How courts should respond to the stories defendants tell: A Bayesian account of a Dutch ruling

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In criminal trials, a defendant sometimes provides an alternative explanation of the evidence. The Dutch Supreme court has set down a framework on how courts should respond to such explanations. Yet this framework is unclear. I offer an interpretation in terms of Bayesian probability theory.

KEYWORDS: alternative explanations; Bayesianism; criminal law; justification; legal evidence; stories

1. INTRODUCTION

In criminal trials, the prosecution usually has a burden to prove that certain events happened which imply the guilt of the defendant. The defendant then often responds with an alternative account of the facts surrounding the alleged crime – one that implies his innocence, for example: "I did not kill her, I was just a bystander, it was someone else". Such accounts explain the facts by offering an alternative story of what happened.

How should fact finders – the jury or the judges who decide which version of the facts to accept - deal with such a story if they believe that it is false? Furthermore, does every explanation offered by the defendant require a reply? And what should this reply look like? In this paper I examine these questions in the light of a ruling of the Dutch Supreme Court. This ruling dealt with how courts should respond to the stories that defendants offer.

The Supreme Court's ruling was about a case that has become known as the Venray murder.[1] In this case the defendant was accused of having killed his wife. He offered an alternative explanation, according to which he came home and found his wife dead. According to Dutch criminal law, whenever a defendant offers such an explanation, the

[1] Dutch Supreme Court, March 16th 2010, ECLI:NL:HR:2010:BK3359. The name comes from the town where the victim and her husband lived.

court can only convict him if it provides a justification for rejecting this explanation in its ruling.[2] When the court of appeal ruled on the Venray case, it acquitted the defendant on the grounds that there was no evidence that refuted his explanation. In response, the Supreme Court decreed that while courts should ideally point to evidence that refutes the explanation, they can also reject alternative explanations even when there is no evidence that refutes it. In particular, the Supreme Court stated that courts can argue that the defendant's story "did not become plausible" or that it is "not credible". Finally, some explanations are so "highly improbable" that they require no explicit justification by the court to be rejected. The schema in figure 1 summarizes the ruling:

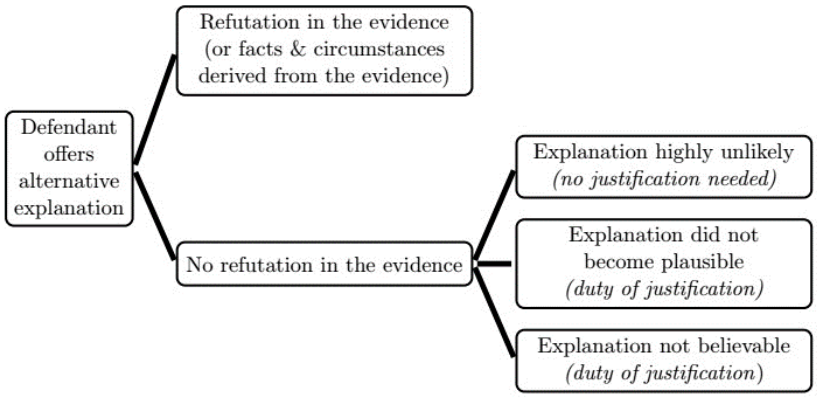

Figure 1 – The Venray ruling schematically

While this is an important ruling, it is also nebulous. The Supreme Court did not offer any explanation of the phrases it introduced (plausible, credible, highly unlikely), nor did it specify how these terms should be applied. As a result, both legal scholars and courts have been struggling to make sense of this ruling. In this paper I offer an interpretation of the ruling. My account is broadly Bayesian in that I use the language of Bayesian epistemology to clarify the necessary distinctions.

I start this paper in the next section by saying more about the Supreme Court's ruling and the problem it aims to solve, namely how courts should respond to explanations that are not eliminated by the evidence. After that, I offer an interpretation of each of the ways in which a court can reject an alternative explanation without referring to the evidence. I argue for the following interpretation:

[2] Article 359.2 Dutch code of criminal procedure.

