Defeasibility in the law

Giovanni Sartor

EUI - European University Institute of Florence
CIRSFID - Faculty of law, University of Bologna

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Defeasible rules in complex systems

A defeasible process can be characterised a mechanism which responds to its normal inputs with certain default outcomes, but that may fails to respond in this way when the input is accompanied by certain additional exceptional elements.
Default hierarchy:

- A default hierarchy has many fewer rules than a set of rules in which each rule is designed to respond to a fully specified situation.
- A higher-level rule [. . .] is easier to discover (because there are fewer alternatives) and it is typically tested more often (because the rule's condition is more frequently satisfied.
- The hierarchy can be developed level by level as experience accumulates (Holland 2012,122).

Defeasibility as nonmonotonicity

"Defeasible inference relies on absence of information as well as its presence, often mediated by rules of the general form: given P, conclude Q unless there is information to the contrary." (Horty 2001,337).
Monotonic and conclusive inference:

- Deduction is monotonic-conclusive: as long as we accept all premises of a deductive inference, we must continue to accept its conclusion.
- By contrast, defeasible inferences are nonmonotonic-presumptive: when given additional information we may reject the conclusion of a defeasible inference while maintaining all of its premises

The standard example

- Tweety is a bird [therefore it flies],
- But it is a penguin, therefore it does not fly.

