Tunnel Vision in Decisions on Guilt: Preventing Wrongful Convictions

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ABSTRACT
Most countries have specific rules on the admissibility of evidence, but almost no rules exist on how evidence should be weighed or integrated by a judge or jury to come to a final decision. The process of evidence integration is, to a large extent, reliant on the cognitive process of the trier of fact, and therefore, subject to bias. Biases in legal decision-making can have grave consequences, as evidenced by the many miscarriages of justice that have come to light. One bias that has been argued to be particularly dangerous to the legal field is confirmation bias, which has also become known as tunnel vision. There are several ways in which confirmation bias can manifest during the course of an investigation or a trial. Legal safeguards are not always equipped at protecting against the influence of bias, but there are certain ways in which the effects can be limited. Several methods have been tried and tested, but with mixed success. Other potential remedies have also been suggested, but remain to be tested. Of course, the issue of implementation of remedies within the legal field is another obstacle that has to be overcome when trying to protect against bias.

KEYWORDS
tunnel vision, wrongful convictions, falsification

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1. *Introduction*

Although legal decisions are to a large extent controlled by the law, there are several aspects that the law cannot control. For instance, the law can regulate what evidence is admissible, but it rarely says how the judge should interpret it, or how much weight the judge should attach to it (ANDERSON et al. 2005). Legal decision-making therefore becomes a largely psychological or cognitive process, and should therefore also be studied from other perspectives. In this chapter, the focus lies on the decision on guilt that is made within criminal law. As the cognitive process of the decision on guilt is relevant within most legal systems, the issues discussed here are also thought to be relevant to most systems. There may however be some differences between the systems. For instance, a judge in an inquisitorial system is expected to be more active than a judge in an adversarial system, which is likely to influence some of the potential solutions suggested in this chapter. Nevertheless, it is expected that the topic of the chapter, namely the influence of bias on the decision of guilt, presents a risk in most systems. Legal processes are thought to not be immune to this influence, although the extent of the impact may differ between legal systems. Therefore, research and cases discussed here may come from several countries or systems, with the requirement that these focus on biases and the decision on guilt, unless otherwise specified. Throughout the chapter, the terms judge and jury or juror will be used interchangeably for readability reasons. The term legal decision-maker or trier of fact may also be used—it is believed that the cognitive processes discussed here are largely applicable to all these roles, as the decision to be made is also mostly comparable. There are a few elements of the decision on guilt that are important to the cognitive processes discussed in this chapter. This includes that the facts of the offence have to in some way be reconstructed in order for the judge to determine what happened, or what can be proven. Another cognitive factor is the requirement that the judge be convinced of the guilt of the suspect, in some systems "beyond a reasonable doubt".

Through applying knowledge gained in other disciplines, the cognitive processes that the legal system relies on could perhaps be improved. The need for such an improvement has, in recent years, become clear through several miscarriages of justice that have come to light. Perhaps due to these cases, the majority of the research on biases and preventing biases has taken place in the context of criminal law, which is also why this chapter will rely on criminal law cases. Most wrongful convictions have been brought to light by the Innocence Project in the US, but other countries have also had their fair share of, at least, questionable convictions (see for instance, the Schiedammer Park Murder in the Netherlands, the Parachute Murder in Belgium, the Amanda Knox case in Italy, and the Arnold Holst case in Germany). In some of these countries, it is extremely difficult to prove that a wrongful conviction has occurred. For example, in the Netherlands, a novum is required to reopen a case. A novum constitutes a fact that was not known to the judges at the time of the initial decision, and that would have led to a different decision if it had been known (FRANKEN 2021; NAN 2020). These requirements set the

bar quite high, thereby making it difficult to reopen the case. The US also applies the principle of finality, which renders it exceptional to overturn a verdict. Nevertheless, the Innocence Project has achieved great progress in that respect by overturning wrongful convictions, and identifying the possibilities to do so. Keeping in mind the Blackstone ratio, namely that it is better to have ten guilty people go free than to have one innocent person in prison, it becomes clear that the occurrence of wrongful convictions undermines the functions of the legal system.

Although acknowledging the fact that wrongful convictions can happen within any legal system is essential, this is not sufficient to also prevent them from happening. In order to do so, there also needs to be an improved understanding of how these wrongful convictions can occur. Often, when wrongful convictions come to light, there is a tendency to focus on a problematic piece of evidence. For instance, false confessions, mistaken eyewitness identifications, or contaminated DNA traces at the crime scene are often cited as causes of wrongful convictions. However, in addition to the problematic evidence that supported the suspect's guilt, there was likely also overlooked evidence that could have supported the suspect's innocence. For instance, in the case of Ronald Cotton, the victim mistakenly identified Ronald Cotton as her rapist. The case is therefore often used to demonstrate the fallibility of eyewitness testimony. However, Cotton also had an alibi, which was not properly taken into account when deciding on his guilt (THOMPSON-CANNINO et al. 2009). From this and many other examples, it becomes clear that deciding on guilt is not a simple matter of weighing evidence for and against guilt. The evidence has to somehow be integrated into an overarching decision, and different attention and weight can be given to different pieces of evidence, regardless of the evidential value it might actually have. That is where the human factor becomes decisive, and therefore the potential faults of the cognitive process should be understood.

In this chapter, several cognitive theories on legal decision-making will be discussed. Subsequently, biases and heuristics will be explained as errors that can occur while making decisions on guilt. In doing so, specific attention will be paid to confirmation bias, as this has been argued to be one of the most important biases to understand in the context of legal decision-making (FINDLEY & SCOTT 2006). The chapter will then discuss how biases and their influence can be prevented in order to reach an optimal decision.

