TOPICS
TOPICS IN COGNITIVE SCIENCE

Topics in Cognitive Science 12 (2020) 1152–1174

ISSN:1756-8765 online
DOI: 10.1111/tops.12426

This article is part of the topic "Models of Rational Proof in Criminal Law," Henry Prakken, Floris Bex and Anne Ruth Mackor (Topic Editors). For a full listing of topic papers, see http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1756-8765/earlyview

The Hybrid Theory of Stories and Arguments Applied to the Simonshaven Case

Floris J. Bex[a,b]

[a]*Department of Information and Computing Sciences, Utrecht University*
[b]*Tilburg Institute for Law, Technology and Society, Tilburg University*

Received 9 December 2018; received in revised form 13 March 2019; accepted 15 March 2019

Abstract

This paper presents the hybrid theory of stories and arguments for reasoning with evidence in legal cases and applies this theory to the Simonshaven case. In the hybrid theory, alternative hypothetical stories about "what happened" in a case are constructed and discussed in a dialectical process of argument and counterargument. After informally explaining stories, arguments, and the ways in which they interact, this paper gives a method for rational proof based on critical questions and shows how this method can be used in the Simonshaven case.

Keywords: Arguments; Stories; Evidence; Proof

1. Introduction

When reasoning with evidence and facts in criminal cases, people construct, test, and justify the hypotheses in a case dialectically. It has been argued that both arguments and stories are needed to capture all the relevant reasoning mechanisms involved in rational proof. Stories—coherent sequences of events—are needed to organize the facts in complex

Correspondence should be sent to Floris J. Bex, Department of Information and Computing Sciences, Utrecht University, PO Box 80.089, 3508 TB Utrecht, The Netherlands. E-mail: f.j.bex@uu.nl

cases into hypotheses about "what happened" in the case (Pardo & Allen, 2007; Pennington & Hastie, 1993; Wagenaar, van Koppen, & Crombag, 1993). Arguments—inferences based on evidence—can then be used to critically evaluate the individual elements in these hypothetical stories (Anderson, Schum, & Twining, 2005; Walton, Reed, & Macagno, 2008). Hence, Bex (2011) proposed a *hybrid theory* of stories and arguments and associated critical questions (Bex & Verheij, 2012).[1] In conjunction with a conceptual, more informally characterized theory (Bex, 2011; Bex & Verheij, 2012), a formal logical version of the hybrid theory has been developed (Bex, 2011). This formal version provides a logic of stories and arguments and a dialectical semantics for this logic (Dung, 1995), marrying ideas from computational argumentation (Bench-Capon & Dunne, 2007) with logical models of causal–abductive inference to the best explanation (Josephson & Josephson, 1994).

Below, an informal version of the hybrid theory that stays close to the formal logical version is given in Section 2—Section 2.1 discusses stories, Section 2.2 arguments, and Section 2.3 the combination of stories and arguments. Section 3 briefly discusses how the concepts from the hybrid theory can be used as the basis for a method for legal argumentation. Section 4 presents the case study of the Simonshaven case, and Section 5 presents a discussion and concludes the paper.

2. The hybrid theory of stories and arguments

The hybrid theory presented in this section is mainly based on the version presented in Bex (2011).

2.1. Stories

In the hybrid theory, stories about what (might have) happened in a case should be constructed to explain the observations. For example, in the Simonshaven case, the emergency services found a confused Ed and a dead Jenny in the Simonsbos. This can be explained by constructing hypotheses about what might have happened, stories that detail the course of events before, during, and immediately after the crime.

[Story] A story is a chronological, causally coherent report of a sequence of events and causal relations between these events.

Fig. 1 depicts a story in the Simonshaven case. Only one of the causal relations of the form "*c* causes *e*" is explicitly mentioned, namely the one between Ed hitting and

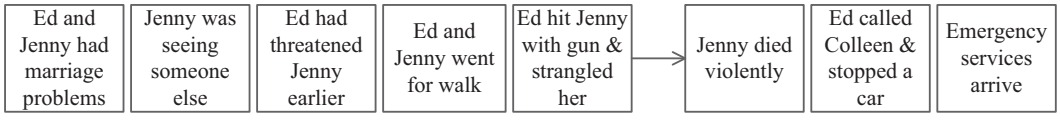

Fig. 1. A chronologically ordered story. The arrow denotes a causal relation.

strangling Jenny (denoted by an arrow in Fig. 1), and the other causal relations (e.g., that between the marriage problems and Ed's violent behavior, or between Jenny dying and Ed being confused) are left implicit.

Related to causal coherence is the notion of story schemes (Bex, 2011) or scripts (Schank & Abelson, 1977), stereotypical patterns that serve as a scheme for particular stories. For example, Pennington and Hastie (1993) give a general story scheme for intentional action: Given some initiating events and states of affairs, a motive may lead to an action with certain consequences. More specific story schemes can then be instances of this generic scheme: A robbery, for example, is a specific type of intentional action, where one person, motivated by the want for money, takes another person's valuables. Associated with a story scheme are critical questions that can point to possible sources of doubt about a story.

When explaining some observed event e, we perform what is commonly called *causal–abductive reasoning* (Josephson & Josephson, 1994): If we know that "c (may) cause e" and we observe e, we can infer cause c as a possible explanation of e. This cause can be a single event, but it can also be a sequence of events, a story.

[Explanation] A story S explains an observation e if S explicitly includes (a report of) e.

Thus, the story in Fig. 1 explains Jenny's death. In addition to using stories to *explain* the evidence in a case, it is also possible to use causal reasoning to *predict* possible events that might have taken place. If we have a story S that includes some event c and we know that "c causes e," we can predict that the effect e should also be observable. For example, if we assume the story in Fig. 1 to be true, we would at least expect to observe Jenny's blood on Ed, as violently hitting someone with a gun causes blood spatters on the attacker's hands or clothes.

Stories must be considered in the dialectical context of inference to the best explanation (IBE), where not just one story but also alternative stories are considered (Josephson & Josephson, 1994; Pardo & Allen, 2007; Wagenaar et al., 1993).

[Alternative explanations] Given a story S that explains evidence e, story S_a is an alternative explanation for e if S_a also explains e.

In Fig. 2, some of the possible stories in the Simonshaven case that explain Jenny's death are visualized. Here, story 2 and 3 are alternative explanations w.r.t. story 1 (Fig. 1).

In IBE, alternative stories must be compared, and ultimately the best one should be chosen. Here, we need to be able to reason *about* the story: Which evidence supports the story? Which evidence contradicts it? Is the story in any way plausible? The hybrid theory allows for such reasoning by introducing a specific type of argument for reasoning from evidence to conclusions (elements of stories).

2.2. Arguments

Arguments are constructed by performing consecutive reasoning or inference steps from one or more premises to a conclusion.

[Argument] An argument is a sequence of statements, where some statements (the premises) are given and other statements (the conclusions) are inferred from the premises by the application of evidential inference rules.

As an example, take argument A_{nc} in Fig. 3, which has as its premise the witness testimonies that "the witnesses saw a black Mercedes (similar to Ed's car) with people on the parking lot (near Simonsbos)," and infers from this that "there was a black Mercedes (similar to Ed's car) with people in the parking lot (near Simonsbos)." It is possible to build more complex arguments by using a conclusion to infer a new conclusion. For example, in argument A_{nc}, the aforementioned conclusion about the people near the car on the parking lot is used to infer that Ed and Jenny were near their car. On the other hand, it is also possible to have arguments for which the premise and conclusion is the same. For example, argument A_{cp} in Fig. 3 consists of just the statement that "the court was in a different position than the witnesses." Often the premises of an argument consist of evidence (e.g., police reports, witness testimonies), but there are also arguments which are not based on evidence. For example, arguments A_{wnr} and A_{cp} are based on observations of the court, not on specific pieces of evidence in the case.

