exonerations in the United States. A staggering 69% of all DNA exonerations involved some failure of eyewitness testimony (Innocence Project, n.d.).

The problems with eyewitness testimony result in grotesque miscarriages of justice. If justice is important, then our legal systems must incorporate a more nuanced

understanding of eyewitness testimony. Not only is it important to understand its weaknesses, but also its *strengths*. Many crimes go unrecorded or have little to no physical evidence associated with them. Eyewitness testimony allows us to tap into the ability of human beings to record the details of events. However, if we are going to use this tool in courts of law where the stakes can be very high, we must understand what its limitations and strengths are, and we need to put that knowledge into practice.

To that end, we can formulate a general philosophical question: Given an eyewitness who is not being deceptive, under what conditions can we gain justified beliefs from their testimony? Furthermore, under what conditions (again, given a non-deceptive witness) does their testimony *not* provide us with justified beliefs? To answer these questions, I will explore recent research into eyewitness testimony in order to determine what some of these conditions might be. However, before diving into the empirical work, a little philosophical background is needed.

The epistemology of eyewitness testimony

The study of knowledge is concerned with four broad questions: How do we get knowledge? What is the structure of knowledge, and is there anything that we cannot know? What necessary and sufficient conditions must be met for something to count as knowledge?

To answer this last question, philosophers have leaned heavily on the traditional account of knowledge, which holds that knowledge requires three things: belief, truth, and justification. Thus, in order to know a proposition, one must believe it; the

proposition must be true; and, to avoid lucking into knowledge, the belief in the truth of the proposition must be justified.

However, the traditional account of knowledge was shown to be inadequate in 1963 by Edmund Gettier, who demonstrated that, under some very peculiar conditions, one could have a justified true belief without it counting as knowledge (Gettier, 1963). Gettier put forward several thought experiments that take the same general form: First, someone acquires a justified belief based on some evidence; however, it turns out that the evidence was misleading. But in a twist of fate, the original belief happens to be true for reasons unrelated to the initial justification. For example, imagine a professor who has a student in his class who always brags about owning a Ferrari, and one day he even shows the professor his ownership papers. The professor goes on to form the justified belief that a student in his class owns a Ferrari. However, it turns out that the student has a cousin with the same name who owns the Ferrari. But, unbeknownst to the professor, a quiet student who sits in the back actually *does* own a Ferrari. So, did the professor know that a student in his class owned a Ferrari? After all, he had a justified true belief. It seems wrong to say that the professor *knew* that at least one of his students owned a Ferrari because he came into this knowledge through sheer luck. In response to Gettier's counterexamples, there have been numerous attempts to fix the traditional account. Many approaches have been taken, from modifying it to abandoning it and proposing completely different accounts of knowledge. Nevertheless, on just about every contemporary epistemologist's view, believing a proposition is crucial to knowing it.

So, if belief is basic to knowledge, then where do our beliefs come from? There are five general sources of belief: perception, introspection, memory, reason, and testimony. Perception is obvious: when I look at the cup on my desk, I spontaneously form the belief, on the basis my visual perceiving (and nothing else), that there is a cup on my desk. Introspection refers to the inspection of one's own mental states: I come to believe that I am tired by being aware that I am in that particular mental state. (On some views, mental states necessarily produce true beliefs since they do not refer to anything in the world, but only to mental "seemings.") The third source of belief is memory. The fourth is reason, the beliefs that come to us a priori and include beliefs such as $1+1=2$, the fact that all bachelors are unmarried, or that doubt implies a doubter. And finally, there is testimony.

So how does testimony work as a source of belief? The simple (and maybe obvious) answer is that when you believe something said by someone else, you have acquired a testimony-based belief. For example: S_1 says P , S_2 hears that P , S_2 believes that P . Testimony is also a particularly puzzling source of belief because it suffers from a kind of "epistemic vulnerability" since it is both the basis for so many of our beliefs, while at the same time being prone to generating false beliefs. Think about how heavily you rely on the testimony of others to fill in your knowledge about the world. How do you know to look both ways when crossing the street? Nobody had to run you over with a car in order for you to learn this lesson; most people take their parents at their word when they tell them not to play in traffic. How do you know that Sir John A. Macdonald was the father of confederation? You probably learned it from your high school history teacher. There are also the countless small, everyday things we come to know through

testimony, like the time of day, directions to the bathroom, the sale price of an item in a shop, etc.

Given the sheer number of beliefs we hold that are based on testimony, and the fact that they generally allow us to competently navigate our way through life, what is it that makes testimony epistemically vulnerable? The “vulnerability problem” (Adler, 2012) arises when we consider what grounds there are to say that any belief, formed solely on the say-so of another person, is justified. Since other people can lie, be misinformed, or inarticulate, how can we ascribe justification to any testimony-based belief?

Two general schools of thought have emerged that are broadly distinguished by their relative positions on whether testimony in and of itself can produce justified belief in the hearer. On one side, the reductionists, who trace their conceptual lineage to Hume, argue that the acceptance of testimony is only justified *a posteriori*:

... our assurance in any argument of this kind [testimonial] is derived from no other principle than our observation of the veracity of human testimony, and of the usual conformity of facts to the reports of witnesses ... The reason why we place any credit in witnesses and historians is not derived from any connexion, which we perceive a priori, between testimony and reality, but because we are accustomed to find a conformity between them. (Hume & Millican, 2007, pp. 80–82)

Hume's key observation here is that there is no a priori reason to believe any utterance of testimony. The only reason we do believe testimony is for the empirical reason that testimony tends to produce a preponderance of truths, and that we have become accustomed to this tendency. Fundamentally, reductionists assert that testimony can only generate beliefs, and does not intrinsically confer justification. In order to produce justified belief in the hearer, reductionists insist that testimony-based beliefs must be backed up by non-testimonial, empirically derived propositions. In other words, the justification of testimony-based beliefs is seen by the reductionists as *reducing* to the sort of justifications for non-testimony-based beliefs.

In contrast to the reductionists, the anti-reductionist attitude towards testimony derives from Thomas Reid's argument that God intended for human beings to be social creatures with a propensity to speak the truth (Reid, 1983). From this, Reid advocates for a principle of credulity—that is, testimony can produce justified belief in the hearer, as long as he has no good reason *not* to believe the testimony. Thus, the anti-reductionists don't see our justifications for our testimony-based beliefs as reducing to our justifications for other kinds of beliefs. On this view, testimony-based beliefs enjoy their own special sort of justification. In support of the anti-reductionist view, C.A.J. Coady argues that the reductionist requirement that justification *requires* non-testimonial belief is circular. He points out that any empirical justification for a testimony-based belief, will itself rely—at least in part—on testimony, since the things that the empiricists write in their scholarly articles are, themselves a kind of testimony (Coady, 1994). The ongoing “replication crisis” in the social sciences (where researchers cannot replicate experimental results) perhaps vindicates Coady's skepticism to some degree.

Eyewitness testimony or “formal testimony” (Coady, 1994) is a special subspecies of testimony, with several features that differentiate it from informal testimony. Eyewitness testimony is provided by witnesses as evidence in a criminal case and, when given on a witness stand, involves some form of oath-taking ceremony, well-known from American procedural dramas where the witness swears to “... tell the truth, the whole truth, and nothing but the truth, so help me God.”

Another characteristic of eyewitness testimony is the high-stakes nature of the context in which it is given. Often what a witness says on the stand can lead to incarceration or even death. The high-stakes nature of court proceedings provides incentives for witnesses to give testimony that will influence the outcome of the case.

Eyewitness testimony is also typically governed by rules about what *kinds* of testimony can and cannot be taken as evidence in a trial. For example, in English law most forms of hearsay (second-hand testimony) are inadmissible with few exceptions. One notable case that hinged on whether to admit hearsay occurred in Ipswich in 1879. Henry Bedingfield was accused of murdering a woman by slitting her throat. In his defence, Henry claimed that the woman had cut her own throat after attempting to kill him. Witnesses testified to seeing her run out of the room with a severe gash on her throat screaming “See what Harry has done!” before expiring. The judge, however, would not allow reports of this utterance to be admitted into evidence since it did not occur at the same time the act was committed. While the woman’s testimony was inadmissible, the jury was not convinced, and Bedingfield still hanged (Coady, 1994).

In this chapter, we have seen that early empirical investigations conducted at the turn of the twentieth century began to throw doubt on the longstanding assumption that eyewitnesses are generally reliable. The Berlin Lecture Hall Shooter experiment revealed that even attentive witnesses with no incentive to lie could produce false eyewitness statements at an alarming rate—especially if a long time elapsed between witnessing an event and testifying to it. Maddeningly, the legal profession’s reaction to these results was to dismiss them and mock their proponents. Fortunately, psychologists pressed on, and the field of eyewitness research has matured over the past century, building up a body of empirical evidence and theoretical understanding of the limitations of eyewitness testimony. Eyewitness testimony is now understood as a cognitive process in which memory plays a crucial role. When a witness recalls information about an event, that information is processed at three stages (perception, retention, and recall) which all seem to be vulnerable to error under various conditions.

However, despite the progress made by researchers, inertia in the legal system has been difficult to overcome, and people are *still* incarcerated on the basis of eyewitness misidentification. These failures of the legal system would go unnoticed and uncorrected if not for the science of DNA analysis—one source of evidence in which the legal system still holds a strong belief (unlike the “sciences” of lie-detectors, phrenology and handwriting).

In the next chapter, I will explore a series of studies into the reliability of eyewitness testimony in order to distil the implications they have for reliability under various conditions.

Chapter 2: The Science

The accumulated social science research on the reliability of eyewitness testimony sheds some light on the vulnerabilities of the psychological process of testimony during its three phases (perception, retention and retrieval). Early studies conducted around the turn of the 20th century tipped psychologists off to the possibility that eyewitness testimony might not be on as solid epistemic ground as the courts had assumed it to be.

