

A case study of hypothetical and value-based reasoning in US Supreme-Court cases

Trevor BENCH-CAPON^a, Henry PRAKKEN^b

^a *Department of Computer Science, University of Liverpool, UK*

^b *Department of Information and Computing Sciences, Utrecht University and Faculty of Law, University of Groningen, The Netherlands*

Abstract. This paper studies the use of hypothetical and value-based reasoning in US Supreme-Court cases concerning the United States Fourth Amendment. Drawing upon formal AI & Law models of legal argument a semi-formal reconstruction is given of parts of the *Carney* case, which has been studied previously in AI & law research on case-based reasoning. The result is compared with Rissland's (1989) analysis in terms of dimensions and Ashley's (2008) analysis in terms of his process model of legal argument with hypotheticals.

Keywords. supreme court oral argument, hypothetical reasoning, value-based reasoning, argument schemes.

1. Introduction

Laws tend to be drafted in abstract terms intended to express the legislative will in a way which covers the widest possible range of situations. When the laws are applied, however, they must be interpreted in the light of specific situations. The gap is closed in a number of ways: [2] describes the process with respect to UK Social Security law, how the very general terms of primary legislation are made more specific using the intermediate concepts of secondary legislation, which are in turn clarified by case law, and then expressed as guidelines expressed in terms of observable facts applicable by those charged with applying the law. A similar process is found with respect to almost all laws. In this paper we will consider how the gap is closed in the case of the United States Fourth Amendment. In particular, drawing on the work of Edwina Rissland [9] and Kevin Ashley [1], we will examine the role played by hypothetical and value-based reasoning in Supreme Court cases, with particular reference to the *Carney* case¹.

Section 2 describes the legal background to *Carney* and summarises its previous discussion in AI & Law. Section 3 provides some formal background and section 4 gives a semi-formal reconstruction of *Carney*. Section 5 provides a conclusion.

¹California v. Carney, 471 US 386 (1985)

2. Legal Background

The Fourth Amendment to the US Constitution protects the

"right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures."

While this is perfectly clear - no unreasonable searches can be conducted - it offers no guidance as to what will be considered unreasonable. In practice this fundamental right is preserved by a requirement that searches be conducted only if a warrant issued by an independent judicial officer has first been obtained. However, there are circumstances where it is impractical to obtain a warrant. For instance, a vehicle can be quickly moved out of the locality or jurisdiction in which the warrant must be sought. This has given rise to the so-called automobile exception². The status of this exception current in *Carney* was expressed in Burger CJ's opinion in *South Dakota v Opperman*³:

The reason for this well settled distinction is twofold. First, the inherent mobility of automobiles creates circumstances of such exigency that, as a practical necessity, rigorous enforcement of the warrant requirement is impossible. But the Court has also upheld warrantless searches where no immediate danger was presented that the car would be removed from the jurisdiction. Besides the element of mobility, less rigorous warrant requirements govern because the expectation of privacy with respect to one's automobile is significantly less than that relating to one's home or office ... Automobiles, unlike homes, are subjected to pervasive and continuing governmental regulation and controls, including periodic inspection.

Thus while exigency was important, since the need to prevent loss of evidence was the original motivation for allowing warrantless search, lowered expectations of privacy were also required. This was shown, for example in *Chadwick*⁴, in which it was held that a locked item of luggage (a footlocker) did require a warrant.

The footlocker search was not justified under the "automobile exception," since a person's expectations of privacy in personal luggage are substantially greater than in an automobile. In this connection, the footlocker's mobility did not justify dispensing with a search warrant.

Note the explicit use of the phrase 'automobile exception' here.

In contrast, the decreased expectations of privacy associated with automobiles would licence the search of a container in the boot of a car in *Ross*⁵:

Where police officers have probable cause to search an entire vehicle, they may conduct a warrantless search of every part of the vehicle and its contents, including all containers and packages, that may conceal the object of the search.

²This exception originated in *Carroll v United States*, 267 U.S. 132 (1925). It became widely used in practice, and although resisted for a while by the Supreme Court (e.g. 'The word "automobile" is not a talisman in whose presence the Fourth Amendment fades away', *Coolidge v. New Hampshire*, 403 U.S. 443 (1971)) was well established by the time of *Carney*

³*South Dakota v. Opperman*, 428 U.S. 364 (1976)

⁴*United States v Chadwick*, 433 U. S. 1 (1977)

⁵*United States v. Ross* 456 US 798 (1982)

Thus by the time of the *Carney* case in 1985 the notion of an Automobile Exception to the Fourth Amendment had become quite well established, justified by the presumed exigency of the search, and the reduced expectations of privacy.