The explanation did not become plausible: An alternative explanation fails to create a reasonable doubt its posterior probability is insufficiently high. When the defendant offers an explanation with a (very) low prior probability this explanation needs to become sufficiently probable in the course of the trial. If it does not, then the court can reject it.

The explanation is not credible: Some explanations can be probable when we look at them in isolation yet improbable when taking into account the credibility of the person who puts forward the story.

The explanation is highly improbable: Some explanations are not just improbable, but obviously improbable. The typical advantages of justifying decisions do not apply to these cases. Offering such a justification would take time and effort, thereby diminishing the efficiency with which decisions are reached in a criminal trial.

2. RESPONDING TO ALTERNATIVE EXPLANATIONS

The Supreme Court's ruling relates to the Venray murder case. In this case a man was accused of stabbing his wife to death. During the investigation, the man called upon his right to remain silent. He only offered an alternative explanation after one and a half years had passed. At that point, he knew the results of the forensic investigations. He then claimed that he had found his wife dead and hypothesized that criminals might have killed her because of an argument they had with him. As the court of appeal noted, this explanation fitted with the limited available evidence (blood stains and shoe prints) at least as well as the story that he killed his wife. However, the court did note that the defendant's story was somewhat hard to believe, especially since the defendant waited so long to come forward with it. Nonetheless, it did acquit him. The court reasoned that it could only convict if there was evidence that refuted the alternative explanation or if it was so implausible that it needed no explicit refutation. According to the court, neither was the case.

The court's position is understandable if we look at the Dutch proof standard for criminal cases. Proof standards determine when the defendant's guilt can be legally proven. In the Netherlands, the proof standard is that the court has to be convinced *based on the admissible evidence*.[3] So, it would seem that when the court has to explain why it is convinced of the guilt of the defendant, it should also do so by referring to the admissible evidence. In turn, when a conviction involves the court rejecting the defendant's story, this would require the court referring to some piece of evidence that refutes this alternative explanation. However, the Supreme Court did not share this reading – it ruled that

[3] Article 338, Dutch code of criminal procedure.

explanations can sometimes be rejected even when there is no evidence that contradicts it. It referred the case back to another court of appeal. The court of appeal then convicted the defendant of murder. [4]

So, the Supreme Court's ruling is about how courts should deal with cases in which the evidence does not refute a defendant's story. Before moving on to my interpretation of this ruling, I want to discuss both situations in which the court can point to evidence that refutes the defendant's story and situations in which the court can reject this explanation though no refuting evidence exists.

2.1 Refuting stories with evidence

When courts reject a defendant's explanation, they typically do so by referring to evidence that refutes this explanation. Evidence refutes a story insofar as it makes the story highly improbable. Courts should only reject a defendant's explanation if its probability is low, in order to avoid erroneous convictions. In Bayesian terms this means that the probability of the hypothesis (H, the explanation) conditional on the all the evidence in the case (E), (P(H|E)) is very low. This 'posterior probability' can be calculated with Bayes' formula:

$$P(H|E) = (P(E|H) * P(H))/P(E)$$

Whether the evidence in a case makes the hypothesis improbable therefore depends on the likelihood of the hypothesis, which refers to the probability of observing the evidence if we assume that the hypothesis (the explanation) is true, P(E|H). A low likelihood means that we would not expect this evidence to occur if the hypothesis were true.