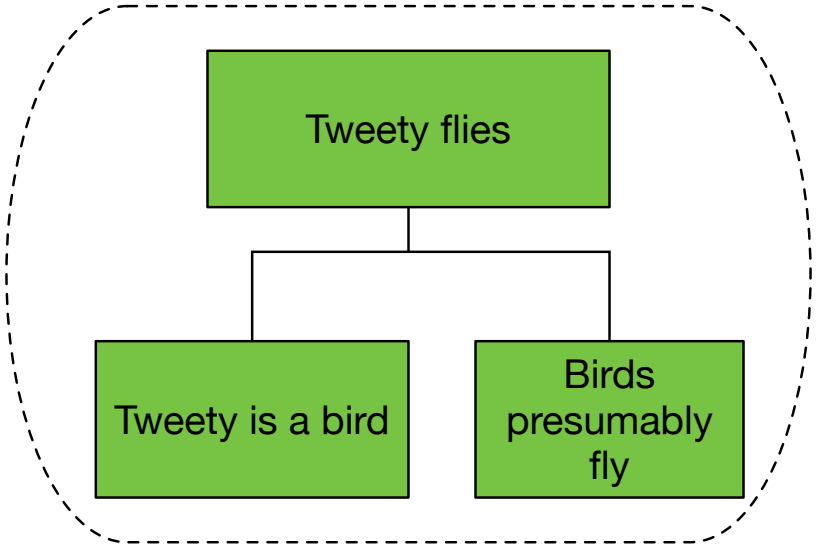


Figure 1: The Tweety case: he is a bird

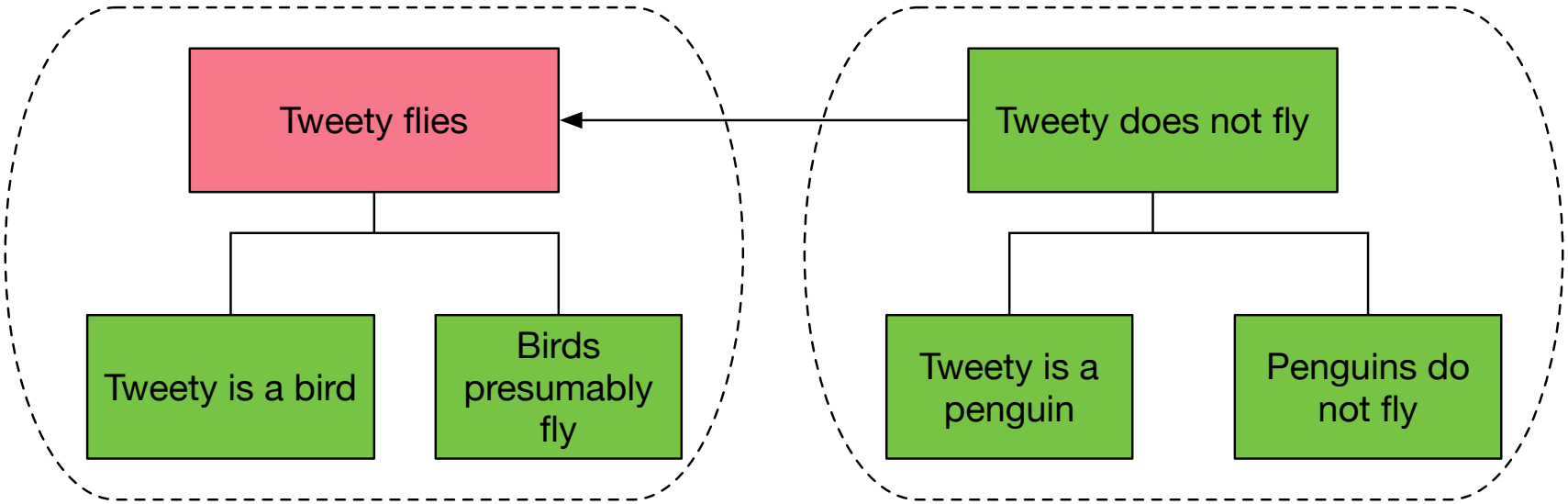


Figure 2: The Tweety Case: but he is a penguin

Conclusive and defeasible arguments

- A *valid argument* can be said to consist of three elements: a set of premises, a conclusion, and a support relation between premises and conclusion.
- In a *deductively valid argument,* the premises provide *conclusive* support for the conclusion: if we accept the premises we must necessarily accept the conclusion.
- In a *defeasibly valid argument* , the premises only provide *presumptive* support for the conclusion: if we accept the premises we should also accept the conclusion, but only so long as we do not have prevailing arguments to the contrary.

Enthymemes and satured inferences

- Arguments in natural language usually have an *enthymematic* form, meaning that they may omit some of the premises that are needed to support their conclusions.
- Here I shall present all arguments in their saturated (completed) form, that is, as including all premises that are sufficient to conclusively or defeasibly establish their conclusion.

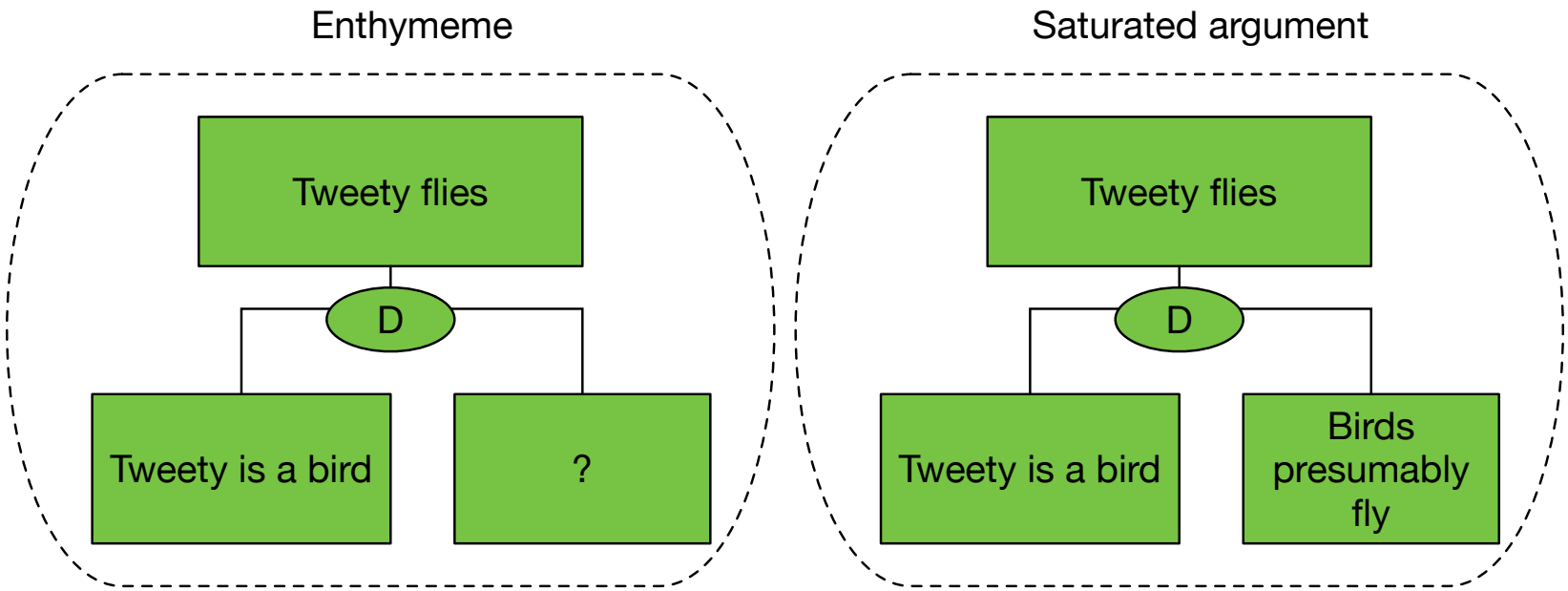


Figure 3: Enthymeme and saturated argument

Defeasible modus ponens

Each elementary defeasible argument includes (a) a set of antecedent conditions, and (b) a defeasible conditional, called a *default* , according to which the (conjunction of the) conditions presumably determines the argument's conclusion. Thus a saturated single-step defeasible argument has the form of a defeasible modus ponens inference:

1. $P_1, \cdots, P_n$ (the antecedent conditions), and
2. if P_1 and $\ldots$ and P_n then presumably Q (the default, in formula: $P_1 \wedge \ldots \wedge P_n \Rightarrow Q$.