2. *Cognitive theories of legal decision-making*

In the vast majority of cases, it is impossible for a judge to know exactly what happened, as they did not witness the event themselves. Yet, based on the available evidence, they have to come to a decision about what happened. These decisions also have high stakes, as the outcome can have a large impact on several individuals as well as society. An inherent leap is required from judges or jurors in order for them to become sufficiently convinced about what happened. How that leap is made has been the subject of many theories, but due to the internal and potentially subjective nature of the decision process, a lot remains unknown about how the leap is made.

According to BEX and colleagues (2010), a distinction can be made between argument-based and story-based approaches within theories on legal decision-making. One of the first theories that emphasised the role of persuasion in legal decision-making, thereby moving away from the question on admissibility, was Wigmore (TWINING 1985). Wigmore's theory was based on the idea that reasoning about judicial proof should be in line with the way in which people reason in everyday life. According to Wigmore, facts could be seen as propositions. In turn, evidence was the connection between a proposition that needed to be proven, and the proposition that supported the first proposition. That proposition was in turn supported by another proposition. Eventually, this results in a chain of propositions, or information, supporting each other, which is also often seen in judicial trials. A fact is accepted based on the evidence, which is supported

by other pieces of evidence or information. An example of how this would work in practice, for instance, in an international criminal trial was previously described by McDermott (2015). According to McDermott, the inferential proposition that several people took part in a criminal organisation could be supported by a meeting having taken place, and this could in turn be supported by direct evidence, such as witness statements.

It is important to acknowledge that the propositions in these models can be challenged at any point. For instance, an alternative explanation for the facts could be offered, or one of the facts could be negated by additional information. Such challenges could result in the inference between propositions losing value (Twining 1985; Bex et al. 2010). Although Wigmore's theory seems quite complex to use in practice (McDermott 2015), several elements of the theory were used in the further development of cognitive theories on legal decision-making.

For instance, Bennett and Feldman (2005 [1981]) also emphasised that the framework within which legal decisions can be understood should be in line with informal and commonplace social judgements. In that way, it should be possible for this to be understood even by those who do not have extensive training in the legal field. One way to achieve such a common understanding is the use of stories or narratives as a form of communication, which was also embraced by Pennington and Hastie in their story model (1991).

According to the story model, evidence within a legal context can be evaluated through the creation of a story. A decision is then made by seeing which verdict category the story fits with best. For example, if someone has killed another person, this could be both murder or manslaughter, dependent on whether premeditation was proven. Murder and man-slaughter would then represent two different categories. A third category could be that the perpetrator acted out of self-defense, which would in several jurisdictions cause the behaviour to be justified (Keiler & Roef 2016). The decision-maker has to determine which verdict category best matches the story that is created based on the evidence.

When the story model was tested experimentally, it was found that when evidence was presented in a story format, it was judged more favourably than when the evidence was presented according to legal issues (Pennington & Hastie 1992). Evidence that was congruent with the presented story was also remembered better by jurors than evidence that was not in line with the story (Pennington & Hastie 1992). The story is thought to be constructed based on the evidence, as well as by integrating evidence that is presented later. This occurs based on causal relations that are implied and on the general knowledge that the juror has (Pennington & Hastie 1986). Thus, the story model explains one possible theory of how different evidence can be integrated by the trier of fact, and is in line with the suggestion that legal decisions should be done in a similar way to everyday decisions.

The idea that the evidence is integrated into a causal story was further developed by the theory of Anchored Narratives (Wagenaar et al. 1993). According to the theory of anchored narratives, the initial story to be considered comes from the charge against the suspect. The charge is then judged on two aspects in order to reach a decision on the guilt of the suspect. The first question is the plausibility of the charge. The second question is whether the charge can be anchored in common-sense beliefs using the evidence available to the decision-maker (Wagenaar et al. 1993). Evidence can prove something if it is grounded in a general rule that can be considered valid most of the time. For instance, a witness statement can prove something if the accepted rule is that witnesses do not lie and do not make mistakes (Wagenaar et al. 1993). In this way, every piece of evidence that is used to prove the charge would have to be anchored into a generally accepted rule. The evidence can be seen as substories of the charge, and can be further divided into multiple substories based on the different elements that may be necessary. For instance, the intention to kill a victim may be divided into the substory of the suspect having told a witness that he wanted to kill the victim, and the substory of the suspect bringing a gun to his meeting with the victim. It is up to the court to consider when evidence is

sufficiently anchored (WAGENAAR et al. 1993). The anchoring of such evidence may be considered unsafe if it is for instance based on an incorrect belief, or if a large number of exceptions are possible for that anchor. If a charge is unsafely anchored, it could result in a wrongful decision on the suspect's guilt, for instance a decision based on information being accepted too easily by the judge. A typical belief on which such a conviction can be anchored is that people do not falsely confess (WAGENAAR et al. 1993).

Similarly to the story model, there is no need for all evidence that may exist in a case to be integrated into either the story or the anchors. For instance, evidence that contradicts the story as it has been constructed, may be disregarded by the decision-maker. This way of reasoning may be in line with the question of "beyond a reasonable doubt" or the requirement that the judge has to be convinced. The question then becomes whether the evidence that is not in line with the existing story can create sufficient doubt to undermine the conviction of the decision-maker. In wrongful convictions, it can be argued that such doubt should have existed in the mind of the decision-maker. Although the theories discussed so far provide insight into how a belief of guilt can be formed, they do not provide a clear answer as to why there was insufficient doubt created to undermine the conviction, despite the innocence of the defendant. The answer to that question can perhaps best be found in the fallibility of human reasoning.

3. *Biases*

Despite the legal regulations and rules that every country has, they still need to be applied and enforced by humans, thereby also making the process of legal decision-making prone to human error. As the theories above have demonstrated, the consideration, interpretation, and integration of evidence are to a large extent left up to the discretion of the trier of fact, and legal regulations can only control these to a limited extent. One of the most common human errors can be found in biases. Biases can be understood in the context of dual-system processing. According to dual-system processing, there are two systems that are used for cognition, including decision-making (KAHNEMAN 2011). Although differing opinions exist on to what extent the two systems are independent of each other, and whether and how tasks really are divided between the two systems (EVANS & STANOVICH 2013; STANOVICH & TOPLAK 2012), there is a general consensus regarding the features of these systems.