In the mid-20th century, during a period of significant social change, Elizabeth Loftus' research into eyewitness reliability reinvigorated the field, and there has since grown a large body of empirical knowledge about the reliability of eyewitness testimony over a vast range of conditions. The purpose of this chapter is not to offer a comprehensive review of the psychological literature (which could fill volumes), but to give the reader a general sense of the sorts of variables that tend to be investigated in these studies, and how they impact the reliability of eyewitness recollections. In addition, I want to impart a sense of how the research evolves over time in order to gain a more and more refined understanding of how humans perceive, store and retrieve information.

The first set of studies that investigate the weapon-focus effect demonstrate some of the factors that affect eyewitness testimony at the perceptual stage, and importantly, show how the research has progressed from only being able to make general claims about reliability in the presence of a weapon to being able to identify the underlying specific factor that causes the effect.

Next, I will present three studies that investigate the post-event information effect and its particularly damaging effect on children; the lack of a strong correlation between witness confidence and testimonial reliability; and finally, factors that can mitigate the effect of post-event information.

The third set of studies investigate the role our social biases play in our perceptions of events and other individuals. These studies were chosen for their significant implications for social justice. Finally, I discuss a study on the effects of sleep deprivation and eyewitness reliability.

Weapon focus

When a weapon is used in the commission of a crime, it can have a devastating effect on the reliability of eyewitness testimony. This effect came to be known as the *weapon focus effect*. Some of the earliest evidence for this phenomenon comes from an experiment (Johnson, 1977) designed to test the effect of emotional arousal on the reliability of eyewitness testimony. Johnson hypothesized that participants in a “low arousal” condition would be better able to describe and identify suspects than those in a “high arousal” condition.

During the experiment, each witness was brought into a reception area and told that the experimenter was busy with another participant in the room next door. Once the witness was seated, the receptionist secretly cued the experimenter and a confederate to begin either a hostile or a neutral interaction. During the hostile interaction (high arousal

condition), the witness overheard an argument between the experimenter and the confederate about continuing an experiment involving electric shocks. The exchange reached a crescendo with the sound of smashing bottles and furniture. The confederate would run out of the room with electrodes attached to his arms carrying a bloodied letter opener. He would turn to the witness and say, “he would not let me go.” Then he would leave.

During the low-arousal interaction, an “equipment failure” prevented the experiment from continuing. The confederate would emerge from the room with grease on his hands carrying a pen and say, “too bad the machine broke.”

After having witnessed the high or low arousal scenarios the witnesses were taken to an interrogation room by the experimenter (dressed as a policeman in the high arousal condition or in a lab coat in the low arousal condition). Witnesses were first asked to freely recall everything they could remember from the scene and then they were asked about specific details. Finally, they were shown mugshots and asked to identify the confederate. Two weeks later, they received a follow-up questionnaire.

When witnesses were asked to freely recall as many details about the scenario as they could, those in the low arousal condition fared better than did those in the high arousal condition. When asked direct questions about certain details of the scene, the most significant factor affecting performance was the time elapsed between witnessing an event and being questioned about it, with those in the low arousal condition performing best. In terms of total details recalled (the sum of the items recalled during the free recall

interrogation and in response to the interviewer's specific inquiries) the picture was reversed and participants in the *high* arousal condition did better.

When it came to identifying the confederate in the photo line-up, there was a significant difference between men and women across both arousal conditions. Among witnesses to the high arousal scenario, men correctly identified the confederate 58% of the time, while women had only an 8% correct identification rate. In the low arousal condition, however, women were significantly better (66%) than men (33%) at identifying the confederate.

The experiment also looked at "errors of commission," which refers to the incorrect inclusion of an item in the description of the event. Witnesses made more errors of commission in the high-arousal condition than in the low arousal condition, and women were more likely to make these kinds of errors than men were. As well, delaying the time between the event and the interrogation increased the frequency of these errors.

Rather than addressing the broader concept of the reliability of eyewitness testimony, this study focused on two *kinds* of testimony: identifying a suspect and answering direct questions.

When it comes to the reliability of suspect identification, the study suggests that the presence of stress-inducing objects can reduce the reliability of women's testimony. During the experiment, Johnson's confederates observed that during the high-arousal scenario women spent more time than men looking at the weapon, which led him to speculate that this preoccupation may have limited the number of peripheral details that

they were able to take in. On the other hand, in the absence of a weapon, women took in more peripheral details and were able to identify the correct suspect at a higher rate than men were.¹ However, regardless of possible gender differences, reliability is significantly reduced for everyone in high-arousal scenarios. Even under low-stress conditions, people are not particularly good at picking out strangers from a line-up, as accuracy never exceeded 67% in any of the experimental conditions.

Johnson found that when witnesses are asked direct questions about a crime, the most important reliability factor is the time between witnessing and testifying. In discussing his findings, Johnson recommends that police schedule witness interviews within 24 hours of the crime taking place.

There is, however, a key weakness in Johnson's experimental design that limits our ability to make inferences about the effect of arousal on the accuracy of testimony. Johnson's experiment did not control for the *type* of object in the confederate's hand, so he is only able to speculate that the effect was caused by attention being drawn to the bloodied letter opener that was present in the high-arousal condition. Over the following two decades, studies began to emerge that directly contradicted his findings, showing that stress was actually *beneficial* to eyewitness accuracy.

¹ A study carried out in 1990 did not find any significant gender differences between weapon-present and weapon-not-present conditions. However, this study significantly differed in methodology from the original Johnson experiment as participants merely looked at a sequence of still images of a crime and were not participants in a live staged scenario. (Kramer et al., 1990)

In 1991, Christianson et al (Christianson et al., 1991) ran an experiment where they presented a series of seven slides to 134 undergraduates depicting a scene involving a bicycle and a car at an intersection. They presented three different versions of the scene by swapping out the critical fourth slide. In the “high arousal” condition, the critical slide showed a woman bleeding from a head wound and lying on the ground next to the car. In the “unusual” condition, the critical slide depicted the woman carrying her bike over her shoulder in front of the car. Finally, in the neutral condition, the woman was depicted riding her bike near the car. After a five-minute filler task, participants were given a cued recall test for both central and peripheral details of the scene they had just witnessed. Surprisingly, they found that the participants in the high arousal condition had significantly better recall, getting 64% of the answers correct compared to 46% and 42% for the neutral and unusual conditions respectively.

In a 2004 meta-analytical study of 27 of these contradictory new studies, (Deffenbacher et al., 2004) found positive, negative and null effects of stress on eyewitness accuracy. The overall body of research was showing that stress can have *every* possible effect on eyewitness accuracy—a big problem for the weapon focus theory.

In order to explain this, the authors put forward an alternative to the “Yerkes-Dodson law,” which holds that a person’s performance on any given cognitive task will (more or less) follow an inverted U-curve as stress increases. This means that cognitive performance improves up to a moderate level of stress and then rapidly decreases as stress increases past that level.

However, Deffenbacher argues that attention control has two modes: an activation mode and an arousal mode. In response to stressful stimuli, one of these modes will dominate, and cognitive performance will be different depending upon which mode is dominant for any given individual. Each mode also produces its own physiological response. The *activation* mode is associated with a *defensive* response that is characterized by increased heart rate, blood pressure, and muscle tone; whereas the *arousal mode* is associated with an *orienting* response that is characterized by a slowing heart rate, reduced blood pressure and muscle tone. Importantly, Deffenbacher theorizes that these two responses—orienting and defensive—have different effects on the accuracy of eyewitness recall, with the orienting response leading to enhanced memory for the most interesting and informative aspects of a given stimulus, while the defensive response leads to either enhanced memory *or* memory impairment.

Returning to the Christianson experiment described above, the results can therefore be explained by the slide depicting the wounded woman inducing an *arousal mode* and its associated memory-enhancing *orienting* physiological response, whereas being a participant in a live action scenario like the one used in the Johnson experiment induces the activation mode and its associated memory-impairing defensive response.

In a test of Deffenbacher's theory, Hope and Wright designed an experiment (Hope & Wright, 2006) to disentangle the effect of merely novel stimuli from the effect of threatening stimuli on eyewitness accuracy and to determine whether any differences could be attributed to the degree to which novel and threatening stimuli draw attention to themselves.

They showed 45 university students a series of slides depicting a man entering a convenience store and removing an object from his jacket. Depending on which experimental group the participants were in, they would see the man pull out either a gun, a colorful feather duster, or a leather wallet. As they watched the slides, participants had to press a key on their keyboard every time an odd number appeared on their screen in order to measure attentional drain. Once the participants had watched the slide show, and completed a 20-minute filler activity, they were asked 22 yes/no questions about the appearance of the man depicted in the slide show.

They found that reaction times suffered significantly in the weapon and feather duster conditions compared to the control condition (where the man simply takes out a wallet). However, there was no significant difference between reaction times in the weapon and feather duster conditions.

As expected, eyewitness recall of the suspect's description was most accurate among those in the control group who saw the man take out his wallet (87% mean accuracy) but decreased in the experimental conditions, with 59% accuracy for the threatening (weapon) group, and 70% for the unusual (feather duster) group. For recall of the *object* removed from the man's jacket, however, the results were flipped: 93% of witnesses in the weapon condition correctly reported seeing the man take a gun from his pocket, 67% of witnesses in the unusual condition reported the feather duster, while only 60% in the control condition remembered that the man pulled out his wallet.

In addition to impairing eyewitness accuracy, Hope and Wright found that response times on the concurrent task were significantly slower for those in the

experimental conditions, suggesting that the presence of these objects demanded more cognitive processing than the wallet. Both the novel and threatening stimuli seem to do the same thing to slightly varying degrees: they draw the witness's attention away from the peripheral details of the scene and towards themselves, giving witnesses more time to encode them into memory.

