



Statutory Interpretation as Argumentation

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1 Introduction

Interpretation is regarded as the passage from a legal text to a legal rule (Hage 1996, 214; Tarello 1980), namely a normative premise under which an individual case is “subsumed” or classified (see Moreso and Chilovi, chapter 2, part III, this volume, on “[Interpretive Arguments and the Application of the Law](#)”). This passage can be compared to the common understanding and processing of utterances in ordinary conversation (Smolka and Pirker 2016), in which semantic content is only a vehicle for getting to the “speaker’s meaning” or what is communicated—a richer content “to which meaning and obvious background assumptions have both contributed” (Soames 2008, 411; see also Butler 2016; Carston 2013; Horn 1995; Miller 1990). Legal interpretation does not differ essentially from ordinary interpretation, even though legislative speech is one-sided (there is nobody who can immediately answer back) and the basic presumption governing such texts is that the author used the language to convey ideas (Sinclair 1985, 390). However, pragmatic principles constitute a dimension of rationality which is necessary for the understanding of

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legal texts (Sinclair 1985, 401). As Soames puts it, the statutory language provides incomplete semantic content, which needs to be completed by pragmatic (contextual) factors and processes:

Just as what I say, and commit myself to, by uttering a sentence, is often a function of more than its semantic content, so “what the law says,” and is committed to, is often a function of more than the semantic contents of relevant legal texts. Just as you have no standing to reinterpret my remark to conform to your moral and political views, simply because the meaning of my sentence doesn’t fully determine the content of my remark, so judges applying the law have no standing to reinterpret it, simply because the linguistic meanings of the relevant legal texts don’t fully determine the content of the law. There are other principles at work filling the gap between sentence meanings and the contents of texts, legal or otherwise (Soames 2008, 404).

In pragmatics, the reconstruction of meaning in ordinary conversation is regarded as characterized by both default reasoning and systematic and critical inferences (Jaszczolt 2005, 46; Wilson 2005). Default inferences are triggered when information about the current context is absent or not necessary for comprehension (i.e., when the inferential conclusion is not in conflict with the present context). When default inferences cannot be drawn (Kecske 2008, 2013, 129, 131; Kecske and Zhang 2009), more complex inferences need to be made. In legal theory, this twofold process is mirrored by the concepts of understanding and interpretation. Interpretation is defined as “an ascription of meaning to a linguistic sign in the case its meaning is doubtful in a communicative situation, i.e., in the case its ‘direct understanding’ is not sufficient for the communicative purpose at hand” (Dascal and Wróblewski 1988, 204). In case there is an “eventual ‘mismatch’ between the ‘computed’ utterance-meaning and some contextual factor” resulting from the background or the specific case to which the law is applied (Dascal and Wróblewski 1988, 213, 216), interpretation needs to be justified through reasons (Atlas 2008; Atlas and Levinson 1981; Dascal 2003, 635).

This chapter addresses the problem of representing and assessing the reasons provided in favor of a specific interpretation and more precisely justifying why and how an interpretation is more acceptable than others (Macagno 2017). At this functional level, such interpretive reasons are regarded as arguments (Macagno and Capone 2016) aimed at showing why a particular rule, rather than another, is valid on the basis of the statutory text (Hage 1996, 215). In statutory interpretation, such arguments are usually analyzed using specific maxims of interpretation, which can be translated into a formal language (Hage 1997). In this chapter, we will show how the canons of interpretation can be represented as schemes, namely patterns of defeasible argument advanced in support of the interpretation of a text (or part thereof). This formalization can be then used to bridge the gap between legal interpretation and argumentation theory, and more specifically the argumentation schemes used for representing and evaluating natural arguments (Macagno and Walton 2015; Walton et al. 2008).

The functional analysis of legal interpretation in terms of arguments and the formalization of the interpretive arguments as schemes (advanced in Sects. 2 and 3) allows modeling legal interpretation combining the formal argumentation

system ASPIC+ with a logical language (Sartor et al. 2014). After introducing the Carneades Argumentation System (Sect. 4) and applying it to two cases (Sects. 5 and 6), Sects. 7–10 will be devoted to developing a logical model for reasoning with interpretive canons, conceived as defeasible rules (see Sartor, chapter 3, part II, this volume, on “[Defeasibility in Law](#)”). The logical structure that will be developed will not be framed in deontic terms, but rather will concern terminological assertions concerning what should count as the best interpretations of the contested or potentially contested expressions.

2 Interpretive Arguments

The justification of an interpretation can be regarded as an argumentation-based procedure in which the best interpretation is the one supported by the strongest or less defeasible arguments (Atlas and Levinson 1981; Macagno et al. 2018). On this perspective, the “canons” or maxims of interpretation can be reframed as arguments (Macagno and Walton 2017), which can be classified according to their communicative purpose and the types of warrants. This classification allows detecting the relationship between interpretive canons and the schemes commonly used in argumentation theory.

2.1 The Existing Types of Interpretive Arguments

Macagno et al. (2012) compiled a list of eleven interpretive arguments identified by MacCormick and Summers (1991). Below, each type of argument recognized in that prior list is explained in a condensed manner to give the readers some idea of how each of them can be reconfigured as a distinct defeasible form of argument.

- *Argument from ordinary meaning* requires that a term should be interpreted according to the meaning that a native speaker would ascribe to it.
- *Argument from technical meaning* requires that a term having a technical meaning and occurring in a technical context should be interpreted in its technical meaning.
- *Argument from contextual harmonization* requires that a term included in a statute or set of statutes should be interpreted in line with whole statute or set.
- *Argument from precedent* requires that a term should be interpreted in a way that fits previous judicial interpretations.
- *Argument from statutory analogy* requires that a term should be interpreted in a way that preserves the similarity of meaning with similar provisions of other statutes.
- *Argument from a legal concept* requires that a term should be interpreted in line with the way it has been previously recognized and doctrinally elaborated in law.



- 95 • *Argument from general principles* requires that a term should be interpreted in a
96 way that is most in conformity with general legal principles already established.
- 97 • *Argument from history* requires that a term should be interpreted in line with the
98 historically evolved understanding of it.
- 99 • *Argument from purpose* requires that a term should be interpreted in a way that
100 fits a purpose that can be ascribed to the statutory provision, or whole statute, in
101 which the term occurs.
- 102 • *Argument from substantive reasons* requires that a term should be interpreted in
103 line with a goal that is fundamentally important to the legal order.
- 104 • *Argument from intention* requires that a term should be interpreted in line with the
105 intention of the legislative authority.

106 These eleven types of interpretive argument are comparable to and overlap with
107 the fourteen types previously identified by Tarello (1980, Chap. 8), listed as follows
108 in Sartor et al. (2014):

- 109 • *Arguments a contrario* rejects interpretations of a term departing from the term's
110 literal meaning.
- 111 • *Analogical arguments* support interpretations according to which the meaning of
112 a term or expression of a legal provision is extended to apply a rule to a case not
113 regulated by the given provision (it is included in neither the core nor the periphery
114 of its application area), but presenting a relevant similarity with the cases covered
115 by it (Damele 2014; Gray 2013, 35).
- 116 • *Arguments a fortiori* support interpretations according to which the meaning of a
117 term or expression in a legal provision is extended to apply that provision a case
118 that is not regulated by such a provision (it is included in neither the core nor the
119 periphery of the application area of the provision in question), but deserves, to a
120 higher degree, the same discipline as the cases covered by it.
- 121 • *Arguments from completeness of the legal regulation* exclude interpretations that
122 create legal gaps.
- 123 • *Arguments from the coherence of the legal regulation* exclude interpretations of
124 different legal statements that make them conflicting.
- 125 • *Psychological arguments* support interpretations driven by the actual intent of the
126 authors of legal text.
- 127 • *Historical arguments* support interpretations giving a legal statement the same
128 meaning that was traditionally attributed to other statements governing the same
129 matter.
- 130 • *Apagogical arguments* exclude interpretations that generate absurdities.
- 131 • *Teleological arguments* support interpretations contributing to it a purpose per-
132 taining to the goals or interests that the law is supposed to promote.
- 133 • *Non-redundancy arguments* exclude interpretations that would make the inter-
134 preted expression redundant, under the assumption that the legislator does not
135 make useless normative statements.
- 136 • *Authoritative arguments* support interpretations already given by authoritative
137 courts or scholars.

- 138 • *Naturalistic arguments* support interpretations aligning a legal statement to human
139 nature or the nature of the matter regulated by that statement.
- 140 • *Arguments from equity* support (exclude) (un)fair or (un)just interpretations.
- 141 • *Arguments from general principles* support (exclude) interpretations that are sup-
142 ported by (incompatible with) general principles of the legal system.

143 The two lists complement each other, even though Tarello's list emphasizes the
144 kinds of input on which interpretive argument is based, such as ordinary language,
145 technical language, and so forth, while MacCormick and Summers' list emphasizes
146 the reasoning steps involved in the interpretive process.

147 In comparing the two lists of types of interpretive arguments, some common
148 elements stand out, but there are also significant differences. Some of the argu-
149 ment types in the Tarello's list—such as analogical arguments, teleological argu-
150 ments, and arguments from general principles—appear to be already included in
151 the list of MacCormick and Summers. Tarello's psychological arguments seem to
152 fit under MacCormick and Summers' category of argument from intention. It looks
153 like Tarello's authoritative arguments might fit under MacCormick and Summers'
154 category of argument from precedent. Others types of argument are distinctively
155 different, while in still other cases it is unclear how the type of interpretive argument
156 described in the one list is related to the type described in the other list.

157 One of the crucial problems concerning types of interpretive arguments is their
158 use (in training legal practitioners or scholars) and their relations with the works in
159 argumentation theory and logic on argument analysis and reconstruction. Recently,
160 the canons or maxims that express the general principle characterizing each type of
161 argument have been represented as defeasible rules, to be integrated within a pri-
162 oritized defeasible logic system (Rotolo et al. 2015). The purpose of this chapter is
163 to analyze types of interpretive arguments as argumentation schemes, or rather dia-
164 logical patterns of arguments, in which an interpretation is regarded as a defeasible
165 viewpoint that needs to be supported by a pattern of reasoning and can be subject
166 to default in case specific critical questions are successfully advanced. On this per-
167 perspective, interpretive reasoning is framed within a broader dialectical framework,
168 involving a specific burden of bearing out and defeating a specific interpretation
169 (Gizbert-Studnicki 1990).

170 Some of the interpretive argumentation schemes in both lists clearly relate to
171 argumentation schemes already widely known and studied in argumentation that are
172 not specifically designed to deal with interpretive issues (Macagno and Walton 2015;
173 Walton et al. 2008). Hence, there are many questions about how some of the new
174 interpretive schemes relate to these more general schemes that have been already
175 widely recognized. For example, the category of authoritative arguments in Tarello's
176 list might relate to scheme for argument from expert opinion. Since laws formulated
177 in statutes are binding on the courts, it can be said that the statement made in this
178 context can be held to hold by reason of authority. But a legal scheme for argument
179 from administrative authority that is a variant on argument from authority already has
180 some recognition in the field of argumentation studies. Hence, there are questions
181 raised about how this new interpretive scheme proposed by Tarello distinguishes
182 between the two kinds of argument from authority. As mentioned above, there is

also the question of how Tarello's version of interpretive argument from authority fits in with schemes from MacCormick and Summers' list such as argument from precedent, argument from a legal concept, argument from general principles, and argument from history. None of these questions can be discussed in this chapter, for reasons of length, but they need to be recognized here as problems for future research.

Another similar problem is how the interpretive argument from precedent, as it is called in MacCormick and Summers' list, is related to the general scheme for argument from precedent, already recognized in the argumentation literature. The problem is that there are great divisions of opinion on precisely how the scheme should be modeled. Many think that argument from precedent is always based on argument from analogy, that is, on a comparison between a source case and a target case. But others might think that legal argument from precedent needs to be based on *ratio decidendi*. Another question raised by this difference of opinion is whether *ratio decidendi* represents some kind of analogy between the two cases where the rationale used to arrive at the conclusion in the source case is supposed to be similar to a comparable rationale that can fit the target case.

In this chapter, we recognize the existence of these problems without delving into a detailed analysis thereof, so that we can forge ahead with building a framework for interpretive argumentation schemes that can later be applied to studying specific schemes and issues. The starting point is to provide a general classification of the most important arguments of the two lists, identifying the more generic identities between them. Then, we move through a sequence of examples of legal arguments where interpretation of a statute or law is an issue, applying the model to the examples. As always, the work of applying formal structures to real cases of argumentation in natural language discourse raises problems and difficulties in its own right.

2.2 Classifying the Interpretive Arguments

MacCormick (2005, 124–25) proposed that there are three main categories of interpretive argument, over the above eleven categories of interpretive arguments acknowledged as persuasive in grounding a selected interpretation of a text in a disputed case in a broad variety of legal systems. First, there are so-called *linguistic arguments* that appeal to the linguistic context itself to support an interpretation (which we can call definitional arguments, Macagno and Walton 2014). Second, there are the *systemic arguments* that take the special context of the authoritative text, within the legal system, into account. Such schemes merge the authority of the source with the reconstruction of the definition from the text. Third, there are the *teleological-evaluative arguments* that make sense of the text in light of its aim or goal (which we can refer to as pragmatic arguments, see Macagno and Walton 2015). A fourth category is what McCormick (2005) calls “*appeal to the lawmaker's intention*.” McCormick does not consider this type of interpretive argument alongside the other main categories of interpretive argument, because of the ambiguity and

indeterminacy of the notion of intention. He rather views it a trans-categorical type of argument that ranges across all the other categories and their types, as linguistic, systemic or teleological-evaluative considerations can support the attribution of intentions to legislators.

If we try to analyze the lists of arguments in terms of patterns of argument, explaining the arguments of legal interpretation using the categories of argumentation schemes, we need to draw a first crucial distinction between arguments that support an interpretation and arguments that reject an interpretation. Some interpretive canons, however, are bivalent, in the sense that they provide for two interpretive schemes: one (positive or negative) when the canon's condition is satisfied, and the opposite (negative or positive) when the canon's condition is not satisfied. For instance, while the contextual coherence of an interpretation supports the adoption of an interpretation, lack of contextual coherence supports rejection. In such cases, we use the symbol + and - to denote the use of a scheme to support and reject an interpretation, for instance + contextual coherence and -contextual coherence.