System 1 is thought to be an unconscious system that makes decisions quickly and automatically. The idea is that by allocating certain but limited cognitive processes to this system, more cognitive energy can be used for more difficult processes. For instance, if every decision—such as how to open the door—had to be consciously thought over, it would be extremely tiring. Decisions that are common and often made are therefore thought to be delegated to system 1. The more difficult processes are thought to be conducted by system 2. Contrary to system 1, system 2 requires more cognitive energy and time, is more controlled, and is less based on intuition. System 2, according to KAHNEMAN (2011), uses logical reasoning. It has also been argued that the default reasoning by system 1 can be overruled by the reflective thinking of system 2 (EVANS & STANOVICH 2013).

This latter argument is important as tasks that may initially be completed by system 2 can later be completed by system 1. That is likely to be true for most tasks which become automatic. For instance, when first learning to ride a bike or drive a car, every action requires conscious thought. Changing gears is considered to be cognitively taxing. However, as driving experience is gained, the handling and decision processes become more automatic. The cognitive processes that were completed by system 2 while learning have then been relegated to system 1. The same can be true for other tasks that might initially be quite demanding, but that become more automatic as more experience is gained. System 1 learns an automatic response through the decisions made by system 2, so that the task is eventually conducted by system 1's automatic response.

In order to be able to function efficiently, system 1 makes use of heuristics. These can be described as mental rules based on experience that allow for a quicker decision. A heuristic can therefore be seen as a rule of thumb. When a heuristic is applied, it can often quickly and efficiently lead to a correct outcome. However, a rule that has worked well in a previous situation does not necessarily apply to a new situation. As such, applying heuristics can also lead to mistakes, which can lead to biases. Biases can be described as discrepancies between the rational, normative behaviour, and the behaviour determined by the heuristic (GONZALEZ 2017). They can be intrinsic or learned and can have several consequences. More than 180 cognitive biases exist that interfere with how we process information, think, remember, and experience reality. As mentioned, the main focus in this chapter will be on what has been argued to be one of the most relevant biases in legal decision making.

3.1 *Confirmation bias*

Confirmation bias, which is one of the essential processes of what is known as tunnel vision, is a cognitive bias that has been described as one of the most influential cognitive errors (NICKERSON 1998). Furthermore, it has been argued to be of particular importance in the context of legal decision-making (FINDLEY & SCOTT 2006). Confirmation bias refers to the tendency to favour information that supports an existing belief or theory. That can happen both by paying disproportionate attention to information that supports an existing belief, as well as by interpreting information in such a way that it is in line with a prior theory (KASSIN et al. 2013; MENDEL et al. 2011; NICKERSON 1998). Tunnel vision has previously been described as a contributing factor to miscarriages of justice (RASSIN 2010), and could explain why exonerating evidence may be overlooked by the decision-maker.

Tunnel vision consists of several interrelated cognitive processes. At the start of these processes, there has to be a certain belief. For instance, the belief that a suspect is guilty could arise, based on an incriminatory case file, or even a particular fact about the defendant such as an earlier conviction. In essence, this belief could come from anything, and the judge is not necessarily aware of its existence or its source. Note though, that this belief, or the subsequent phenomenon of tunnel vision, is not necessarily a process that could only affect judges. An investigative team or prosecutor can also be hampered by it, which may result in a biased case file being presented to the trier of fact. The subsequent cognitive process that plays a role occurs when information that is contradictory to the belief arises. Holding contradicting information leads to an uncomfortable feeling, known as cognitive dissonance, a term introduced by FESTINGER (1957). He argued that when one experiences cognitive dissonance, one will try to reduce that uneasy feeling by attempting to achieve consonance. Cognitive dissonance can therefore be considered a precursor to behaviour aimed at achieving consonance, or aligning the beliefs held. According to CANCINO MONTECINOS (2020), there are several potential processes that can be used to reduce dissonance. These include trivialization, whereby the importance of either the original attitude or the dissonant information is reduced. Another strategy would be bolstering the initial opinion. The existence of cognitive dissonance has received ample support in the literature, despite the difficulty in testing it empirically (HARMON-JONES & HARMON-JONES 2007). Due to the need to reduce dissonance, it can have a considerable influence on further cognitive processes.

The process of achieving consonance in the context of legal decision-making has previously been studied by SIMON (2004), who argued that cognitive coherence is imposed on tasks that are complex, such as legal decision-making, in order to transform this process into a simpler one. In that way, an easier decision can be made with more confidence. SIMON (2004) also found the process of achieving consonance to be bidirectional—not only does the evaluation of the evidence influence the decision, but an already existing preference for a specific decision outcome also influences the evaluation of the evidence. One relatable way in which this could be understood is

perhaps the feeling one experiences when making a pros and cons list, only to find out they already had a preferred option. This need for consonance or consistency can also be related to the theories on legal decision-making described above. Namely, the extent to which the evidence is consistent with the story constructed by the decision-maker likely influences the manner in which it is integrated. An alternative possibility would be that the contradicting evidence could be trivialised in order to achieve consonance (Cancino Montecinos 2020).

Another way in which consonance can be achieved is through belief perseverance. Belief perseverance can be considered the next phase of tunnel vision. It refers to the tendency to adhere to one's belief, even when presented with contradictory information. Belief perseverance has been observed in practice—some prosecutors in wrongful conviction cases maintain a belief in the defendant's guilt, despite the evidence that led to their exoneration (Burke 2007).