From these results, it looks like the weapon focus effect can be explained in terms of attention. The weapon and the feather duster draw attention away from the odd numbers flashing under the slides causing performance on the concurrent button-pushing task to suffer. This is consistent with the earlier findings of (E. F. Loftus et al., 1987) who tracked participants' eye movements while they were observing a simulated bank robbery and found that witnesses spent significantly more time looking at the object in the actor's hand when it was a gun than when it was a cheque.

So, we can infer that for someone to testify reliably, they at least need to have paid attention to the thing they are testifying about. Moreover, the presence of threatening objects, and (to a lesser extent) unusual objects are the sorts of things that draw a witness's attention away from peripheral details. In a 1990 study entitled *Weapon Focus, Arousal, and Eyewitness Memory: Attention Must Be Paid*, (Kramer et al., 1990) argue for the central role of attention in explaining the weapon focus effect. In their experiment they controlled for the time participants spent looking at either the weapon or the suspect's face and found that the amount of time spent looking at a given feature (whether it was a gun or a suspect's face) was positively correlated with later recall of that feature.

In addition to being a clear example of how the scientific study of eyewitness testimony iterates and refines its understanding of the fundamental factors that impair eyewitness testimony, this set of studies serve as a reminder that in such a large body of research, there are bound to be seemingly inconsistent results popping up from time to time.

Post-event information

Another factor that research shows can affect the reliability of eyewitness accounts is the “post-event information effect” where a witness’ memory of an event is manipulated by a casual remark from another witness or the leading questions of an investigator, attorney, or prosecutor. Since Loftus’s original experiment in the 70s (briefly discussed in the previous chapter), further research has refined our understanding of the effect, providing insight into susceptible populations, the subjective experience associated with misinformation, and even into factors that can reduce the effect.

To find out whether children are a particularly susceptible population to misinformation effects, (Roebers & Schneider, 2000) recruited 284 participants from four different age groups: six-year-olds, eight-year-olds, ten-year-olds, and adults. During the experiment, each participant was shown a video in which a boy and his little sister are stopped by a gang of boys who, after a fight, steal money from the boy and run off.

In order to assess *cued recall*, subjects were called in three weeks later to answer questions about the events depicted in the video. Half of the subjects were asked leading questions and the other half were asked unbiased questions. The questions themselves

were divided into two categories based on whether they referred to the central or peripheral details of the video. The central details were the major plot beats, such as the boy and his sister encountering a gang of boys, the fight, the gang running away, and the boy not getting his money back. Peripheral details included how the characters looked and what they were wearing.

At four weeks, participants were assessed for *recognition* by questioning them about the same details they were asked about in the first interview. However, this time they were given a choice between two alternative answers.

In terms of the total accuracy of *cued recall* (the questions asked at three weeks), they found that age has a significant effect on accuracy, with accuracy increasing with age regardless of whether the questions asked were biased or unbiased. Also, the older the participant, the better they were at resisting the effects of biased questioning. It is also worth noting that there was a strange reversal of the effect of biased questioning on children and adults. While biased questioning impaired the recall of children, it slightly *enhanced* the recall of adults by about 9%.

When it came to the cued recall of central and peripheral details, older participants were generally more accurate, and that all participants had better recall of central over peripheral details. However, the negative effect of misleading questioning on recall was amplified in very young children when the questions were about peripheral rather than central details.

Overall, recognition accuracy was higher than cued recall accuracy for all groups; however, they found that age had a similar effect, with accuracy increasing with age up to

adulthood. Generally, results here followed the same pattern as those with cued recall except that when it comes to recognition accuracy, the misinformation effect mainly impairs the recognition of peripheral details. Nevertheless, children under seven-years-old still produced less accurate testimony than the older participants.

Overall, the study suggests that adults (when not being deceptive) are more competent eyewitnesses than children, even when exposed to post-event information. Conversely, very young children are unreliable witnesses, and post-event information introduced through biased questioning further reduces their already poor reliability as witnesses.

These results should be disquieting to anyone interested in protecting children from abuse since the victims are often the sole witnesses. However, if it is necessary to rely on the testimony of children, the study provides us with three possible ways to enhance the reliability of children's testimony: avoid biased questions, use recognition questions instead of open-ended questions, and focus on central rather than peripheral details.

When children were interviewed using *unbiased* questions, for their *recognition* of *central* details, they answered 6.4 of 8 questions correctly on average as opposed to just 2.1 of 8 when the questions were biased, open ended, and about peripheral details (essentially the worst-case scenario when it comes to child witnesses).

Another set of studies delves deeper into eyewitness susceptibility to post-event information. All propositional memories² have subjective qualities pertaining to the strength of the memory; some memories are vague recollections, while others are remembered with a sense of absolute certainty. Researchers wondered, What if there were a measurable difference in the subjective experience associated with a true memory and the subjective experience associated with misinformation? Moreover, do people more confidently remember misinformation that contradicts their experience than information that merely adds to what they saw? Finally, what effect does time have on the subjective experience of remembered misinformation? To find out, researchers (Frost, 2000) gathered 48 volunteers to watch computer-projected slides depicting a man stealing 20 dollars and a calculator from an office. Four slides contained critical details and one of two versions of the slides were shown during each experimental session. For example, participants were shown a mug with either the letter “M” or “L” printed on it, a Coke or a Sunkist can, a Glamour or a Vogue magazine, and a hammer or wrench.

After watching the slide show, participants were fed misinformation through a written narrative that provided details that contradicted two of the four slides. Finally, they were asked four cued recall questions: two questions were associated with the contradictory misinformation presented in the narrative, and two control questions referred to critical details that had not been presented in the narrative. In order to measure

² Muscle memory, a non-propositional kind of memory, does not seem to be associated with any subjective experience of its strength. For example, one’s muscle memory of how to juggle can be strong and they can juggle well, or the memory has faded, and they can juggle poorly or not at all. We seem to have no (or at least very little) introspective access to the strength of our muscle memories; we judge the strength of our muscle memories empirically.

memory confidence, participants were asked to indicate after each question whether they “knew” (believed they had seen a detail but could not explicitly remember the episode in which the detail was encoded) or “remembered” the detail in question (had a memory of the episode in which the detail was encoded). For example, one might remember where they left their car keys by picturing the moment they misplaced them, or they might have a vague idea of where they might be without being able to picture the specific moment they misplaced them.

To compare the effects of additive and contradictory misinformation, the researchers ran a second experiment that largely mirrored the method of the first but differed in that it included additive information to the narrative. Finally, participants were randomly assigned to take the cued recall test either right away or one week later.

The results of this study showed that there was clearly a misinformation effect. When participants were asked questions related to the misleading narrative, they were more likely to select answers that were consistent with the misinformation than when they were asked control questions. For example, if the slide showed a man drinking Coke but the narrative said the man was drinking Sunkist, participants were more likely to respond to the question about what the man was drinking in a manner consistent with the misinformation they had heard and select “Sunkist” than if they had been asked a question about a detail *not* present in the misinformation narrative³.

³ The study does not include a list of the actual questions used, so this example is purely hypothetical.

As for subjective judgments about the strength of their memories, participants were more likely to select “know” judgments after short retention intervals than if they had waited a week. When the misinformation included *additive* details, participants were more likely to select “remember” judgments. However, when the misinformation was *contradictory*, participants were more likely to select “know” judgments regardless of whether they had waited ten minutes or one week before being questioned.

This study provides additional evidence that the post-event information effect is real; eyewitness testimony is less reliable when witnesses are fed a false narrative prior to questioning, since there is a good chance that they will incorporate aspects of the narrative into their testimony. Moreover, the results also show that as the time between witnessing an event and testifying increases, a witness’ confidence becomes a less useful indicator that they will give reliable testimony. However, when the interval is as short as ten minutes, an unsure witness is a slightly more reliable indicator that they are about to give testimony that has incorporated misinformation. In their discussion of the findings, the authors explain this by suggesting that people tend to forget more quickly the sources of their information than the information itself.

Knowing that misinformation can have a significant effect on eyewitness reliability, is there any way to mitigate it? A study conducted in 2012 sought to find out whether misinformation presented as a question has the same negative effect on eyewitness reliability as misinformation presented in the form of a statement. Seventy-two undergraduates were shown a six-minute video clip showing the morning routine of a university student. Similar to the studies discussed already, two versions of the video

were shown with one version replacing several critical objects (for example, swapping out a mop for a broom). After watching the video, participants were given misinformation through one of several audio narratives that were presented as the diary entry of the student featured in the video. These audio narratives presented the misinformation either as an affirmative sentence or as a question. For example, “I reached for the toothpaste beside the cleansing cream. Was it Dove?” or “I reached for the toothpaste beside the Dove cleansing cream.” Finally, participants were given a cued recall test for the items shown in the video (Lee & Chen, 2013).

The results were striking. When misinformation was presented in the form of a statement, they found the expected misinformation effect with participants recalling the correct items only 61% of the time. However, when misinformation was presented as a question, participants recalled correct items 78% of the time. This last result was astonishingly close to the accuracy of the control group that had heard a narrative that confirmed what they had seen in the video (82%).

The growing body of evidence on the post-event information effect confirms that eyewitness testimony can be manipulated rather easily and in ways that are hard to detect or notice. The difficulty at a practical level, is to design systems and protocols that effectively minimize the ability of unscrupulous agents to exploit this effect to their own ends.

Social bias

Identifying suspects is a critical function of eyewitnesses, and they are routinely called upon by the criminal justice system to identify one stranger among a group of similar looking strangers⁴. Unfortunately, our social biases can impair our ability to do this task accurately. One of these biases is known as the *own-race bias*, which refers to the tendency of individuals to be better at recognizing people belonging to their own race than they are at recognizing people belonging to other races. Psychologists first began to investigate this phenomenon in the 1930s and have since developed a large confirming body of research. In one meta-analytic review of 39 own-race bias studies, researchers found that own-race bias accounted for around 15% of the variance in eyewitness identification accuracy across the studies surveyed. The effect is highly replicated across many studies, with one meta-analysis finding a significant own-race bias effect in 80% of the studies it examined. Moreover, the effect is consistent across racial groups (Meissner & Brigham, 2001).