therefore

3. Q.

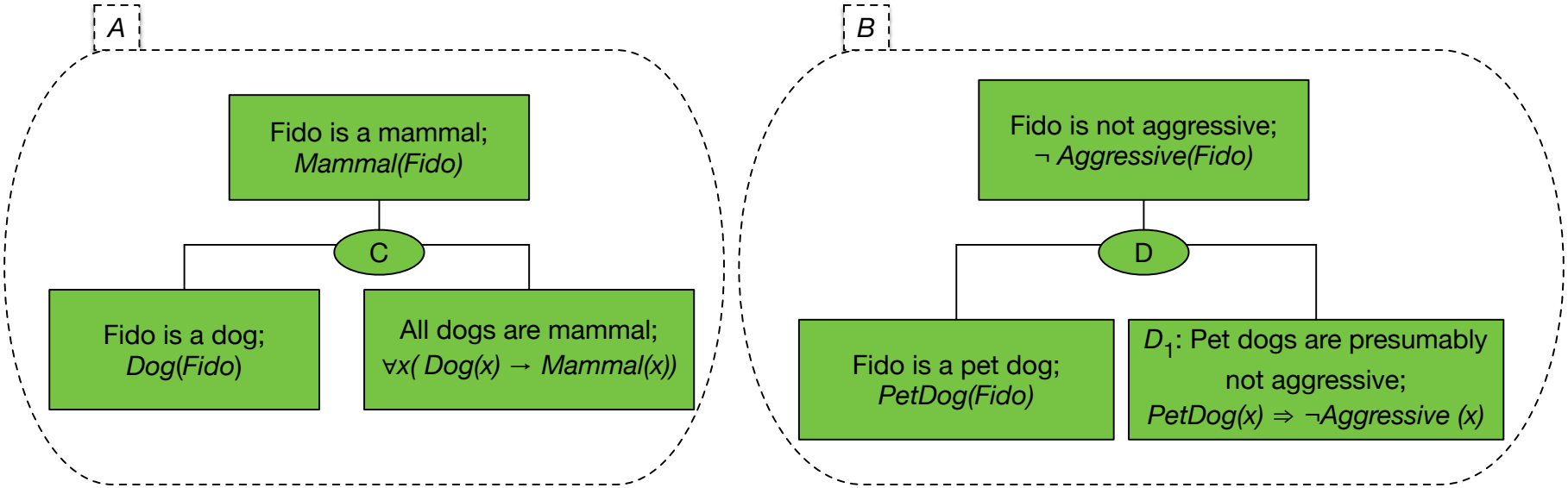


Figure 4: Conclusive and defeasible arguments

Linked and convergent arguments

- A linked argument includes, beside a conditional warrant, more than one premises. None of these premises is sufficient to trigger on its own the conjunctive antecedent of the conditional warrant.
- A convergent argument structure is a combination of multiple arguments, each leading to the same conclusion. Often, but not always a convergent argument structure provides a stronger support to the common conclusion of its component arguments than each of these arguments would do in isolation