Associated with the inferences in an argument are evidential inference rules or generalizations of the form "*e* is evidence for *p*," the background knowledge that justifies inferences. These generalizations can range from very general—for example, "the fact that some witnesses saw *p* is evidence for *p*" (used in A_1, Fig. 3)—to more specific—for example, "the fact that witnesses make detailed and consistent statements is evidence for the fact that they are reliable" (used in A_4, Fig. 3). Walton et al. (2008) have collected a large set of such generalizations, referring to them as argumentation schemes. Argumentation schemes have associated critical questions, often associated with specific types of evidence. For example, a witness's truthfulness ("Is there a reason to believe the person is lying?") or observational abilities ("Could the witness have seen the event from where they were standing?") can be questioned. Similar questions are possible for other types of evidence, such as expert testimonies ("Is the expert really an expert in the field?"). The

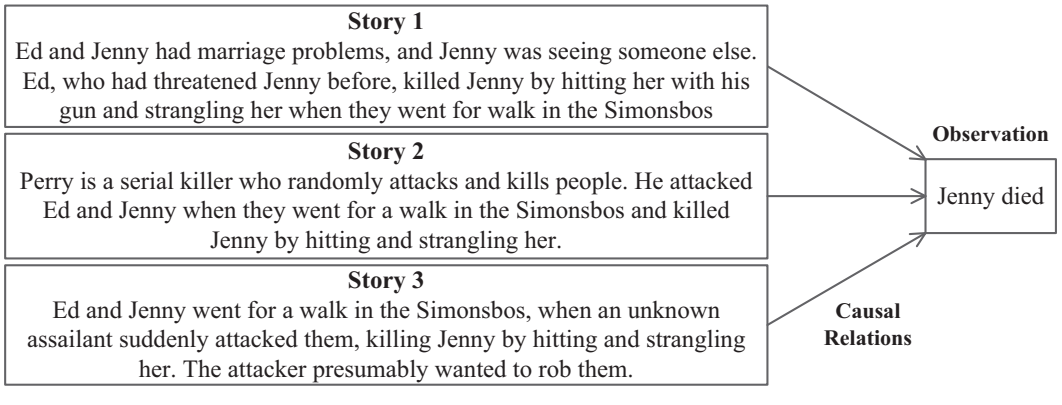

Fig. 2. Alternative explanations for Jenny's death.

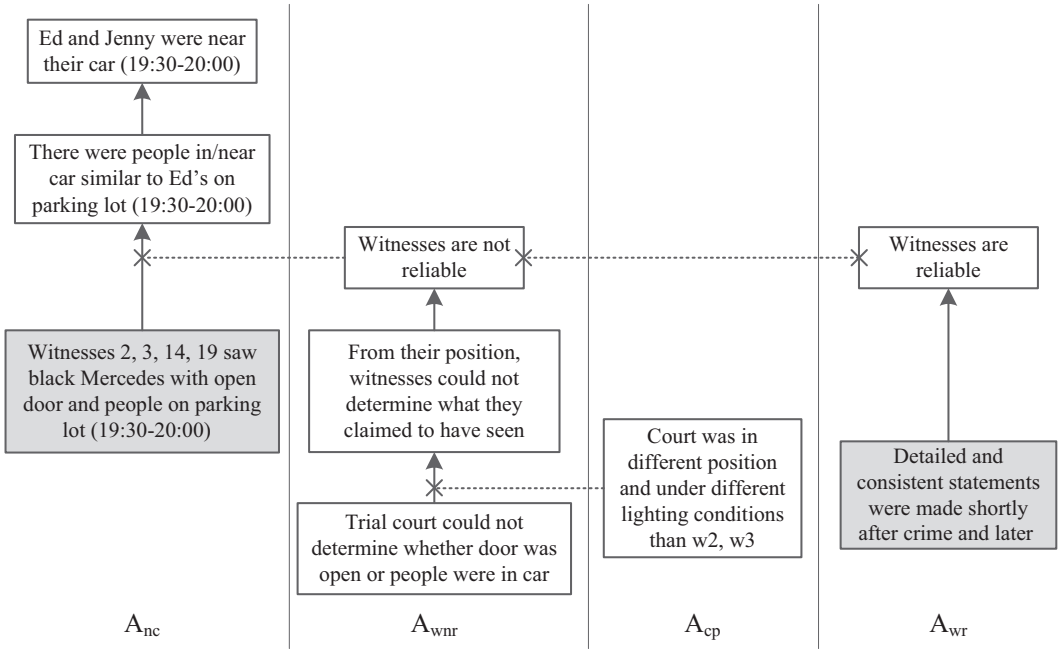

Fig. 3. Evidential arguments separated by vertical lines. Arrows denote inferences; dashed lines with crosses denote attack relations.

critical questions point to exceptions to the general scheme. For example, for argument A_{nc}, one could argue that while normally it is the case that "witnesses saw *p* is evidence for *p*," because of the position of the witnesses in this case there is an exception to the general rule, namely that the witnesses are not reliable (argument A_{wnr}).

Critical questions indicate that argumentation is dialectical: Not only arguments for a conclusion but also counterarguments should be considered. Two types of attack can be distinguished, namely rebuttal and undercutting.

[Attack] Argument *A* rebut-attacks argument *B* if *A* has the opposite conclusion of *B*. Argument *A* undercut-attacks argument *B* if *A* provides an exception to an evidential generalization that was used for an inference in *B*.

Rebuttal is always symmetric. For example, argument A_{wnr} rebut-attacks argument A_{wr}, as one argument concludes that the witnesses are reliable, and the other argument concludes that the witnesses are not reliable. In the case of an exception to the general rule underlying the inference, we speak of an undercutting attack; such as the attack of A_{wnr} on A_{nc}.

Once it has been determined which arguments attack each other, we can assess which conclusions to draw from a set of arguments and their attacks; that is, we can determine the status of arguments (Dung, 1995).

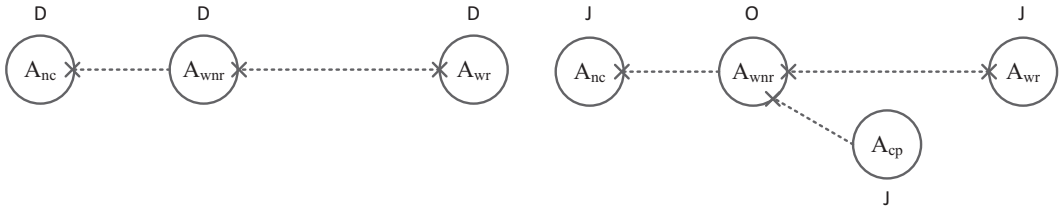

Fig. 4. The status of the arguments from Fig. 3—(D)efensible, (J)ustified, (O)verruled.

[Status of arguments] Justified arguments are those that are attacked only by overruled arguments, overruled arguments are those that are attacked by justified arguments, and defensible arguments are those that are involved in a tie.

For example, if we consider A_{nc}, A_{wnr}, and A_{wr} without taking A_{cp} into account, A_{wnr} and A_{wr} would be defensible: There is a conflict that is not resolved, a tie, because there is support for the claim that the witnesses are reliable (A_{wr}) and support for the claim that the witnesses are not reliable (A_{wnr}). A_{nc} is then also defensible, as it is attacked by another defensible argument. The left side of Fig. 4 shows this situation. If we now add A_{cp} (right side of Fig. 4), which is justified by definition, because it is not attacked, then A_{wnr} is attacked by a justified argument. This makes A_{wnr} overruled, which makes A_{nc} and A_{wr} justified, because they are now only attacked by an argument that is overruled (A_{wnr}).

2.3. Combining stories and arguments

There are multiple dialectical elements in the hybrid theory: Not only conflicting arguments have to be compared but also alternative, conflicting stories. The question then is how to compare stories; in the hybrid theory, this is done by using arguments to reason *about* the stories. Several criteria with which to assess stories are introduced, which roughly fall into two categories. The first set of criteria concerns how the story conforms to the specific evidence in the case at hand, while the second set of criteria is about whether the story conforms to general, common sense knowledge of the world.

First, consider the first set of criteria: How does the story conform to the evidence in the case? The first relevant criterion of this category is evidential support: pieces of evidence that support a particular story.

[Evidential support] The set of pieces of evidence that are used as premises of some argument *A*, where the conclusion of *A* is an element of story *S*.