In recent decades, psychologists have begun to investigate a closely related bias: *own gender bias*. Given that we know people have trouble with cross-race eyewitness identification, could people also have trouble identifying suspects of different genders? (Wright & Sladden, 2003) recruited 20 female and 20 male university students to take part in an experiment to find out.

⁴ Provided that the line-up is un-biased. An un-biased line-up is, ideally, one where the police's suspect doesn't stand out like a sore thumb—for example by not placing a black suspect next to five other white men.

Each participant was shown a random sample of photos of 24 faces that were divided evenly into four categories: male, female, hair visible, and hair not visible. After looking at the photos, participants were then shown another random sample of photos of men and women (all with hair) and for each photo they were asked whether they recognized the person in it, and to rate how confident they were about that on a scale of one to ten. In addition to recognition and level of confidence, the researchers were also interested in measuring a construct called “recollective state.” This construct involves four states: remember, know, familiar, and guess. Like the Frost study described in the previous section, if a participant chose “remember,” it meant that they could actually recall the particular episode of having seen the face. If they chose “know,” it meant that they felt that they recognized the face but could not remember the specific episode in which they first saw it. If they chose “familiar,” it meant that the face just felt more familiar than the faces they did not recognize. Finally, if they chose “guess,” the face was completely unfamiliar to them, and they were simply guessing.

The results of the experiment showed that, on average, men are about two and a half times less accurate at recognizing female faces than they were at recognizing male faces, and women are nearly three times less accurate at identifying male faces than female faces. They also found that when witnesses can see a suspect’s hair, it enhances their ability to identify them later—especially if they are of the same gender as the witness.

Finally, when it came to the “recollective states,” they found a large difference in the number of times participants “remembered” faces with hair than without hair. In the

cross-gender condition, the researchers counted four instances of remembering when hair was not visible versus 39 instances of remembering when hair was visible. In the same-gender condition, they counted only three instances of remembering in the hair-not-visible condition versus 69 instances of remembering in the hair-visible condition.

These results tell us that the accuracy of suspect identification testimony is increased significantly when the witness and the suspect are the same gender. Moreover, if a suspect's hair is not visible during the crime, the reliability of this sort of testimony is further reduced (although to a *slightly* lesser degree when the witness and suspect are the same gender).

This provides interesting insight into the relationship between witness confidence and suspect identification accuracy. This is especially important given that jurors and people in general tend to give more credibility to the testimony of confident witnesses as opposed to witnesses who appear reticent or unsure (Cutler et al., 1988). The study suggests that confident witnesses are more likely to correctly identify suspects; when witnesses had not seen a face before, they tended to report less certain recollective states than when they had actually seen the face. However, the correlation is by no means perfect; many witnesses who had never seen a face before, nevertheless, reported either remembering a specific episode of seeing the face or knowing that they had seen the face but couldn't remember the specific episode. When a suspect's hair is covered, witness confidence becomes an even worse indicator of accuracy; under this condition, witnesses were more likely to report never having seen a face that they had actually seen, and when they *had* seen a face, they were less confident in their memories.

Sleep deprivation

In 2014, (Frenda et al., 2014) conducted an experiment to determine what effect, if any, sleep deprivation has on an eyewitness's tendency to accept and incorporate post-event information into his or her testimony. Earlier studies into the effect of sleep deprivation on the formation of false memories relied on the Deese-Roediger-McDermott (DRM) paradigm which involves giving participants a list of thematically related words to remember and then asking them if they recall seeing a non-appearing thematically related word. For example, subjects might be given a list of words like drive, tire, engine, brake, etc. and then asked if they had seen the word "car" appear in the list. The idea is that the car-related words in the list will make people more likely to incorporate the word "car" into their memory of what was on the list. This paradigm has come in for criticism for being too artificial, and studies that have used it have generated mixed results.

Looking to overcome the shortcomings of previous studies, Frenda et al conducted two experiments. They designed the first experiment to determine whether sleep restriction makes eyewitnesses more likely to form false memories. They designed the second to determine the effect of 24-hour sleep deprivation on a witness's susceptibility to false memory formation and to figure out whether the effect is greatest when sleep deprivation occurs before or after witnesses are exposed to events that they are later asked to recall.

For the first experiment, researchers recruited 193 undergraduates and had them self-report the amount of sleep they had gotten the night before the experiment.

Participants took part in two tasks: a news event task and a misinformation task. In the

news event task, participants were asked to fill out a questionnaire on a brief passage about the plane that failed to hit its intended target on the September 11 attack and crashed in a field in Pennsylvania. The passage claimed that video of the crash had been widely distributed online (it had not) and participants were asked to indicate on the form whether they had seen the footage.

After completing the news event task, participants were shown two sets of 50 photographs that depicted someone breaking into a car in a parking lot. Forty minutes later, they were shown a text narrative for each photo they had seen. Mixed into each narrative were false statements that contradicted certain details present in the photos they had been shown. Finally, participants were given a multiple-choice questionnaire testing their memory for certain details depicted in the photographs.

The results of the news event task showed that the participants who had reported fewer than five hours of sleep the previous night were about 20% more likely to report having seen the non-existent Pennsylvania plane crash video than were participants who were not sleep-deprived. On the misinformation task, however, the differences were slighter. The sleep-deprived group incorporated misinformation into their responses to the multiple-choice test 38% of the time, while the control group did so just 28% of the time.

The second experiment aimed at determining the effect of 24-hour sleep deprivation on the formation of false memories, and to further tease out at what stage in the memory formation process sleep deprivation is most detrimental.

Researchers recruited a sample of 104 undergraduates and subjected them to the same process as described in the first experiment: they self-reported the amount of sleep they got the previous night, read the passage about the plane crash, filled out the questionnaire, saw the photos of the car break-in and answered questions about it. In order to test the effects of sleep deprivation, some participants were assigned to encode (remember) some information either in the evening or the morning, and in each group, half the participants were kept awake all night and half were allowed to sleep. This design allowed researchers to ascertain whether sleep deprivation has a greater impact on memory when it occurs before or after the memory has been formed.

The results showed that the sleep-deprived group were more susceptible to misinformation relative to the rested group. However, this effect only held true when participants were sleep deprived *during* the initial encoding of the information. When participants were rested during encoding *and then* sleep deprived, there was no discernible effect on memory.

This experiment tells us two key things about the reliability of eyewitness testimony. First, witnesses who have had fewer than five hours of sleep prior to witnessing an event are less reliable than well-rested witnesses since they are more likely to incorporate misinformation and false memories into their testimony. Second, witnesses who have been sleep deprived for 24 hours immediately prior to an event are less reliable since they are more likely to incorporate misinformation into their testimony. However, when witnesses are well-rested during an event, but sleep deprived prior to giving testimony, there is no significant impact on reliability.

Conclusion

In this chapter, we reviewed a small sample of the empirical research conducted into the reliability of eyewitness testimony in order to get a sense of the complex and evolving web of factors that have been empirically shown to modify the reliability of eyewitness testimony.

The early research into the weapon focus effect seemed to suggest that eyewitnesses are less reliable when they perceive events in a high stress context—specifically when a weapon is present. However, as psychologists moved to resolve contradictory findings, a more fundamental factor than anxiety or the presence of a weapon was uncovered, namely attention. Testimony about something one did not notice is unreliable testimony.

Witnesses are also susceptible to false narratives in the form of post-event information, and very young children are especially vulnerable since they have not developed the cognitive tools to resist misinformation. When gathering testimony from children, the misinformation effect can be mitigated by asking open-ended questions and avoiding leading questions. Moreover, their testimony will generally be more accurate when it is about central rather than peripheral details.

There are also measurable differences in the subjective feeling associated with true memories and false memories derived from misinformation. Witnesses tend to be less sure of their false memories than of their true memories when the retention interval is short, however as the retention interval increases, their confidence becomes a less reliable indicator that they will give accurate testimony.

There is also at least one factor known to mitigate the misinformation effect: when misinformation is given in the form of a question, it has no effect on a witness's ability to recall true events.

Social biases can also influence the accuracy of eyewitness testimony. Witnesses are not very good at reliably identifying suspects of a different race or gender, and reliability is further degraded when witnesses are unable to see a suspect's hair. Furthermore, contrary to common sense, when a witness appears confident in their identification of a suspect, their level of confidence in their own testimony is not a reliable indicator that they are in fact correct.

Finally, sleep deprivation is a factor that can impact the reliability of eyewitness testimony by making witnesses more susceptible to misinformation.

While these studies paint a grim picture for the reliability of eyewitness testimony, it is important to keep in mind they are all experimental studies which limits our ability to generalize their results to the rest of the population. A specific criticism that has been levelled against experimental psychological research is that researchers tend to enroll participants that are close at hand, which happen to be mostly white university students. In psychological research there are two general kinds of studies: observational and experimental. Both research methods come with trade-offs. While experimental studies can establish a causal relationship between dependent and independent variables, they suffer from limited generalizability. On the other hand, observational studies (typically surveys, or analysis of population data collected over time) are highly generalizable but can only establish correlations. Nevertheless, psychological

experiments can be made more generalizable by taking steps to ensure that participants represent an accurate cross-section of the population to which you want to generalize your results.

In the next and final chapter, I will argue that a corollary of Goldman's reliabilist theory of justified belief is that—given that testimony is a psychological process—one derives justified belief from testimony just in case that process is reliable. From this premise, I propose a short list of epistemic norms derived from the research presented above, and I argue that we are justified in adopting these norms (at least in part) on the grounds that it could reduce or eliminate testimonial injustice.