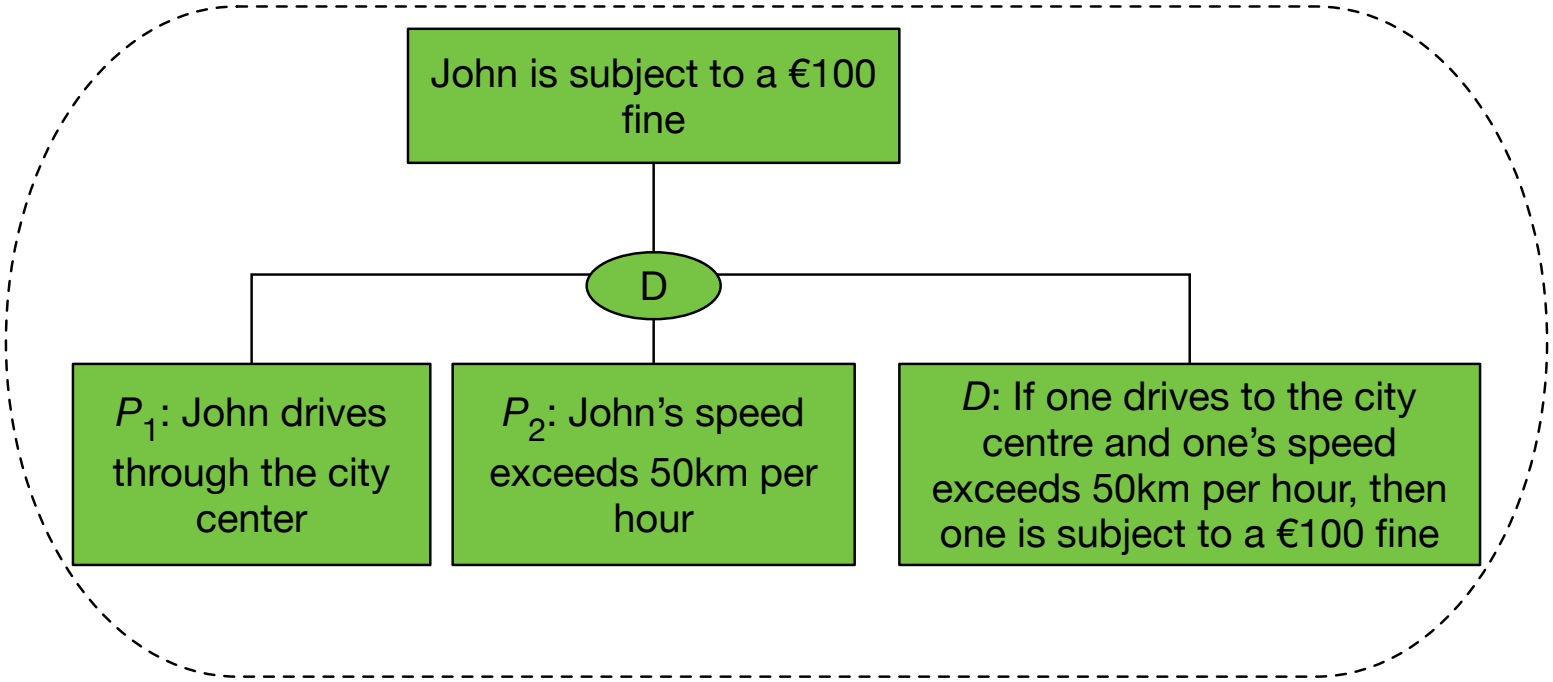


Figure 5: Linked argument

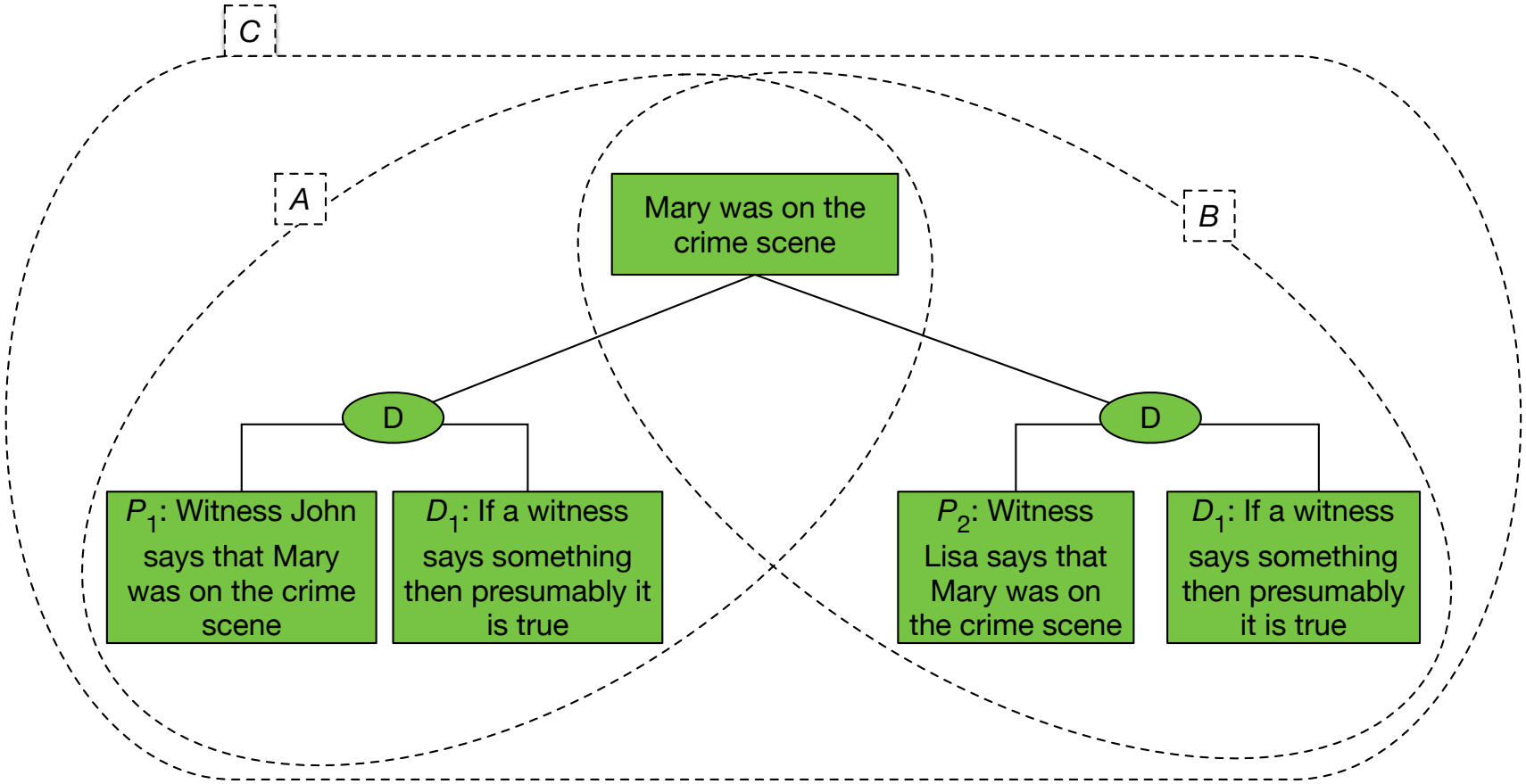


Figure 6: Convergent factual argument

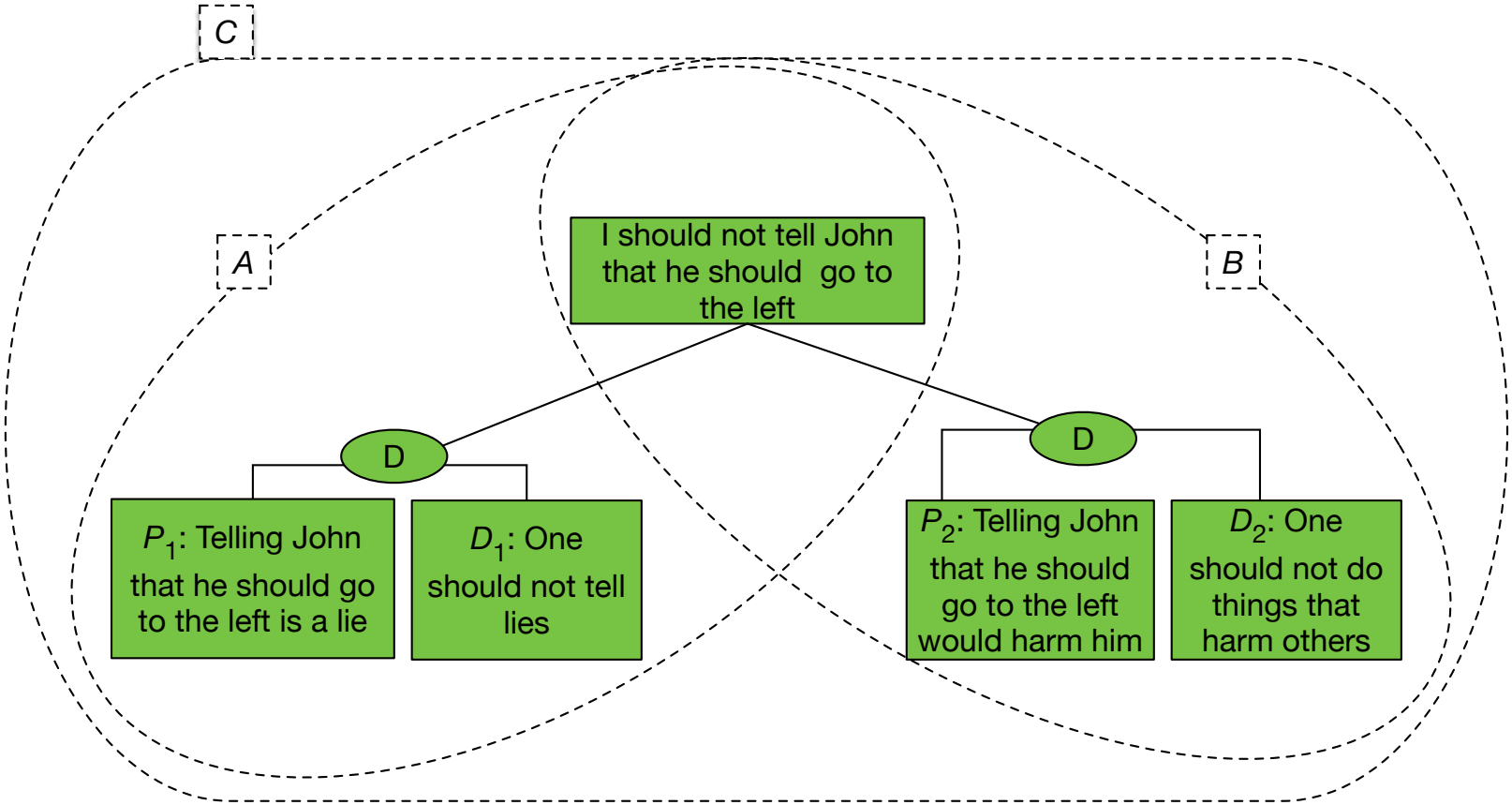


Figure 7: Convergent practical argument

Rebutting and undercutting

An argument can be attacked in any of three ways:

- by attacking its premises,
- by attacking its conclusions (rebutting),
- or by attacking the support relation between premises and conclusions (undercutting)

Defeat

An argument is defeated iff:

- its premises are attacked
- it is rebutted by a stronger argument
- it is undercut by an argument