As an example, consider part of the story contained in the trial court's verdict of Ed (Fig. 5). Here, we see six pieces of evidence that are premises of arguments with an element of the story as their conclusion: Ed's statement that he went for a walk with Jenny,

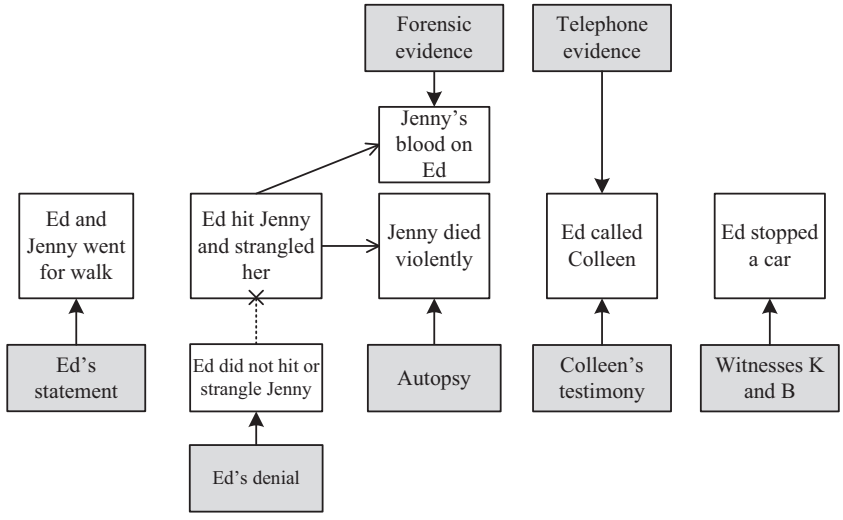

Fig. 5. Evidential arguments supporting the trial court's story.

the autopsy that Jenny's violent death was caused by violent force and strangulation, the forensic report that the blood spatters on Ed's shoes were Jenny's, and the testimonies and telephone records confirming the events just before the emergency services arrived. Note the different arrows used in Fig. 5: an open arrowhead (>) denotes a causal (story) relation, a closed arrowhead (►) denotes an evidential inference (argument) relation, and a dashed line with a cross (×) denotes attacks.

The notion of evidential support shows that there are different ways to include evidence in one's analysis of a case. Consider Fig. 6. On the left, the forensic scientist report evidence is *explained* (cf. Section 2.1) by the story that Ed hit Jenny—Jenny's blood on Ed caused the forensic scientist to report thusly. In the middle, the forensic report evidentially supports the story that Ed hit Jenny because the report is evidence for the fact that Jenny's blood was on Ed. Finally, on the right there is a story consisting of one event, Ed hit Jenny, which is evidentially supported by an argument based on the forensic report. Thus, the hybrid theory can capture causal explanations (the story explains the evidence) as well as evidential arguments (the evidence supports the conclusion), and the same situation can be modeled as a story (left), argument (right), or a mix of the two (middle). Note that for all three situations, the evidential support is the same (namely the forensic report evidence).

Given the evidential support of a story, we can also determine which evidence is *not* explained by a story and for which parts of the story there is no evidence.

In Fig. 5, the most important event in the story—that it was Ed who killed Jenny—is not directly supported by evidence. On the contrary: that Ed killed Jenny is explicitly contradicted by evidence, namely Ed's statement that he did not hit or strangle his wife. This is an example of evidential contradiction: pieces of evidence that contradict a particular story.

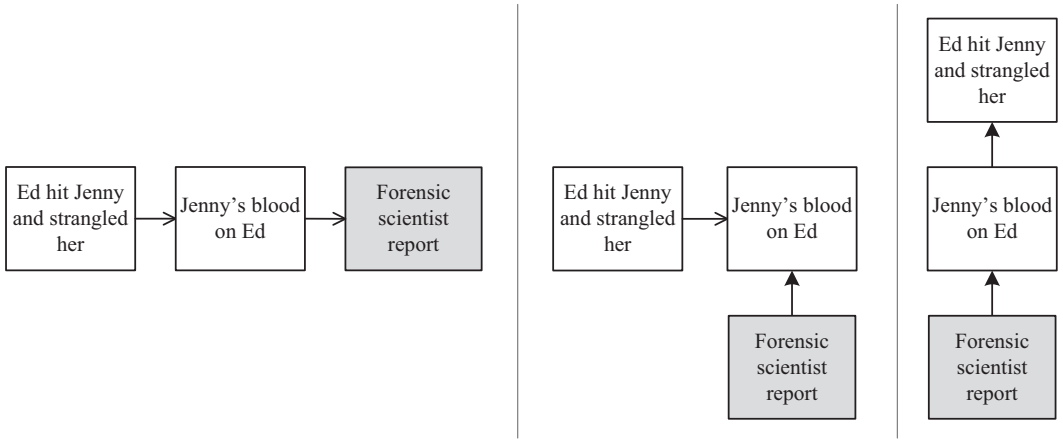

Fig. 6. Causal story explaining evidence (left), evidential argument supporting story (middle), and evidential argument supporting conclusion (right).

[Evidential contradiction] The set of pieces of evidence that is cited as premises of some argument *A*, where the conclusion of *A* attacks an element of the story.

Thus, arguments can be used to argue for or against elements of the story. In Fig. 5 there is one piece of evidence that is the premise of an argument that attacks the story that Ed killed Jenny, namely Ed's denial. In addition to attacking the story (evidential contradiction), it is also possible to attack the arguments supporting or contradicting the story. For example, consider the attacking argument based on Ed's denial from Fig. 5, which attacks the event in the story that Ed killed Jenny. In Fig. 7, this argument is shown as argument A_{ne1}, which is undercut by argument A_{end}, that Ed is not a reliable source since he refused to give any details. If we take this undercutter into account, A_{ne1} is overruled. So the status of arguments can be taken into account when considering support and contradiction: Being supported by a justified argument would be better than being supported by an overruled argument, for example. We will briefly discuss this further in Section 3.

While the evidence in a case should always be the main deciding factor, in complex cases it is hard to decide just based on the evidence—there might be different interpretations of the evidence, particularly in situations where the only persons who can provide the conclusive evidence are, for example, a suspect, a young child, or a traumatized victim (Wagenaar et al., 1993). Hence, we also need to consider the plausibility of a story, that is, whether the story conforms to our background knowledge of the world (Bex, 2011; Pennington & Hastie, 1993).

The plausibility of a story can become the subject of a dialectical process. First, by proposing a hypothetical story about "what happened" in a case, we essentially provide an argument for what we think (plausibly) might have happened. We can then argue against such a story by proposing alternative, conflicting stories (Fig. 2, Section 2.1) or by giving arguments against the plausibility of the first story. Such arguments are based

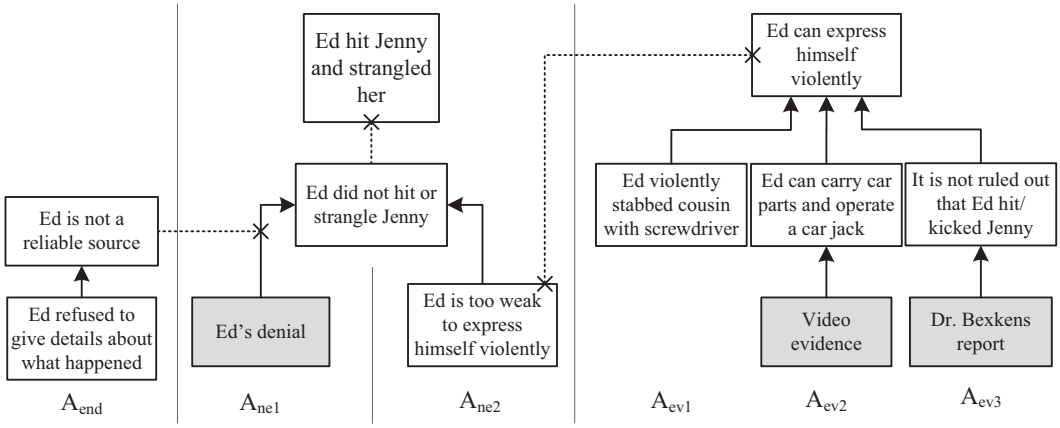

Fig. 7. Two arguments contradicting an event from a story (A_{ne1}, A_{ne2}) and their attackers (A_{end}, A_{ev1}–A_{ev3}).

on general assumptions about the world around us instead of on case-specific evidence. These assumptions (that contradict a story) are collectively characterized as the *implausibility* of a particular story.