In order to maintain a belief, confirmation bias can come into play. As previously described, confirmation bias is the tendency to disproportionally focus on, or favour, information that can confirm an existing belief compared to information that contradicts that belief (Kassin et al. 2013, Nickerson 1998). In that way, confirmation bias can maintain the previously held belief. There is a distinct difficulty in trying to study confirmation bias—as it is an internal and often unconscious process, finding the effect is dependent on the behaviour of the participants. Such behaviour, for example only following news outlets that align with political preference, can be considered the behavioural manifestation of tunnel vision. Confirmation bias is therefore a key element of tunnel vision, and the aspect or process that can most likely be observed. Subsequently, research most often focuses on measuring confirmation bias, including when studying tunnel vision.

There are several tasks that have been developed in an attempt to experimentally test confirmation bias. One task that is often used is Wason's card selection task (Wason & Johnson-Laird 1972). In this task, participants are given a rule to test and several options to investigate whether or not the rule is true. For instance, the rule could be "if one side has a vowel, the other side of the card must have an even number". Participants are then given 4 options that they can test in order to determine whether the rule is true. For the above rule, the cards could for instance show E, K, 4 and 7. Participants are asked to choose as few cards as possible to determine whether the rule is true. The E-card can here be used to verify the rule—if there is an even number on the back, that supports the rule. The K- and 4-card are uninformative, as the rule does not mention what must be on the back of a card with a consonant, nor does it say that an even number card must have a vowel on the other side. The 7-card can be used to falsify the rule, as a vowel on the other side would disprove the rule. The correct answer would therefore be to turn over the E-card and the 7-card (Cosmides 1989; Wason & Johnshon-Laird 1972). According to Rachlinski, typically, fewer than 10% of respondents give the correct answer to the selection task. The task has also been used in surveys answered by judges (Rachlinski 2012). Among Dutch judges, one study found that 32% of respondents gave the correct answer (Rachlinski 2012), whereas another found that 22% of judges gave the correct answer (Maegherman 2021). Therefore, it can be argued that, although judges may show less bias than the average population, only a minority showed no tendency to confirm their hypothesis when tested experimentally.

Confirmation bias has been shown to affect various key players in the judicial field such as police investigators and forensic scientists. For instance, Kassin and colleagues (2003) found that interviewers who had a stronger belief that the person they were interviewing was guilty tended to ask more questions confirming the guilt of the interviewee than those who had an expectation of the suspect being innocent. Moreover, when neutral observers then watched the interviews, they were also more likely to judge the former interviewees to be guilty than the latter. Dror and colleagues (2006) have previously demonstrated that a prior belief based on external information could influence the judgement of forensic fingerprint examiners. Liden and collegues (2018) also investigated confirmation bias in prosecutorial decision-making. In their study, prosecutors

showed a tendency towards confirming guilt once they had made the decision to press charges against the defendant. However, before that decision, they did not show this tendency, suggesting the commitment to a belief in guilt increased the confirmation bias, which can be understood in terms of the processes explained above. Although confirmation bias has been shown to have an effect on both the investigation and the prosecution, it could perhaps still be corrected at the trial stage. However, considering the final decision is also reliant on human cognition, it is also likely to be influenced by the same cognitive errors that other phases are affected by.

Based on findings from experimental research, it could indeed be argued that the decision on guilt or innocence is equally likely to be tainted by bias as the earlier decision or investigative processes. One study done by SCHÜNEMANN (1983, as cited in SCHÜNEMANN & BANDILLA 1989) seems to demonstrate the existence of belief perseverance in German trial judges. They compared a group of judges who had initially received mainly incriminating information prior to the trial to a group of judges who had received information that was less incriminating prior to the trial. Both groups subsequently read identical trial proceedings, and were unaware of the experiment being conducted. Of the group who received more incriminating information, 82% would convict the suspect, compared to only 53% in the group who received the less incriminating information. It therefore seems that the initial belief the judges had formed was maintained throughout reading the case file, and ultimately affected their decision on guilt. In other studies, using different populations, comparable results have been found. For instance, RASSIN (2010) used a sample of law students and presented them with a case file, after which participants had to make a judgment about the suspect's guilt. They were then asked to select further investigative measures, some of which were incriminating for the suspect, whereas others were exonerating. Based on the investigative measures that were chosen by participants, the further investigative measures that were chosen seem to have been influenced by their initial opinion on guilt. The selection of incriminating investigative measures was also associated with higher conviction rates. Thus, an initial belief tainted the further investigation and the subsequent decision. In practice, this may occur not only during the police investigation, but also in cases where the judge may have the opportunity to request further investigation. It should be mentioned that in Rassin's study, there was no general preference towards incriminating information—the preference that was observed was dependent on the initial belief of guilt. A similar result was observed by MARKSTEINER and colleagues (2011). They found that only police trainees with a prior belief in the suspect's innocence rated incriminating and exonerating evidence as equally reliable—those with a prior hypothesis of guilt found the incriminating evidence to be more reliable than the exonerating evidence.

4. *Combatting tunnel vision*

In this section, research on preventing biases, with a focus on tunnel vision, will be discussed. As explained above, tunnel vision can be seen as a combination of several cognitive process, including confirmation bias. In order to understand the difficulty of preventing tunnel vision, an explanation of the difficulty of fighting bias in general will first be discussed. Some of the research on bias, and bias reduction, are applicable to tunnel vision whereas other studies and methods have focused specifically on reducing tunnel vision. By looking at methods that have been researched to prevent bias in general, as well as those focused on tunnel vision, it becomes possible to identify remedies that continue to be promising.

4.1 *Difficulties in bias prevention*

Although biases are a widely accepted phenomenon, and have been found to have an influence in several areas of life, little is known about how biases, and their influences, can be prevented.

In general, it seems that training aimed at reducing biases has limited effect, which could be due, for instance, to the difficulty of voluntary suppression of an unconscious process, or to the fact that individuals may be less susceptible to learning during coerced training (WILLIAMSON & FOLEY 2018). Researchers have also found that the effects of training diminish over time (CLARKE et al. 2011). Nevertheless, as some trainings do seem to have an effect, although the longevity may be limited, it is still worth considering the aspects of these training.