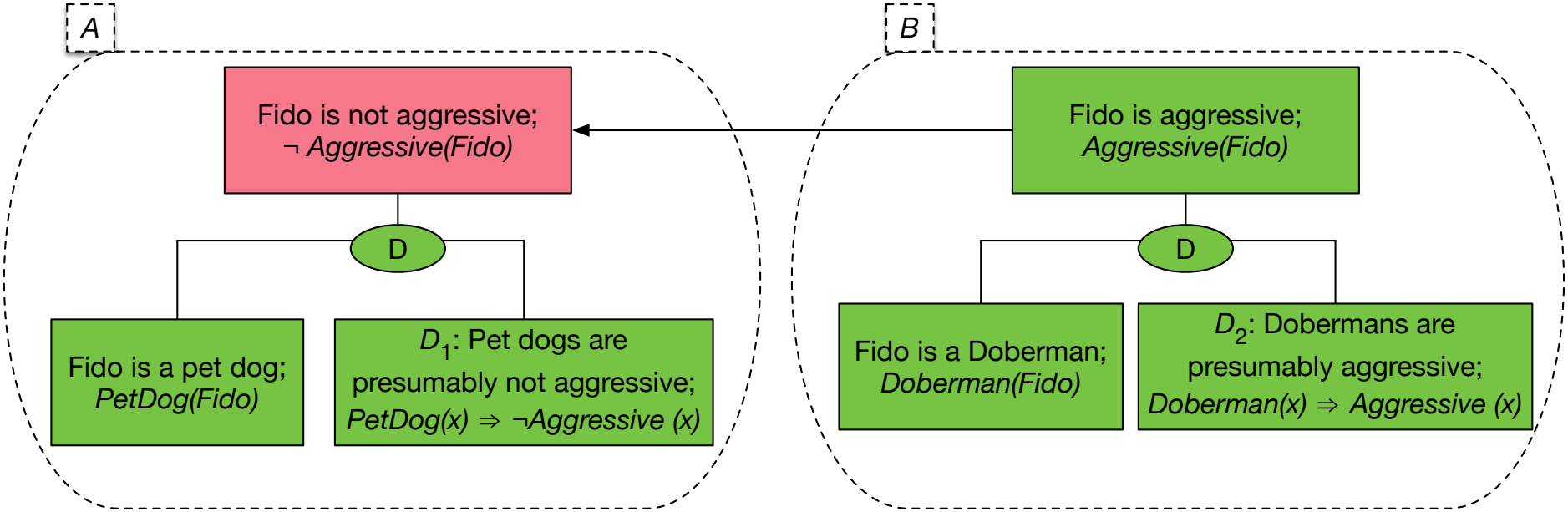


Figure 8: Rebutting attack

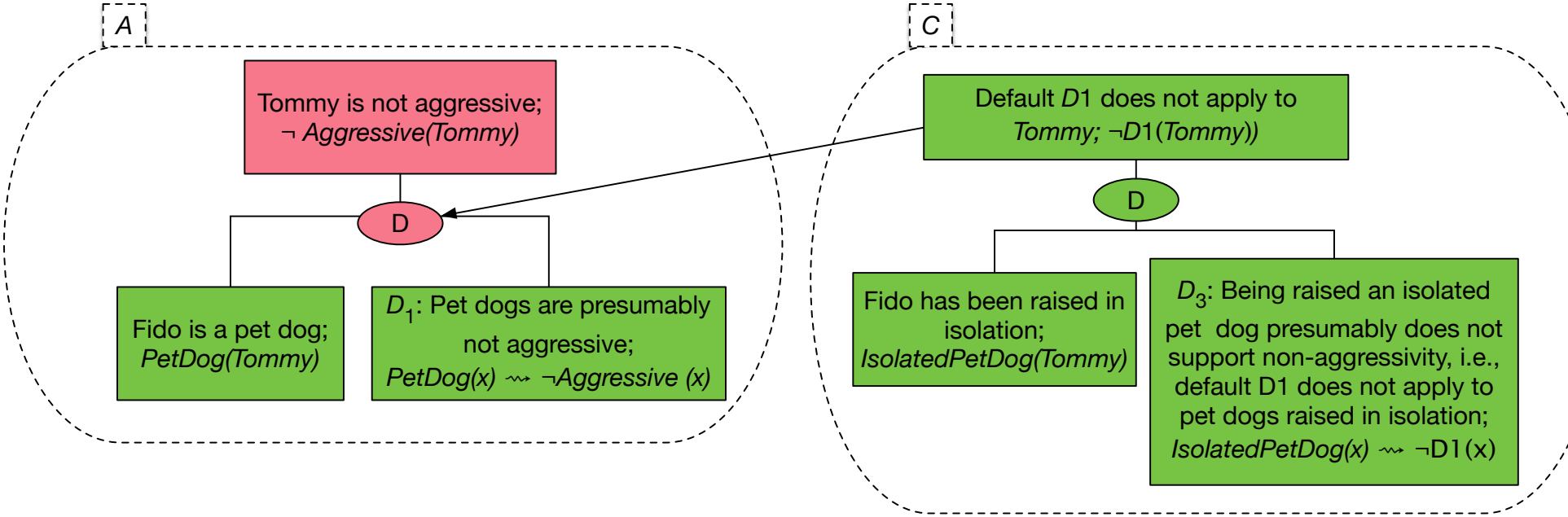


Figure 9: Undercutting attack

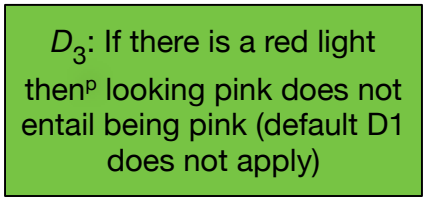


Figure 10: Undercutting attack: defeasible perception

Rebutting and undercutting in the law

Defeat in the law can result from different attacks

- the conclusion of the argument is contradicted by a non-weaker arguments (rebuttal)
- the default (rule) in the argument undercut by an exception
- the default (rule) in the argument is undercut by establishing an impeditive fact.