Chapter 3: Adopting a Scientific Attitude Towards Eyewitness Testimony

The circular logic of the empirical research

The question of whether we are even epistemically entitled to rely on the findings of psychologists to tell us about the reliability of eyewitness testimony may seem like a strange question to ask but is nevertheless one that anti-reductionist C.A.J. Coady seriously considers. Coady challenges the conceptual basis for empirical research into eyewitness testimony, arguing that the empirical investigation into the reliability of eyewitness testimony is an incoherent endeavor. He argues that reported results of experiments like those surveyed in the previous chapter are themselves a form of testimony. Thus, if the psychologists are correct in their claim that eyewitness testimony is generally unreliable, then so too must be the testimony they publish in their academic journals. Coady writes:

“The ‘findings’ of psychological science are represented as the outcome of quite neutral cognitive processes operated by beings of a superior intellectual and moral status whose interest in the outcome and application of their inquiries is wholly ‘scientific’, i.e. beyond discussion. A curious paradox results when this picture is confronted with the actual claims of the tradition, since these claims are predominantly dismissive and disparaging of basic human capacities for arriving at the truth. Only the psychologist stands aloof, above the fray, Promethean and triumphant—but how? After all, many of the frailties and fallibilities he purports to uncover are apparently part of the human condition and is he not human? Does he not use perception, memory, inference, testimony?”

Is he not biased, partial, full of expectations and ambitions—even in his professional work? Does he lack a psychology?” (Coady, 1994, p. 4)

Coady’s charge of incoherence here is off the mark because he treats testimony as a single category when there are numerous features that meaningfully differentiate one instance of testimony from another. For example, in the previous chapter we saw how the testimony given in the presence of threatening objects differs from the testimony given in the presence of a merely novel object; we saw how testimony can be distinguished on the basis of the type of question to which it is a response; we saw the difference between testimony given in the presence of misinformation and testimony without misinformation; and so on. Consider Fricker’s criticism of Coady:

“...while such work, conceived as an independent investigation into the reliability of all testimony as a single category, would be, as Coady rightly points out, incoherent (since the investigation itself must depend on testimony), there are clearly other ways of conceiving it; as testing, non-circularly, the reliability of specific kinds of testimony, in specific circumstances; or as seeking an internal, rather than a foundational, vindication of reliance on testimony” (E. Fricker, 1995, p. 408).

Fricker has it right; it *would* be incoherent to investigate the reliability of testimony as a single category, but clearly there are different categories of testimony. The psychologists investigating the reliability of eyewitness testimony are looking into a very specific *kind* of testimony that involves difficult perceptual and cognitive tasks, such as encoding peripheral details during brief, high-stress encounters; holding many details in

memory and guarding them from misinformation effects; or recognizing a suspect with whom the witness has only had brief contact. Contrast this with the kinds of testimony that we intuitively take to be very accurate: testifying to the directions to the corner store, your own name, where you work, certain facts that you studied in school, the peer-reviewed observations made during the last experiment you conducted into the reliability of eyewitness testimony. Clearly eyewitness testimony—at least that of most interest to psychologists—is a completely different and more difficult cognitive task compared to these mundane kinds of testimony. As testimony researcher Robert Buckhout points out, “Research and courtroom experience provide ample evidence that an eyewitness to a crime is being asked to be something and do something that a normal human being was not created to be or do” (Buckhout, 1974, p. 23).

There is a distinction, therefore, to be made between at least two broad categories of testimony: controlled and uncontrolled eyewitness testimony. On my view, testimony is controlled when the factors that are empirically known to impair the reliability of testimony are either not present, or whose effect on testimonial reliability are managed. When we look at the relative positions of the researcher and participant in a given experiment, the distinction becomes obvious. For example, a conscientious psychologist conducting an experiment into the weapon focus effect might set up a scenario involving a mock crime to which he would expose a sample of participants. The participants would likely be experiencing stress, and their attention would be drawn away from salient details by menacing letter openers or odd feather dusters. Thus, the testimony perceived and retained under such chaotic conditions will be “uncontrolled.” Contrast this with the position of the researcher. He will have carefully set up the experimental scene through

multiple revisions; chosen each central and peripheral detail; and he will know the experimental scenario by heart. During the experiment he will calmly record his observations, by taking notes, recording data in a database and videotaping the reactions of his participants. Afterwards, he will analyze his observations, apply statistical calculations and produce an interpretation of his findings in light of other similarly conducted research. He will submit his work to a journal where his peers will review his findings for errors and inconsistencies before being published. And this final published study will be an instance of “controlled” testimony.

So, when psychologists say that testimony has been found to be generally unreliable, they are referring specifically to uncontrolled testimony—a distinct cognitive task from controlled testimony. Therefore, we are epistemically entitled to use empirical research to evaluate the reliability of eyewitness testimony.

Testimonial reliabilism

Testimony is a mental process that takes certain mental characteristics as inputs and outputs beliefs (Matheson, 2006). Specifically, testimony is a process that takes in, through the senses, another person’s understood linguistic reports about the world and outputs belief in what is reported. Consider what it takes for me to testify that it snowed last Thursday. First, I must receive the visual stimulus that usually obtains when it is snowing. The raw data received by my retina is processed at progressively higher levels of abstraction in my visual cortex and then the resulting information is stored as a memory in my hippocampus. Later, I see you and you ask me how the weather was last Thursday, triggering me to retrieve the memory and form an appropriate linguistic

utterance in response to the question: “It snowed last Thursday.” Finally, without belabouring the details, you hear and understand my utterance and come to believe that it snowed last Thursday.

If testimony is a psychological process, then what does it take for that process to produce justified belief in the hearer? The simplest, and most intuitive, answer is: if the process of testimony is a reliable process—one that generally outputs true utterances—then beliefs formed based on the outputs of that process are justified (Goldman, 1979). This idea comes out of the debate surrounding justification of belief in general. First articulated in the 1970s by Alvin Goldman, “reliabilism” was conceived as a way forward to an analysis of knowledge that could address the shortcomings of evidentialist⁵ proposals. While foundationalists⁶ are hard pressed to explain how basic beliefs confer justification, reliabilism explains basic belief justification in terms of the reliability of the process through which those beliefs are formed. For example, according to reliabilism, beliefs formed on the basis of vision are deemed basic beliefs because vision is a generally reliable belief-forming process.

In addition to dealing with concerns raised against evidentialism, reliabilism also responds to objections levelled against non-evidentialist contenders like Nozick’s Tracking Theory. As well as the standard requirement, true belief, Tracking Theory requires that knowers use a method to form their belief, so that when that method is

⁵ Evidentialism is the idea that beliefs are justified in virtue of our articulable reasons to hold them.

⁶ Foundationalism is the idea that our beliefs are justified by a set of basic, foundational beliefs that cannot be justified in terms of any further beliefs.

applied, the resulting belief tracks the truth value of the proposition in question (Nozick, 1981). For example, when I believe the proposition, “I am one thousand feet above sea-level,” based on the read-out of a properly functioning altimeter, my belief is justified because it has been formed by applying a method that tracks the true altitude above sea level.

A problem for truth-tracking theories of justification is that it is not clear that truth-tracking is necessary for justification. For example, if I were to use the method of “glancing over yonder” to form a belief about whether or not there is a bear eating honey over there, that method tracks the truth if, whenever I glance over yonder, and there is a bear eating honey over there, I will typically come to form the belief that there is a bear eating honey; and when there is not a bear eating honey, I will typically come to believe that there is *not* a bear eating honey. However, if there is a hill blocking my view, then it is possible that even if I apply my truth-tracking method, I will form the belief that there is not a bear eating honey over there, even if, in fact, there is a bear eating honey behind the hill—the method is not truth tracking. The absurd conclusion that follows is that, according to the requirements set out by the truth-tracking theory, if I were to use the method of looking over yonder and I clearly saw a bear eating honey, I would not be justified in believing that there was a bear eating honey because I had not used a truth-tracking method.

Reliabilism has an answer to this problem: “looking over yonder” is not a reliable belief forming process because it is possible that one’s view of bears eating honey can be occluded by a hill. For the reliabilist, you are only justified in your belief about there

being bears over there eating honey if, in addition to looking over yonder, you also look behind all obstacles big enough for a bear to hide behind.

Although reliabilism solves problems with other theories of justification, it has been criticized for allowing “justified belief” in something that is clearly not true. Imagine that you have a mental clone that shares all your thoughts, experiences, and beliefs. When you come to believe that Biden legitimately won the 2020 presidential election, so does your mental clone. However, your mental clone is a brain-in-a-vat. When you form the belief that you are driving a car using a reliable process involving visual perception, tactile feedback, sound, and information from your inner ear, your mental clone forms the exact same belief using the same reliable belief-forming process. By reliabilism, your clone is as justified in the belief that they are driving a car as you are.

The problem with this objection is that it is not clear that your mental clone is, in fact using an identical belief forming process. On the surface, it seems that when I use my reliable visual process to arrive at the justified belief that there is an infinity cube⁷ in my hand, my mental clone would also use his putatively reliable visual process to arrive at the same belief. However, when we compare the two processes, my visual process is different from that of my mental clone. For me to see the infinity cube in my hand, photons are reflected off the object and sent flying into the rods and cones in my retina. This causes chemical changes in those cells which stimulates them to send action potentials through my optic nerve to my brain. However, if my mental clone is a brain in a vat whose optic nerve is directly wired into a computer simulation, then the similarities

⁷ A stress-relieving desk toy

between our visual processes ends where the optic nerve meets the retina or, in the case of my clone, where his optic nerve plugs into the simulator's HDMI port. Thus, it does not logically follow that my mental clone's belief that he is holding an infinity cube is justified in virtue of *my* belief being justified on the basis of the reliability of *my* visual process.