One reason why training may have a limited effect, and why bias in general might be difficult to prevent, is thought to be the bias blind spot. The bias blind spot refers to the tendency to ignore one's own bias, despite acknowledging that other people or colleagues are impacted by biases (PRONIN et al. 2002). A study by KUKUCKA and colleagues (2017) showed a bias blind spot in forensic examiners. They surveyed forensic experts on the existence of bias in forensic science in general, and specifically in their field. Although the majority acknowledged the problem of bias in forensic science as a whole, fewer acknowledged it to be a problem in their discipline, and a distinct minority recognised that they themselves might also be impacted by bias. The bias blind spot in itself also seems hard to fight. WEST and colleagues (2012) found that cognitive ability was associated with a higher bias blind spot, suggesting it is something that affects everyone. They also found that not suffering from a bias blind spot does not necessarily lead to being less influenced by biases.

SCHMITTAT and ENGLICH (2016) investigated whether judicial experts are protected against biased reasoning. They included both several legal fields and several roles, such as judges, prosecutors, and defense lawyers. Their study used German practitioners. Based on their results, the practitioners showed a preference for information that supported their preliminary beliefs. They evaluated that information more positively than information that conflicted with their prior belief. However, there was a positive effect within specific domains. Namely, experts within their own domain showed less bias than general experts, who did not perform better than laypeople. Confirmatory reasoning could be reduced in general experts by inducing responsibility by emphasising the consequence of the decision for the defendants. However, the fact that expertise in itself does not protect against confirmatory reasoning also implies that judges may be affected by bias.

One could argue that, generally speaking, biases can be reduced by using system 2 instead of system 1, including when making important decisions as to whether somebody is guilty or not. As system 2 uses critical rather than automatic thinking, the use of system 2 could indeed lead to fewer cognitive errors. However, the activation of system 2 is not necessarily easily done, specifically in situations where there may be time pressure or a need to achieve cognitive closure (i.e., the urge to stop ambiguity and come to a clear conclusion). Moreover, when a task has been completed several times, it may also rely on system 1 (KAHNEMANN 2011). Therefore, structural ways in which critical thinking can be encouraged warrant attention. These can be focused on the individual, such as for example specific training, or they can be aimed at more structural changes, such as, for instance, reducing time pressure or increasing the requirements to explain a decision-making process, thereby activating system 2.

4.2 *Falsification and alternative scenarios*

When considering confirmation bias, one method that has been studied as an attempt to reduce bias is the use of falsification. Falsification is a concept that was used by Popper to explain the scientific method or a way of testing whether a hypothesis is true. Popper argued that a theory can only be considered true until contradictory evidence is found. Therefore, if one only looks for evidence that supports the theory, it may incorrectly be assumed to be true. According to Popper, a better way of determining whether or not a theory is true would be to look for evidence that can disconfirm the theory. If such evidence cannot be found after several serious

attempts, then that would again support that the theory is true. The process of looking for evidence that contradicts a scenario was termed falsification, and is thought to be equally as important as verification when trying to determine whether a theory or scenario is true (POPPER 2005 [1959]). Failed attempts at falsification increased the likelihood of the scenario being true (CROMBAG et al. 2006).

The classic example that is often used to explain the concept of falsification involves swans. If the hypothesis or theory is that all swans are white, it is likely that a lot of support can be found for that theory. However, it would only take one sighting of a swan of a different colour to prove that the theory is false. Subsequently, when trying to determine whether the theory is true, one should not only look for white swans, but should actively try to find swans of a different colour. If swans of a different colour are found, the theory can be considered false. If however, several serious attempts to find a swan of a different colour only result in finding more white swans, that gives support to the theory. The theory that all swans are white can still not be considered ultimately proven, as a sighting of a swan of a different colour could still occur and would disprove the theory.

Although the above example may be easily understood, it is also quite far removed from the practice of legal decision-making. However, similar reasoning can be applied in that context. There is a theory or a hypothesis, namely that the defendant is guilty of the crime they are charged with. Evidence confirming that theory can most likely be easily found in the case file. There is an inherent requirement for incriminating evidence to be present, as the case would otherwise not be brought before a judge. Therefore, verification of the theory that the defendant is guilty will in most cases be relatively easy. However, in order to determine whether the theory is true, falsification should also be applied. In the context of a decision on guilt, that would mean looking for exonerating evidence. For instance, determining whether the suspect might have an alibi, or whether there may be an alternative explanation for the DNA of the suspect found at the crime scene.

Exonerating evidence may not be explicitly present in the case file, and the judge or responsible party may be required to order additional investigative measures in order to obtain the exonerating evidence. Based on a survey and interviews conducted with Dutch judges, it became clear that exonerating evidence may not always be present in the case file. Moreover, in the documents that are prepared for the judge, the exonerating information may not be included. One example was that if a suspect was identified by a witness whereas another witness did not recognize the suspect, then it is possible that only the identification would be included in the preparation material (MAEGHERMAN 2021).

One method that is closely associated with the idea of falsification is the use of alternative scenarios. The scenario approach was explained in detail by VAN KOPPEN and MACKOR (2020). It is also related to the theory of anchored narratives discussed earlier, although more focus is placed on the consideration of multiple scenarios. According to VAN KOPPEN and MACKOR (2020), a scenario should consist of a chronological and causal account of an event, including a central action that can be understood in the context of the surrounding scene. Similarly to the story model by PENNINGTON and HASTIE (1992), in this approach, a scenario also relies on background knowledge, or scripts. Once several scenarios have been identified, the next component is what is known as the inference to the best explanation. The inference to the best explanation was explained by HARMAN (1965) as concluding that the hypothesis is true, based on the fact that the hypothesis is able to explain the evidence. Alternative hypotheses which could also explain the evidence should be rejected before making the inference to the best explanation. If one particular hypothesis can give a better explanation for the evidence than any other alternative hypothesis, it can be inferred to be true (HARMAN 1965). It should be remembered that the conclusion of the inference to the best explanation is not guaranteed to be

the truth—even though it might offer the best explanation possible, it is not necessarily true. The inference to the best explanation is nevertheless a key element of the scenario approach.