The facts in *Carney* were

A Drug Enforcement Administration (DEA) agent, who had information that respondent's mobile motor home was being used to exchange marijuana for sex, watched respondent approach a youth who accompanied respondent to the motor home, which was parked in a lot in downtown San Diego. The agent and other agents then kept the vehicle under surveillance, and stopped the youth after he left the vehicle. He told them that he had received marijuana in return for allowing respondent sexual contacts. At the agents' request, the youth returned to the motor home and knocked on the door; respondent stepped out. Without a warrant or consent, one agent then entered the motor home and observed marijuana. (*Carney*, Syllabus)

The issue here was that a mobile motor home (even, as in *Carney*, a Dodge mini motor home, by no means the largest or most luxurious of this class of vehicles) not only possessed the characteristics of a normal automobile, but also the characteristics of a home. In the words of Steven's dissent in *Carney*:

Although it may not be a castle, a motor home is usually the functional equivalent of a hotel room, a vacation and retirement home, or a hunting and fishing cabin. These places may be as spartan as a humble cottage when compared to the most majestic mansion, but the highest and most legitimate expectations of privacy associated with these temporary abodes should command the respect of this Court.

The point was that *Carney's* vehicle was mobile and so the need to search without a warrant was *prima facie* exigent, justifying a warrantless search to facilitate enforcement of the law, but had the characteristics of a home suggesting that maybe the expectations of privacy were at least as great as in *Chadwick*, where mobility had been insufficient to justify a warrantless search.

In oral argument the question was addressed through presenting the counsels for the parties with a series of hypothetical situations. As described in [9], there are two major dimensions, *inherent-mobility* and *use-of-a-home*, and these hypotheticals are stronger or weaker than the actual situation of *Carney* along one of these dimensions. Thus a hypothetical in which the vehicle was in motion on the road would make it look more like an automobile, and one where it was in a trailer park and hooked up to gas and water would make it look more like a home. The purpose of these hypotheticals is to explore where the line should be drawn, so as to see on which side the actual facts fell. In [1], the hypotheticals are located with a process model in which a test is proposed and then, using hypotheticals, attacked as too broad or too narrow, sometimes leading to modification of the test. Here the weight to be given to the principle of Privacy as against the principle of Law Enforcement is explored, so as to find the correct balance between them. The attack can be met either by asserting the importance of the principle, or by modifying the test so as to incorporate or avoid some elements of the hypothetical situation.

The holding in *Carney* was that

When a vehicle is being used on the highways or is capable of such use and is found stationary in a place not regularly used for residential purposes, the two justifications for the vehicle exception come into play.

This is effectively a modification of the automobile exception, based on some of the hypotheticals used in Oral Argument, to require consideration be given to its location. As a place not regularly used for residential purposes a mobile home may be searched in a parking lot, whereas a warrant might well be required if it were found in a trailer park.

The test is explicitly held to balance the relevant values of privacy and law enforcement. Burger’s majority opinion states:

Our application of the vehicle exception has never turned on the other uses to which a vehicle might be put. The exception has historically turned on the ready mobility of the vehicle, and on the presence of the vehicle in a setting that objectively indicates that the vehicle is being used for transportation. These two requirements for application of the exception ensure that law enforcement officials are not unnecessarily hamstrung in their efforts to detect and prosecute criminal activity, and that the legitimate privacy interests of the public are protected.

3. Formal background

In the remainder of the paper we will provide a semi-formal account of the reasoning involved in *Carney*, drawing upon existing formal AI & Law models of legal argument. Our analysis will be largely semi-formal but at various places we will indicate how it can be fully formalised in the existing work.