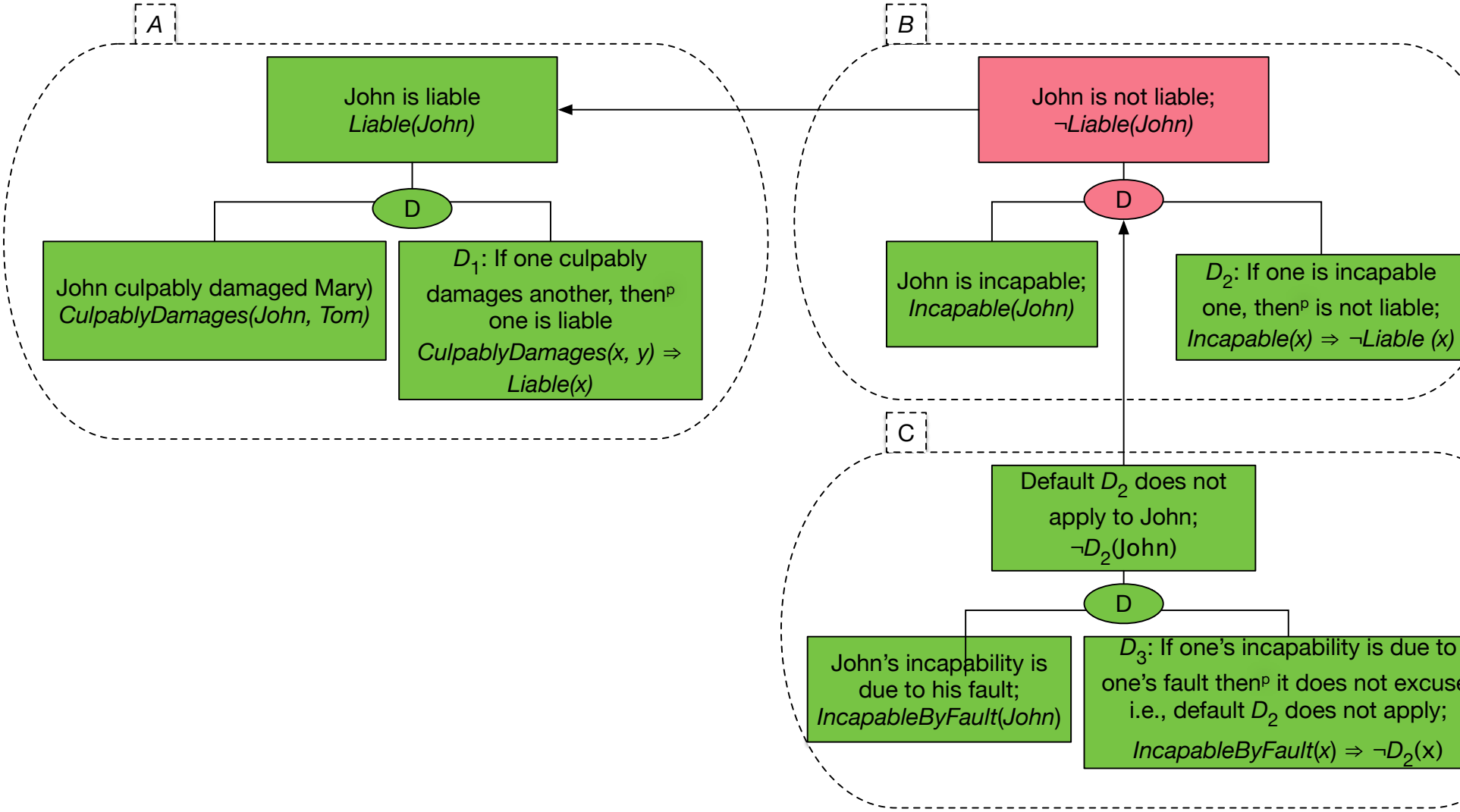


Figure 11: Undercutting attack: inapplicability rule

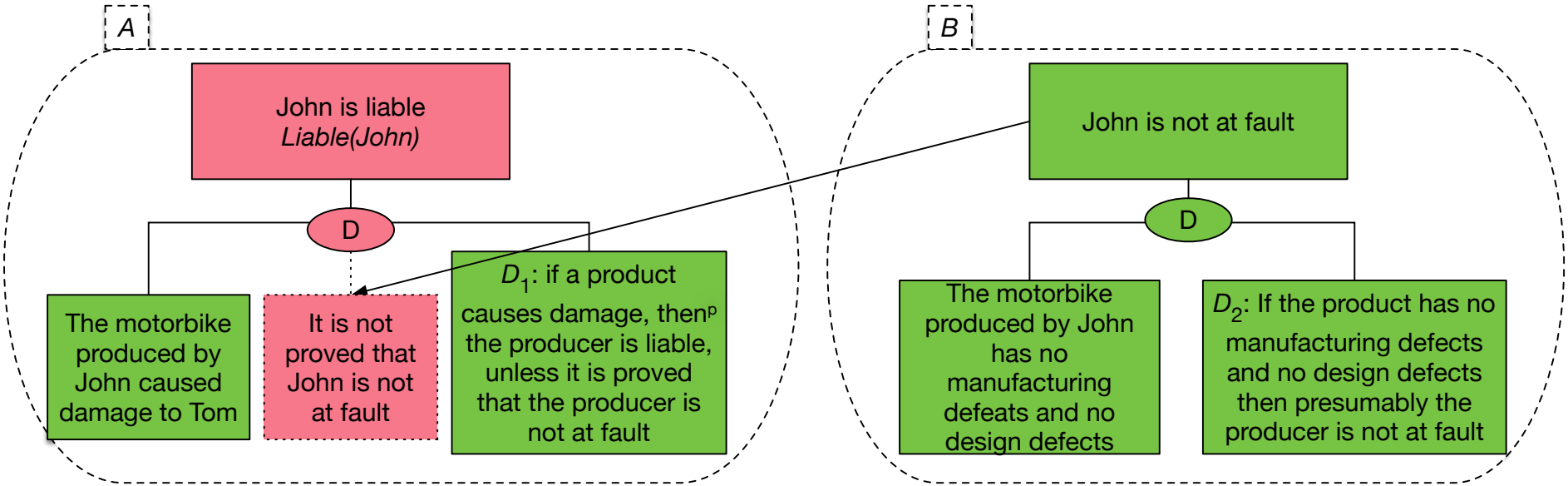


Figure 12: Undercutting attack: impeditive fact

Strict defeat

An argument A strictly defeats argument B iff A defeats B without being defeated by it.

- A rebuts B and it is stronger than B
- A undercuts B

A rebuts B and B rebuts A and none of the two is stronger than the other, then they defeat one another (non-strict defeat)