The arguments supporting an interpretation are different in nature (Macagno 2015). Pragmatic arguments, definitional arguments (of different types, including the systemic ones), and analogical arguments represent distinct reasoning patterns, which are often merged with authority arguments. Such arguments are intended to back up a specific definition based on previous interpretations (epistemic authority) or on the reconstruction of a possible "intention" of the lawmaker (deontic authority), or on the alleged "nature" of a concept (the commonly shared definition). Such categories often merge with each other, but they can be classified in Fig. 1 based on a distinctive feature, namely their distinctive reasoning pattern.

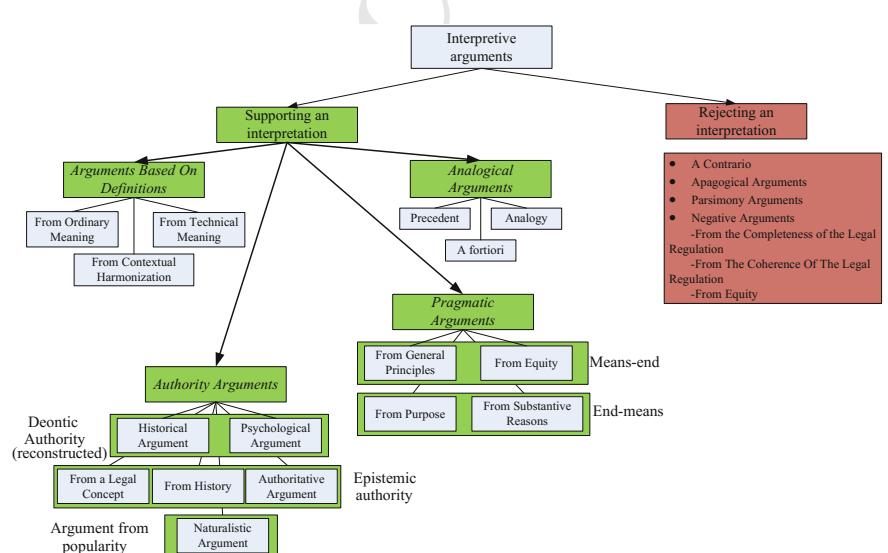


Fig. 1 Classifying the arguments of interpretation

It was recognized by MacCormick (2005) that there can be conflicts between interpretive arguments, pitting one form of interpretive argument against another (Rotolo et al. 2015). Some legal traditions provide general criteria for dealing with conflicts of this sort based on certain kinds of priorities. Alexy and Dreier (1991, 95–8) have cited criteria such as the following: (a) In criminal law, arguments from ordinary meaning have priority over arguments from technical meaning; (b) in criminal law, generic arguments based on the intention of the legislator have priority over arguments not based on authority, but not over linguistic arguments. In this chapter, we will use argumentation tools to represent such conflicts and priorities.

3 Translating Interpretive Arguments into Schemes

The classification of interpretive arguments can be the starting point for translating the arguments (and canons or maxims) into formal (or rather, quasi-formal) schemes representing how a conclusion is supported by premises. In particular, we will provide the schemes for the two general categories (positive versus negative) and the definition-based arguments (in particular, from ordinary and technical meaning). These schemes will be the ground for the further formal representations in Sects. 4, 5 and 6 and the logical formalization in the remaining sections.

3.1 Assumptions and Common Template

Statutes are written in natural language. Our concern is with the interpretation of sentences expressed in natural language that are susceptible to differing interpretations (Atlas 2005; Horn 1995). The major philosophical concern is how the notion of meaning is to be defined in relation to the task of finding the evidential basis for preferring one interpretation or another (Atlas 2005; Atlas and Levinson 1981; Dascal 2003, 635). In this chapter, we find it most highly suitable to adopt a pragmatic approach to meaning, namely to understand statutory meaning as the intention expressed through the legal text (Carston 2013), an approach that corresponds to the trans-category understanding of interpretation in McCormick (2005). The syntax representing the structure of a sentence, as well as the individual semantic meanings of each term contained in the sentence, are important. But over and above such factors, it needs to be acknowledged that the meaning of the sentence composed of these elements, especially in the examples considered in this chapter, needs to be placed in the context of a broader text or corpus in which it is embedded. For example, the issue of whether a contested word should be taking it as expressing an ordinary meaning or a technical meaning is a dispute about whether the word can be interpreted the one way or the other in a special context of use. For these reasons, although we acknowledge the importance of semantics and syntax in matters of statutory interpretation, we need to study the notion of meaning in a broad manner to include not only these



aspects, but also the aspect of the placement of the sentence in a broader context of use in different kinds of discourse.

From our perspective, making an interpretation consists in associating a linguistic occurrence and a meaning within a specific context and use, i.e., in claiming that a certain expression E in certain document D has a certain meaning M . Interpretations are not necessarily correct. They may be right or wrong, preferable or not to other interpretations.

We shall model the application of interpretation canons by using a uniform template, so that for each canon we obtain an argument scheme including a major premise, a minor premise, and an interpretive conclusion.

- The major premise is a general canon: If interpreting an expression (word, phrase, sentence) in legal document (source, text, statute) in a certain way satisfies the condition of the canon issue, then *the expression* should/should not be interpreted (depending on whether the canon is a negative or positive one) in that way.
- The minor premise is a specific assertion: Interpreting an expression in a particular document in a certain way satisfies the condition of the canon.
- The conclusion is a specific claim: The expression in that document indeed should/should not be interpreted in that way.

In this chapter, we shall apply this template to provide schemes for the following canons: (1) argument from ordinary language (OL); (2) argument from technical language, whose requirement is correspondence to technical language (TL); (3) *a contrario* argument (AC); (4) argument from purpose (Pu); (5) argument from precedent (Pr); (6) argument from contextual harmonization (CH). This list of schemes will be added to as new schemes are formulated. + for schemes uses to argue for an interpretation. Here is our system of notation for labeling the nodes in an argument diagram to indicate a scheme. We use – for schemes used to argue against an interpretation, +e for exclusion, and +i for inclusion. Hence, we put +e as the use is in favor of exclusion (for the exclusionary conclusion). In Carneades, + indicates an argument in favor of its conclusion, so if the conclusion is exclusionary, it should be +e. So, for example, the notation +i Pr labels a pro argument from inclusive argument from precedent.

3.2 Positive Interpretive Schemes

As mentioned above, two fundamental macro-categories of interpretive argument schemes need to be distinguished, the positive ones supporting an interpretation and the negative ones rejecting an interpretation. Here is the template for positive interpretive argument schemes. In presenting this template, we shall use uppercase letters for variables and lowercase letters for constants:



Major premise	<i>C: If the interpretation of E in a D as M satisfies C's condition, then E in D should be interpreted as M</i>
Minor premise	<i>The interpretation of e in d as m satisfies C's condition</i>
Conclusion	<i>e in d should be interpreted as m</i>

322 In applying this template, we need to substitute in the major premise the condition
 323 that characterizes a canon, for instance, fitting *ordinary language* (OL).

324 In order to show how positive interpretive canons can be applied with this pattern,
 325 we use the case of *Dunnachie v Kingston-upon-Hull City Council*, also used by
 326 MacCormick (2005), as a running example. This case concerns an employee who
 327 claimed to have been unfairly dismissed, and as a result to have suffered humiliation,
 328 injury to feelings and distress. The employer argued that the relevant section of the
 329 current UK legislation, called the Employment Rights Act of 1996, only permits
 330 recovery of *financial loss*. The employee argued that a proper construction of all the
 331 relevant section of the statute allows for recovery of *losses* other than financial losses
 332 narrowly construed. The question posed was whether the term “*loss*,” as used in the
 333 statute, referred only to financial loss or could be given a more extended meaning so
 334 that it included losses such as emotional loss that are not strictly financial.

If we use the canon *Ordinary Language*, we obtain the following structure:

Major premise	<i>OL: If The interpretation of E in D as M fits ordinary language, then E in D should be interpreted as M</i>
Minor premise	<i>The interpretation of “loss” in Employment Relations Act as PecuniaryLoss fits ordinary language</i>
Conclusion	<i>“loss” in the Employment Relations Act should be interpreted as PecuniaryLoss</i>

335 Note that we use inverted commas for linguistic occurrences (“*loss*”) and a single
 336 word, with capitalized initials for meanings (*PecuniaryLoss*).
 337

338 By substituting the conditions of the *OL* canon, with the requirement of other
 339 canons listed above it is possible to generate other interpretation schemes. For
 instance, we can obtain the following scheme for *Technical Language* (*TL*):

Major premise	<i>TL: If the interpretation of E in D as M fits technical language, then E in D should be interpreted as M</i>
Minor premise	<i>The interpretation of “loss” in the Employment Relations Act as PecuniaryOrEmotionalLoss fits technical language</i>
Conclusion	<i>“loss” in the Employment Relations Act should be interpreted as PecuniaryOrEmotionalLoss</i>

Obviously, our interpretive schemes only provide the top-level step in the reasoning that is needed to apply an interpretive canon. For supporting the application of a canon, we need to establish the minor premise of the corresponding scheme, namely to show that the interpretation we are proposing indeed satisfies the canon we are considering. This requires specific arguments, according to scheme being considered. For instance, for establishing that interpretation “*pecuniary loss*” of expression “*loss*” in document *Employment Relations Act* fits canon *ordinary language*, we will have to establish, by providing adequate evidence, that this interpretation matches the current linguistic usage. Thus, for instance, to support the application of the *ordinary language* canon, we would need an inference like the following:

Major premise	If <i>E</i> is commonly understood as <i>M</i> , then the interpretation of <i>E</i> in <i>D</i> as <i>M</i> fits <i>ordinary language</i>
Minor premise	The “ <i>loss</i> ” is commonly understood as <i>PecuniaryLoss</i>
Conclusion	The interpretation of “ <i>loss</i> ” in <i>Employment Relations Act</i> as <i>PecuniaryLoss</i> fits <i>ordinary language</i>

Here, the minor premise is a substitution instance of the antecedent of the major premise.

3.3 Negative Interpretive Schemes

According to negative canons, if an interpretation meets the canon’s condition, then it is to be rejected.

Major premise	<i>C</i> : If the interpretation of <i>E</i> in <i>D</i> as <i>M</i> satisfies condition of <i>C</i> ’s canon, then <i>E</i> in <i>D</i> should not be interpreted as <i>M</i>
Minor premise	The interpretation of <i>e</i> in <i>d</i> as <i>m</i> satisfies condition of negative canon
Conclusion	<i>e</i> in <i>d</i> should not be interpreted as <i>m</i>

The most common negative canon is the *a contrario* (AC), which rejects an interpretation which is over- or under-inclusive with regard to the usual semantic meaning of that expression, according to the idea that *Ubi lex voluit, dixit; ubi noluit, tacuit* (what the law wishes, it states, what the law does not want, it keeps silent upon). The *a contrario* canon can also be viewed as a counterfactual appeal to the intention of the legislator: If the legislator had meant to express a meaning that is different from the usual meaning (the semantic meaning) of the expression at issue, he would have used a different expression. Here is for instance an example of application of the *a contrario* canon.



Major premise	AC: If the interpretation of <i>E</i> in <i>D</i> as <i>M</i> conflicts with the usual meaning of <i>E</i> (is over or under-inclusive), then <i>E</i> in <i>D</i> should not be interpreted as <i>M</i>
Minor premise	The interpretation of the expression “loss” in the <i>Employment Relations as PecuniaryOrEmotionalLoss</i> conflicts with the usual meaning of “loss”
Conclusion	“loss” in <i>Employment Relations Act</i> should not be interpreted as <i>PecuniaryOrEmotionalLoss</i>

365 There is also a more specific kind of *a contrario* argument, which we may call
 366 subclass *a contrario*: Rather than rejecting an interpretation as a whole, it addresses
 367 the exclusion or inclusion of a certain subclass in the interpretation at issue, based on
 368 the fact that the subclass is included in or excluded from the usual meaning. Here are
 369 the two variants: the exclusionary *a contrario* (*eAC*) and the inclusionary *a contrario*
 370 (*iAC*). Note that the *iAC* has a positive interpretive conclusion, as the non-exclusion,
 371 i.e., the non-non-inclusion is an inclusion.

Here is the first variant, namely the exclusionary *a contrario* argument.

Major premise	<i>eAC</i> : If the interpretation of <i>E</i> in <i>D</i> as including <i>S</i> conflicts with the usual meaning of <i>E</i> , then <i>E</i> in <i>D</i> should be interpreted as excluding <i>S</i>
Minor premise	The interpretation of “loss” in the <i>Employment Relations as including EmotionalLoss</i> conflicts with the usual meaning of “loss”
Conclusion	“loss” in <i>Employment Relations Act</i> should be interpreted as excluding <i>EmotionalLoss</i>

372 Here is the second variant, the inclusionary *a contrario* argument.

Major premise	<i>iAC</i> : If the interpretation of <i>E</i> in <i>D</i> as excluding <i>S</i> conflicts with the usual meaning of <i>E</i> , then <i>E</i> in <i>D</i> should be interpreted as including <i>S</i>
Minor premise	The interpretation of “loss” in the <i>Employment Relations as excluding EmotionalLoss</i> conflicts with the usual meaning of “loss”
Conclusion	“loss” in <i>Employment Relations Act</i> should be interpreted as including <i>EmotionalLoss</i>

373 The *a contrario* scheme can also be used in a meta-dialogical sense that concerns
 374 the choice of the scheme. A clear example is the following argument taken from
 375 *R. v. Barnet London Borough Council* (1 All ER 97, 2004):

376 The words ‘ordinarily residing with’ are common English words and here there is no context
 377 requiring that they should be given other than their natural meaning in accordance with the
 378 accepted usage of English. Even in such circumstances, however, there can be difficulty and
 379 doubt as to their applicability to particular facts, because the conception to which the words
 380 have reference does not have a clearly definable content or fixed boundaries.