We assume that reasoning takes the form of applying and combining argument schemes. Argument schemes are stereotypical patterns of reasoning, consisting of a set of premises and a conclusion that is presumed to follow from them. Uses of argument schemes are evaluated in terms of a set of critical questions matching each scheme. Each negative answer to a critical question gives rise to a counterargument. Such reasoning can be fully formalised using logics for defeasible reasoning (e.g. [3, 5, 8]). The basic scheme that we assume is for applying rules:

$$\frac{r : P_1, \dots, P_n \Rightarrow Q}{P_1, \dots, P_n} \quad Q$$

Here r is the rule’s name. We assume the following critical questions of this scheme (partly inspired by [4]):

- CQ1: Is r valid?
- CQ2: Is r applicable to the current case?
- CQ3: Are there no reasons for $\neg Q$?

Next, following [8, 3], reasons for and against a conclusion are represented in separate rules and the resolution of their conflict is expressed with rule priorities:

$$\begin{aligned} r_1: & \textit{Pro-reasons} \Rightarrow \textit{Conclusion} \\ r_2: & \textit{Con-reasons} \Rightarrow \neg \textit{Conclusion} \\ p: & \dots \Rightarrow r_1 \succ r_2 \end{aligned}$$

In the present study these rule priorities arise from value considerations. Of each rule it is said which values it advances or demotes. Then for each rule all these values are collected and the resulting sets are compared in terms of an ordering of the values (which may itself be the outcome of a reasoning process on which values are the most important.)

More specifically, if a conclusion c because of reason f is expressed with a rule

$$r: f \Rightarrow c$$

then the opinion that concluding c in case of f advances value v can be expressed as $Advances(r, v)$. Here this is just stated as a fact but it may also be the conclusion of an argument. Similarly, where a rule demotes a value, we say $Demotes(r, v)$.

Next the information on the value(s) advanced and demoted by a rule is used to derive priorities between rules. Intuitively, the more important the set of values advanced by a rule and the less important the set of values that it demotes, the higher its priority. For possible formalisations of these ideas see [8] and [5]. Here we simply assume that this method gives rise to arguments for rule priorities.

4. A semi-formal account of some arguments in the case

4.1. The legal background

To be able to talk about degrees of exigency and expectation of privacy, and to be able to say that in a case there is (or is not) a degree of exigency and/or expectation of privacy that is sufficient to draw a certain conclusion, we use the following notation.

- $e(c) \leq t_e$ means that the degree of exigency in case c is less than or equal to its threshold t_e .
- $p(c) \leq t_p$ means that the degree of expectation of privacy in case c is less than or equal to its threshold t_p .

The symbol \leq denotes a partial preorder on the degrees of exigency and privacy expectations. Other relational symbols are defined in terms of \leq as usual. If there is no danger of confusion, the term c will be left implicit. The general rule that searches require a warrant and its vehicle exception are now represented as follows.

$$\begin{aligned} r_1: & \text{Search} \Rightarrow \text{Warrant required} \\ r_2: & \text{Search} \wedge \text{Probable cause} \wedge e(c) \geq t_e \wedge p(c) \leq t_p \Rightarrow \neg \text{Warrant required} \end{aligned}$$

Together this is meant to say that searches require a warrant unless there is a sufficiently high degree of exigency and a sufficiently reduced expectation of privacy. (Note that this rule conflict is needed to capture that the vehicle exception really is an exception to the general rule that searches require a warrant, so that the burden of proof is on the side who wants to apply it.) However, to formally capture this reading, an argument is needed for why r_2 has priority over r_1 . This argument can be based on the following information (where V_p denotes the value of privacy and V_l denotes the value of law enforcement):

$$\begin{aligned} v_1: & \Rightarrow Advances(r_1, V_p) \\ v_2: & \Rightarrow Advances(r_2, V_l) \\ v_3: & \text{Search} \wedge \text{Probable Cause} \wedge e(c) \geq t_e \wedge p(c) \leq t_p \Rightarrow Demotes(r_1, V_l) \end{aligned}$$

Note that if r_2 had been simply $\text{Search} \wedge \text{Probable cause} \wedge e(c) \geq t_e \Rightarrow \neg \text{Warrant required}$, it would still have advanced Law Enforcement, but would have also have demoted Privacy in those cases with no lowered expectations. With the additional condition, however, we ensure that r_2 does not demote privacy.

Then we assume that from this and a method for comparing value sets, in every case where there is probable cause for a search and the conditions of r_2 are satisfied an argument can be constructed for the conclusion $r_1 \prec r_2$. Intuitively this is since r_2 only advances a value while r_1 also demotes a value. Without probable cause, a warrantless search might still promote V_l , but now would be rejected on the basis of $V_l \prec V_p$.