VAN KOPPEN and MACKOR (2020) explain several criteria that can be used to select and assess scenarios. These include the internal coherence of scenarios, the coherence of the scenarios with general background knowledge, and coherence of the scenarios with elements of the case that have been accepted to be true. Several of these requirements are also akin to the theory of anchored narratives, where the sub-scenarios of the main scenario should ultimately be anchored in commonly accepted knowledge. Furthermore, the scenario approach includes three ways in which scenarios relate to the evidence. The first is creation. A scenario is created during a criminal investigation on the basis of the evidence. The second way is accommodation. A scenario might have to be adapted in order to accommodate for contradicting evidence that is encountered. Alternatively, the scenario might have to be rejected when such evidence is encountered. Lastly, the third way in which a scenario can be used is to predict what evidence one would expect to find. For instance, if there is a scenario in which the suspect is thought to have touched the victim in several places, it could be expected that there would be traces of DNA. In this way, if evidence that is expected is not found, that would undermine how well the scenario can explain the evidence, and thus, the scenario might have to be rejected.

Falsification is also a key element of the scenario approach. As previously mentioned, multiple serious failed attempts at falsification increase the likelihood of the scenario being true (CROMBAG et al. 2006). According to VAN KOPPEN and MACKOR (2020), finding a good alternative scenario can also be considered part of the falsification process. The main scenario is presented by the prosecution and argues, based on a coherent selection of incriminating evidence, that the suspect is guilty. The defense can construct an alternative scenario based on another selection or interpretation of the evidence that is present in the case file. The alternative scenario could try to show that the suspect is not guilty, or that the scenario presented by the prosecution is not likely. Those scenarios should then be compared to one another in order to determine which scenario best explains the evidence.

When Dutch judges were asked about their use of alternative scenarios and falsification, it became clear that they understand the importance of considering alternative scenarios in order to avoid confirmation bias. However, their answers also suggested that their main focus was on trying to verify the main scenario or falsify the alternative scenario, which would not protect against confirmation bias (MAEGHERMAN 2021). On the contrary, what the judges described can be interpreted as looking for confirmation of the main scenario. In order for alternative scenarios to be used effectively, one should attempt to verify and falsify both the main and the alternative scenarios. In that way, the scenario that best explains the evidence can be identified.

In previous experimental research, it has also been found that the mere existence of alternative scenarios is unlikely to be enough to protect against bias. For instance, O'BRIEN (2009) presented participants with a mock case file. Some participants were asked to name a prime suspect after reading part of the case file, whereas others were not. Those who had expressed their belief in the prime suspect's guilt subsequently seemed to be more biased in their reasoning than those who had not. O'Brien then tested several ways in which this bias could be countered. One way this was tested was to have the participants think of explicit reasons why the scenario of guilt might be false. Another way was to have participants think of alternative scenarios, e.g. of another perpetrator having committed the crime. Whereas the first method did counter the effect of confirmation bias, the latter did not, which suggests the active assessment of scenarios might be necessary. RASSIN (2018) found similar results. Rassin presented participants with a case file including a scenario of guilt only, or also including an alternative scenario. Some of the participants were asked to use a pen-and-paper tool, whereas others were just presented with the case file. Those who used the pen-and-paper tool showed less confirmation bias than those who were simply presented with the alternative scenario, which again supports that the mere presence

of an alternative scenario would not necessarily protect against confirmation bias. Another study was conducted by TENNEY and colleagues (2009). They compared the effect of defense lawyers either refuting the incriminating evidence, or also arguing for an alternative scenario in which someone else committed the crime. Based on their finding, participants returned fewer guilty verdicts than when the defense lawyer only argued against the incriminating evidence. Based on these findings, it is not only important for the legal decision-maker to consider alternative scenarios, but also to carefully consider both the support for and evidence against each of the scenarios, in order to reach a valid conclusion about which scenario is most likely. One way in which this could be encouraged is perhaps through the use of training, or through specific instructions on explaining how the decision has been made.

4.3 *The analysis of competing hypotheses*

One type of training that was developed in intelligence analysis and which has previously found some success at reducing confirmation bias, is the analysis of competing hypotheses, hereinafter ACH (HEUER 1999). It is a structured analytic technique (CHANG et al. 2018). ACH involves carefully weighing alternative explanations again each other, which should prevent the decision-maker from settling on the first option that seems satisfactory. The analysis consists of eight steps, which will not all be described here; the most relevant aspects of the analysis will be explained. The first steps require the construction of potential hypotheses, and the listing of the available evidence. A matrix is then created where it can be indicated whether each piece of evidence is consistent, inconsistent or irrelevant to the hypothesis. The matrix helps the decision-maker with determining the diagnosticity of the evidence. For instance, if a piece of evidence is consistent with three out of four hypotheses in the matrix, its diagnostic value is low. This would be clear when using ACH, but might not be clear when the evidence is considered in light of only one hypothesis. Evidence that has no diagnostic value should be removed from the matrix. When looking at which hypothesis is most likely, ACH does not focus on the hypothesis with the most consistent evidence, but rather at the hypothesis with the least inconsistent evidence (HEUER 1999). It thereby also incorporates the principle of falsification. There have also been several criticisms of the ACH technique which have emerged in recent years. DHAMI and colleagues (2019) for instance found issues with the implementation: if the technique is not implemented properly, its effect on the decision-making process would be limited. Findings by MAEGHERMAN and colleagues (2021) also suggest that participants struggled to apply the methodology, as they did not seem to follow the steps of the technique, despite being explicitly instructed to do so. DHAMI and colleagues (2019) also criticized the technique for being too vague. Although the technique in its current form may not be suitable for application in legal decision-making, it may be further developed or adapted for use in the legal system, as the essential elements remain promising (MAEGHERMAN et al. 2021).