Another objection to reliabilism is that it has trouble responding to counterexamples involving accidental reliability. Is someone justified in believing that P if they come to believe that P through a process that they have reason to think is unreliable, but is actually reliable? In order to exclude this kind of accidental justification, Goldman adds a "no defeater" clause to his original analysis: justification requires, in addition to being formed through a reliable process, that there also be no reliable process available to S that, had S used it, it would have caused S not to believe that P. If I come to believe that it only rains when my dog wags her tail, and I have reason to believe that this is an unreliable process, I now have an alternate reasoning process I can use: "my belief that it rains whenever my dog wags her tail was formed through an unreliable process, so I will not believe that it rains whenever my dog wags her tail."

While this solves the problem of accidental reliability when there is an alternative process available to a subject, what if there isn't one available and the subject has no idea whether their belief has been formed through a reliable process? However, this line of criticism starts to push the limits of plausibility by asking us to imagine someone who is reliably clairvoyant about things but has no evidence for or against the existence of clairvoyance or that he possesses the power (BonJour, 1985, p. 41).

Another objection to reliabilism, the *generality problem*, is that putatively reliable belief-forming processes are not generalizable (Feldman, 2003, pp. 96–97). That is, a reliable process in one context can be an unreliable process in another context. For example, one might reasonably think that a cursory glance over yonder is an unreliable process, whereas a careful, painstaking observation is a reliable process. However, a cursory glance into a room will reliably yield true beliefs like “that room is empty.” Likewise, it is conceivable that reliable processes like detailed observation could yield false beliefs. For example, someone who is unfamiliar with Italian wines might take a sip of a Chianti, carefully swirling the wine over their tongue and savoring the flavours in the same manner a sommelier would do, but nevertheless come to the incorrect conclusion that they are drinking an Amarone.

This objection fails to take into consideration that for any process to be reliable, it must be appropriately matched to the task to which it is being applied. So, if your task is to reliably form a belief about whether a room is empty, then a cursory glance is a reliable process for that task. If your task is to form a belief about the type of wine you are drinking, then carefully tasting the wine is not a reliable process; in addition to swirling the wine over all your tastebuds, and aerating the wine, you must also have had sufficient experience and training. To use an analogy, Consider the pen-and-paper algorithms we all learn in elementary school to perform addition and division. These are both reliable processes for coming to believe certain mathematical propositions. However, the long division algorithm is an unreliable process for forming beliefs about the sum of 343 and 788; likewise, the addition algorithm is an unreliable process for forming beliefs about the number of times 550 can be divided by 110. Nevertheless, this

does not shake our correct belief that these are reliable belief forming processes when used properly.

Given that testimony is fundamentally a psychophysical process, involving both the physics of perception, and the psychology of memory and retrieval, and that reliabilism offers a robust and intuitive account of doxastic justification, I will propose a tentative analysis of justified testimony-based belief roughly along the following lines:

A hearer is justified in believing the testimonial proposition P only if the testifier's testimony was not subject to reliability-defeating factors during its formation or transmission.

I am not putting this forward as a complete analysis of justified testimonial belief, however, if we can accept something along these lines, something that is sensitive to the variables uncovered by the empirical research that impact witness reliability, then we can reasonably state the following general norm:

One ought to be skeptical of testimony formed through an unreliable process.

This norm, however, is far too general to be useful. The first thing one attempting to put it into practice might wonder is how to tell if any instance of testimony was formed via an unreliable process. In the next section, and in order to address this issue, I will put forward a set of very specific norms that can be distilled from the research discussed in the previous chapter.

The norms

The series of studies on the weapon focus effect provide a vivid example of how the science and the norms that can be derived from them evolve over time. From the Johnson study, we might come up with these epistemic norms to follow when a weapon is present during the commission of a crime:

***Weapon:** One ought to be skeptical of free-recall eyewitness testimony where a weapon is present during the encoding phase*

***Memory decay:** One ought to be skeptical of eyewitness testimony given in response to specific questions where the time elapsed from the initial encoding is greater than two-weeks.*

***Weapon + gender:** One ought to be less skeptical of free-recall eyewitness testimony, given by a man rather than a woman, where that testimony was encoded in the presence of a weapon; conversely, one ought to be less skeptical of the same kind of testimony, given by a woman, encoded in the absence of a weapon.*

Although these norms are justified by the Johnson study, we saw in the second chapter that the findings weren't getting at the heart of the phenomenon; the differences found between the weapon-present and weapon-not-present; as well as those found between genders were abstractions from the more fundamental factor of attention. With that in mind, we can replace (1), and (3) with the following:

Attention: One ought to be skeptical of eyewitness testimony where the witness' attention was drawn away from salient details.

This norm more closely aligns with the current empirical findings and does away with the problematic sexist overtones of (3); no longer would one be justified in dismissing one's eyewitness testimony based on their gender—only attention matters. One problem with this norm is that it is highly impractical. Outside of a lab setting, where eye movement can be tracked, it would be nearly impossible to ascertain whether, or to what degree a witness was paying attention to details of interest during encoding. So, perhaps we might opt for a practical version of the norm that adds a probability condition (PC):

Attention (PC): One ought to be skeptical of eyewitness testimony where the witness' attention was likely drawn away from salient details.

In this case, our norm can be applied based on knowable factors, such as the presence of a weapon, or the level of arousal. However, it is not entirely implausible that perhaps a simple test could be devised to determine where a witness' attention was during encoding. For example, further research might uncover a negative correlation between the level of detail of a witness' description of a suspect's weapon and the amount of time they spent looking at the suspect's face.

To illustrate how empirically backed norms could be used, consider a hypothetical trial of an armed robbery suspect. Instead of applying traditional epistemic norms like *one ought to give credibility a witness if it is unlikely that they are lying* (a common-sense norm that derives from the false assumption that memory functions like a tape-recorder),

jurors should apply norms that are based on what empirical research has discovered about human attention and memory. If the suspect pointed a gun at the witness, then jurors should treat that testimony with some skepticism, and look for other evidence that might confirm or deny their testimony. During the 1970s, my mother was robbed at gunpoint while working in a bank. After the incident, she gave a detailed description of the suspect to the detective, and over the course of several years, she repeatedly testified in court to what she had witnessed. Later, she found out that her description of the suspect was actually a detailed description of the detective who had first interviewed her—down to his police academy ring. Thankfully her testimony was contradicted by other evidence and the detective was not arrested for bank robbery.

Another example where scientific norms should replace traditional norms is during a judge's instructions to the jury—after all, juries are eyewitnesses to the proceedings of a trial. In the recent trial of Derek Chauvin, who was convicted of murdering George Floyd, Judge Cahill explicitly instructed the jury to prefer their own recollections if they differed from their own notes (Jury Instructions, 2021). The judge here expected the jury to trust its recollections of a trial that took three weeks and involved complex expert testimony, when the empirical research shows that witness accuracy can significantly degrade after just one week. The rest of the norms that I propose here will be useful in similar cases where jurors could either apply potentially baseless common-sense norms or norms that enjoy empirical backing.

We can derive another set of norms from the research into the post-event information effect. From the original research demonstrating the existence of the effect,

combined with the research demonstrating that question-type can moderate the effect we can state the following norm:

***Misinformation:** One ought to be skeptical of eyewitness testimony from a witness who was exposed to counterfactual information in the form of a statement.*

This is another idealistic norm that would be difficult to put into practice, so we might add a probability condition (PC) as we did for attention:

***Misinformation (PC):** One ought to be skeptical of eyewitness testimony from a witness whose testimony was likely influenced by post-event information*

Should juries internalize this or a similar epistemic norm, they would be better equipped to properly weight a witness' credibility when a defense lawyer demonstrates that the witness' testimony had been influenced by, for instance, misleading information from other witnesses.

We may also derive further norms from the research on the effect of post-event information on the reliability of child eyewitness testimony. As we saw, in the previous chapter, Roebbers & Schneider found that adults are generally more accurate witnesses than children. Thus, we can propose the following epistemic norm:

***Age:** One ought to give more credibility to the non-deceptive eyewitness testimony of an adult than to that of a very young child.*

Although I have mentioned it previously, it is important to stress that this norm only pertains to non-deceptive eyewitness testimony since adults are vastly more

competent liars than very young children⁸. Where a jury is limited only to the eyewitness testimony of children, the Roebers & Schneider study can point us in the direction of another norm:

***Age + misinformation:** One ought to give more credibility to the eyewitness testimony of a very young child who has not been subjected to biased questioning than to a child who has been subjected to biased questioning.*

As we saw in the second chapter, the common sense notion that a confident witness is a credible witness is not empirically supported. A witness' assertion that their testimony is true—a kind of meta-testimony—does not increase their credibility. Thus, one might adopt the following norm:

***Confidence + time:** One's skepticism ought not be reduced in virtue of a witness' confidence in the accuracy of their own eyewitness testimony where at least one week has elapsed from witnessing to testifying.*

From the studies into the effects of social bias—the own race, and own gender biases, in particular—I propose the following norm:

***Gender/racial differences:** One ought to be more skeptical of eyewitness identifications where the identified suspect is of a different race or gender than the eyewitness than in cases where the race or gender are a match.*

⁸ As anyone who has been lied to by a very young child can attest to.

Finally, the research into the effect of sleep deprivation on eyewitness accuracy leads us to this norm:

Sleep deprivation: *One ought to be skeptical of eyewitness testimony given by a witness who was sleep-deprived at the time they witnessed the event in question.*

While these norms, or norms along the same lines may seem to flow from the research, it is not obvious why we should feel morally compelled to adopt them. In the next section, I will put forward some considerations in favor of adopting evidence-based epistemic norms.