382 The reasoning can be represented as follows, where *mAC* stands for meta-*a con-*
 383 *trario*.

Major premise	<i>mAC</i> : If E in D is an ordinary English expression, and E in D has no context requiring a technical meaning, then the <i>technical language</i> is inapplicable to expression E in a document D
Minor premise 1	“ <i>Ordinarily residing with</i> ” in the <i>Local Education Authority Awards Regulations</i> is an ordinary English expression
Minor premise 2	“ <i>Ordinarily residing with</i> ” in the <i>Local Education Authority Awards Regulations</i> has no context requiring a technical meaning
Conclusion	The <i>technical language</i> canon is inapplicable to expression “ <i>Ordinarily residing with</i> ” in the <i>Local Education Authority Awards</i>

384 In this case, the absence of a context requiring a technical language (such as a
 385 definition, or the technical nature of the object of the regulation at issue) leads to the
 386 inapplicability of the *technical language* canon. This scheme is not a mere rebuttal
 387 (exclusion of a determinate meaning), but an undercutter (an attack to the grounds
 388 of an argument, in this case the possibility of using a major premise) (Pollock 1995;
 389 Walton 2015). Thus, the fact that the *technical language* argument cannot be used
 390 to support that interpretation does not exclude that the same interpretation can be
 391 successfully proposed through a different argument, such as the teleological one
 392 (argument from purpose).

393 The meta-dialogical analysis of the *a contrario* argument raises two issues con-
 394 cerning its nature. The first one is the relationship between the exclusion of alterna-
 395 tive canons of interpretations and the idea of default. According to Alexy and Dreier
 396 (1991, 95–8), the *ordinary language* scheme should be taken as the default setting.
 397 The general principle at work here is the following conditional: Any expression in a
 398 legislative document should be interpreted using *ordinary language*, unless there are
 399 superior reasons to interpret the expression as fitting one of the other ten schemes.
 400 However, all interpretive canons are defaults. The difference here is that for any
 401 expression we can raise the defeasible claim that it should be interpreted according
 402 to its ordinary language meaning, while claims based on other canons can only be
 403 raised under specific conditions (e.g., a technical context is required to substantiate
 404 the claim that a term should be interpreted in a technical meaning).

405 The second controversial issue about the *a contrario* argument is whether it ought
 406 to be treated only as an argumentation scheme or also as a meta-level principle that
 407 can be applied in conjunction with interpretive argumentation schemes. Argument
 408 from ignorance has traditionally been treated as an argumentation scheme in logic
 409 (Macagno and Walton 2011; Walton 1995), whereas the closed world assumption
 410 has been treated in AI as a meta-level principle rather than as a specific form of
 411 argument in its own right (Reiter 1980). The *a contrario* argument is similar to the
 412 argument from lack of evidence as it supports an inference from a negative finding
 413 to a positive conclusion.

4 Attacking, Questioning, and Defending Interpretive Arguments

Since the basic defeasible schemes share a general pattern for interpretive arguments, there is no need to formulate critical questions for each of these schemes individually. The critical questions for each of them follow the general pattern indicated by the three critical questions presented below.

- (CQ₁) What alternative interpretations of E in D should be considered?
- (CQ₂) What reasons are there for rejecting alternative explanations?
- (CQ₃) What reasons are there for accepting alternative explanations as better than (or equally good as) the one selected?

The function of the critical questions is to help someone dealing with interpretive issues to probe into an interpretive argument in order to get an initial idea of what some of the weak points and it might be. They have a heuristic function of suggesting to an arguer who is at a loss on how to respond by suggesting possible avenues of attack. In this instance, the CQs are not independent of each other, and they have an ordering. CQ₁ should be asked first.

The way we will analyze interpretive arguments, as well as critical questions matching them and counterarguments attacking them, is to build an argumentation tree which includes a contested interpretive argument and provides an analysis of how the chains of argumentation on both sides of the dispute connect with each other and to the ultimate claim at issue. This can be done using tools from formal argumentation systems such as the Carneades Argumentation System (Carneades) or the ASPIC+ system. Both ASPIC+ and CAS are based on a logical language comprising both strict and defeasible inference rules that can be used to build arguments, and both systems use argumentation schemes. Sartor et al. (2014) have applied ASPIC+ to build a logical analysis of interpretative schemes, and we will use here a simplified version of Carneades which will prove to have some tools that can be applied to examples illustrating the distinctive argumentation approach to interpretative arguments.

Both ASPIC+ and Carneades use a scheme called defeasible *modus ponens*, also used in the DefLog argumentation system of Verheij (2008). This scheme is a variant of *modus ponens* in which the antecedent of the conditional premise takes the form of a conjunction. Verheij (2008, 24) observed that if you look at the typical argumentation scheme with eyes slightly narrowed, it appears to have a *modus ponens* format in outline. In the formalism that will be used in the second part of the present contribution, a scheme fits the following type of argument structure, where the major premise is a defeasible conditional with a conjunctive antecedent.

Major Premise: $A, B, C, \dots \Rightarrow Z$

Minor Premise: A, B, C, \dots

Conclusion: Z

It was shown in Walton (2004, 134–39) how a majority of the schemes recognized in the argumentation literature can be tailored to fit this defeasible *modus ponens* form.



455 In all three systems, arguments are modeled as graphs containing nodes representing
456 propositions from the logical language and edges from nodes to nodes. In these
457 systems, an argument can be supported or attacked by other arguments, which can
458 themselves be supported or attacked by additional arguments. The outcome in a
459 typical case of argumentation is a graph structure representing a series of supporting
460 arguments, attacks, and counterattacks in a sequence that can be represented using
461 an argument map, also often called an argument diagram.

462 Carneades models arguments as directed graphs consisting of argument nodes
463 connected to statement nodes. The premises and conclusions of an argument graph
464 are represented as statement nodes, shown as rectangles in Fig. 3 (Gordon 2010).
465 Argument nodes represent different structures of different kinds of arguments, such
466 as linked or convergent arguments. A linked argument is one where two or more
467 premises function together to support a conclusion. In the argument maps below,
468 the name of the argumentation scheme is inserted in the node (the circle) joining the
469 premises to the conclusion. As will be shown in the figures, there can be two kinds
470 of arguments shown in the node, a pro (supporting argument) or a con (attacking)
471 arguments. A supporting argument is represented by a plus sign in its argument
472 node, whereas a con argument is represented by a minus sign in the nodes containing
473 argumentation schemes such as *modus ponens*, argument from expert opinion, and
474 so forth (<http://carneades.github.com>). Conflicts between pro and con arguments can
475 be resolved using proof standards such as including preponderance of the evidence
476 (Gordon and Walton 2009b). Argument graphs are evaluated relative to audiences,
477 modeled as a set of assumptions and an assignment of weights to argument nodes.
478 An audience is defined as a structure $\langle \text{assumptions}, \text{weight} \rangle$, where $\text{assumptions} \subseteq L$ is a consistent set of literals assumed to be acceptable by the audience and weight
479 is a partial function mapping arguments to real numbers in the range 0.0–1.0. These
480 numbers represent the relative weights assigned by the audience to the arguments
481 (Gordon and Walton 2011).

482 In Carneades, there can be compound arguments consisting of several argument
483 nodes joined together by edges in the graph so that an argument represents a chain
484 of reasoning from the supporting premises down to the ultimate proposition to be
485 proved, the so-called statement at issue. Arguments are evaluated on the basis of
486 whether the audience accepts the premises or not, and on how strong the various
487 arguments making up the graph are. A very simple example of how an argument
488 evaluation works in the Carneades system is shown in Fig. 2. The rounded nodes
489 represent argumentation schemes accepted by the audience. A pro argument is indi-
490 cated by the plus sign in its node. A con argument is represented by a minus sign in
491 its argument node. A green (light gray) node means the proposition in it is accepted
492 by the audience. A red (dark gray) node means the proposition in it is rejected by the
493 audience. If the node is white (no color), the proposition in it is neither accepted nor
494 rejected. In the printed version, green appears as light gray and red appears as dark
495 gray.

496 In both argument diagrams shown in Fig. 2, the ultimate conclusion, statement 1,
497 is shown on the far left of the diagram. First, let us consider which premises the audi-
498 ence accepts or rejects, as shown in the argument diagram on the left. Argument 2



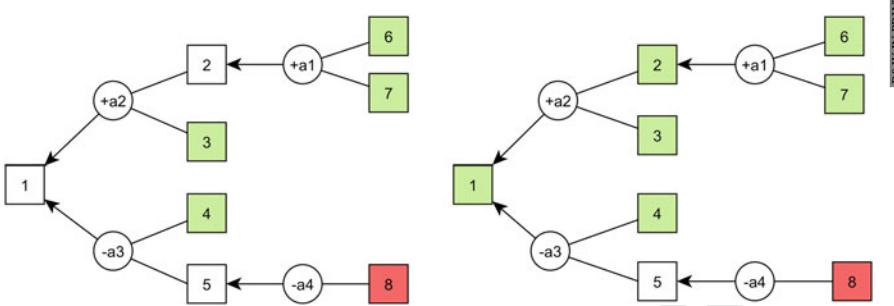


Fig. 2 Carneades graphs displaying an argument evaluation

is a pro argument supporting statement 1, while argument 3 is a con argument attacking statement 1. The audience accepts proposition 3 as a premise in argument 2, but the other premise, statement 2, is neither accepted nor rejected by the audience. Both premises of this additional argument, argument 1, are accepted by the audience. Argument a3 is a con argument but one of its premises, statement 5, is not accepted. Moreover, this premise is attacked by a con argument, but the only premise in this con argument statement 6 is rejected.

To see how this conflict is resolved, look at the diagram on the right. Since both statements 6 and 7 are accepted by the audience, Carneades automatically calculates that the conclusion 2 is accepted. However, what about the con argument against statement 1 shown at the bottom, namely argument 3? This con argument could defeat statement 5, but its premise 8 is rejected by the audience. Therefore, pro argument a2 wins out over con argument a3, and so conclusion 1 is shown in green as acceptable.

Carneades also formalizes argumentation schemes. Schemes can be used to construct or reconstruct arguments, as well as to determine whether a given argument properly instantiates the types of argument deemed normatively appropriate according to the scheme requirements.

The critical questions matching an argumentation scheme cannot be modeled in a standard argument graph straightforwardly by representing each critical question as an additional implicit premise of the scheme. The reason is that there are two different variations on what happens when a respondent asks a critical question (Walton and Gordon 2005). These variations concern the pattern of how the burden of proof shifts from the proponent to the respondent and back as each critical question is asked by the respondent in a dialogue. With some critical questions merely asking the question is enough to defeat the proponent's argument, because the burden of proof is shifted onto the proponent's side, and if the proponent fails to meet this burden of proof, the initial argument is immediately defeated. With other critical questions, merely asking the critical question is not enough by itself to defeat the proponent's argument. For example, if the respondent asks the bias critical question when the proponent has put forward an argument from expert opinion, the proponent can simply reply, "What proof do you have that might expert is biased?" On this

532 approach, merely asking the question does not defeat the proponent's argument until
533 the respondent offers some evidence to back it up. Carneades deals with this problem
534 of burden of proof for critical questioning by distinguishing three types of premises
535 in an argumentation scheme, called ordinary premises, assumptions, and exceptions.
536 Assumptions are assumed to be acceptable unless called into question. Exceptions
537 are modeled as premises that are not assumed to be acceptable and which can block
538 or undercut an argument as it proceeds. Hence, an exception, which is modeled
539 in Carneades as an undercutter, only defeats the argument it was attacking if it
540 is supported by other arguments which offer reasons to back up the undercutting
541 argument. Ordinary premises of an argumentation scheme are treated as assumptions.
542 They are assumed to be acceptable in case they are put forward, but must be supported
543 by further arguments to remain acceptable after being challenged by critical questions
544 or counterarguments.

545 For any one of these critical questions to the effective in defeating the original
546 interpretive argument, the respondent must give some indication of what he takes this
547 alternative interpretation to be. Thus, it would appear that each of these critical ques-
548 tions only defeats the original interpretive argument if some evidence is presented
549 by the respondent pinpointing an alternative interpretation which might challenge
550 the one originally appealed to by the proponent's argument.

551 Like ASPIC+, Carneades has three ways in which one argument can attack and
552 defeat another. An opponent can attack one or more of the premises of an argument.
553 This is called an undermining attack. Or an opponent can attack the conclusion by
554 presenting an argument to show it is false or unacceptable. This type of attack is
555 called a rebutter. But thirdly, the opponent can attack the inferential link joining
556 the premises to the conclusion. This type of attack is called an undercutter. For
557 example, if the inference is based on a rule, the attack could claim that there is an
558 exception to the rule that applies in the present case at issue. This way of modeling
559 argumentation is based on Pollock's distinction (Pollock 1995, 40) between two kinds
560 of argument attacks called rebutters and undercutters. On Pollock's view, a rebutter
561 is a counterargument that attacks the conclusion of a prior argument, whereas an
562 undercutter is a counterargument that attacks the argument link between the premises
563 and the conclusion. For example, an argument that fits the argumentation scheme for
564 argument from expert opinion can be critically questioned by asking whether the
565 expert is biased. In Carneades, such a critical question is modeled as an undercutter,
566 and an undercutter is modeled as an argument that defeats the original argument it
567 was aimed at only if it is backed up by some additional evidence that supports it.

568 Next, we use Carneades to show how the interpretative statutory schemes can be
569 applied to an extended sequence of argumentation in a typical case using a large
570 argument graph to connect the individual interpretive arguments to each other.

5 The Education Grants Example

571 According to the account of the following case described in Cross (2005, 90),
572 Section 1 of the Education Act of 1962 required local education authorities to make



574 grants to students who were “ordinarily resident” in their area, so that the student
 575 could attend higher education courses. A requirement in the Education Act stipulated
 576 that to be eligible, the student had to have been ordinarily resident in the UK for three
 577 years prior to his or her application. The following issue arose: Could someone who
 578 had come to the UK for education count the period spent in education as ordinary
 579 residence to qualify for a mandatory grant under the Education Act?

580 There were two sides to the issue. The Court of Appeal held that such a person
 581 could not count this period as ordinary residence, offering the following argument
 582 (Cross 2005, 90). Lord Denning MR and Everleigh LJ were impressed by the need
 583 to relate this Act to the policy of the Commonwealth Immigrants Act 1962 and its
 584 successor, the Immigration Act 1971. Under the latter Act, students coming only for
 585 study had a conditional leave to stay in the country limited to the purpose of study
 586 which did not involve ordinary residence for the general purposes of everyday life.
 587 Denning and Everleigh considered that consistency with this Act required the term
 588 “ordinarily resident” in the Education Act to be interpreted as living as an ordinary
 589 member of the community would, which would not include residence for the limited
 590 purpose of study.