In cases with two competing explanations, such as the Venray case, we are often interested in the probability of one explanation compared to the other. For that purpose, we can rewrite Bayes' rule to its 'odds' version:

$$\frac{P(H_1|E)}{P(H_2|E)} = \frac{P(E|H_1)}{P(E|H_2)} \times \frac{P(H_1)}{P(H_2)}$$

Here H1 and H2 represent the hypotheses that either one or the other explanation is true. In this version of the formula, whether the evidence skews the prior ratio in favour of guilt or innocence depends on the 'likelihood ratio', P(E|H1)/P(E|H2). When the likelihood ratio is lower

[4] Court of justice of Arnhem, October 15th 2012, ECLI:NL:GHARN:2012:BY0075.

than 1 it means that the evidence raises the probability of H1 whereas a likelihood ratio higher than 1 means that the probability of H2 is raised.

When reasoning about which story to accept, rejecting one story and accepting the other often means finding 'discriminating evidence', i.e. evidence that fits better with one story than another (Van Koppen, 2011, pp. 52-55). In Bayesian terms this means evidence where the likelihood ratio strongly favors one story over the other. Take again the example of the witness who testifies that he saw the husband kill the victim. This evidence discriminates between the two explanations because we would expect the evidence much more if the husband was the killer than if someone else was. This would mean that the likelihood ratio would be (much) greater than 1.

If the likelihood ratio is sufficiently much greater than 1, the probability of the story that the defendant killed the victim will be high and the probability that someone else killed her will be low. In such a case the court can point to the witness' statement as a reason why it convicts the defendant.

2.2 Refuting stories without evidence

Let us now turn to situations where the evidence does not refute the defendant's story, as in the Venray case. In that case the key question was which of two competing stories to accept, a situation that is best captured by the odds-version of Bayes rule. There the court noted that the evidence did not discriminate between these stories. Whether it was the husband who killed his wife or someone else, either way, we would expect to find the kind of evidence that was found (such as the shoe prints and the blood stains). This means that the likelihood ratio is close to 1. This means that the evidence did not significantly change the prior probability of either explanation.

Recall that on Bayes' rule, a low posterior probability of a hypothesis can depend either on a low likelihood, $P(E|H)$ or on a low prior probability, $P(H)$ of the hypothesis. So, we might assume that, if the evidence does not discriminate between explanations in terms of the likelihood, an alternative explanation's low posterior probability can only be because that explanation has a low prior probability. Is this how we should read the Supreme Court's ruling? To put it differently, when courts reject a defendant's explanation for being implausible, incredible or highly unlikely, is this always a judgment about that explanation's prior probability? And what should we then make of the distinction between these three terms?

In the following sections I will argue that prior probability only plays a key role in one of the three criteria that the Supreme Court mentioned, namely whether the explanation needs to "become

plausible". I will look at this criterion in the next section. For the other two criteria we need different concepts, which I discuss in sections 4 and 5 respectively.

3. IMPLAUSIBLE EXPLANATIONS FAIL TO BECOME PROBABLE

Let us begin with the first term the Supreme Court introduces. According to the Supreme Court, courts can reject an explanation if it "did not become plausible" during the criminal proceedings.[5] The obvious question when interpreting this statement is why some explanations need to become plausible. The answer to this lies in the proof standard. As mentioned, in the Netherlands the proof standard states that the court should be convinced of the defendant's guilt based on the admissible evidence. However, in practice, many legal scholars believe that the standard is actually similar to that of common law countries - that guilt has to be proven beyond a reasonable doubt (Ter Haar & Meijer, 2018, 7.4; Nijboer 2017, pp. 73-74). So, if the defendant hopes to be acquitted by telling an alternative story, that story needs to be good enough to create a reasonable doubt about his guilt (assuming that the prosecution's case is in itself strong enough).

Suppose that the defendant's story is weak and that the prosecution's case is strong. This means that if no further evidence or arguments were to be adduced, the defendant would most likely lose the case and be found guilty beyond a reasonable doubt. So, if the defendant tells a story that initially seems weak, he risks losing the case if no new evidence confirms his story. The defendant may then have a burden to introduce new arguments or evidence that would make the court decide in his favor or he risks losing the case.