Addressing epistemic injustice

In her book, *Epistemic injustice: power and the ethics of knowing* Miranda Fricker articulates the concept epistemic injustice which has two sub-categories: testimonial injustice and hermeneutical injustice. According to Fricker, hermeneutical injustice is:

“... the injustice of having some significant area of one’s social experience obscured from collective understanding owing to a structural identity prejudice in the collective hermeneutical resource.” (M. Fricker, 2007, p. 155)

The basic idea behind hermeneutical injustice is that certain groups experience gaps in their collective understanding of certain aspects of their social experience so that when a social injustice is done to them, they cannot even articulate the harm they have experienced. Where this becomes an epistemic wrong is where one group, in a position of power, prevents the weaker group from hermeneutical participation (participation in

building the collective social understanding). Fricker uses the example of men traditionally excluding women from the roles that generate our collective social understanding, such as journalism, academia, law, and politics. Although Fricker's concept of hermeneutical injustice is compelling, it is not obvious that the norms I propose would do anything to address it.

Testimonial injustice, in its simplest formulation, is where one is unfairly given a deficit of credibility (M. Fricker, 2007). This unfair distribution of credibility arises, she argues, because hearers' credibility judgments of testifiers are informed by a set of morally culpable social prejudices—specifically, unfounded assumptions about the credibility of women, of people of different races, social class, etc. Fricker is careful to distinguish between morally culpable and non-morally culpable prejudice.

Fundamentally, the prejudices of hearers are heuristics used to reduce the cognitive load that would arise if one had to consider every possible piece of evidence in order to assess a speaker's credibility. For example, when we see someone wearing a pilot's uniform, we will generally take them to be competent about aeronautical matters since that stereotype embodies an empirically reliable generalization about pilots—as Fricker says, “our stereotypes oil the wheels of testimonial exchange” (M. Fricker, 2007, p. 32). While stereotypes can be useful, the ones that result in testimonial injustice (and are therefore culpable) are those that are made without “proper regard to the evidence” (M. Fricker, 2007, p. 33).

Fricker's proposed remedy for testimonial injustice is rooted in the idea of the virtuous perceiver, an idea that she draws out by analogy to virtuous moral perception.

The virtuous moral agent is someone who, because of their proper moral upbringing has developed the ability to perceive the morality of a situation in the same spontaneous, non-inferential way one perceives the color of an object. Likewise, the virtuous perceiver of testimony will possess the ability to assess the credibility of a witness in the same manner. This skill, Fricker argues, is developed through an ongoing process of “epistemic socialization,” that involves “participation in, and observation of, practices of testimonial exchange” (M. Fricker, 2007, p. 83).

Fricker’s motivation for this approach comes from her belief that codifying good epistemic norms to be used in judging testimonial credibility is untenable:

“... the virtuous subject does not arrive at her perceptual judgement by way of obedience to any codification of the endlessly complex norms implicit in her judgement” (M. Fricker, 2007, p. 73).

Fricker here has put us onto what could be a serious objection to the assessment of eyewitness credibility through the internalization and application of empirically backed norms. The studies surveyed in the second chapter represent a thin cross-section of the empirical work and are presented to provide a general sense of what psychologists have uncovered about the reliability of eyewitness testimony. A hearer of eyewitness testimony would have to learn, and internalize thousands of norms, and any norm one might apply would come with a list of caveats. For example, the empirical norm that one ought to be skeptical of witnesses who are sleep-deprived must be modified by the caveat that it only applies when the witness is sleep-deprived at the time they perceived the event. Moreover, the science is always advancing; perhaps a study comes out that finds

that the effect of sleep-deprivation on reliability is moderated by caffeine levels in the witness' blood at the time they witnessed a particular event, or that the effect of witness age is modified by sleep deprivation.

Clearly, it is correct that, for common testimony—the sort of testimony that we give and receive in our day-to-day lives—this places an unreasonable burden on hearers. It would be absurd to think that one cannot be justified in believing a stranger's assertion of the time of day without applying some set of empirically backed norms about the reliability of witnesses in the context of accurately reporting the time. In our day-to-day lives, we do quite well by spontaneously accepting this sort of testimony more or less uncritically.

However, in the context of a courtroom where belief or disbelief in eyewitness testimony can mean the difference between freedom and incarceration, or even life and death, every participant in the putatively truth-seeking process embodied by a trial has a duty to direct every resource available to them towards the most accurate assessment of witness credibility. People strongly hold on to the intuition that in these circumstances no stone should be left unturned. Should it be the case that, for example, the suspect was carrying a gun, and properly conducted empirical research has shown that the presence of a weapon results in witnesses only correctly identifying suspects about 64% of the time, then this must be seriously taken into consideration if one has any interest whatsoever in correctly dispensing justice.

Despite all the compelling reasons we might have to rely on empirical findings to assess the credibility of eyewitness testimony, it is one thing to say that this is how judges

and juries *ought* to engage with eyewitness testimony, but that doesn't address the practical problem of internalizing and applying a vast range of complex norms to the task of assessing a witness' credibility. However, this may not actually be all that insurmountable of a challenge. In criminal psychology, a great deal of effort has been put into compiling statistical findings and developing empirically backed inductive risk assessment tools. One such instrument that has been used by Corrections Canada for decades is the Level of Service Inventory-Revised (LSI-R). By assigning weights to statistical factors that are correlated with recidivism, the LSI-R can predict recidivism with more accuracy than the more traditional methods, like one-on-one interviews with psychologists (Pozzulo et al., 2009) (Bonta, 2002). So, in principle, the vastness and complexity of the empirical research into eyewitness testimony can be overcome.

But let us imagine that for one reason or another, a statistical approach does not translate well to the context of assessing eyewitness credibility. It may not even be necessary for the participants of a criminal case—from investigation to verdict—to internalize an overly complex set of epistemic norms. Consider how the typical criminal case evolves. In the first place, a witness to a crime places a call to 911 and an operator must assess the credibility of that witness' testimony (that a crime has taken place) for the purposes of directing an appropriate emergency response. Although a matter of life and death, the consequence of a false positive is limited to a temporary misallocation of resources so the operator would be justified in taking the caller to be credible. Here a 911 operator might apply the epistemic norm that people who call 911 are generally reliable. Next, police arrive and begin taking witness statements. Again, a default stance of credibility generosity is warranted since the purpose is to gather as many investigative

leads as possible. It would be strange to think that at this stage, a detective would ever be justified in ignoring a report that so-and-so was seen leaving the area with a bloody knife on the basis that the witness was affected by an empirically based, reliability reducing factor⁹ like the ones discussed in the previous chapter. So, investigators might learn and internalize a small, general set of empirical epistemic norms. They would be justified in limiting themselves to such a “working set” since they would only be used to assist them in prioritizing their own investigative resources.

However, once a case reaches trial, the picture changes: there is a strong intuition that if a jury fails to duly consider *any* factor that could enhance or diminish a witness’ credibility, an injustice would follow. This is the intuition that, at first, seems to call for the internalization and application of every available empirically derived epistemic norm relating to eyewitness accuracy by jurors. However, it may be enough for jurors to internalize just one norm:

Where the baseline credibility of a witness’ memory of an event is at question, one ought to give appropriate weight to the empirical findings of experts.

This norm would remove a significant amount of cognitive burden from jurors since it only calls on them to learn and internalize those norms relating to eyewitness reliability that are specific to the case they are hearing. Thus, an epistemically virtuous hypothetical juror hearing a case involving a violent bank robbery, would, upon learning

⁹ Excluding factors that obviously reduce the reliability of eyewitness testimony in every case. For example, exceedingly rare cases where a completely blind person claims to have seen something.

from the expert witness that eyewitnesses are only accurate about 64 % of the time when a weapon is present, have a duty to apply an appropriately related epistemic norm—one in the same vein as the one proposed earlier. If differences between the gender of the suspect and witness or sleep deprivation are not relevant factors, then the juror need not know about or apply norms relating to cross-gender identification or sleep deprivation.

Given that it seems possible to overcome Fricker’s worries about the practicality of codifying and applying a vast constellation of epistemic norms, the way to overcome testimonial injustice is clear: we must base our assignment of testimonial credibility on the factors known to *actually* affect witness credibility. Although Fricker does not explicitly endorse an empirical approach, she describes the epistemically virtuous moral agent whose power to effortlessly perceive the reliability of a testifier as being “conditioned by a vast wealth of diverse testimony-related experiences, individual and collective.” Clearly, her ideal epistemic agent is engaging in some kind of informal, automatic, empirically-based inductive reasoning. What is not so clear is how this is preferable to basing our judgments of the word of others on a formal scientific process that records instead of memorizes, that attempts to minimize biases instead of being ruled by them, that understands probabilities instead of having a notoriously flawed understanding of probability. Is this automatic informal empirical process not the very same process that has led us to flawed epistemic norms like “women of questionable morals tend to lie,” or “smartly dressed men tend to be honest,” or “witches float?”

Another objection I can anticipate to adopting empirically based norms comes from ethical dilemmas that could arise. Consider cases where applying such epistemic

norms might result in one class of people being systematically assigned less credibility than others. For example, how do we avoid injustices in criminal cases where the only available evidence is the eyewitness testimony of a very young child when we know that the eyewitness testimony of very young children is often unreliable? If we dismiss the testimony, we harm the child in her capacity as a knower, and we may fail in our duty to provide justice to the victim. However, if we accept the testimony as sufficient evidence to convict, then there is a high statistical chance that an innocent person could be sent to prison or in some cases executed. This is a difficult and complex ethical problem whose solution is beyond the scope of this paper; however, we may find a possible way forward in Scott Gelfand's account of justice that relies on the general framework of agent-based virtue ethics.

The general idea is that the moral goodness of every law in a society is determined by the degree to which the motives of the legislators who passed those laws are virtuous, and that care is a virtuous motive. Thus, laws under such a moral scheme will embody this motive towards caring rather than vengeance. Gelfand illustrates this by analogy to the care relationship between parents and children: when a child transgresses, a caring parent's response is motivated by a desire to correct the behaviour so that the child can go on to be a happy, well-socialized adult, rather than a desire for retribution (Gelfand, 2004).