[Implausibility] The set of general assumptions cited as premises of an argument the conclusion of which attacks an element of story *S*.

So, arguments can be used not only to support or attack a story using evidence, but also for arguing that (elements of) the story are implausible. As an example of implausibility, consider the assumption that "Ed is too weak to express himself violently" (argument A_{ne2}, Fig. 7), which attacks the event that Ed violently killed Jenny. Note that no specific evidence for Ed's weak state is mentioned in the case (e.g., a doctor's report stating he is physically weak) and that therefore this is not an evidential contradiction argument. As with any support or contradiction based on arguments, we can take the status of arguments into account. In this case, the trial court gave numerous counterarguments to Ed's weakness (A_{ev1}, A_{ev2} and A_{ev3}). This makes A_{ne2} defensible.

One way to approach plausibility is to look at individual elements (events, causal relations) of a story, like in the above example. However, for plausibility, we do not just consider the individual elements of an explanation (events, causal relations), but also the story as a whole by looking if the story fits a coherent story scheme (cf. Section 2.1). By comparing a story, particularly one that at first glance seems in some way incoherent, with stories based on common schemes, we can determine if the story is some way implausible, or if there are relevant parts missing from the story.

As an example, consider Ed's story in Fig. 8. There are two related stories based on two different schemes. The top story is based on the robbery scheme. This is the kind of plausible story we would expect if the man who jumped at Ed and Jenny wanted to rob them. If Ed's story were to follow the robbery scheme, it would have to be as complete as this robbery story, that is, include all the elements of the robbery story. However, there

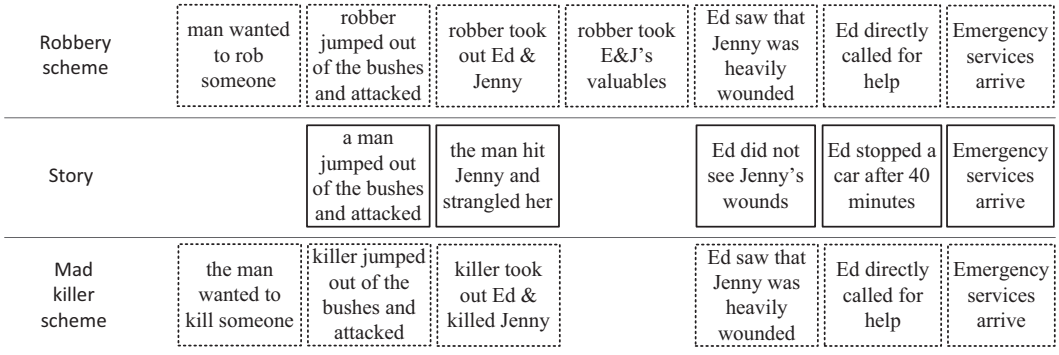

Fig. 8. Ed's story with two related stories based on relevant story schemes.

are several elements in the robbery story that are missing in Ed's story, namely the motive, the way in which the man took out Ed and the taking of valuables. So Ed's story is incomplete, there are elements missing.

[Story incompleteness] The set of elements of a relevant story scheme that are missing in the particular story.

Story incompleteness thus points to missing elements of a story, given a relevant story scheme. As a second example, take the "mad killer scheme": the man was not a robber but a mad killer (bottom story in Fig. 8). Notice that compared to the mad killer story, Ed's story is less incomplete than when compared to the robber story, as there is only one missing element, the killer's motive.

Story schemes can also be used when determining whether a story is plausible. For example, note the elements of Ed's story which are also in the robbery story, but noticeably different. The first is that a "normal" robber is not directly interested in killing someone—he just wants to incapacitate his victims so he can steal their valuables. The violence with which Jenny was killed seems disproportionate for a robbery. Second, Ed's behavior after the crime is not what we would expect from a husband after he and his wife were attacked: He said he did not see Jenny's wounds even though she was severely mutilated and there was a lot of blood, and he did not directly get help but waited for 40 min. These elements of the story are incompatible with what we would expect in case of a normal robbery or attack, they are implausible. Furthermore, consider the mad killer scheme. While not completely implausible (as we will see in the case study in Section 4), a story about a mad killer who violently kills people, and especially a woman when she is with a man, leaving the man virtually untouched is certainly less common than a robbery. Furthermore, no matter which story scheme we pick, Ed's behavior after the crime does not fit what we would expect from a husband.

So, story schemes can be used to analyze the (im)plausibility of a story. This analysis of a story using the schemes leads to arguments about the implausibility of the story. In Fig. 9, the arguments based on the comparison with the robbery and mad killer story that

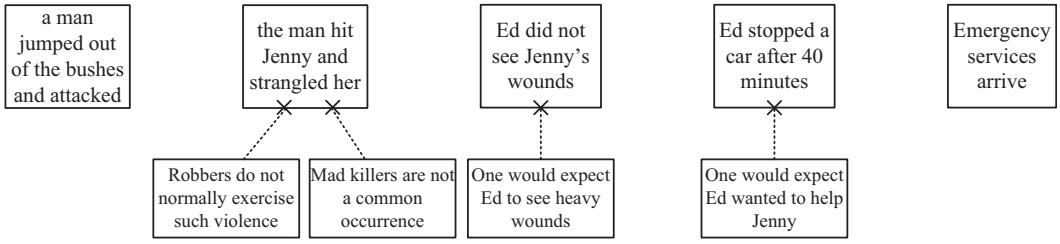

Fig. 9. Plausibility arguments against Ed's story based on the robbery scheme from Fig. 8

attack Ed's story are shown. The two arguments attacking the element in the story that the man attacked Jenny with such violence are based on the story's deviation from the robbery scheme and the fact that mad killer stories are not that common. The other arguments are based on the deviations from either scheme.

3. The hybrid theory as a method for rational proof

The criteria of evidential support, contradiction, implausibility, and completeness can be used to compare stories. Take, as an example, evidential support, the set of pieces of evidence that support one story. When comparing the evidential support of story S_1 with that of S_2, for example, we can say that there are more pieces of evidence in the case (in an absolute sense) that support S_1, so S_1 is better than S_2. Or we might find that S_1 is better because the set of evidence that supports S_1 is a superset of the set of evidence that supports S_2. Or we can use the notion of evidential support to measure the discriminatory power of a story: Which pieces of evidence support only S_1 and no other story?

If desired, we can thus use the different criteria for stories to rank stories: Which story has the highest (largest set) evidential support, and the lowest (smallest set) evidential contradiction, implausibility and incompleteness (Bex, 2011). Note that such rankings are fairly crude because they do not, for example, take the strength of evidence or the status of arguments into account. For example, it might be that story S_1 is supported by only one piece of evidence that is deemed highly credible and relevant (e.g., conclusive DNA evidence), whereas story S_2 is supported by multiple much weaker arguments based on evidence (e.g., vague witness testimonies). Even though in absolute terms the evidential support of S_2 is higher, we would not say S_1 is better, since we value the DNA evidence more than the vague witness testimonies.

There are various ways to capture the strength of arguments or stories more precisely (see, e.g., Zenker, 2012; Fenton et al. 2013; Vlek, 2016 for Bayesian approaches to arguments and stories). The central idea of the hybrid theory, at least the more informal version discussed here, is not, however, to numerically calculate probabilities. Rather, the hybrid theory is intended as a method for critically analyzing the evidence, hypotheses, and background knowledge used in a case. Thus, proof is a dialectical process, which can

be guided by the criteria for stories and arguments. For instance, whenever the evidential support of S_1 is larger than that of S_2, we can try to improve S_2 in relation to S_1 by looking for more evidence to support S_2 or more evidence to contradict S_1. Thus, we can provide a set of *critical questions* based on the hybrid theory (Bex & Verheij, 2012).