Note that this method does not require that specific numerical values are given to the various degrees and thresholds. For example, each decision that in a certain case no warrant is needed says that in that case it holds that $e(c) \geq t_e$ and $p(c) \leq t_p$. Likewise, each decision that a warrant is needed says either that $e(c) \not\geq t_e$ or that $p(c) \not\leq t_p$.

This representation method also respects Rissland's [9] analysis in terms of dimensions: each case is a point in the two-dimensional space formed by the dimensions exigency and privacy expectation. Moreover, some forms of *a fortiori* reasoning with dimensions are automatically captured by the method. For example, if c_1 and c_2 are cases such that $e(c_1) \geq t_e$ and $p(c_1) \leq t_p$ and we know that $e(c_1) < e(c_2)$ while $p(c_1) \not\leq p(c_2)$ then it follows that $e(c_2) \geq t_e$ and $p(c_2) \leq t_p$. Again no numbers are needed. As an example of this the dissent in *Carney*, referring to *Chadwick*, stated

It is perfectly obvious that the citizen has a much greater expectation of privacy concerning the interior of a mobile home than of a piece of luggage such as a footlocker.

If this is so, since we know from *Chadwick* that *Footlocker* $\Rightarrow p(c) \not\leq t_p$, it must also be the case that *Mobile Home* $\Rightarrow p(c) \not\leq t_p$.

4.2. The decision in *Carney*

We now apply our approach in a formalisation of *Carney*, giving the relevant quotations as footnotes. We have the following facts: *Search*, *Mobile home*, *Parked in parking lot*, *Licensed* and *Probable cause*. The majority concluded \neg *Warrant required*. We must therefore identify a set of rules which, together with r_1 and r_2 and the preference identified from v_1 to v_3 would enable this conclusion to be drawn. One such set might be:

- r_3 : *Vehicle* \wedge *Readily mobile* $\Rightarrow e(c) \geq t_e$ ⁶
- r_4 : *Subject to pervasive regulation* $\Rightarrow p(c) \leq t_p$
- r_5 : *In use as vehicle* \wedge *Licensed* $\wedge \Rightarrow$ *Subject to pervasive regulation*⁷
- r_6 : *Vehicle* \wedge *Setting objectively indicates use for transportation* \Rightarrow *In use as vehicle*⁸

and some commonsense rules

- r_7 : *Parked in parking lot* \Rightarrow *Setting objectively indicates use for transportation*
- r_8 : *Mobile home* \Rightarrow *Self propelled* \wedge *Wheels*
- r_9 : *In use as vehicle* \Rightarrow *Readily mobile*
- r_{10} : *Self propelled* \wedge *Wheels* \Rightarrow *Vehicle*

⁶The capacity to be "quickly moved" was clearly the basis of the holding in *Carroll*, and our cases have consistently recognized ready mobility as one of the principal bases of the automobile exception.

⁷there is a reduced expectation of privacy stemming from its use as a licensed motor vehicle subject to a range of police regulations inapplicable to a fixed dwelling.

⁸the vehicle was so situated that an objective observer would conclude that it was being used not as a residence, but as a vehicle.

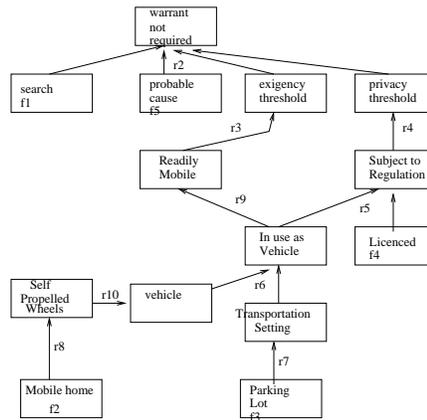


Figure 1. Inference Tree for Majority

These rules can be used to derive the desired conclusion, given the value-based preference for r_2 over r_1 , as shown in Figure 1. Such an account, however, takes no cognizance of the fact that we are dealing with a mobile home, which can be used as a home. We might construct a counterargument using the following rules.

r_{11} : *Mobile home* \wedge *Stationary* \Rightarrow *In use as home*

r_{12} : *Parked in parking lot* \Rightarrow *Stationary*

r_{13} : *In use as home* $\Rightarrow p(c) \not\leq t_p$

With these rules we can block r_2 , leaving us to conclude that a search was required by r_1 . Now one thing to do here would be to express a preference for r_4 over r_{13} . This the majority might be prepared to do, but their comment