591 Arriving at a different interpretation, the House of Lords unanimously reversed
 592 this decision. They felt that the Court of Appeal had given too much weight to
 593 arguments drawn from the Immigration Act. They offered the following argument,
 594 quoted from Cross (2005, 91).

595 Parliament’s purpose expressed in the Education Act gave no hint of any restriction on
 596 the eligibility for a mandatory award other than ordinary residence in the United Kingdom
 597 for three years and a satisfactory educational record. There was nothing expressed in the
 598 Immigration Act which gave guidance as to the interpretation of the Education Act and,
 599 indeed, despite a series of immigration measures since 1962, nationality had not formed
 600 part of the regulations under the Education Act until 1980. Accordingly, the ordinary natural
 601 meaning of the Education Act prevailed to make the students eligible for a mandatory grant
 602 if they had resided in the United Kingdom for the purposes of study.

603 In this case, it was concluded that the role of the judge should not be to reconcile
 604 legislative provisions. Instead, it was proposed that the basis for interpretation should
 605 be that of the ordinary language meaning of the expression “ordinarily resident.”

606 The argumentation in this case can be analyzed as an interpretive argument put
 607 forward by its proponents Denning and Everleigh and countered by an interpretive
 608 argument put forward in the House of Lords. Below, we use a sequence of three
 609 argument maps to model the structure of the argumentation sequence in the case.

610 The first argument, shown in Fig. 3, cites the Immigration Act of 1971, which
 611 stated that students coming to a country for study only had a conditional leave to
 612 stay in the country, adding that this conditional leave does not involve ordinary
 613 residence for the general purposes of everyday life. Because a related document is
 614 cited as the basis for drawing a conclusion in support of statutory interpretation, the
 615 argumentation scheme which is the basis of this argument is the one for argument
 616 from contextual harmonization (CH), recognized by MacCormick and Summers. For
 617 present purposes, this scheme is taken to represent the following kind of argument:
 618 A certain expression that occurs in a document is best interpreted as fitting with its
 619 usage in a set of related documents; therefore, in this document it will be interpreted in



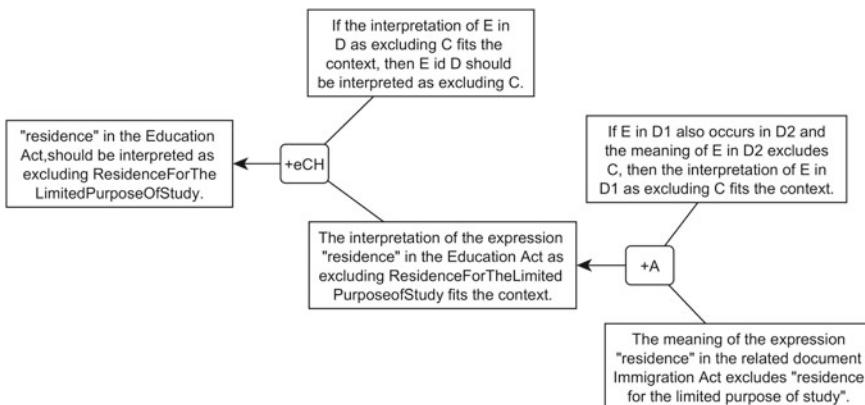


Fig. 3 Proponent's argument in the educational grants example

the same way. In other words, if there is an issue about how to interpret an expression in a document, such as a statute, then it can be argued that the best way to interpret it is within a context of related documents so that it fits with the way the term has been interpreted in these other documents.

Let us apply the scheme for the argument from contextual harmonization to the first part of this example. The notation *+CH*, referring to a supporting use of argument from contextual harmonization, has been inserted in the node linking the two premises in the middle of Fig. 2 to the ultimate conclusion shown at the left. Here is a textual representation of the arguments, which corresponds to the graph of Fig. 3. Let us first examine the top argument by Lord Denning.

Major premise	<i>eCH</i> : If the interpretation of <i>E</i> in <i>D</i> as excluding <i>C</i> fits the context, then <i>E</i> in <i>D</i> should be interpreted as excluding <i>C</i>
Minor premise	The interpretation of “ <i>residence</i> ” in the <i>Education Act</i> as excluding <i>ResidenceForTheLimitedPurposeOfStudy</i> fits the context
Conclusion	“ <i>residence</i> ” in <i>Education Act</i> should be interpreted as excluding <i>ResidenceForTheLimitedPurposeOfStudy</i>

The supporting argument may appeal to the fact that in other pieces of legislation “*ordinary residence*” excludes indeed “*residence for the limited purpose of study*.”

The ultimate conclusion is the statement that non-UK students cannot count the period as ordinary residence.

Next, we turn to an analysis of the argumentation in the second quoted text above, where the opponent, in this instance the House of Lords, put forward a counterargument.



Major premise	<i>eCH</i> : If an expression E in document D_1 also occurs in a related document D_2 , and the meaning of E in D_1 excludes a concept C , then the interpretation of the expression E in D_2 as excluding C fits the context
Minor premise	The meaning of “ <i>residence</i> ” in the related document <i>Immigration Act</i> excludes concept “ <i>residence for the limited purpose of study</i> ”
Conclusion	The interpretation of an expression “ <i>residence</i> ” in the <i>Education Act</i> as excluding <i>ResidenceForTheLimitedPurposeOfStudy</i> fits the context

637 Parliament’s purpose expressed in the Education Act gave no hint of any restriction on the
 638 eligibility for a mandatory award other than ordinary residence in the United Kingdom for
 639 three years and a satisfactory educational record.

This argument fits the scheme for inclusionary argument from intention (+iAI):

Major premise	+iAI: If the interpretation of E in D as excluding S conflicts with legislative purpose, then E in D should be interpreted as including S
Minor premise	The interpretation of an expression “ <i>residence</i> ” in the <i>Education Act</i> as excluding <i>ResidenceForTheLimitedPurposeOfStudy</i> conflicts with legislative purpose
Conclusion	“ <i>residence</i> ” in <i>Education Act</i> should be interpreted as including <i>ResidenceForTheLimitedPurposeOfStudy</i>

640
 641 The reason why the minor premise holds is provided by the following supporting
 counterfactual argument.

Major premise	If the linguistic meaning of E in D includes S , and there are no hints that the legislator intended to exclude S from the meaning of E in D , then the interpretation of E in D as excluding S conflicts with legislative intention
Minor premise 1	The linguistic meaning of “ <i>residence</i> ” in the <i>Education Act</i> includes <i>ResidenceForTheLimitedPurposeOfStudy</i>
Minor premise 2	There are no hints the legislator intended to exclude <i>ResidenceForTheLimitedPurposeOfStudy</i> from the meaning of “ <i>residence</i> ” in <i>Education Act</i>
Conclusion	The interpretation of an expression “ <i>residence</i> ” in the <i>Education Act</i> as excluding <i>ResidenceForTheLimitedPurposeOfStudy</i> conflicts with legislative intention

642
 643 This argument is shown in Fig. 4 as a counterargument to the one in Fig. 3.
 644 We leave it as an open problem how the argument on the right could be more
 645 fully represented, for example, by including the “there are no hints” statement as
 646 a premise in an *a contrario* argument. This would make the argument on the right
 647 more complex. Hint: it is possible to solve this problem by invoking the notion of an
 648 enthymeme.

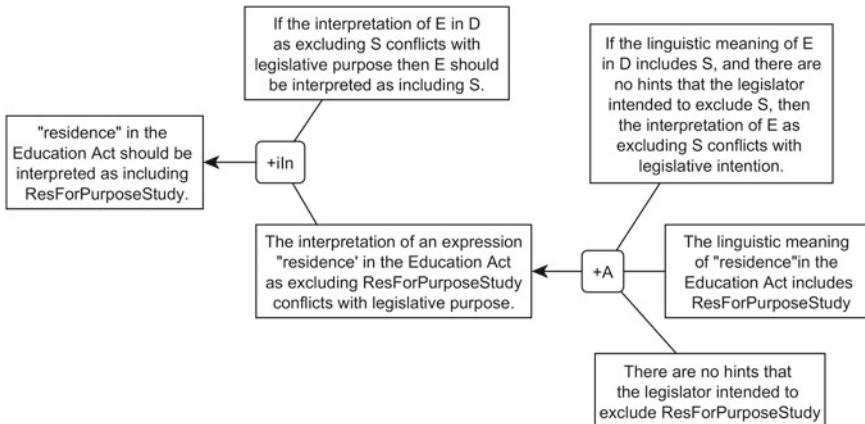


Fig. 4 Respondent's rebuttal to the educational grants example

649 Next let us look at the other argument just below this one. Cross (2005, 91–92)
 650 offers this account of this part of the case.

651 Lord Denning MR and Everleigh LJ were impressed by the need to relate this Act to the
 652 policy of the Commonwealth Immigrants Act 1962 and its successor, the Immigration Act
 653 1971. Under the latter act, students coming only for study had a conditional leave to stay in
 654 the country limited to the purpose of study and this did not involve ordinary residence for the
 655 general purposes of everyday life. They considered that consistency with this Act requires
 656 the term 'ordinarily resident' in the Education Act to be interpreted as living as an ordinary
 657 member of the community would, which could not include residence for the limited purpose
 658 of study.

659 We are told in the quoted part of the text that Denning and Everleigh considered that
 660 consistency with the Education Act requires living as an ordinary member of the
 661 community and that being an ordinary member of the community does not include
 662 residence for the limited purpose of study. Accordingly, we have represented these
 663 two propositions as premises in a linked argument supporting the conclusion that
 664 conditional leave does not involve ordinary residence, as shown in Fig. 5 at the
 665 bottom right. The rightmost argument supports one premise of the argument to the
 666 left of it. It is labeled as a supporting argument labeled *+iPr* in Fig. 5. The conclusion
 667 of this argument is the opposite of the conclusion shown in Fig. 4.

668 What we see in Fig. 5 is therefore a rebuttal because it presents an argument that
 669 attacks the ultimate conclusion of the original argument shown in Fig. 4. There is
 670 a conflict between the argument shown in Fig. 5 and the previous two arguments
 671 shown in Figs. 3 and 4.

672 We have chosen to use the term "interpretation" instead of "meaning," because the
 673 latter term is not only vague but is itself susceptible to many contested interpretations.
 674 Nevertheless, it can be said generally that what the interpreters of the statue are
 675 generally seeking is an interpretation that they contend that represents the genuine,

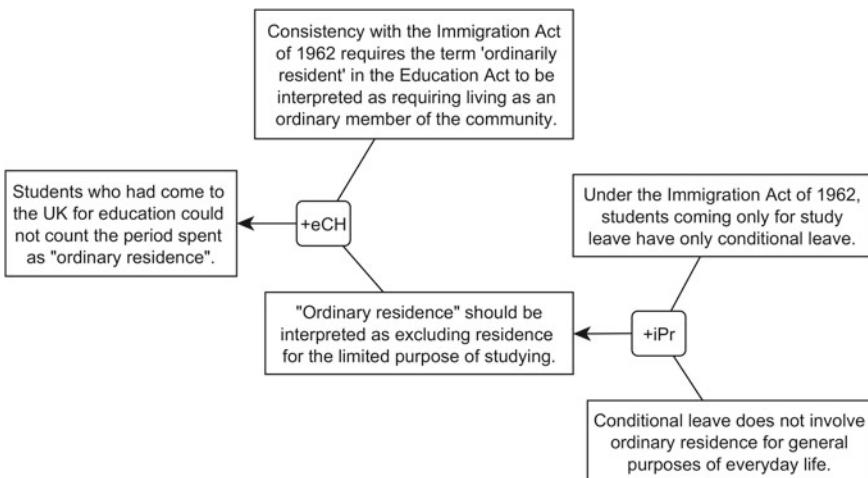


Fig. 5 Respondent's premise attack in the educational grants example

676 true, or real meaning of the textual item they are discussing. This notion that there is
 677 what is called a real meaning underneath the vagaries in the text being examined or
 678 deconstructed has however been subject to some abuse in philosophy. For all these
 679 reasons, we generally prefer using the term “interpretation” to the term “meaning.”

680 The evaluation system of Carneades compares the set of pro arguments against
 681 the set of con arguments if the two sets of arguments are independent of each other.
 682 However, summing the weights of arguments to check if the sum of the weights of the pro
 683 arguments outweighs the sum of the weights of the con arguments is only
 684 feasible if it be assumed that the two arguments are independent of each other. This
 685 can be done with Carneades, but it requires an additional evaluation.

686 As with all arguments found in natural language texts, it is possible to analyze
 687 the given text in further depth by bringing out more implicit assumptions and more
 688 subtle inferences. However, building an argument map of a real argument expressed
 689 in natural language is very often a difficult interpretive task requiring learned skills
 690 and often itself providing many challenges of textual interpretation. Generally, one
 691 finds there are alternative interpretations opened up as the text of the cases is analyzed
 692 in greater depth and more implicit premises and arguments are brought out. Building
 693 an argument diagram can often raise important questions of argument interpretation
 694 and analysis that might not be initially visible to someone who is trying to deal
 695 with the argument or find out what to do with it. To illustrate some of the problems
 696 inherent in such as task, we go back to the *Dunnachie* example.

6 Fitting Interpretive Schemes to Cases

Dunnachie, following the commentary of MacCormick (2005, 128), offers an example of argument from contextual harmonization. The scheme for argument from contextual harmonization requires that a particular sentence in a statute should be interpreted considering the whole statute and any set of related statutes that are available. In line with the model of interpretive schemes introduced in Sect. 2, the scheme for contextual harmonization as applied to *Dunnachie* takes the following form.

Major premise	+CH: If the interpretation of <i>E</i> in <i>D</i> as <i>M</i> fits the context, then <i>E</i> in <i>D</i> should be interpreted as <i>M</i>
Minor premise	The interpretation of “ <i>loss</i> ” in the <i>Employment Relations Act</i> as <i>PecuniaryLoss</i> fits the context
Conclusion	“ <i>loss</i> ” in <i>Education Act</i> should be interpreted as <i>PecuniaryLoss</i>

The reason why this interpretation fits context is provided by the following supporting argument, which addresses the case in which the same expression occurs in different positions in the document (for simplicity’s sake, we do not include in the scheme the possibility that there are multiple occurrences of the expression in the same document):

Major premise	If <i>E</i> besides occurring in position <i>P</i> ₁ of document <i>D</i> also occurs in positions <i>P</i> ₁ , ..., <i>P</i> _{<i>n</i>} , where it has meaning <i>M</i> , then <i>E</i> in <i>P</i> ₁ should also be interpreted as <i>M</i>
Minor premise	“ <i>loss</i> ” besides occurring in <i>Section 2</i> of the <i>Employment Relations Act</i> also occurs in <i>Section 4</i> where it has the meaning “ <i>pecuniary loss</i> ”
Conclusion	“ <i>loss</i> ” in <i>Section 2</i> of the <i>Employment Relations Act</i> should be interpreted as “ <i>pecuniary loss</i> ”

Again following the commentary of MacCormick (2005, 128) on *Dunnachie*, the following example can be given to show how Carneades models a pro argument supporting a claim in a case where there is also a con argument attacking the same claim (Fig. 6).