Explanation (CQ-Ex)
Are all the important observations in the case explained by the story?

Prediction (*CQ-Pr*)
Which observations would we expect to find given story *S*?

Alternative explanations (CQ-AltEx)
Have alternative stories been sufficiently considered?

Evidential support (CQ-ES), Evidential Contradiction (CQ-EC)
Which elements of story *S* are supported/contradicted? Which evidence supports/contradicts (only) *S*? How much evidence supports/contradicts *S*?

Plausibility (CQ-Pl)
Which elements of story S are implausible? Which assumptions conflict with (only) *S*? How many assumptions contradict *S*?

Story schemes (CQ-SS)
Which story schemes are relevant for story *S*? Are these schemes plausible? Does the story fit the story scheme; that is, are there story elements missing (incompleteness) or noticeably different (plausibility)?

Argumentation Schemes (CQ-AS)
Which argumentation schemes are relevant for the arguments? Are there possible exceptions to the general scheme (undercutters)?

Attacking arguments (CQ-AA)
Are there possible counterarguments to the arguments? What is the status of the arguments (justified, defensible, overruled)?

By answering the critical questions, the parties in the criminal trial (defense, prosecution) can strengthen their own positions and weaken the other party's position. Furthermore, failing to answer a critical question also makes one's own position in a case weaker.

4. Analysis of the Simonshaven case

The method followed for the analysis was as follows. First, all the case documents were studied, and some examples of concepts in the hybrid theory were constructed based on these texts. Figs. 1–3 are based on text from the appellate court's decision, and Figs. 5–9 are based on text from the trial court's decision. Given the basic stories and arguments in the trial court's decision, the critical questions from Section 3 while reading through the prosecutor's and defense's arguments, building the stories and arguments in the case as I went along. In the rest of this section, I will discuss this analysis step by step, mentioning the relevant critical questions. The final three main stories are shown in Tables 1–3. In these tables, the stories are shown top to bottom in chronological order. Arguments that support or contradict the story (cf. Fig. 5) are also shown in the tables. These arguments are labeled as (A_i), the evidence is labeled as (e_i), and the assumptions are labeled as (a_i). Arguments where the premises directly support an element in the story are shown on a single line. For example, the argument A_a has as premise "(e_a) witnesses 18, 12" and as conclusion the relevant part of the story, namely "Ed and Jenny arrived at the parking lot." Arguments which have intermediate conclusions or contradicting arguments, where the conclusion is not part of the story, are shown in an indented fashion, with the (intermediate) conclusions first and premises indented below this. For example, argument (A_{nc}) has the premise "(e_{nc}) witnesses 2, 3, 14, 19," as intermediate conclusion "There were people near a car similar to Ed's on the parking lot (19:30–20:00)" and as final conclusion the relevant part of the story, namely "Ed and Jenny were near the car at Simonsbos parking lot (19:30–20:00)" (Fig. 3).

4.1. Ed killed Jenny (Table 1)

Ed's motive—We have to explain Jenny's death (CQ-Ex). Let us start with the story given in the trial court's ruling of the case (Fig. 5). There is enough evidence that Ed was near Jenny when she died (CQ-ES: A_a, A_{nc}, A_{w1}). However, Ed is missing a motive for killing his wife (CQ-SS). Supporting evidence for this motive is that Ed and Jenny had marriage problems (CQ-ES: A_{m1}–A_{m3}). The question is then whether marriage problems are a plausible motive (CQ-Pl), as most husbands do not kill their wives when there are marriage problems. However, there are multiple witnesses who state that Ed was known to be violent and that he had threatened Jenny (CQ-ES: A_t). On the other hand, the defense mentions that they seemed happy and said they wanted to continue together (CQ-EC: A_{m4}, A_{m5}).

Ed killed Jenny—Based on numerous independent witness testimonies, it is determined that Ed and Jenny arrived at the Simonsbos parking lot around 19:00 (ES: A_a), after which they were seen in or near their car (CQ-ES: A_{nc}, this argument will be further discussed in Section 4.4, see also Fig. 3).

Table 1
The story that Ed killed Jenny

Story S_1	**Supporting Arguments**	**Contradicting Arguments**
Ed and Jenny had marriage problems	(A_{m1}) Jenny was seeing someone else (e_{m1}) witnesses Felix L., H., S., vB., R. (A_{m2}) There were problems with money, fatherhood, and violence (e_{m2}) witnesses J., V., Ki (A_{m3}) Jenny wanted to end the relation (e_{m3}) witnesses Felix L., Ko, Fin L.	(A_{m4}) Ed and Jenny wanted to continue together (e_{m4}) witnesses Fin L., Jack L. (A_{m5}) Ed and Jenny seemed happy the day of Jenny's death (e_{m5}) witnesses Bo., Harry L.
Ed had threatened Jenny	(A_t)(e_t) witnesses Jack L., Felix L., Ki	
Ed had a gun	(A_{eg})(e_{eg}) witnesses Jack L., Frank L., Franka L.	
Ed and Jenny arrived at the parking lot (18:50–19:00)	(A_a)(e_a) witnesses 18, 12	
Ed and Jenny were near the car at Simonsbos parking lot (19:30–20:00)	(A_{nc}) There were people near a car similar to Ed's on the parking lot (19:30–20:00) (e_{nc}) witnesses 2, 3, 14, 19 **(A/J)**	
Ed and Jenny walked away from the car (20:00–20:15)	(A_{w1})(e_{w1}) Witness 6	
Ed killed Jenny by hitting her with his gun and strangling her	(A_{g1}) Jenny was killed by being hit with a gun (e_g) Autopsy report cause of death (A_{g2}) The gun with which Jenny was killed was similar to Ed's gun Ed's gun looked similar (e_x) witnesses Jack L., Frank L., Franka Cartridges that were found were similar to those for Ed's gun (e_g) police report	(A_{ne1}) Ed did not kill Jenny **(A/O)** (e_{ne1}) Ed's denial (A_{ne2}) Ed did not kill Jenny **(A/O)** (a_{ne}) Ed is too weak to express himself violently
caused		
Gunshot particles on Ed's hands, shirt, trousers	(A_{gp1})(e_{gp1}) Forensic report gunshot particles	(A_{cp1})(e_{cp1}) Particles on shirt did not match those on Jenny's skull.
Gunshot particles on Jenny's hands, skull	(A_{gp2})(e_{gp2}) Forensic report gunshot particles	
Jenny's blood on Ed's shoes and shirt	(A_b)(e_b) Forensic report blood spatters	
Ed called Colleen	(A_{cc1})(e_{cc1}) Colleen's testimony (A_{cc2})(e_{cc2}) Telephone records	
Ed smoked three cigarettes next to Jenny's body	(A_{cb}) Cigarette butts with Ed's DNA (e_{cb}) Forensic report cigarettes	
Ed calls Colleen three more times	(A_{cc3})(e_{cc3}) Colleen's testimony (A_{cc4})(e_{cc4}) Telephone records	
Ed walked back to the parking lot		
Ed drove to the water pump station, where he dumps his gun (20:20)	(A_{ps1}) Dark car parked at water pump station (e_{ps1}) witness 10 (A_{ps2}) There was no car on the car park (e_{ps2}) witness 15	
caused		
No gun was found	(A_{ng})(e_{ng}) police report	
Ed stopped a car (21:00)	(A_{sc})(e_{sc}) witnesses K and B	
Colleen and Jack arrived	(A_{cj})(e_{cj}) witness Colleen, Jack L.	
Ed collapsed and hit his head on the asphalt	(A_{ec2})(e_{ec2}) witness Colleen, K, B	
caused		
Bump on forehead	(A_{ew})(e_{ew}) police report (A_{ew2}) Ed could have caused the bump himself (e_{ew2}) witness Colleen	