4.4 *Accountability*

The stimulation of critical thinking has previously been investigated through the concept of accountability. Accountability refers to requiring decision-makers to account for their decisions, or that one justifies one's views (LERNER & TETLOCK 2003). There are several types of accountability, each of which may have a different effect on the decision-making process and its consequences. For instance, a different effect has been observed depending on whether participants knew they had to account for a decision before making it, or whether they were asked to do so afterwards. Whereas prior accountability was observed to increase exploratory reasoning and to improve judgement, post-decisional accountability increased confirmatory reasoning and led to self-justifying behaviour (LERNER & TETLOCK 1999). Another distinction

that can be made is whether the decision-maker is asked to account for the decision itself, or whether they have to explain the decision-making process. This distinction is captured by contrasting outcome-accountability with process-accountability. Process-accountability is generally thought to lead to better decisions (LERNER & TETLOCK 2003), although some researchers have argued that this beneficial effect may be limited to elemental tasks that involve linear relations between the cues and the outcome (DE LANGHE et al. 2011).

A third factor that moderates the effect of accountability is the audience to whom the decision-maker has to account for the decision. For instance, PENNINGTON and SCHLENKER (1999) found that students who had to judge a cheating case gave harsher punishments when they expected to have to explain their decision to the professor who reported the cheating compared to if they had to explain their decision to the student who was accused of cheating. However, according to HALL and colleagues (2015), research is lacking on how having to account for the decision to multiple or varied audiences could influence the decision.

When placing these research findings in the context of legal decision-making, it seems certain elements are implemented well. For instance, in most jurisdictions, judges or jurors will be aware that they will need to explain their decision before making the decision. In the Netherlands this is required according to Art. 359 DCCP, but is fairly limited compared to the German requirement to motivate the decision (SIMMELINK 2001; MEVIS 2019). In addition, the explanation of the decision may serve different purposes to different audiences. For instance, for the victims or family members of the defendant, the explained decision can help them to understand why it was made. The decision may also be used by the court of appeal, or the Supreme Court, if the decision is appealed. Therefore, more research on the effect of varied audiences would be very valuable to understand the impact in the context of legal decision-making. Similarly, the focus on either the decision itself or on the decision-making process could also be improved within the context of legal decision-making, although this is likely to vary between different jurisdictions. In the Netherlands, for instance, the Supreme Court has previously ruled that the reasoned decision given by judges does not have to be a representation of what was considered, but should contain evidence that the decision could reasonably be based on. The reasoned decision is therefore not necessarily a valid representation of the decision-making process, but is instead focused on the decision itself (REIJNTJES & REIJNTJES-WENDENBURG, 2018). According to the existing research, this could increase the tendency for confirmatory reasoning and self-justification. On the other hand, the German code of criminal procedure seems to encourage a more critical perspective, as the judge has to account for their selection and evaluation of the evidence. Furthermore, they also have to pay attention to the facts that indicate an alternative version of events that was not accepted (MEVIS 2019; DREISSEN 2007). In the case of contradicting witness statements, the judge has to consider how both statements came about, and to consider the discrepancies between them. Due to the higher number of requirements attached to the written decision by the German judge, it can be expected that this would lead to more exploratory rather than confirmatory reasoning.

In an experimental study conducted by MAEGHERMAN and collegues (2021), participants were presented with a mock case file and asked to decide on the guilt of the suspect. They were asked to explain their decision according to instructions based on either the Dutch Code of Criminal Procedure, the German Code of Criminal Procedure, the principle of falsification, or minimal instructions in the control condition. They were also given these instructions prior to reading the case file, so as to mimic the prior accountability judges also experience. Furthermore, they were told that their decision would be reviewed by a panel of professional judges. It was found that those in the German condition used significantly more exonerating evidence in their written decision than those in the Dutch condition. Nevertheless, there was no difference in conviction rates between the two conditions, even though the amount of exonerating evidence in the decision was found to be a significant predictor of the final decision on guilt. There therefore

seems to be a discrepancy between the evidence that was included in the written decision and the actual consideration. Although the exact impact of the different accountability requirements were therefore hard to determine, there nevertheless seemed to be a positive effect of requiring a more critical explanation of the decision.

Changing or increasing the accountability requirements may also help to prevent the task of explaining a decision from becoming routine. When a reasoning task has been done many times, it can become routine. When this is combined with pressure, for instance due to time constraints, the reasoning process can become increasingly reliant on intuitive cognitive processes, which can in turn reduce the accuracy of the decision-making. Experience can contribute to faulty thinking in experts when feedback is not provided (KAHNEMANN 2011; TAY et al. 2016). In a review of physician's experience and the quality of the care they provide, CHOUDRY and colleagues (2005) found that those who have been in practice longer are actually likely to give lower-quality care. Interventions may help to maintain, or even improve the quality of care. The same is likely to be true for judges. Although the decisions they make cannot be considered simple, judges with several years of experience may have come across similar cases. Furthermore, judges are rarely provided with feedback on their work, except in the case of wrong decisions coming to light, or perhaps colleagues coming to a different decision. It would therefore also be beneficial for the decision of judges to be reviewed structurally and regularly, which could also aid the effect of the accountability requirements by adding a critical audience for the reasoned decision.

4.5 *Remedies requiring further investigation*

Of course, the remedies that have been discussed in this chapter are by no means the only measures that exist to protect against bias. In this final section, a few more will be discussed, which have, to my knowledge, not yet been sufficiently tested in the context of legal decision-making, or which may not be suitable for application in that context in their current form.