The claim that “*loss*” should be interpreted as including both financial loss and emotional loss was partly based on a statement made in an earlier case. In this case, *Johnson Unisys Ltd.*, Lord Hoffman had made the statement that an extension of the word “*loss*” to “*emotional loss*” could be made. So, it would appear, at least initially, that the argument drawn from the statement can be classified as an instance of a pro argument from precedent.

The reader will recall from the list in Sect. 2 that according to the description given by MacCormick and Summers, (1987) an interpretive argument from precedent requires that if a term has a previous judicial interpretation, it should be interpreted



722 to fit that previous interpretation. In the previous case of *Norton Tool Co. v Tewson*,
 723 it had been ruled that "loss" was to be interpreted as signifying exclusively financial
 724 loss. Following the lines of the analysis of the structure of interpretative schemes
 725 in section, the scheme for interpretive argument from precedent can be cast in the
 following inclusionary and exclusionary forms.

Major premise	<i>ePr</i> : If the interpretation of <i>E</i> in <i>D</i> as excluding <i>S</i> fits precedents, then <i>E</i> in <i>D</i> should be interpreted as excluding <i>S</i>
Minor premise	The interpretation of an "loss" in the <i>Employment Relations Act</i> as excluding <i>EmotionalDamage</i> fits precedents
Conclusion	"loss" in <i>Education Act</i> should be interpreted as excluding <i>EmotionalDamage</i>

726

The supporting argument is the following:

Major premise	If <i>E</i> in <i>D</i> was understood in precedent <i>P</i> as excluding <i>C</i> , then the interpretation of <i>E</i> in <i>D</i> as excluding <i>C</i> fits precedents
Minor premise	"loss" in the <i>Employment Relations Act</i> was understood in <i>Norton</i> as excluding <i>EmotionalDamage</i>
Conclusion	The interpretation of "loss" in the <i>Employment Relations Act</i> as excluding <i>EmotionalDamage</i> fits precedents

727

728 Here is a positive application of the argument by precedent:
 729 A supporting argument is the following:

730 The arguments could be further developed by pointing to the clues which support
 731 this understanding of the precedent, using the argument diagram in Fig. 7.

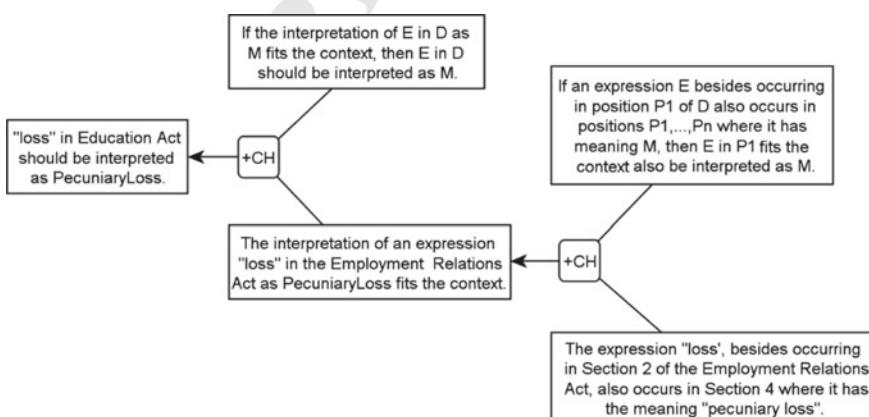


Fig. 6 Use of the scheme for argument from contextual harmonization in *Dunnachie*



Major premise	<i>iPr</i> : If the interpretation of <i>E</i> in <i>D</i> as including <i>C</i> fits precedents, then <i>E</i> in <i>D</i> should be interpreted as <i>M</i>
Minor premise	The interpretation of “ <i>loss</i> ” in the <i>Employment Relations Act</i> as including <i>EmotionalDamage</i> fits precedents
Conclusion	“ <i>loss</i> ” in <i>Education Act</i> should be interpreted as including <i>EmotionalDamage</i>
Major premise	If <i>E</i> in <i>D</i> was understood in precedent <i>P</i> as including <i>C</i> , then the interpretation of <i>E</i> in <i>D</i> as including <i>C</i> fits precedents
Minor premise	The interpretation of an expression “ <i>loss</i> ” in the <i>Employment Relations Act</i> was understood in precedent <i>Johnson vs Unisys</i> as including <i>EmotionalDamage</i>
Conclusion	The interpretation of an expression “ <i>loss</i> ” in the <i>Employment Relations Act</i> as including <i>EmotionalDamage</i> fits precedents

732 But in *Dunnachie*, in addition to this pro instance of interpretive argument from
 733 precedent, there was also a con argument for the same conclusion. There is a conflict
 734 between the two interpretations shown in Fig. 8.

735 How could this conflict be resolved? The answer requires taking a closer look at
 736 the interpretive scheme for argument from precedent to see how one precedent can
 737 be stronger than another in supporting or attacking a claim about how a statute or
 738 law should be interpreted.

739 This way of modeling the scheme rests on the assumption that the user already has
 740 a clear idea of what a precedent is. Schauer (1987) has shown that arguments from
 741 precedent are already highly familiar in everyday conversational argumentation. This
 742 suggests that we need to begin with some intuitive understanding of what constitutes

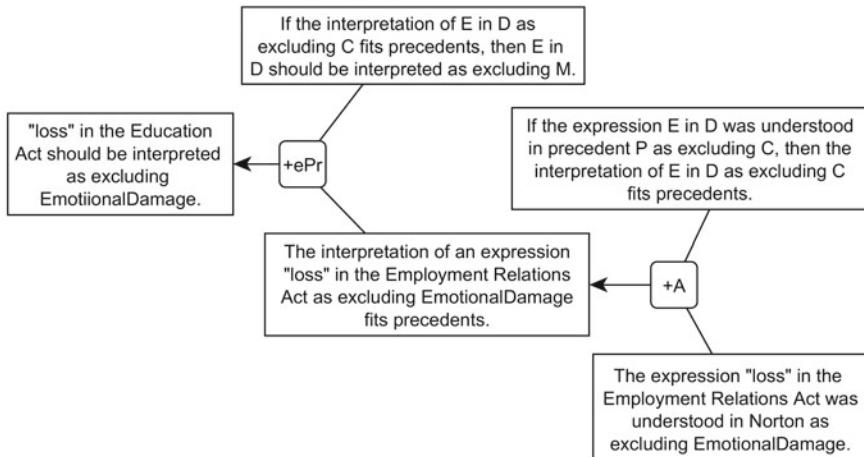


Fig. 7 Use of a prior case as a precedent supporting a textual interpretation



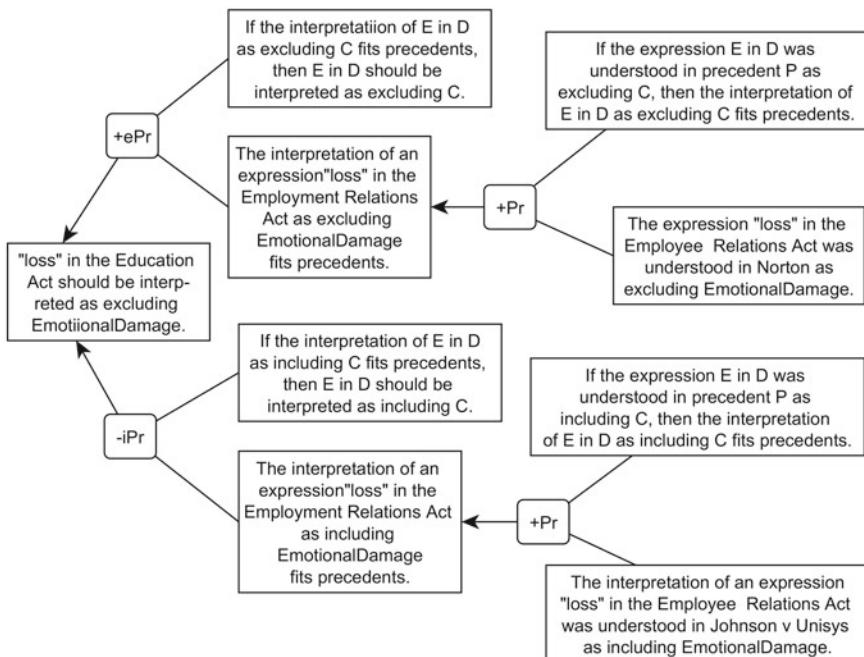


Fig. 8 Conflicting pro and con interpretive arguments from precedent

a precedent case. We could also build on the scheme for argument from precedent generally known in the argumentation literature, but there are differences of opinion on how that should be formulated (Walton 2010), in particular on the issue of how that scheme is related to the one for argument from analogy.

In his commentary on the case, MacCormick (2005, 129) made the following argument to support seeing this statement by another court as a binding premise in an argument from precedent. First, this ruling had been followed and approved many times. Second, it contained an acceptable rationale for interpreting loss exclusively as financial loss. Therefore, MacCormick concluded that it was a better guide for future rulings than the *Johnson* case.

In contrast, MacCormick put forward arguments advancing several reasons why Lord Hoffman's statement in *Johnson* might not constitute a binding precedent. First, they were not necessary to the decision reached in *Johnson*. Second, it had not been followed by other courts as a binding precedent. Third, although it was open to the House of Lords to have overruled *Norton Tool*, establishing a new ruling on the meaning of loss, this was not done. These arguments were used by MacCormick to question whether the remarks made by Lord Hoffman constitute a precedent binding on subsequent cases. These further arguments are shown in Fig. 9. For simplicity and readability's sake, we do not rigidly follow the structures illustrated above, and we omit to fully indicate the canons that are applied.

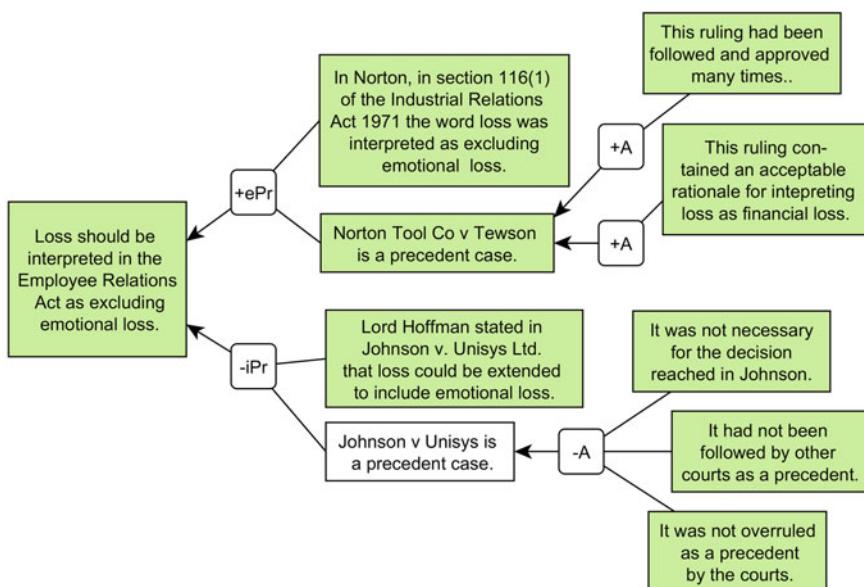


Fig. 9 Conflict resolved by taking other arguments into account

763 Let us say that all the propositions shown in the five rightmost rectangles are
 764 accepted by the audience. These five rectangles are shown in green backgrounds.
 765 Next, look at the pro argument from precedent at the top. Each of the two arguments
 766 supporting the proposition that *Norton Tool Co. v Tewson* is a precedent case has
 767 only one premise, and in both instances, that premise is accepted. Therefore, the
 768 proposition that *Norton tool Co. v Tewson* is a precedent case is automatically shown
 769 as accepted by Carneades. Let us also assume that the other premise of this argument
 770 is accepted. Since both premises of the argument are now accepted, the ultimate
 771 conclusion shown at the left of Fig. 9 is now automatically shown as accepted.

772 But now let us look at the bottom argument, the con argument from precedent.
 773 Since all three of its premises are accepted, the con argument attacking the proposition
 774 that *Johnson v Unisys* is a precedent case is successful in defeating it. Hence, this
 775 proposition is shown in a rectangle with a white background, indicating that it is
 776 not accepted. Actually, the additional evidence provided by the two pro arguments
 777 shown at the top right of Fig. 9 is not needed for the pro argument from precedent
 778 to defeat the con argument from precedent in the case. It is enough that because one
 779 premise of the con argument (shown in white at the bottom of Fig. 9) is defeated, the
 780 pro argument from precedent at the top prevails.