Table 2
The story that an unknown attacker killed Jenny

Story S_2	**Supporting Arguments**	**Contradicting Arguments**
Ed and Jenny arrived at the parking lot (18:50–19:00)	$(A_a)(e_a)$ Witnesses 18, 12	
Ed and Jenny went for a walk, which took about an hour (19:00) **(C)**	$(A_w)(e_{et1})$ Ed's statement	(A_{nc}) There were people near a car similar to Ed's on the parking lot (19:30–20:00) **(C) (A/J)** (e_{nc}) witnesses 2, 3, 14, 19
A man was waiting in the bushes to rob and kill a passer by		(A_{np2}) man was not waiting in the pit (e_{np1}) the pit was not suitable to spend more than a day in
The man jumped out of the bushes and attacks (20:00) **(C)**	$(A_j)(e_{et2})$ Ed's statement	
The man took out Ed without too much violence	$(A_{to})(e_{et3})$ Ed's statement	(A_{nh}) Ed "didn't feel being hit" (e_{et4}) Ed's statement $(A_{rv1})(a_{rv1})$ Implausible that the man hardly harms Ed
caused		
Bump on forehead	$(A_{ew})(e_{ew})$ police report	
The man killed Jenny by hitting her with a gun and strangling her (20:00–20:20)	(A_{g1}) Jenny was killed by being hit with a gun (e_g) Autopsy report cause of death (A_{g3}) Cartridges that were found (e_g) police report	$(A_{rv2})(a_{rv2})$ Robbers do not normally exercise such violence $(A_{mk})(a_{mk})$ Mad killers are not a common occurrence
Jenny's blood on Ed's shoes and shirt	$(A_b)(e_b)$ Forensic report blood spatters	
Gunshot particles on Jenny's hands, skull	$(A_{gp2})(e_{gp2})$ Forensic report gunshot particles	
The man took valuables		
Ed woke up next to Jenny, takes her hand, screams	$(A_h)(e_{et5})$ Ed's statement	
Gunshot particles on Ed's hands	$(A_{gp1})(e_{gp1})$ Forensic report gunshot particles	
Ed did not see anything special about Jenny **(C)**	$(A_s)(e_{et6})$ Ed's statement	$(A_{hi})(a_{hi})$ Implausible that Ed did not see Jenny's wounds given that he took her hand
Ed called Colleen	$(A_{cc1})(e_{cc1})$ Colleen's testimony $(A_{cc2})(e_{cc2})$ Telephone records	
Ed was confused	$(A_h)(e_{et7})$ Ed's statement	
Ed smoked three cigarettes next to Jenny's body **(C)**	(A_{cb}) Cigarette butts with Ed's DNA (e_{cb}) Forensic report cigarettes	$(A_{c1})(a_{c1})$ Confusion does not explain him smoking
Ed did not call emergency number	$(A_{ill})(e_{ill})$ Ed is illiterate	$(A_{c2})(a_{c2})$ Confusion does not explain him not calling
Ed called Colleen three more times	$(A_{cc3})(e_{cc3})$ Colleen's testimony $(A_{cc4})(e_{cc4})$ Telephone records	
Ed did not ask Colleen to call emergency services	$(A_{cc3})(e_{cc3})$ Colleen's testimony	$(A_{c3})(a_{c3})$ Confusion and illiteracy do not explain him not asking
Ed stopped a car (21:00) **(C)**	$(A_{sc})(e_{sc})$ witnesses K and B	$(A_{he})(a_{he})$ One would expect Ed wanted to help Jenny earlier

Table 3
The story that Perry killed Jenny

Story S_3	**Supporting Arguments**	**Contradicting Arguments**
Ed and Jenny arrived at the parking lot (18:50–19:00)	(A_a)(e_a) Witnesses 18, 12	
Ed and Jenny went for a walk, which took about an hour (19:00) **(C)**	(A_w)(e_{et1}) Ed's statement	(A_{nc}) There were people near a car similar to Ed's on the parking lot (19:30–20:00) **(C) (A/J)** (e_{nc}) witnesses 2, 3, 14, 19
Perry is waiting in his pit in the bushes	(A_p) Man-made pit near the crime scene (e_p) police report (A_{pp}) The pit was Perry's **(A/D)** Two crosses on the map point to pits Perry used (e_{mc1}) evidence police investigation There was a cross at the Simonsbos crime location (e_{mc3}) map evidence	(A_{np1}) Perry was not waiting in the pit (e_{np1}) the pit was not suitable to spend more than a day in (A_{np2}) Perry was not in the pit Perry's phone was not in the area (e_{np1}) phone records (e_{np1}) no traces of Perry were found in the pit
Perry jumped out of the bushes and attacked (20:00) **(C)**	(A_j)(e_{et2}) Ed's statement	(A_{np3}) The man did not look like Perry (e_{et8}) Ed's statement
Perry took out Ed without too much violence	(A_{to})(e_{et3}) Ed's statement	(A_{nh}) Ed "didn't feel being hit" (e_{et4}) Ed's statement (A_{rv1})(a_{rv1}) Implausible that Perry hardly harms Ed
caused		
Bump on forehead	(A_{ew})(e_{ew}) police report	
Perry killed Jenny by hitting her with a gun and strangling her (20:00–20:20)	(A_{cc}) Crosses indicate Perry's crimes **(A/D)** one cross on map points to murder by Perry (e_{mc1}) evidence police investigation (A_{g1}) Jenny was killed by being hit with a gun (e_g) Autopsy report cause of death (A_{g3}) Cartridges that were found (e_g) police report	
Jenny's blood on Ed's shoes and shirt	(A_b)(e_b) Forensic report blood spatters	
Gunshot particles on Jenny's hands, skull	(A_{gp2})(e_{gp2}) Forensic report gunshot particles	
Perry took valuables		
Ed woke up next to Jenny, takes her hand, screams	(A_h)(e_{et5}) Ed's statement	
Gunshot particles on Ed's hands	(A_{gp1})(e_{gp1}) Forensic report gunshot particles	
Ed did not see anything special about Jenny **(C)**	(A_s)(e_{et6}) Ed's statement	(A_{hi})(a_{hi}) Implausible that Ed did not see Jenny's wounds given that he took her hand
Ed called Colleen	(A_{cc1})(e_{cc1}) Colleen's testimony (A_{cc2})(e_{cc2}) Telephone records	
Ed was confused	(A_h)(e_{et7}) Ed's statement	
Ed smoked three cigarettes next to Jenny's body **(C)**	(A_{cb}) Cigarette butts with Ed's DNA (e_{cb}) Forensic report cigarettes	(A_{c1})(a_{c1}) Confusion does not explain him smoking
Ed did not call emergency number	(A_{ill})(e_{ill}) Ed is illiterate	(A_{c2})(a_{c2}) Confusion does not explain him not calling
Ed called Colleen three more times	(A_{cc3})(e_{cc3}) Colleen's testimony (A_{cc4})(e_{cc4}) Telephone records	
Ed did not ask Colleen to call emergency services	(A_{cc3})(e_{cc3}) Colleen's testimony	(A_{c3})(a_{c3}) Confusion and illiteracy do not explain him not asking
Ed stopped a car (21:00) **(C)**	(A_{sc})(e_{sc}) witnesses K and B	(A_{c2})(a_{c2}) One would expect Ed wanted to help Jenny earlier

The question is now how the central element in S_1, that Ed killed Jenny, is supported by evidence (CQ-ES). First, it is argued that Jenny was killed by being hit with what could have been the handle of a gun (CQ-ES: A_{g1}). There is evidence that Ed had a gun (A_{eg}) and evidence that this gun was similar to the one Jenny was killed with (CQ-ES: A_{g2}). Furthermore, Ed hitting Jenny with the gun would have caused the presence of gunshot particles on Ed's hands as well as Jenny's head (CQ-Pr), both of which are supported (CQ-ES: A_{gp1}, A_{gp2}). Finally, violently hitting Jenny would have caused blood spatters, so Jenny's blood on Ed's shirt and shoes is an indication that it was Ed who hit Jenny (CQ-ES: A_b).