One such remedy that has been proposed to reduce the influence of bias in legal decision-making is to make use of Bayesian reasoning. Bayes theorem makes use of prior possibilities, which are updated with the evidence, in order to reach a posterior probability. When a decision-maker is given further evidence for a hypothesis, the probability of the hypothesis must be reconsidered given the evidence (DAHLMAN 2020). Although in theory, Bayesian reasoning sounds like a structured manner of reaching a decision that might be resistant to human cognitive biases, its application is less straightforward. Firstly, the method is quite difficult to understand and apply properly. It is also a method of reasoning that is likely to be very unfamiliar to those who have spent their life training in the law and are likely to be unfamiliar with mathematics (DAHLMAN 2020). Furthermore, DAHLMAN (2020) pointed out that the analysis is dependent on the subjective assumptions of the person charged with finding the information or making the decision. The need to estimate certain probabilities would result in there still being a significant amount of room for human error. The method also relies on likelihood estimations, which are unlikely to be available for all types of evidence. For example, using an identification made by a witness to determine a likelihood would be very difficult, as the validity of the identification could be affected by many factors, such as the visibility of the perpetrator by the eyewitness, or the identification procedure. Determining a mathematical value for the likelihood of all these factors is very difficult to do, and so a lot of estimation is still involved. Furthermore, there is a possibility of ignoring that pieces of evidence may not be independent of each other, among other things that the decision-maker may fail to take into account. For a more in-depth explanation of the Bayesian method of reasoning, and example of its application to a case, please see DAHLMAN (2020). For the scope of this chapter, it suffices to conclude that Bayesian reasoning is unlikely to offer an easily applicable solution to biases in

legal decision-making. According to ROBERTS (2020), it is far removed from the type of reasoning judges actually engage in.

Although a lot of the solutions that have traditionally been offered to counteract biases focus on the individual, an argument can also be made for changes to the system that could limit the opportunity for biases to arise. For instance, it is commonly accepted that being under time pressure can reduce the quality of reasoning. Therefore, it is important to make sure that judges and decision-makers have sufficient time available to study the case file and to carefully consider all the information that is available. That does not seem to be the case everywhere. For instance, in the Netherlands, there was a public letter sent by the judiciary that explained that the workload was too high, and that this would eventually lead to a reduction of the quality of the legal system (TEGENLICHT 2018).

Aside from the different legal systems, a distinction can also be made between the constellations of trier of facts. Whereas some courts, usually for lower-level offenses, require only one judge, other courts can consist of several judges. For instance, in the Netherlands, cases before the police judge will require a single judge, whereas more complicated cases will be assigned to three judges (VERBAAN 2016). In Belgium, a case can also be tried by one or multiple judges, or can even be tried by a jury (Assisen-court; TRAEST 2018). The difficulty that arises with having several decision-makers is that conformity can arise. Conformity can be defined as an intrinsic tendency to follow or agree with others, particularly in case of dominant opinions or socially desirable outcomes (PEOPLES et al. 2012). The tendency to conform can also be related to the concept of falsification—an alternative opinion may not be expressed due to not wanting to stand out from the group. For that reason, it is particularly problematic if a unanimous verdict has to be reached. WATERS and HANS (2009) conducted a study on juror decision-making in the US. They sent a questionnaire to 3500 jurors who had previously decided on felony cases. Out of those, one third had disagreed with the outcome of the jury deliberations, and would have decided differently if they had made the decision on their own.

In case of decisions made by multiple individuals, another potential remedy might be available. Closely linked to falsification, the idea of a devil's advocate has been used in several fields, such as for instance management and health practice. The devil's advocate is supposed to take a stance contrary to that of the group. That should in turn cause the other members of the group to consider the issue at hand from different perspectives, and to avoid making decisions without critically thinking about the possibilities (MACDOUGAL & BAUM 1997; BROHINSKY 2022). By expressing alternative opinions, the use of a devil's advocate could also be helpful against confirmation bias. The term devil's advocate is one of many that has been used for similar processes. Another way in which alternative views could be facilitated is through the use of dissenting opinions. For instance, the ECtHR publishes the dissenting opinions of the judges who did not agree with the final verdict. By giving more exposure to such differing opinions, alternative scenarios could also receive more attention and be considered more actively.

5. *Conclusion*

The current chapter has explained some of the existing theories that have been developed to explain the elusive process of bridging the gap between evidence and the decision on guilt. Furthermore, it has looked at the role of (confirmation) bias, and the problems it can cause when trying to make a correct decision on guilt. Although the problem of biases has been shown in several experimental studies, as well as case studies, a reliable way of counteracting biases is still lacking. This chapter has provided a short overview of several techniques that have been researched to try and avoid biases, and the mixed results these methods have found. Through an

overview of part of the literature, it has become clear that there is a lot left to learn about how to fight biases, and how to implement such protection within the legal system.

It is also important to acknowledge that the role of the judge may be different in different legal systems. For example, in an inquisitorial system, the judge has a much more active role than in an adversarial system. In the adversarial system, the judge does not decide in the same way as the judge in the inquisitorial system does (STRIER 1992; SPENCER 2016). It can be argued that several of the ways to fight biases which have been described here, could become part of the task of the active judge. However, at the moment, there seems to be no consensus on how to interpret this role, even within a single country (MAEGHERMAN 2021). The different legal systems may present varying difficulties when trying to prevent the influence of biases. Although some of the methods discussed here would most likely be applicable to a range of systems, and a range of decision-makers, more research should be done to find the optimal ways to prevent biases in each system. In order to do so, more cooperation between researchers and practitioners is needed. Research should be guided by the needs of practitioners, and practitioners should participate in research as much as possible. In that way, the remedies to protect against biases and reduce the risks of wrongful convictions can be further developed and optimized.

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