These two requirements for application of the exception ensure that law enforcement officials are not unnecessarily hamstrung in their efforts to detect and prosecute criminal activity, and that the legitimate privacy interests of the public are protected.

suggests that they would not wish to be seen as stating such a preference, but rather as giving due weight to the privacy interests, and so they would not wish to deny the applicability of r_{13} . Rather they would wish to reject r_{11} , preferring instead

r_{14} : *In use as Vehicle* $\Rightarrow \neg$ *In use as Home*

This fits well with a footnote to the opinion which says

We need not pass on the application of the vehicle exception to a motor home that is situated in a way or place that objectively indicates that it is being used as a residence.

and then offers a list of factors which might be considered relevant to such a question. We might finally suggest an answer to the dissent's contention mentioned at the end of section 4.1 that the privacy expectations of a mobile home were greater than a piece of luggage. The majority cite a number of cases where, like *Ross*, warrantless search of car trucks, and sealed containers in car trunks were allowed. Since a separately lockable area of a vehicle should arouse greater expectations of privacy than to interior of a mobile home, which is a single space, it seems reasonable that

r_{15} : *In Use as Vehicle* $\Rightarrow p(\text{locked case in locked trunk}) \geq p(\text{interior of mobile home})$

With these rules we can reconstruct the argument underlying the majority opinion, and also defend it against some possible counterarguments.

4.3. Tests and hypotheticals in the oral argument

The majority opinion in *Carney* does not contain hypotheticals but they are extensively used in the oral arguments. An example discussed by [1] (his Figure 2) starts with a proposed test

If search is of a self-propelling vehicle with wheels then no warrant required.

which is attacked with a hypothetical

What if the vehicle is self-propelled but has been in one of these mobile home parks for three months and it's hooked up to water and electricity but still has its wheels on?

Such hypotheticals cannot be modelled as above, since the various hypothesised conditions are not true in the current case, and may be incompatible with the actual facts (a vehicle cannot be in a trailer park and a parking lot). This raises the long standing problems associated with the treatment of counterfactual conditionals [6]: the difficulty is that we need the hypothetical situation to be as close as possible to the actual situation, whilst being consistent. The hypotheticals do not simply add extra facts, but require some of the actual facts to be modified. So we cannot model this test plus attack as follows:

Proponent:

Vehicle \wedge *Self-propelled* \wedge *Wheels* \Rightarrow *No warrant needed*

Vehicle \wedge *Self-propelled* \wedge *Wheels*

Therefore, *No warrant needed*

Opponent:

Vehicle \wedge *Self-propelled* \wedge *Wheels* \wedge *In trailer park ...* \wedge *Hooked up to water ...* \Rightarrow *Warrant needed*

Vehicle \wedge *Self-propelled* \wedge *Wheels* *In trailer park ...* \wedge *Hooked up to water ...*

Therefore, *Warrant needed*

The problem with this modelling is that the conditions *In trailer park ...* and *Hooked up to water ...* are not compatible with the facts of the *Carney* case. So a way is needed to let possible exceptions defeat a test even when they are in conflict with the facts of the current case. Mackie argued that counterfactuals should be seen as elliptical arguments [7]. One way to model such arguments in the present setting is to regard them as meta-level arguments on what follows from certain rules and facts (cf. [10]). For tests that only propose sufficient conditions this is captured by the following argument scheme.

$$\frac{\{T\} \cup \text{Relevant knowledge} \vdash \text{Legal conclusion}}{r: T \Rightarrow \text{Legal conclusion}}$$

Here \vdash is a call to a program able to derive consequences from a theory including defeasible rules, such as the one assumed in the present paper. We assume the following critical questions of this scheme:

CQ1: Is there a set of conditions C and a set of additional relevant knowledge R such that $\{T\} \cup C \cup \text{Relevant knowledge} \cup R \not\sim \text{Legal conclusion}$?

CQ2: Are the test's conditions T easily observable?

The first critical question in fact comprises a range of ways of criticising the application of the scheme, since both C and R may contain any piece of actual or hypothesised information that invalidates the object-level inference of *Legal conclusion*. For instance, it could be used to question whether the thresholds were correctly set, whether the degree of exigency exceeds the threshold, whether the rules advance or demote the values, or whether the rules in the relevant knowledge were applicable to the case in hand or valid.