So, a defendant's explanation can be rejected if its posterior probability fails to become high enough during court proceedings. Recall that, on a Bayesian account, there are two reasons why an explanation can be improbable: due to the evidence in the case (likelihood) or due to its prior probability. So, one reason why an explanation can be improbable at the moment that the defendant offers it, is because it conflicts with (reliable) evidence that was already brought forward in court. However, in such cases the court can point to that evidence when justifying its decision to reject the explanation. Yet the Supreme Court's ruling is about cases in which courts cannot point to such evidence. So, it presumably describes situations in which an explanation is improbable due to its low prior probability. The lower the prior probability of an explanation is, the stronger the evidence has to be to make that explanation probable. If the evidence is not strong

[5] In Dutch "*niet aannemelijk geworden*", my translation.

enough (in terms of the likelihood) then the prior probability will not be raised sufficiently to create a reasonable doubt. In that case, the explanation has not become 'plausible'.

4. INCREDIBLE EXPLANATIONS ARE TOLD BY UNRELIABLE STORYTELLERS

Apart from arguing that the explanation is implausible, the Supreme Court also decreed that courts can reject explanations by arguing that they are "incredible".[6] How does this differ from an explanation that is implausible – i.e. improbable, either a priori or due to the evidence? When the term 'incredible' is used by Dutch courts, it typically refers to actions within the scenario that the defendant undertook or in how the defendant told the story (Lettinga, 2015). For instance, suppose that the defendant claims that he was a bystander of a murder but that he did not call the emergency services while he did spend time trying to hide possessions of the victim. Such a story would be implausible, in the way we just saw: it contains illogical elements and therefore has a low prior probability. However, it would also be incredible. The defendant would not come across as a reliable storyteller. Telling bad stories and lacking credibility as a storyteller often go hand in hand, but not always. Some stories fit well with the evidence and with our background beliefs, perhaps even better than the true explanation but are still improbable due to the lack of credibility of the defendant.

First, some stories are vague. For example, a defendant may claim that 'something else happened', without providing further details. People tend to find such stories difficult to believe because they lack relevant details (Pennington & Hastie, 1991). However, typically, the more general a claim the more probable it is. Suppose that a defendant offers the alibi "I saw someone else committing the murder." On its own this story should be much more probable than the story "I saw someone else, who had red hair and glasses, committing the murder." After all, there are many men but only a smaller subset of them have red hair and glasses. The claim that 'there was a man with red hair and glasses' therefore, by definition, implies that 'there was a man', and the former can therefore never be more probable than the latter.

But what we are assessing is not the statement 'there was a man' versus 'there was a man with red hair and glasses'. We are assessing whether this claim is credible given that the defendant tells it. On a Bayesian account, the credibility of the story depends on the answer to the following question: "given that a witness testifies to fact X, what is the probability of X?" (Goldman, 1999, 4.2–4.4). So, in the case where

[6] In Dutch "*ongeloofwaardig*", my translation.

the defendant tells the general story, we are assessing the probability of 'there was a man' (H1) given that 'the defendant reports that "there was a man" (E1). When the defendant gives the more specific story, we are assessing the probability of 'there was a man with red hair and glasses' (H2) given that 'the defendant reports that "there was a man with red hair and glasses" (E2).

Suppose that the defendant was in a good position to observe the characteristics of the man. That means that, if he is truthfully reporting on his own experiences, we can reasonably expect him to testify to those characteristics. However, if the defendant then offers a vague story, we might become suspicious that he was lying by deliberately offering a vague story so that his story is not contradicted by the evidence. In other words, if we can reasonably assume that the defendant could tell a more specific story, which better explains the facts, then we have reason to doubt the credibility of his story.