781 Summing everything up, the pro argument from precedent at the top prevails over
 782 the con argument from precedent at the bottom, because one of the premises of the
 783 con argument is unacceptable. It is shown by Carneades as not accepted because it

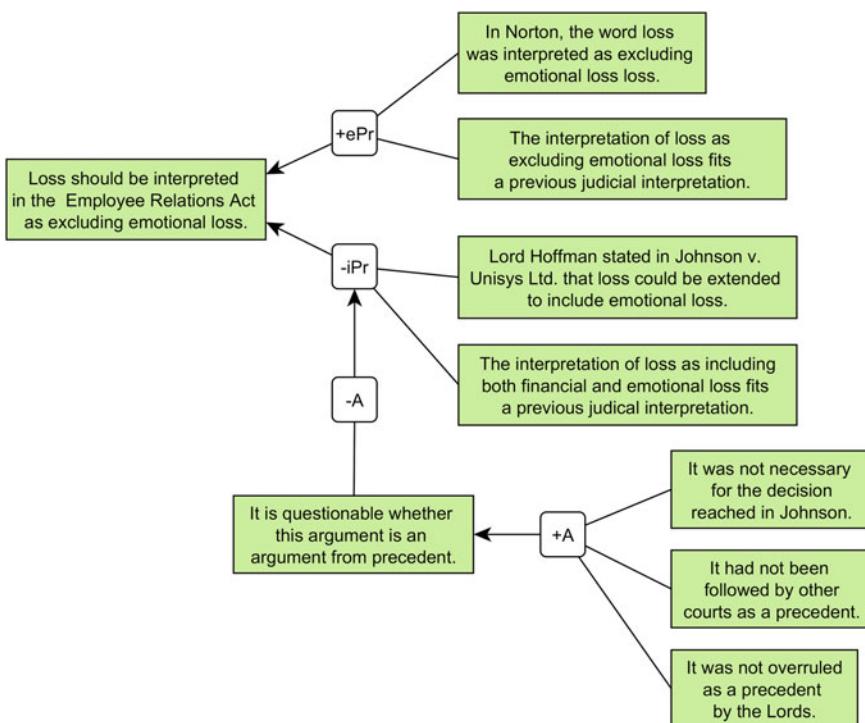


Fig. 10 Attacking an interpretive argument from precedent

784 is defeated by the applicable con argument - A. Only the pro argument is accepted,
 785 and so the conclusion is accepted. Hence, the conflict is resolved.

786 There is another way of modeling the conflict between the two arguments from
 787 precedent.

788 Using the scheme for argument from precedent put forward in Sect. 2, Mac-
 789 Cormick's argument could be modeled as an undercutter critically questioning
 790 whether the top argument shown in Fig. 10 fits the argumentation scheme for argu-
 791 ment from precedent. This way of interpreting MacCormick's remarks on how to
 792 model the argumentation in this instance is to take his argument above as an under-
 793 cutter that attacks the argument used in the *Johnson* case by arguing that it is ques-
 794 tionable whether the pro argument shown in Fig. 10 is a proper instantiation of
 795 the scheme for argument from precedent. Such an interpretation of MacCormick's
 796 evaluation of the argumentation is shown in Fig. 10.

797 This case is an interesting one because the way MacCormick analyzes the argu-
 798 mentation in it, because there is still another alternative interpretation of it that is
 799 possible, judging from his remarks. It might be possible to argue that even though
 800 the ruling in *Johnson* on how to interpret loss was not a binding precedent, because
 801 it was not necessary to the decision made in that case, still it could be taken to be a

weaker kind of precedent. MacCormick (2005, 129) distinguishes between a binding precedent and a precedent that is persuasive but not binding. Honoring this distinction, interpretation of the word “loss” in Johnson could be taken as a weaker kind of precedent. Following this line of argument, the conflict between the two arguments from precedent no longer represents a deadlock because the stronger precedent from Norton would have priority over the weaker precedent from Johnson. Carneades and ASPIC+, as well as other systems, recognize different kinds of priority orderings on rules, and so that would be another way that AI systems could model the argumentation in this case.

In Sect. 2, we only proposed schemes for some of the interpretive arguments to give the reader an idea of what these schemes should ultimately look like. However, especially with some of the schemes, the descriptions of the different kinds of interpretive arguments given by MacCormick and Summers are not enough in themselves to definitively formulate the matching scheme. In particular, the scheme for argument from precedent needs more study by applying it to cases before a definitive version can be given.

7 Formalizing Interpretive Arguments—General Structure

In this section, we shall provide a general formal structure for interpretive arguments, based on the approach of interpretive arguments introduced and exemplified in the previous sections. Let us first summarize that approach.

Interpretive arguments can be distinguished along two different criteria: positive versus negative and total versus partial. The first distinction concerns whether they argue that a certain interpretation should be adopted or rather rejected. The second distinction pertains as to whether they address the whole interpretation of a term, or only the inclusion or exclusion of a subclass in the term’s meaning. Correspondingly, partial interpretive arguments can be distinguished into exclusionary and inclusionary ones.

All interpretive arguments we shall consider are based on canons, namely defeasible conditionals, stating that if certain conditions are or are not met, a certain interpretive condition should or should not be adopted. Canons may be positive or negative depending on whether their consequent is the obligation to adopt or not to adopt a certain interpretation. Positive canons can also have a negative counterpart, to the extent that the absence of the condition they require leads to the rejection of an interpretation.

In this section, we shall propose appropriate formal structures for capturing all these forms of interpretive arguments.

Let us start with positive and negative total interpretive arguments. Both structures have the following elements: an expression E (word, phrase, sentence, etc.) occurs in a document D (statute, regulation, contract, etc.), interpreting this occurrence as meaning M satisfies the condition of a certain interpretive scheme (of ordinary language, technical language, purpose, etc.). Positive canons state that if all these

elements are satisfied we are licensed to derive the interpretive conclusion that E in D should be interpreted as M . Negative canons state that if an interpretation I would not fit the scheme, then E in D should not be interpreted as M . In Sartor et al. (2014), we modeled interpretive claims as deontic claims, stating the obligation to adopt a certain interpretation. Here, we follow a different approach, focusing on the relationship between an interpretation and its justification, as a metalinguistic discourse on why a meaning is the best interpretation of an expression. In this sense, we model interpretive claims as terminological assertions concerning best interpretations of the contested or potentially contested expressions within a legal text (for a similar idea, see Araszkiewicz 2013).

All canons are modeled as defeasible rules (expressed in the form $r : \varphi_1, \dots, \varphi_n \Rightarrow \psi$, where r is the rule name, where $\varphi_1, \dots, \varphi_n$ and ψ are formulas in a logical language, $\varphi_1, \dots, \varphi_n$ being the antecedents, and ψ being the consequent of the rule).

We express interpretive conclusions as claims concerning conceptual relations between a meaning M that is proposed and the outcome of the best legal interpretation of the linguistic occurrence at issue, namely expression E in document D (Bezuidenhout 1997; Carston 2002, 2013; Soames 2008; Sperber and Wilson 1986; Wilson and Sperber 2004). Such an outcome is denoted by the function expression $BestInt(E, D)$, denoting the best interpretation of expression E in document D . Conceptual relations are expressed with description logic symbols: \equiv for conceptual equivalence, $\not\equiv$ for difference, \sqsupseteq for inclusion. Thus $BestInt(E, D) = M$ means that the best interpretation of expression E in document D is represented by meaning M .

Thus, a general pattern for positive total interpretive canons can be expressed as follows:

C : expression E occurs in document D ,

the interpretation of E in D as M satisfies the condition of positive canon $C \Rightarrow$

$BestInt(E, D) \equiv M$

Here is an example:

OL : expression E occurs in document D ,

the interpretation of E in D as M fits ordinary language \Rightarrow

$BestInt(E, D) \equiv M$

Similarly, negative canons claim that the best interpretation is not the proposed one, as in the following example, based on the non-redundancy canon:

NR : expression E occurs in document D ,

the interpretation of E in D as M is redundant \Rightarrow

$BestInt(E, D) \not\equiv M$

Let us now provide examples for partial interpretations, such as, for exclusionary interpretative claims:

$eSAC$: expression E occurs in document D ,

883 the interpretation of expression E in the D as including S conflicts with usual meaning \Rightarrow

884 $BestInt(E, D)^C \supseteq S$

885 where $BestInt(E, D)^C$ is the complement of $BestInt(E, D)$, and for inclusionary interpretive
886 claims:

887 iSAC: expression E occurs in document D ,

888 the interpretation of E in the D as excluding S conflicts with the usual meaning \Rightarrow

889 $BestInt(E, D) \supseteq S$

890 We can also identify a pattern for priority arguments between different (instances of)
891 interpretive canons (we use \succ to express priority).

892 C : concerning expression E in document D , the interpretation as M_1 according to canon C_1

893 meets the priority criterion with regard to the interpretation as M_2 according to canon $C_2 \Rightarrow$

894 $C_1(E, D, M) \succ C_2(E, D, M_2)$.

895 where $C(E, D, M)$ denotes the instance of canon C which attributes meaning M to
896 expression E in document D . Consider, for instance, Alexy and Dreier's idea that in
897 criminal law *ordinary language* has priority over *technical language*.

898 P_1 : expression E in document D concerns Criminal law \Rightarrow

899 $OL(E, D, M_1) \succ TL(E, D, M_2)$.

900 where $OL(E, D, M_1)$ denotes the instance of canon OL (*ordinary language*) which
901 attributes meaning M_1 to expression E in document D , and similarly for TL (*technical
language*). In this sense, interpretive arguments can be ordered in hierarchies depend-
902 ing on the specific legal context.

903 For reasoning about interpretation, we need an argumentation system including
904 strict rules, defeasible rules, and preference between rules, such as the system devel-
905 oped by Prakken and Sartor (1996), the ASPIC+ system (Prakken 2010), or the
906 Carneades system (Gordon and Walton 2009a). We express defeasible rules in the
907 form $r : \varphi_1, \dots, \varphi_n \Rightarrow \psi$ and strict rules in the form $\varphi_1, \dots, \varphi_n \mapsto \psi$. We use
908 arrows \mapsto and \leftrightarrow for material conditional and biconditional of propositional logic.
909 We also assume that our system includes the inferences of classical logic, namely
910 that for any propositions of classical logic φ and ψ , if φ is derivable from ψ , then
911 we have a strict rule $\varphi \mapsto \psi$.

912 Here, we assume that argument A including defeasible rules may be defeated
913 in two ways. This first consists in successfully *rebutting* A , i.e., by contradicting
914 the conclusion of a subargument of A , through an argument that is not weaker than
915 the attacked subarguments (we assume that A too is a subargument of itself). More
916 precisely, B rebuts A when (a) B 's conclusion is incompatible with the conclusion
917 of a subargument A' of A , and (b) B is not weaker than A' , i.e., $A' \not\succ B$ (see Prakken
918 2010). Condition (b) corresponds to the idea that if A were stronger than B , it would
919 resist B 's challenge.

920 Regarding comparative strength, we assume that the comparison between two
921 arguments A and B is to be assessed according to two criteria:



- 923 (a) preference for strict arguments (those only contains strict rules) over defeasible
 924 ones (those also containing defeasible rules): If A is strict and B is defeasible,
 925 then $A > B$.
 926 (b) preference between defeasible arguments according to the last link principle: If
 927 A is preferable to B according to the last link principle, then $A > B$.

928 The *last link principle* assumes a partial strict ordering \succ over defeasible rules and
 929 compares arguments A and B having incompatible conclusions by considering the
 930 sets of the last defeasible rules which support such conclusions in the two arguments
 931 (see for a formal characterization, Prakken and Sartor 1996; Prakken 2010).

932 The second way of defeating an argument A consists in *undercutting* A , i.e., in
 933 producing an argument B that rejects the application of a defeasible rule included
 934 in argument A . Let us express the claim that a rule does not apply, by denying the
 935 corresponding name of the rule: The statement $\neg r$ denies that rule named r applies.
 936 Then, we can say in general terms that argument B undercuts argument A , if B has the
 937 conclusion $\neg r$, where r is the top rule of a subargument A' of A . For instance, argument
 938 $[\rightarrow a; r_1: a \Rightarrow b]$ is undercut by argument $[\rightarrow c; r_2: c \Rightarrow \neg r_1]$. When we want to
 939 refer to the rule instance that is obtained by specifying a general rule r relatively
 940 to entities e , we use the expression $r(e)$. Thus, the expression $\neg r(e)$ expresses the
 941 claim that the rule instance $r(e)$ does not hold, or, in other words, the claim that the
 942 rule r does not apply to entities e . For instance, the proposition $\neg OL(123(1)ERA)$
 943 expresses the claim that canon OL does not apply to the text 123(1)ERA.

944 Semantics for an argumentation system can be based on the idea of an extension,
 945 namely a set of compatible arguments, which includes resources (arguments) that
 946 respond to all defeaters of arguments in the set. Here, we adopt the approach that
 947 consists in looking for most inclusive extensions, which are called preferred exten-
 948 sions (Dung 1995). An argument is then considered to be justified if it is included
 949 in all such extensions. It is considered defensible if it is included in some (but not
 950 necessarily in all) extensions.¹ The arguments that are defensible but not justified are
 951 only in some preferred extensions: Their status remains undecided, as their inclusion
 952 in a preferred extension depends on what other arguments are already included in
 953 the extension, different choices being possible.

954 Consider for instance the following set of arguments:
 955 $\{[a], [b], [a, r_1: a \Rightarrow c], [b, r_2: b \Rightarrow \neg c]\}$. We have two preferred extensions
 956 $E_1 = \{[a], [b], [a, r_1: a \Rightarrow c]\}$ and $E_2 = \{[a]\} \cup \{[b], [b, r_2: b \Rightarrow \neg c]\}$. Each
 957 extension includes an argument that is defeated, but also defeats an argument in the
 958 other extension: $A_1 = [a, a \Rightarrow c]$ for E_1 and $A_2 = [b, b \Rightarrow \neg c]$ for E_2 . So, each one
 959 of the two extensions is able to respond to all defeaters of any argument it includes.
 960 A_1 and A_2 are merely defensible as they are incompatible, and we do not have, in
 961 the given set of arguments, reasons for preferring one to the other.

962 Assume that we add argument $[r_3 :=> r_1 \succ r_2]$. Then, we have just one preferred
 963 extension, namely $\{[a], [b], [a, r_1: a \Rightarrow c], [r_3 :=> r_1 \succ r_2]\}$, since, according to the
 964 preference $r_3 :=> r_1 \succ r_2$, A_1 is no longer defeated by A_2 .

¹In Sartor chapter 3, part II, this volume, on “[Defeasibility in Law](#),” a semantics based on labeling, which is equivalent to the extension based semantic here presented, was adopted.

Moving from arguments to conclusions, we have two possibilities for defining what conclusions are justified. One option is to view a conclusion as justified when it is established by a justified argument. The other option consists in viewing a conclusion as justified when it is supported in all preferred extensions possibly through different arguments. More precisely, we get the following definition:

Definition (Defensibility and Justifiability).

- **Defensibility.** Claim φ is defensible with regard to argument set \mathcal{A} if there exists a preferred extension S of \mathcal{A} that contains an argument with conclusion φ .
- **Strong justifiability.** Claim φ is strongly justifiable with regard to argument set \mathcal{A} , if φ is the conclusion of an argument \mathcal{A} that is contained in all preferred extensions.
- **Weak justifiability.** Claim φ is weakly justifiable with regard to argument set \mathcal{A} if all preferred extensions of contain arguments having conclusion φ .