It is also important to look for possible counterevidence to S_1 (CQ-EC). Contradicting arguments were that Ed denied he was involved (CQ-EC: A_{ne1}) and that Ed is too weak to express himself violently (CQ-EC: A_{ne2}). However, these arguments were further questioned and counterarguments were given (AS/AA: A_{end}, A_{ev1}–A_{ev3}, see Fig. 7) overruling A_x, indicated in Table 1 by including the label (A/O), which stands for "(A)ttacked/(O) verruled." Furthermore, it was argued that the gunshot particles on Ed's shirt and trousers did not match the particles on Jenny's skull (CQ-EC: A_{cp1}).

After Jenny died—The story S_1 can be further completed (CQ-SS) by including Ed's erratic behavior after the killing, such as smoking cigarettes and calling Colleen. This is, according to the prosecution, plausible (CQ-Pl): Men who have just killed their wives are uncertain what to do (CQ-SS). Furthermore, Ed got rid of his gun at the water pump station (CQ-SS) where a car was spotted by witnesses (CQ-ES: A_{ps1}, A_{ps2}). This further explains that no gun was found (CQ-Ex) and makes it plausible (CQ-Pl) that Ed only stopped a car after 40 min, as he was busy getting rid of the gun. The final observation that needs explaining (CQ-Ex) is the bump on Ed's forehead, for which the prosecution provides evidence that Ed collapsed and hit his head on the asphalt (CQ-ES: A_{ec}, A_{ew1}, A_{ew2}).

4.2. An unknown man killed Jenny (Table 2)

The question is now whether there is an alternative explanation of Jenny's death (CQ-AltEx) that creates a reasonable doubt. Ed's story was as follows: When he and Jenny arrived at the Simonsbos, they went for a walk that would normally take them about an hour. As they were walking back to the car, a crazy madman jumped out of the bushes and attacked them. He does not know what happened, but he passed out and woke up next to a dead Jenny. While he did not see that she was wounded, he noticed she did not react and called Colleen, confused and unsure what to do.

What happened in the parking lot?—According to Ed, he and Jenny must have started their walk of about an hour around 19:00 (CQ-ES: A_w). However, this is contradicted (CQ-EC: A_{nc}) by numerous witnesses who saw people near a car similar to Ed's between 19:30 and 20:00 (cf. Fig. 3). The reliability of these witnesses was questioned (CQ-AS: A_{wnr}), arguing that from their position they could not have seen the parking lot. However, the appellate court did think the witnesses were reliable (CQ-AA: A_{cp}, A_{wr}), making argument A_{nc} justified, hence the label (A/J) in Table 2.

The unknown attacker—It is questionable whether the type of story Ed tells is plausible (CQ-Pl, CQ-SS, cf. Fig. 9): "normal" robbers don't usually use this much violence and mad attackers are not very common (CQ-Pl: A_{rv2}, A_{mk}). Furthermore, it is unclear what happened to Ed when the man attacked. Ed has a wound on his head, which might have been caused by the attacker hitting him (CQ-ES: A_{ew}). On the other hand, Ed did not feel that he was hit (CQ-EC: A_{nh}). Furthermore, it is implausible that the attacker would only harm Jenny and not Ed (CQ-Pl: A_{rv1}). Finally, because no mention is made of valuables that were taken, there is a gap in the story (CQ-SS, denoted by the gray event in Table 2).

Explaining the blood and gunshot particles—The defense gives an alternative explanation for the blood on Ed's clothes and the gunshot particles on his hands (CQ-AltEx). The blood only indicates that Ed was near Jenny when she was violently beaten, not that Ed was the one who hit her, and the gunshot particles transferred from Jenny's to Ed's hand when Ed woke up and grabbed Jenny's hand to see if she was OK.

After Jenny died—The prosecution argues that it is hard to believe that Ed did not see anything special about Jenny when he woke up, given the extent of her wounds (CQ-Pl: A_{hi}). This is even more implausible because the defense explains the gunshot traces by saying that Ed took Jenny's hand and screamed at her (CQ-SS).

The defense says that Ed was very confused immediately after Jenny's death, which explains why he did not call the emergency services or tried to stop a car earlier (CQ-Ex). They further support the fact that Ed did not call the emergency number by saying that he is illiterate and does not know this number (CQ-ES: A_{ill}). The prosecution counters this by arguing that this behavior is, despite the confusion, still implausible (CQ-SS): if it were really a mad attacker and he loved his wife, why did he smoke three cigarettes next to Jenny's lifeless body (CQ-Pl: A_{c1}), why did he not ask Colleen to call the emergency services (CQ-Pl: A_{c2}) and why did he not try to stop a car earlier (CQ-Pl: A_{he})?

Ed's unwillingness to answer questions—Ed's story throws up numerous critical questions, which can only be answered by Ed. The problem is that Ed refuses to answer these questions: there is an important difference between not answering a question by saying that you do not remember and not answering a question by saying that you do not *want* to answer. In Table 2 (and Table 3), the fact that Ed did not respond to any of the critical questions targeted at his story or arguments is indicated by the label (C), meaning "challenged."

4.3. Perry killed Jenny (Table 3)

After the ruling by the trial court, new evidence came to light. In another case, Perry Sultan was found guilty of robbing and brutally killing a young woman, and there were indications that he also killed and robbed another woman and that he almost beat a man to death. So it can safely be said that Perry was a "mad killer" of the sort that Ed described, and if it can be demonstrated that Perry was in the Simonsbos at the time of the killing, this would make Ed's story suddenly a lot stronger: Even though the mad attacker scenario is implausible, finding specific evidence for such an unusual attacker would indicate that there is an exception to the general case.

Map with crosses—An important point of discussion was the map with crosses found in Perry's house, and whether this map indicated either pits dug by Perry to use as shelters, places were Perry was planning to rob or attack people, or both. The defense argued that the crosses indicated shelters by Perry, supporting story S_3 (CQ-ES: A_{pp}). However, two counterarguments to the map evidence could also be made (CQ-AA: A_{npp1}, A_{npp2} in Fig. 10), making the original argument defensible at best. Another argument that was made based on the map was that the crosses indicated (intended) crimes by Perry (CQ-ES: A_{cc}). Again, a counterargument to this is that many of the crosses did not indicate a crime (AA: A_{ncc} in Fig. 10).

Other evidence w.r.t. Perry's involvement—Most of the other evidence pertaining to Perry's involvement turned out to contradict Ed's story: The pit was not suitable to spend time in (CQ-EC: A_{np1}), Perry's phone was not in the area at the time of the crime (CQ-EC: A_{np2}), and no traces of Perry were found in the pit (EC: A_{np2}). Furthermore, the man described by Ed did not look like Perry (CQ-EC: A_{np3}). Finally, Ed refused to answer further questions about the man who attacked him, whether he had something in his hand, and so forth (C).

4.4. Outcome of the analysis

There are now three stories: Ed killed Jenny (S_1, Table 1), an unknown man killed Jenny (S_2, Table 2), and Perry killed Jenny (S_3, Table 3). The court accepts the arguments based on the forensic reports about the cause of death (A_{g1}) and the gunshot particles and blood on Ed's clothes (A_{gp1}, A_{gp2}, A_b), and that thus Ed was near Jenny when she died. However, this evidence does not discriminate between the different stories (i.e. it supports all stories S_1, S_2 and S_3). The court, however, says that it believes all the arguments for Ed and Jenny's marriage problems, Ed threatening Jenny, and the similarity of Ed's gun to the gun with which Jenny was hit. Furthermore, the court argues that

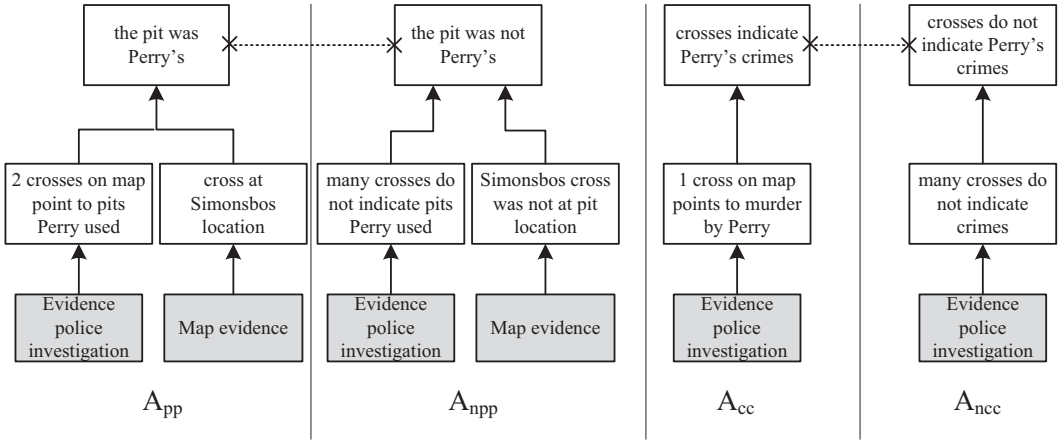

Fig. 10. Arguments for and against Perry's involvement.

it is not reasonable that someone else other than Ed was responsible for or involved in Jenny's death.