A second important category of incredible stories are ad-hoc explanations. An ad-hoc explanation is an explanation that is made up to fit the available evidence but that is difficult or impossible to falsify (Lipton, 2003, p. 219). For instance, a guilty defendant could make up a somewhat believable, specific story intended to avoid falsification (Mackor, 2017). For instance, he can call upon his right to remain silent and only offer an explanation once all the evidence has been presented. This was what the defendant in the Venray case did. Such a story is not necessarily implausible or incoherent. On the contrary, false explanations of criminal evidence are sometimes more coherent (Vredeveldt et al., 2014) and better supported by the evidence (Gunn et al., 2016) than true explanations. This is because they can be tailored to the known facts. However, if we have good reasons to suspect that the defendant has fitted his story to the evidence, then this should lower our degree of belief that he is truthfully reporting on his own experiences.

5. HIGHLY IMPROBABLE EXPLANATIONS ARE OBVIOUSLY FALSE

When a court considers an explanation to be implausible or incredible it must generally justify why it does not believe the defendants explanation before convicting him. However, according to the Supreme Court, some explanations are so "highly improbable" that courts do not have a duty to respond to them.[7] Of the terms that the Supreme Court introduces in its ruling, this one is possibly the most nebulous. At first sight, the term would seem to refer to explanations that have a very low

[7] In Dutch "*zo onwaarschijnlijk is, dat zij geen uitdrukkelijke weerlegging behoeft*", my translation.

(posterior) probability. But this straightforward interpretation faces the difficulty that any alternative explanation that the court rejects is highly improbable. I mentioned earlier that (in practice) Dutch criminal law requires that a defendant's guilt must be proven beyond a reasonable doubt. This is a high standard for proof. In probabilistic terms, the standard is often taken to mean that the probability of guilt should be high enough (e.g. 95%) (Cheng, 2013, p. 1256). However, this means that the probability of any story consistent with guilt can be at most 5%. Furthermore, this 5% probability is a maximum, meaning that in many cases, the probability of the story that the defendant tells will be (far) lower. So, if all rejected alternative explanations are very improbable, what distinguishes those that are 'highly improbable' that they need not be addressed? We could, of course, answer this challenge by saying that while many explanations are improbable, some explanations are highly improbable, say less than 0.01%. Yet this still leaves us with the question why courts do not have to respond to such explanations. What makes highly improbable explanations special?

An answer to this question begins with a discussion about why courts usually should justify their decision to reject an alternative explanation. There are, broadly speaking, two purposes that such justification serves: making the explanation understandable and forcing the court to reflect on its reasoning. First, justification helps make the decision understandable for its audience, which includes the parties at trial, the legal community and society as a whole (Knigge, 1980; Dreissen, 2007, pp. 392-404). If the audience understands the arguments for the decision, then this makes the court's decision more legitimate for them. An explicit justification also allows courts of appeal, judicial scholars, experts and other interested parties to check whether the decision was correct and to point out possible flaws. Finally, by making the reasons for the decision understandable, parties might be less inclined to appeal the ruling. This would aid the efficiency of the criminal law system because courts of appeal would have to hear fewer cases (Buruma, 2005). The second reason why judges should justify their decision is that it forces courts to reflect on the arguments for their ruling. This in turn can help them avoid reasoning errors (see e.g. Dreissen, 2007, pp. 392-404). This is in line with psychological research that suggests that explaining one's decision-making process helps people make better decisions (Wilkenfeld & Lombrozo, 2015).

These benefits of justification also occur when courts justify why they reject an alternative explanation. In such cases the justification gives both the court and the audience insight into why that explanation is improbable enough not to create a reasonable doubt. However, there are cases in which this kind of insight is not required. In particular, some stories that defendants tell are so obviously improbable that we

would gain little by arguing against them. For example, take a (real) case in which the defendant pleaded that he was not accountable for the child porn on his computer because his mind was controlled by aliens.[8] It seems fair to say that no reasonable audience would consider the 'alien' explanation remotely probable. Furthermore, a defendant who offers such an explanation would either be delusional or insincere. So, it is improbable that arguments would sway him. Hence, the court would (most likely) gain little by justifying why it rejects this alternative explanation, with respect to the parties, legal community and general audience's understanding of it. More generally, explaining does not help if the audience already believes that the explanation is improbable or if they believe that the explanation is probable, but this belief would most likely not be affected by further arguments from the court.