Note that the weak definition of justifiability is broader than the strong, since it allows for a justifiable conclusion to be obtained through different incompatible arguments, included in different extensions. This is the notion that seems to be more appropriate to interpretation, as we shall argue in the following.

8 Interpretive Arguments—A Formalization

An interpretive argument can be constructed by combining an interpretive canon with the corresponding interpretive conditions. For instance, an argument from ordinary language would have the following form (in each argument, for conciseness sake, we put the general norm rather than its instantiation to the case at hand):

Argument A₁

1. expression “Loss” occurs in document 123(1)ERA
 2. the interpretation of “Loss” in 123(1)ERA as *PecuniaryLoss* fits *ordinary language*
 3. *OL*: expression E occurs in document $D \wedge$
the interpretation of E in D as M fits *ordinary language* \Rightarrow
 $BestInt(E, D) \equiv M$
-

$$C.BestInt(\text{“Loss”}, 123(1)\text{ERA}) \equiv PecuniaryLoss$$

Interpretive arguments can be attacked by counterarguments. For instance, the following counterargument based on *technical language* successfully rebuts the above argument based on *ordinary language*, by providing a different incompatible interpretation (assuming that no priority can be established and that concepts are different when denoted with a different name):



1000

Argument A₂

- 1002 1. expression “Loss” occurs in document 123(1)ERA
 1003 2. the interpretation of “Loss” in 123(1)ERA as *PecuniaryOrEmotionalLoss* fits technical
 1004 language
 1005 3. *TL*: expression *E* occurs in document *D* \wedge
 the interpretation of *E* in *D* as *M* fits *technical language* \Rightarrow
 1006 $BestInt(E, D) \equiv PecuniaryOrEmotionalLoss$
-
- 1009 $BestInt(\text{“Loss”}, 123(1)\text{ERA}) \equiv PecuniaryOrEmotionalLoss$

1010 The interpretation based on ordinary language could also be attacked by directly denying
 1011 its conclusion, for instance by a non-redundancy argument claiming that “Loss”
 1012 should not be interpreted in this way, since this would make 123(1)ERA redundant.

1018

Argument A₃

- 1015 1. expression “Loss” occurs in document 123(1)ERA
 1016 2. the interpretation of “Loss” in 123(1)ERA as *PecuniaryLoss* makes the norm redundant
 1017 3. *NR*: expression *E* occurs in document *D* \wedge
 the interpretation of *E* in *D* as *M* makes the norm redundant \Rightarrow
 1019 $BestInt(E, D) \not\equiv M$
-
- 1021 $BestInt(\text{“Loss”}, 123(1)\text{ERA}) \not\equiv PecuniaryLoss$

1022 A rebutting attack can also be played by using partial (inclusionary or exclusionary)
 1023 interpretive arguments.

1028

Argument A₄

- 1026 1. expression “Loss” occurs in document 123(1)ERA
 1027 2. the interpretation of “Loss” in 123(1)ERA as *EmotionalLoss* conflicts with usual meaning
 1028 3. *eAC*: expression *E* occurs in document *D*,
 the interpretation of expression *E* in the *D* as including *S* conflicts with usual meaning
 1029 $\Rightarrow BestInt(E, D)^C \supseteq S$
-

1031

1032 $BestInt(\text{“Loss”}, 123(1)\text{ERA}) \supseteq EmotionalLoss$

1033 where $BestInt(\text{“Loss”}, 123(1)\text{ERA})^C$ denotes the complement of
 1034 $BestInt(\text{“Loss”}, 123(1)\text{ERA})$.

1035 Given that *PecuniaryOrEmotionalLoss* includes emotional loss, i.e.,

1036 4. *PecuniaryOrEmotionalLoss* $\supseteq EmotionalLoss$

1037 we can conclude

1038 5. $\text{BestInt}(\text{"Loss"}, 123(1)\text{ERA}) \neq \text{PecuniaryOrEmotionalLoss}$

1039 which contradicts the conclusion of the above argument A_2 .

1040 An undercutting attack against the *ordinary language* argument could be mounted
 1041 by arguing that the expression “loss” in the Employment Rights Act is used in a
 1042 technical context, e.g., in the context of the discipline of industrial relations, where
 1043 arguments from *ordinary language* do not apply. Thus, this canon is inapplicable to
 1044 the expression *Loss* in 123(1)ERA, which is expressed using the formalism above as
 1045 $\neg\text{OL}(123(1)\text{ERA})$.

1046 1. expression “Loss” occurs in document 123(1)ERA

1047 2. 123(1)ERA is a technical context

1048 3. TC : expression E occurs in document D ,

1049 D is a technical context $\Rightarrow \neg\text{OL}(E)$

1051 $\neg\text{OL}(123(1)\text{ERA})$

1052 9 Preference Arguments over Interpretive Arguments

1053 We may have preferences over interpretive arguments. For example, in Italy, the
 1054 Court of Cassation revised its interpretation of the term *Loss* (*danno*) as occurring
 1055 in the Italian Civil Code (ICC) using an argument from substantive reasons (the
 1056 constitutional value of health): The Court thus rejected the traditional interpretation
 1057 as pecuniary damage, arguing that also damage to health should also be included in
 1058 the scope of the term (and consequently compensated):

1059 *Argument A₁*

1061 1. expression “Loss” occurs in document Art2043ICC

1062 2. the interpretation of “Loss” in Art2043ICC as *PecuniaryLoss* fits legal history

1063 3. OL : expression E occurs in document D ,

1064 the interpretation of E in D as M fits legal history $\Rightarrow \text{BestInt}(E, D) \equiv M$

1066 $\text{BestInt}(\text{"Loss"}, \text{Art2043ICC}) \equiv \text{PecuniaryLoss}$

1068 *Argument A₂*

1069 1. expression “Loss” occurs in document Art2043ICC

1070 2. the interpretation of “Loss” in Art2043ICC as *PecuniaryLossOrDamageToHealth* con-
 1071 tributes to substantive reasons

1072 3. SR : expression E occurs in document D ,

1073 the interpretation of E in D as M contributes to substantive reasons \Rightarrow

1074 $\text{BestInt}(E, D) \equiv M$



1076 $\text{BestInt}(\text{"Loss"}, \text{Art2043ICC}) \equiv \text{PecuniaryLossOrDamageToHealth}$

1077 These two arguments conflict (rebut each other), as:

1078 $\text{PecuniaryLoss} \neq \text{PecuniaryLossOrDamageToHealth}$

1080 To address the conflict, the judges argued that the second argument defeats the first,
1081 since SR in this context contributes to constitutional values.

1082 *Argument 3*

- 1084 1. The interpretation of expression “Loss” in Art2043ICC, as
1085 $\text{PecuniaryLossOrDamageToHealth}$ according to SR contributes to constitutional
1086 values
- 1087 2. SR: The interpretation of expression E in D , as M according to SR contributes to consti-
1088 tutional values $\Rightarrow \text{SR}(E, D, M) \succ \text{LH}(E, D, M')$

1089 $\text{SR}(\text{"Loss"}, \text{Art2043ICC}, \text{PecuniaryLossOrDamageToHealth}) \succ$

1090 $\text{LH}(\text{"Loss"}, \text{Art2043ICC}, \text{PecuniaryLossOrDamageToHealth})$

1091 **10 From Best Interpretations to Individual Claims**

1092 We must be able to move from interpretive claims to conclusion in individual cases,
1093 namely from conceptual assertions to individual claims. For this purpose, we can
1094 adopt general patterns for strict rules, which provide for the transition from interpre-
1095 tive claims to assertions concerning individuals:

- 1096 1. $\text{BestInt}(E, D) \equiv M \mapsto \forall x [E_D(x) \leftrightarrow M(x)]$
- 1097 2. $\text{BestInt}(E, D) \supseteq M \mapsto \forall x [M(x) \rightarrow E_D(x)]$
- 1098 3. $\text{BestInt}(E, D)^C \supseteq M \mapsto \forall x [M(x) \rightarrow \neg E_D(x)]$

1099 where x is sequence of variables which is required by concept M , $M(x)$ is the predicate
1100 corresponding to concept M , and E_D is a predicate representing the occurrence of E
1101 in D at issue. Consider for instance the above interpretive claim according to which

1102 $\text{BestInt}(\text{"loss"}, 125ERA) \equiv \text{PecuniaryLoss}$

1104 The corresponding instance of transition rule 1 would be:

1105 $\text{BestInt}(\text{"loss"}, 125ERA) \equiv \text{PecuniaryLoss}$

1108 $\mapsto \forall x [\text{LOSS}_{ERA}(x, y, z) \leftrightarrow \text{PecuniaryLoss}(x, y, z)]$

1108 To be read as: If the best interpretation of expression “loss” in document Section 125
1109 of the Employment Relations Act is concept *PecuniaryLoss*, then a person x in an



1110 event y has a “loss” of amount z (as understood in Section 125 of the Employment
 1111 Relations Act) if and only if x in y has a pecuniary loss of z .

1112 Let us assume that John in his unfair dismissal by Tom had a pecuniary loss of Euro
 1113 100, i.e., $PecuniaryLoss(John, DismissalByTom, 100)$. Let us expand the ordinary
 1114 language argument with the following: the latter assumption, the above instance of
 1115 transition rule 1, and strict rules corresponding to an inference of classical logic. We
 1116 get the following argument (where we list with the premises in the argument and
 1117 with letters the intermediate conclusions).

1118 *Argument A₄*

- 1120 1. expression “Loss” occurs in document 123(1)ERA
- 1121 2. the interpretation of “Loss” in 123(1)ERA as *PecuniaryLoss* fits *ordinary language*
- 1122 3. *OL*: expression E occurs in document $D \wedge$
 1123 the interpretation of E in D as M fits *ordinary language* \Rightarrow
 1124 $BestInt(E, D) \equiv M$

- 1126 a. $BestInt(\text{“Loss”}, 123(1)\text{ERA}) \equiv PecuniaryLoss$ (from 1, 2, and 3)
- 1127 4. $BestInt(\text{“loss”}, 125\text{ERA}) \equiv PecuniaryLoss \leftrightarrow \forall x [Loss_{\text{ERA}}(x, y, z) \leftrightarrow$
 1128 $PecuniaryLoss(x, y, z)]$

- 1129 b. $\forall x [Loss_{\text{ERA}}(x, y, z) \leftrightarrow PecuniaryLoss(x, y, z)]$ (from a and 4)
- 1130 5. $PecuniaryLoss(John, DismissalByTom, 100)$

- 1132 c. $Loss_{\text{ERA}}(John, DismissalByTom, 100)$ (by classical logic) (from b and 5)

1133 The mixture of interpretive and other arguments that are needed for a legal conclu-
 1134 sion can also include additional conceptual relations. For instance, let us assume that
 1135 we know that John has sustained a pecuniary loss of 100 Euros, as a consequence of
 1136 his unfair dismissal. Since the concept of pecuniary loss is included in the concept
 1137 of pecuniary or emotional loss, we can infer that he suffered a pecuniary or emo-
 1138 tional loss. This conclusion would enable us to conclude that John has a loss in the
 1139 sense of Section 125 ($Loss_{\text{ERA}}(John, DismissalByTom, 100)$), also on the basis of
 1140 the interpretation of loss as *PecuniaryOrEmotionalLoss*, according to an argument
 1141 *Argument A₅* which includes this interpretation.

1142 *Argument A₅*

- 1144 1. expression “Loss” occurs in document 123(1)ERA
- 1145 2. the interpretation of “Loss” in 123(1)ERA as *PecuniaryOrEmotionalLoss* fits *technical*
 1146 *language*
- 1147 3. *TL*: expression E occurs in document $D \wedge$
 1148 the interpretation of E in D as M fits *technical language* \Rightarrow
 1149 $BestInt(E, D) \equiv M$

-
- 1150
- 1151 a. *BestInt*("Loss", 123(1)ERA) \equiv *PecuniaryOrEmotionalLoss* (from 1, 2, and 3)
- 1152 4. *BestInt*("loss", 125ERA) \equiv *PecuniaryOrEmotionalLoss* \mapsto
 $\forall x [Loss_{ERA}(x, y, z) \leftrightarrow .PecuniaryOrEmotionalLoss(x, y, z)]$
-
- 1153
- 1154 b. $\forall x [Loss_{ERA}(x, y, z) \leftrightarrow PecuniaryOrEmotionalLoss(x, y, z)]$ (from a, and 4)
- 1155 5. $\forall x [PecuniaryLoss(x, y, z) \rightarrow PecuniaryOrEmotionalLoss(x, y, z)]$
- 1156 6. *PecuniaryLoss*(John, DismissalByTom, 100)
-
- 1157
- 1158 c. *PecuniaryOrEmotionalLoss*(John, DismissalByTom, 100) (from 5, and 6)
-
- 1159
- 1160 d. *Loss_{ERA}*(John, DismissalByTom, 100) (from 5 and c)

1161 Arguments A_4 and A_5 are inconsistent, as they include incompatible interpretive con-
1162 clusions (incompatible subarguments): According to conclusion (a) in A_4 , the best
1163 interpretation of "loss" in Section 125 is *PecuniaryLoss*, while according to conclusion
1164 (a) in A_5 the best interpretation is a different concept, namely *PecuniaryOrEmotion-
1165 alLoss*. However, the two arguments lead to the same conclusion in the case of John's
1166 dismissal: He suffers a loss of 100, as understood in Section 125 of the Employment
1167 Relations act.

1168 Therefore, we may view this conclusion as legally justified, namely as weakly
1169 justified. This is the case even though we are unable to make a choice between
1170 the two incompatible interpretations (the two competing interpretive arguments are
1171 both defeasible, and neither is justified), as the conclusion follows from both such
1172 interpretations. This view corresponds to the idea that only relevant issues have to be
1173 addressed in legal decision-making: The issue of whether "loss" is limited or not to
1174 pecuniary losses is irrelevant in John's case, since he has only suffered a pecuniary
1175 loss (this issue would be relevant if he had on the contrary suffered instead, or
1176 additionally, an emotional loss).