A justice system conceived along these lines will consider the care of not only the victim but the offender as well; and the sort of harsh punishments common to most justice systems involving lengthy incarceration in nightmarish conditions would not be

acceptable. Such a system would segregate offenders from society, but still allow for eudemonistic flourishing. The effect would be a lowering of the stakes associated with criminal trials. So, to return to our hard case, we might still be able to respect the child in her capacity as a knower whose testimony is to be respected and believed, without committing the repugnant moral sin of destroying an innocent person's life. This is one possibility; however, the comfortable conditions of their incarceration may still be little solace to someone wrongly labelled a child abuser.

Conclusion

The empirical research going back over a century paints a depressing picture of the baseline reliability of eyewitness testimony. Even when witnesses are being honest and trying their best to recall events and details, they simply do not function as the legal system needs them to—like video cameras or tape recorders. The realist is that as human beings we are selective about what information enters our consciousness, and that information is heavily interpreted through the filter of their own life experiences, biases and prejudices. Moreover, even when we are attentive, and our biases do not come into play, our memories can be highly fallible; they decay over time, and something like an innocuous comment from another witness or a leading question from a police officer can subtly alter our memories of events.

Staunch anti-reductionists like Coady who are highly motivated to preserve a default attitude of credulity towards eyewitness testimony have questioned whether a reliance on empirical research into eyewitness testimony is logically coherent since it circularly relies on testimony to debunk the reliability of testimony. This argument is

based on the premise that testimony is a singular category; as we saw in the research, testimony can be split into two broad groups: uncontrolled and controlled testimony. The latter, embodied by scientific research, is characterized by painstaking efforts on the part of researchers to eliminate the factors that reduce the reliability of testimony in the wild—uncontrolled testimony.

Thus, given that the empirical findings are not logically incoherent, and that testimony is a psychological process, testimony-based belief is justified when it is caused by a reliable belief forming process, analogous to how Goldman's reliabilism confers justification to non-testimony-based belief. So, if reliabilism about testimony is true, then we can articulate a new, scientifically based set of norms that are sensitive to the realities of human perception and memory, and abandon our outdated, colloquial norms about what an eyewitness can and cannot do.

Finally, in addition to the obvious benefit of producing fairer trials, where people are convicted or exonerated on the basis of reliable evidence, adopting empirical testimonial norms can address testimonial injustices, and properly assign credibility to testifiers where it is due.

Bibliography

- Adler, J. (2012). Epistemological Problems of Testimony. In *Stanford Encyclopedia of Philosophy*. <https://plato.stanford.edu/entries/testimony-episprob/#TraKno>
- Allport, G. W. 1897-1967, & Postman, L. J. (1947). *The psychology of rumor*. H. Holt and company.
- BonJour, L. (1985). *The structure of empirical knowledge* (pp. xiii, 258 p.). Harvard University Press. <file://catalog.hathitrust.org/Record/000351055>
- Bonta, J. (2002). Offender Risk Assessment: Guidelines for selection and use. *Criminal Justice and Behavior*, 29(4), 355–379. <https://doi.org/10.1177/0093854802029004002>
- Buckhout, R. (1974, December). Eyewitness Testimony. *Scientific American*, 23–31.
- Cady, H. M. (1924). On the Psychology of Testimony. *The American Journal of Psychology*, 35(1), 110–112.
- Christianson, S.-A., Loftus, E., Hoffman, H., & Loftus, G. R. (1991). Eye Fixations and Memory for Emotional Events. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 17(4), 693–701.
- Coady, C. A. J. (1994). *Testimony: A Philosophical Study*. Oxford University Press.
- Cutler, B. L., Penrod, S. D., & Stuve, T. E. (1988). Juror decision making in eyewitness identification cases. *Law and Human Behavior*, 12(1), 41–55. <https://doi.org/10.1007/BF01064273>
- Deffenbacher, K. A., Bornstein, B. H., Penrod, S. D., & McGorty, E. K. (2004). A meta-analytic review of the effects of high stress on eyewitness memory. *Law and Human Behavior*, 28(6), 687–706. <https://doi.org/10.1007/s10979-004-0565-x>
- Feldman, R. (2003). *Epistemology* (1st ed.). Prentice Hall Pearson.
- Frenda, S. J., Patihis, L., Loftus, E. F., Lewis, H. C., & Fenn, K. M. (2014). Sleep Deprivation and False Memories. *Psychological Science*, 25(9), 1674–1681. <https://doi.org/10.1177/0956797614534694>
- Fricker, E. (1995). Telling and Trusting: Reductionism and Anti-Reductionism in the epistemology of Testimony. *Mind*, 104(414), 393–411.

<http://www.jstor.org/stable/2254797>

- Fricker, M. (2007). *Epistemic Injustice: Power and the Ethics of Knowing*. Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780198237907.001.0001>
- Frost, P. (2000). The quality of false memory over time: Is memory for misinformation “remembered” or “known”? *Psychonomic Bulletin & Review*, 7(3), 531–536. <https://doi.org/10.3758/BF03214367>
- Gelfand, S. D. (2004). The ethics of care and (capital?) punishment. *Law and Philosophy*, 23(6), 593–614. <https://doi.org/10.1023/B:LAPH.0000031085.22493.5c>
- Gettier, E. L. (1963). Is Justified True Belief Knowledge? *Analysis*, 23(6), 121–123. <https://doi.org/10.1093/analys/23.6.121>
- Goldman, A. I. (1979). What is Justified Belief. In G. Pappas (Ed.), *Justification and Knowledge*. D. Reidel.
- Harris, R. J. (1973). Answering questions containing marked and unmarked adjectives and adverbs. *Journal of Experimental Psychology*, 97(3), 399–401.
- Hope, L., & Wright, D. (2006). Beyond Unusual? Examining the Role of Attention in the Weapon Focus Effect. *Applied Cognitive Psychology*, 21, 951–961.
- Hume, D., & Millican, P. F. (Peter F. . (2007). *An enquiry concerning human understanding*. Oxford University Press.
- Innocence Project. (n.d.). *No Title*. Retrieved August 23, 2021, from <https://innocenceproject.org/>
- Johnson, C. L. (1977). *The effects of arousal, sex of witness and scheduling of interrogation on eyewitness testimony*. Oklahoma State University.
- Jury Instructions*. (2021). Hennepin County 4th District Court. <https://mncourts.gov/mncourtsgov/media/High-Profile-Cases/27-CR-20-12646/JuryInstructions04192021.pdf>
- Kramer, T. H., Buckhout, R., & Eugenio, P. (1990). Weapon focus, arousal, and eyewitness memory: Attention must be paid. *Law and Human Behavior*, 14(2), 167–184. <https://doi.org/http://dx.doi.org/10.1007/BF01062971>
- Laughery, K. R., Alexander, J. F., & Lane, A. B. (1971). *Recognition of human faces*: 55(5), 477–483.

- Lee, Y., & Chen, K. (2013). Post-event information presented in a question form eliminates the misinformation effect. *British Journal of Psychology*, *104*(1), 119–129. <https://doi.org/http://dx.doi.org/10.1111/j.2044-8295.2012.02109.x>
- Loftus, E. (1975). Leading questions and the eyewitness report. *Cognitive Psychology*, *7*, 560–572.
- Loftus, E. (1996). *Eyewitness Testimony*. Harvard University Press.
- Loftus, E. F., Loftus, G. R., & Messo, J. (1987). Some facts about “weapon focus.” *Law and Human Behavior*, *11*(1), 55–62. <https://doi.org/10.1007/BF01044839>
- Matheson, D. (2006). Testimony. In *The Encyclopaedia of Language and Linguistics* (2nd ed.). Elsevier.
- Meissner, C. A., & Brigham, J. C. (2001). Thirty Years of Investigating the Own-Race Bias in Memory for Faces: A Meta-Analytic Review. *Psychology, Public Policy, and Law*, *7*(1), 3–35. <https://doi.org/10.1037/1076-8971.7.1.3>
- Munsterberg, H. (1908). *On the witness stand : essays on psychology and crime*. Doubleday, Page & Co.
- Nozick, R. (1981). *Philosophical Explanation*. Harvard University Press.
- Pozzulo, J., Bennell, C., & Forth, A. (2009). *Forensic Psychology* (2nd ed.). Pearson Prentice Hall.
- Reid, T. (1983). *Thomas Reid's Inquiry and essays*. (R. E. Beanblossom & K. Lehrer (Eds.); 1st ed.). Hackett,.
- Roebbers, C. M., & Schneider, W. (2000). The Impact of Misleading Questions on Eyewitness Memory in Children and Adults. *Applied Cognitive Psychology*, *14*, 509–526.
- The National Registry of Exonerations. (2016). *Beverly Monroe*. <https://www.law.umich.edu/special/exoneration/Pages/casedetail.aspx?caseid=3482>
- The National Registry of Exonerations. (2020). *Joseph Abbit*. <https://www.law.umich.edu/special/exoneration/Pages/casedetail.aspx?caseid=3807>
- Valentine, T., & Maras, K. (2011). The effect of cross-examination on the accuracy of adult eyewitness testimony. *Applied Cognitive Psychology*, *25*(4), 554–561. <https://doi.org/10.1002/acp.1768>

Vidmar, N. (1978). Effects of adversary versus non-adversary investigative procedures on testimonial evidence. *Paper Presented at the Law and Society Association.*

Wigmore, J. H. (1909). Professor Muensterberg and the Psychology of Testimony. *Illinois Law Review*, 3(7), 399–445.

Wright, D. B., & Sladden, B. (2003). An own gender bias and the importance of hair in face recognition. *Acta Psychologica*, 114(1), 101–114.
[https://doi.org/10.1016/s0001-6918\(03\)00052-0](https://doi.org/10.1016/s0001-6918(03)00052-0)