As I discussed above, justifying one's decisions is not just important for its outside relevance. It is also important to improve one's decision making by carefully considering one's reasoning and finding possible flaws in it. Why should spelling out the reasons against obviously improbable explanations not improve one's decision-making? My proposal is that the more difficult it is to see why an explanation is improbable, the more room for error there is. However, when an explanation's improbability is obvious, the reasoning required to understand its probability does not require much thought. Hence, there is less to be gained by carefully spelling out one's reasoning to see whether this reasoning is sound. For instance, the court does not have to carefully reflect on whether they might be making an error when they assume that mind controlling aliens do not exist.

So, there is little gain to justifying why we reject obviously improbable explanations. Yet spelling out such arguments does take time and effort and impedes the efficiency of decision making. So, with respect to obviously highly unlikely explanations, the costs of explicit justification will often outweigh the benefits.

It is not always obvious that an explanation is improbable. Seeing that an explanation is improbable often boils down to seeing that its elements do not cohere with one another, or that the explanation does not cohere with the evidence or with our general knowledge about the world. For instance, in criminal cases, the mere description of the evidence can sometimes be hundreds of pages long. Judging whether the evidence makes the explanation unlikely might therefore require seeing how numerous pieces of evidence cohere with one another. Similarly, an explanation can have a very low prior probability because of internal inconsistencies, without this being immediately obvious. Understanding that the explanation is highly improbable might then involve, for

[8] Court of Noord-Holland, November 24th 2014, ECLI:NL:RBNHO:2014:11709

instance, creating a time line of the story and seeing that the story implies that the defendant was in two places at the same time. This explanation then has a very low probability (perhaps even 0) but it is not immediately obvious that it does. This fact requires further explaining by the court.

6. CONCLUSION

When defendants plead for their innocence, they often do so by offering an alternative explanation of the evidence. When may courts reject such alternative explanations and when should they justify this decision to reject the defendant's story? In this paper, I discussed these questions in the context of the Dutch Supreme Court's ruling about the Venray murder case. What makes this ruling interesting is that it offers a nuanced approach to the above questions but it does so in nebulous terms, in need of further clarification. My goal was to make the ruling understandable by giving it a more precise interpretation, employing Bayesian probability theory. This interpretation ties the ruling to the goals of avoiding errors (in particular, courts should reject a defendant's explanation only when its posterior probability is sufficiently low), of making the decision to convict understandable to the parties and other audiences and of reaching these decisions efficiently.

At the heart of the Supreme Court's ruling is the idea that courts can reject a defendant's explanation even in cases where the evidence does not refute this explanation. While rejecting the story by referring to a smoking gun (i.e. refuting evidence) may be the ideal, other responses are possible too. The Supreme Court distinguishes three categories. First, some explanations can be rejected because they "did not become plausible." I argued that whether an explanation needs to become plausible during the criminal proceedings depends on its inherent plausibility at the time it is offered - its prior probability. If an explanation with a low prior probability does not become probable by means of the evidence, then the explanation fails to create a reasonable doubt. Second, explanations are "incredible". Whether an explanation offered by a defendant is probable does not just depend on whether it is a good story, it also depends on the credibility of the defendant. If an explanation is incredible, the defendant is not a believable storyteller, meaning that the posterior probability of his story is low because of the evidence of his unreliability. Finally, some explanations are so "highly improbable" that the court does not have a duty to respond to them. I argued that what distinguishes these explanations from explanations that the court should respond to is that their improbability is obvious. When an explanation is obviously improbable, the court would not

serve the goals of making its decision understandable by offering a response. A duty to respond would then only reduce the efficiency of the decision process.

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