Exactly why the court decides to believe story S_1 over S_2 and S_3 is not explained. However, we can use the hybrid theory's criteria to compare the stories and thus try to see whether the court's decision makes sense. Clearly, S_1 is the better story compared to S_2 or S_3: It has higher evidential support, and lower evidential contradiction, implausibility, and incompleteness. However, because this is a criminal case, it has to be determined whether the "guilty story" meets the standard of proof, beyond a reasonable doubt. As discussed by Bex and Walton (2012), even if there is enough supporting evidence for a story, a reasonable doubt can still be cast on the main story by offering contradicting arguments or alternative explanations.

With respect to contradicting evidence, the counterarguments to the bad marriage (A_{m4}, A_{m5}) are directly countered by multiple evidential arguments in favor of the bad marriage (A_{m1}, A_{m2}, A_{m3}). Ed's denial (A_{ne1}) and the argument that Ed was too weak to be violent (A_{ne2}) are both attacked and overruled (cf. Fig. 7).). The next question is whether S_2 or S_3 is good enough for a reasonable doubt. Again, both stories are not particularly strong (high contradiction and implausibility, low completeness)—the court calls these stories "unreasonable." However, one might argue that the discussions about the pit, map crosses, and the fact that Ed's description of the man did not fit Perry's appearance are by no means clearly settled—most of the arguments are defensible.

There is one other point, however, against S_2 and S_3, namely that numerous elements of these stories have been challenged (C) by critical questions that have not been answered (cf. the CQ's in Section 3). This is also taken into account by the court, which argues that Ed's refusal to answer questions supports the conclusion that Ed committed the crime. In other words, at this point in the case Ed has a rational burden of proof: Given the incriminating story S_1, the evidence supporting this story and the fact that the alternatives S_2 and S_3 are sufficiently weak, Ed should respond to any critical questions.

5. Discussion of the analysis

This section discusses the hybrid theory by means of four questions.

5.1. To what extent is the analysis objective and to what extent is it based on subjective beliefs, assumptions, and choices?

The analysis is as objective as possible and mainly follows the reasoning of the prosecution, defense, and courts. In some cases, I have rephrased or interpreted the original text—for example, the prosecution argues that "the mad attacker story is implausible," which I capture as three explicit implausibility arguments A_{rv1}, A_{rv2}, A_{mk} (Table 2). The advantage of the hybrid theory is that stories, arguments, and the background knowledge on which they are based are presented explicitly, so any subjectivity can be readily identified and disagreements between analysts can be captured as

arguments. Say that, for example, a second analyst disagrees with A_{mk} and instead wants to argue that "There is a real possibility that serial killers and attackers hide in parks such as Simonsbos." Using the hybrid theory, this analyst can then provide an explicit, natural language counterargument to A_{mk}. Thus, the hybrid theory allows for the explicit capturing of discussions about, for example, the assumed background knowledge in a case.

5.2. How natural is the analysis from a cognitive and legal point of view?

There is empirical evidence for the hypothesis that reasoning with stories and scenarios is a cognitively feasible way for "average people" (i.e., American jurors) to analyze complex cases (Pennington & Hastie, 1993; Wagenaar et al., 1993). Furthermore, authors from the legal field have also argued that (non-probabilistic) inference to the best explanation is the mode of reasoning that we see in the courtroom. On the other hand, argument-based reasoning and analysis from evidence to conclusions also has a long tradition, particularly in Anglo-American evidence law (cf. Anderson et al.'s "Neo-Wigmorean" analysis, 2005), and dialectical argumentation is at the core of many of our critical reasoning and analysis processes (van Eemeren et al., 2014). Furthermore, the literature on argumentation (cf. Walton et al., 2008) provides many relevant critical questions for, for example, expert testimony, witness testimony, and causal argumentation.

Integrating the story-based and argument-based approaches to rational proof into one theory provides the "best of both worlds." The hybrid theory allows for a fully story-based, a fully argument-based, or a mixed analysis of a case. As shown in the example in Fig. 6, when reasoning with evidence and hypotheses using the hybrid theory, we can take the view that the hypotheses causally explain the evidence (story-based reasoning), that the evidence justifies the hypotheses (argument-based reasoning), or something in between. Which approach to emphasize depends on the context (Bex, 2011). For example, in the early investigation stage, police investigators are used to abductively infer different hypothetical stories and use these to predict possible further hypotheses which can be investigated. In the courtroom, however, judges are more inclined to see if the elements of the indictment can be supported by the evidence in the case—that is, if from the evidence the elements of the indictment can be inferred.

One of the clear advantages of the hybrid theory over Bayesian approaches (cf. Verheij et al., 2016), in which assumptions and generalizations are encoded as (conditional) probabilities, is that discussions about the case can take place in natural language. Bayesian analyses of a case are hard to understand for people less familiar with probabilistic reasoning (e.g., judges, jurors), and the assumptions the analysis makes might not be explicitly represented but rather included in the underlying probabilistic inference mechanisms. For example, in a Bayesian approach the generalization that "Mad killers are not a common occurrence" (argument A_{mk}) might be captured as a low prior probability for the fact that there is a mad killer in the bushes. Anyone disagreeing with the generalization cannot simply argue against it, but has to find, interpret, and change the prior

probability of a killer in the bushes. Note that in this case, the original prior changed into the new one, so the disagreement between analysts is not explicitly captured.

It can be argued that the structured schemes, tables, and diagrams presented in this article do not represent how people normally write down or analyze their reasoning in a case. First, this is only partly true—police investigators use various structured analysis techniques based on tables, mind maps, and so on. Second, the hybrid theory does not enforce a representation format—stories can be captured as diagrams, in tables, but also as a piece of text. Furthermore, developing more formal, logical versions of the hybrid theory (Bex, 2011, chapter 5) leads to a certain amount of conceptual preciseness and clarity that is lacking in more informal approaches (most notably Wagenaar et al., 1993). Finally, formalizations allow for automated reasoning and implementations. Bex, Testerink, and Peters (2016), for example, have proposed an automated intake system for the police which uses an inference engine based on the hybrid theory.

5.3. Did your analysis identify errors or biases in the reasoning of the judge, prosecutor, or defense?

One possible weakness of the court's reasoning is that it, as the defense argues, seems to attach much weight to the fact that Ed's description did not match Perry. If this were the case, this would be evident in the analysis: Story S_3 would then have very few contradicting arguments, perhaps only A_{np3} ("the man did not look like Perry"). However, as can be seen in Table 3, other arguments contradicting S_3 can be made; furthermore, Ed did not respond to the challenges (C) put forward by the court about his whereabouts and behavior.

5.4. Does your analysis respect the legal constraints, such as the burden and standard of proof and the right to remain silent?

Burdens and standards of proof can be captured in the hybrid theory (Bex & Walton, 2012). They are very briefly discussed in Section 4.5.

Note

1. Purely story-based approaches (Pardo & Allen, 2007; Wagenaar et al., 1993) allow for dialectical and (implicitly) argumentative analyses of a case, but they do not discuss arguments from evidence to conclusions as used in the hybrid theory (cf. Section 2.2).

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