We next apply this scheme to the hypothetical of [1]'s Figure 2. From hereon we assume unless stated otherwise that *Relevant knowledge* contains at least the above $r_1, r_2, r_7 - r_{10}, r_{12}$ and $v_1 - v_3$. We also assume that in all tests *Probable cause* is implicitly assumed. Then in the hypothetical of [1]'s Figure 2 the proposed test is:

$$\text{Wheels} \wedge \text{Self-propelled} \wedge \text{Probable cause} \Rightarrow \neg \text{Warrant required}$$

With r_{10} the conditions of this test imply *Vehicle*. Now to derive $e(c) \geq t_e$ this test arguably puts in *Relevant knowledge* a version of r_3 without the condition *Readily mobile*. Furthermore, it arguably assumes a 'faulty' version r'_2 of r_2 without the condition $p(c) \leq t_p$. Then we have that $\neg \text{Warrant required}$ is implied.

The attack as being too broad in case of *In trailer park ...* and *Hooked up to water ...* then applies CQ1 by adding these conditions to C , adding the correct version of r_2 to R and also adding $\neg \text{Valid}(r'_2)$ to R . Furthermore, it adds to R the rules r_{13} and:

$$r_{15}: \text{Mobile Home} \wedge \text{In trailer park} \dots \wedge \text{Hooked up to water} \dots \Rightarrow \text{In use as home}$$

Then $\neg \text{Warrant required}$ does not follow any more.

The third hypo in [1] is similar to the first but is directed at a test proposed by the defence that if something has the attributes of a home it should be treated like a home. Justice Marshall proposes that something which was indisputably a vehicle, such as a limo or a van, might have attributes of a home, such as curtains and a bed. This is in part to cast doubt on the ability of attributes of a home to provide an objective test (CQ2), but also to suggest that the test is too broad, in that having attributes of a home might not be sufficient. When counsel hesitates to concede, it is further suggested that the van be travelling on a public road at 55mph. Now counsel concedes that it should be treated as in use as a vehicle, effectively assenting to r_{14} . But counsel does not concede r_6 . Instead he suggests that a vehicle should be treated as in use as a vehicle only if it is *imminently mobile*, explained as the key being in the ignition [9]. Note that this test for use as a vehicle covers the hypothetical but not the facts of *Carney*. Ultimately, however, this proposed test for use as a vehicle was rejected by the Court in favour of r_6 .

The following scheme is for tests that also propose necessary conditions.

$$\frac{\begin{array}{l} \{T\} \cup \text{Relevant knowledge} \not\sim \text{Legal conclusion} \\ \{\neg T\} \cup \text{Relevant knowledge} \not\sim \neg \text{Legal conclusion} \end{array}}{r: T \Leftrightarrow \text{Legal conclusion}}$$

This scheme should be combined with two deductive object-level schemes for concluding $r_a: P \Rightarrow Q$ and $r_b: \neg P \Rightarrow \neg Q$ from $r: P \Leftrightarrow Q$. As critical questions it has CQ1 and CQ2 of the previous scheme plus:

CQ3: Is there a set of conditions C and a set of additional relevant knowledge R such that $\{\neg T\} \cup C \cup \text{Relevant knowledge} \cup R \vdash \sim \text{Legal conclusion}$?

This scheme and question allow us to give a precise interpretation of [1]’s attacks on a test as too narrow. Such attacks interpret a test as giving both necessary and sufficient conditions for a legal conclusion, that is as an if-and-only-if rule. According to CQ3 an attack as being too narrow then amounts to saying that there are cases where the necessary conditions are not fulfilled but the legal conclusion should still be drawn. For reasons of space we omit a full reconstruction of [1]’s examples of such an attack.

5. Conclusion

We have illustrated in a case study how formal AI & law models of legal argument can be used to model and clarify hypothetical and value-based case-based reasoning. In particular, we have illustrated how formal tools can be used to model and test proposals and reference to values and to interpret two ways of attacking a test proposal. We have also shown how one aspect of dimension-based reasoning, namely, a fortiori arguments, can be modelled. On the other hand, what we have not modelled is references to precedents and heuristics for modifying tests or for generating hypotheticals, which we leave for future work.

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