11 Conclusions

1177 In this chapter, our goal was to show how interpretive schemes can be formulated
1178 in such a manner that they can be incorporated into a formal and computational
1179 argumentation system such as Carneades or APSICf+ and then applied to display-
1180 ing the pro–contra structure of the argumentation using argument maps applied to
1181 legal cases. To this purpose, we have analyzed the most common types of statutory
1182 arguments and brought to light their common characteristics. We have shown how
1183 canons of interpretation can be translated into argumentation schemes, and we have
1184 distinguished two general macrostructures of positive and negative, total and partial
1185 canons, under which various types of schemes and rebuttals can be classified. This



1187 preliminary classification was then used for modeling the interpretive arguments
1188 formally and integrating them into computational systems and argument maps.

1189 The interpretive schemes can be applied initially when constructing an argument
1190 diagram to get an overview of the sequence of argumentation in a case of contested
1191 statutory interpretations. The schemes can be applied in order to help the argument
1192 analyst convey an evidential summary showing how the subarguments fit together in
1193 a lengthy sequence of argumentation in a case, as indicated in the main example of
1194 the educational grants case. The next step is to zoom in on parts of the argumentation
1195 sequence that pose a problem where critical questions need to be asked or refinements
1196 need to be considered. Here, the critical questions can be applied in order to find
1197 further weak points in an argument by bringing out implicit premises that may have
1198 been overlooked and that could be questioned.

1199 The function of the set of critical questions matching a scheme is to give the arguer
1200 who wants to attack the prior argument some idea of the kinds of critical questions that
1201 need to be asked in replying to it. Thus, the critical questions can offer guidance as to
1202 where look for weak points that could be challenged. However, there are theoretical
1203 issues of how to structure the critical questions. If critical questions can be modeled
1204 in the argument diagrams as additional premises, ordinary premises, assumptions, or
1205 exceptions such as done in Carneades or ASPIC+, they can be modeled in argument
1206 maps as undercutting or rebutting counterarguments. The problem that always arises
1207 in attempts to fit critical questions into argument diagrams in this manner is one
1208 of burden of proof. Is merely asking a critical question enough to defeat a given
1209 argument? Or should a critical question be taken to defeat the given argument only if
1210 some evidence is given to back it up. Carneades or ASPIC+ provides a way of dealing
1211 with this problem that has been shown to be applicable to interpretative schemes.

1212 The danger with using such schemes to construct hypotheses about the best inter-
1213 pretation is one of jumping to a conclusion too quickly. This danger can be overcome
1214 by asking critical questions matching the scheme and by considering possible objec-
1215 tions to the argument fitting an interpretive scheme. For as we have seen in the
1216 example, a sequence of argumentation based on the application of interpretive argu-
1217 mentation schemes is defeasible and can be attacked by undercutters and rebutters
1218 in an opposed sequence of argumentation. Indeed, it is this very situation of one
1219 sequence of interpretive argumentation being used to attack another one that is char-
1220 acteristic of the example we studied, a standard example of statutory interpretation.

1221 We have also provided a fresh logical formalization of reasoning with interpretive
1222 canons. Rather than modeling interpretive conclusion as deontic claims, as we did
1223 in Sartor et al. (2014), here we have modeled them as conceptual (terminological)
1224 claims concerning best interpretations.

1225 We have then considered how interpretive arguments can be framed within argu-
1226 mentation systems, including defeasible and strict rules. We have argued that a seman-
1227 tics based on preferred extensions can provide an appropriate approach to interpre-
1228 tive conclusions and can be used to distinguish between defensible and justifiable
1229 interpretive claims. Regarding justification, we have argued for weak justifiability
1230 (derivation in all extensions, also through different argument) to be more appropriate
1231 to interpretive reasoning in legal contexts.

This work still is quite preliminary, but necessarily so, since AI and law research has neglected issues pertaining to statutory interpretation and more generally the issue of determining the correct meaning of authoritative sources of the law. Further research should include a more refined classification system for interpretative schemes. Also, the idea of merging argumentation with deontic logic as advanced in Sartor et al. (2014), Walton et al. (2014) needs to be reconsidered and integrated with the different framework presented in this chapter.

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References

- Alexy, R., and R. Dreier. 1991. Statutory interpretation in the federal republic of Germany. In *Interpreting statutes. A comparative study*, ed. N. MacCormick, and R. Summers. Aldershot: Dartmouth.
- Araszkiewicz, M. 2013. Towards systematic research on statutory interpretation in ai and law. In *Proceedings of JURIX 2014: The 27th annual conference on legal knowledge and information systems*, ed. R. Hoekstra, 15–24. Amsterdam: IOS Press.
- Atlas, J.D. 2005. *Logic, meaning, and conversation*. Oxford: Oxford University Press.
- Atlas, J.D. 2008. Presupposition. In *The handbook of pragmatics*, ed. L. Horn, and G. Ward, 29–52. Oxford: Blackwell.
- Atlas, J.D., and S. Levinson. 1981. It-clefts, Informativeness and logical form: Radical pragmatics (Revised Standard Version). In *Radical Pragmatics*, ed. P. Cole, 1–62. New York: Academic Press.
- Bezuidenhout, A. 1997. Pragmatics, semantic undetermination and the referential/attributive distinction. *Mind* 423: 375–409.
- Butler, B. 2016. Law and the primacy of pragmatics. In *Pragmatics and law: Philosophical perspectives*, ed. A. Capone, and F. Poggi, 1–13. Cham: Springer.
- Carston, R. 2002. *Thoughts and utterances: The pragmatics of explicit communication*. Oxford: Blackwell.
- Carston, R. 2013. Legal texts and canons of construction: A view from current pragmatic theory. In *Law and language: Current legal issues*, vol. 15, ed. M. Freeman, and F. Smith, 8–33. Oxford: Oxford University Press.
- Cross, R. 2005. *Statutory interpretation*, ed. J. Bell, and G. Engle. Oxford: Oxford University Press.
- Damele, G. 2014. Analogia legis and analogia Iuris: An overview from a rhetorical perspective. In *Systematic approaches to argument by analogy*, ed. H. Ribeiro, 243–256. Amsterdam: Springer.
- Dascal, M. 2003. *Interpretation and understanding*. Amsterdam: John Benjamins Publishing Company.
- Dascal, M., and J. Wróblewski. 1988. Transparency and doubt: Understanding and interpretation in pragmatics and in law. *Law and Philosophy* 72: 203–224.
- Gizbert-Studnicki, T. 1990. the burden of argumentation in legal disputes. *Ratio Juris* 31: 118–129.
- Gordon, T. 2010. An overview of the carneades argumentation support system. In *Dialectics, dialogue and argumentation. An examination of douglas Walton's theories of reasoning and argument*, ed. C. Reed, and C. Tindale, 145–156. London: College Publications.

- 1276 Gordon, T., and D. Walton. 2009a. Legal reasoning with argumentation schemes. In *Proceedings*
1277 *of the 12th international conference on artificial intelligence and law*, ed. C. D. Hafner, 137–46,
1278 New York: ACM.
- 1279 Gordon, T., and D. Walton. 2009b. Proof Burdens and Standards. In *Argumentation in artificial*
1280 *intelligence*, ed. I. Rahwan, and G. Simari, 239–258. Berlin: Springer.
- 1281 Gordon, T., and D. Walton. 2011. A formal model of legal proof standards and burdens. In *7th*
1282 *Conference on argumentation of the international society for the study of argumentation (ISSA*
1283 *2010)*, ed. F. van Eemeren, B. Garssen, A. Blair, and G. Mitchell, 644–655. Amsterdam: Sic Sat.
- 1284 Gray, C.B. 2013. *The philosophy of law: An encyclopedia*, Vol. I–II. London and New York: Rout-
1285 ledge.
- 1286 Hage, J. 1996. A theory of legal reasoning and a logic to match. *Artificial Intelligence and Law* 4:
1287 199–273.
- 1288 Hage, J. 1997. *Reasoning with rules*. Dordrecht: Kluwer.
- 1289 Horn, L. 1995. Vehicles of meaning: Unconventional semantics and unbearable interpretation.
1290 *Washington University Law Quarterly* 73: 1145–1152.
- 1291 Jaszczołt, K. 2005. *Default semantics*. Oxford: Oxford University Press.
- 1292 Kecske, I. 2008. Dueling contexts: A dynamic model of meaning. *Journal of Pragmatics* 3:
1293 385–406.
- 1294 Kecske, I. 2013. *Intercultural pragmatics*. Oxford: Oxford University Press.
- 1295 Kecske, I., and F. Zhang. 2009. Activating, seeking, and creating common ground: A socio-
1296 cognitive approach. *Pragmatics and Cognition* 2: 331–355.
- 1297 Macagno, F. 2015. A means-end classification of argumentation schemes. In *Reflections on the-*
1298 *oretical issues in argumentation theory*, ed. F. van Eemeren, and B. Garssen, 183–201. Cham:
1299 Springer.
- 1300 Macagno, F. 2017. Defaults and inferences in interpretation. *Journal of Pragmatics* 117: 280–290.
- 1301 Macagno, F., and A. Capone. 2016. Interpretative disputes, explicatures, and argumentative reason-
1302 ing. *Argumentation* 4: 399–422.
- 1303 Macagno, F., G. Sartor, and D. Walton. 2012. Argumentation schemes for statutory interpretation.
1304 In *Argumentation 2012. International conference on alternative methods of argumentation in*
1305 *law*, eds. J. Šavelka, M. Araszkiewicz, M. Myška, T. Smejkalová, and M. Škop, 63–75. Brno:
1306 Masarykova univerzita.
- 1307 Macagno, F., and D. Walton. 2011. Reasoning from paradigms and negative Evidence. *Pragmatics*
1308 *and Cognition* 1: 92–116.
- 1309 Macagno, F., and D. Walton. 2014. *Emotive language in argumentation*. Cambridge: Cambridge
1310 University Press.
- 1311 Macagno, F., and D. Walton. 2015. Classifying the patterns of natural arguments. *Philosophy and*
1312 *Rhetoric* 1: 26–53.
- 1313 Macagno, F., and D. Walton. 2017. Arguments of statutory interpretation and argumentation
1314 schemes. *International Journal of Legal Discourse* 1: 47–83.
- 1315 Macagno, F., D. Walton, and G. Sartor. 2018. Pragmatic maxims and presumptions in legal inter-
1316 pretation. *Law and Philosophy*. 37(1): 69–115. <https://doi.org/10.1007/s10982-017-9306-4>.
- 1317 MacCormick, N. 2005. *Rhetoric and the rule of law*. Oxford: Oxford University Press.
- 1318 MacCormick, N., and R. Summers (eds.). 1991. *Interpreting statutes: A comparative study*. Dart-
1319 mouth: Aldershot.
- 1320 Miller, G. 1990. Pragmatics and the maxims of interpretation. *Wisconsin Law Review*: 1179–227.
- 1321 Pollock, J. 1995. *Cognitive carpentry*. Cambridge, MA: MIT Press.
- 1322 Prakken, H. 2010. An abstract framework for argumentation with structured arguments. *Argument*
1323 *and Computation* 2: 93–124.
- 1324 Prakken, H., and G. Sartor. 1996. A dialectical model of assessing conflicting arguments in legal
1325 reasoning. *Artificial Intelligence and Law* 4: 331–368.
- 1326 Reiter, R. 1980. A Logic for default reasoning. *Artificial Intelligence* 1–2: 81–132.

- 1327 Rotolo, A., G. Governatori, and G. Sartor. 2015. Deontic defeasible reasoning in legal interpreta-
1328 tion: Two options for modelling interpretive arguments. In *Proceedings of the 15th international*
1329 *conference on artificial intelligence and law*, 99–108, New York, ACM.
- 1330 Sartor, G., D. Walton, F. Macagno, and A. Rotolo. 2014. Argumentation schemes for statutory
1331 interpretation: A logical analysis. In *Frontiers in artificial intelligence and applications*, ed. R.
1332 Hoekstra, 11–20. Amsterdam: IOS Press.
- 1333 Schauer, F. 1987. Precedent. *Stanford Law Review* 39: 571–605.
- 1334 Sinclair, M. 1985. Law and language: The role of pragmatics in statutory interpretation. *University*
1335 *of Pittsburgh Law Review* 46: 373–420.
- 1336 Smolka, J., and B. Pirker. 2016. International law and pragmatics. An account of interpretation in
1337 international law. *International Journal of Language and Law* 5: 1–40.
- 1338 Soames, S. 2008. *Philosophical Essays, vol. I. Natural language: What it means and how we use*
1339 *it*. Princeton: Princeton University Press.
- 1340 Sperber, D., and D. Wilson. 1986. *Relevance: Communication and cognition*. Oxford: Blackwell.
- 1341 Tarello, G. 1980. *L'interpretazione della legge*. Milan: Giuffrè.
- 1342 Verheij, B. 2008. About the logical relations between cases and rules. In *Legal Knowledge and*
1343 *information systems. JURIX 2008: The 21th annual conference*, ed. E. Francesconi, G. Sartor,
1344 and D. Tiscornia, 21–32. Amsterdam: IOS Press.
- 1345 Walton, D. 1995. *Argumentation schemes for presumptive reasoning*. Mahwah, N.J.: Routledge.
- 1346 Walton, D. 2004. *Abductive reasoning*. Tuscaloosa: University of Alabama Press.
- 1347 Walton, D. 2010. Similarity, precedent and argument from analogy. *Artificial Intelligence and Law*
1348 3: 217–246.
- 1349 Walton, D. 2015. *Goal-based reasoning for argumentation*. Cambridge: Cambridge University
1350 Press.
- 1351 Walton, D., and T. Gordon. 2005. Critical questions in computational models of legal argument.
1352 In *Argumentation in artificial intelligence and law, IAAIL workshop series*, ed. P. Dunne, and T.
1353 Bench-Capon, 103–111. Nijmegen: Wolf Legal Publishers.
- 1354 Walton, D., F. Macagno, and G. Sartor. 2014. Interpretative argumentation schemes. In *JURIX 2014:*
1355 *The 27th annual conference*, ed. R. Hoekstra, 21–22. New York: IOS Press.
- 1356 Walton, D., C. Reed, and F. Macagno. 2008. *Argumentation schemes*. New York: Cambridge Uni-
1357 versity Press.
- 1358 Wilson, D. 2005. New directions for research on pragmatics and modularity. *Lingua* 8: 1129–1146.
- 1359 Wilson, D., and D. Sperber. 2004. Relevance theory. In *Handbook of pragmatics*, ed. L. Horn, and
1360 G. Ward, 607–632. Oxford: Blackwell.