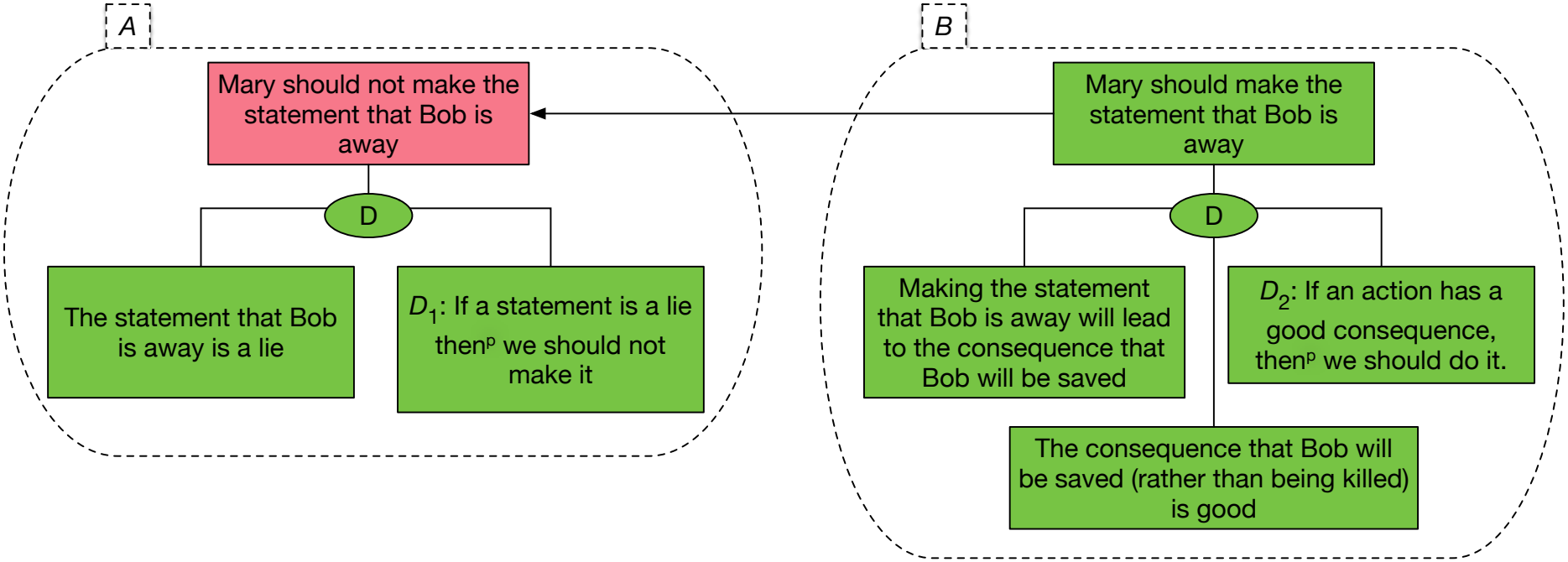


Figure 13: Conflicting arguments: strict defeat

Reinstatement

An argument A that is defeated by a counterargument B can still be acceptable when B is in turn defeated by a further argument C:

- Conditions that an argument should meet to be IN (acceptable) or OUT (inacceptable).
  1. An argument $\mathcal{A}$ is IN iff no argument which defeats $\mathcal{A}$ is IN.
  2. An argument $\mathcal{A}$ is OUT iff an argument which defeats $\mathcal{A}$ is IN.

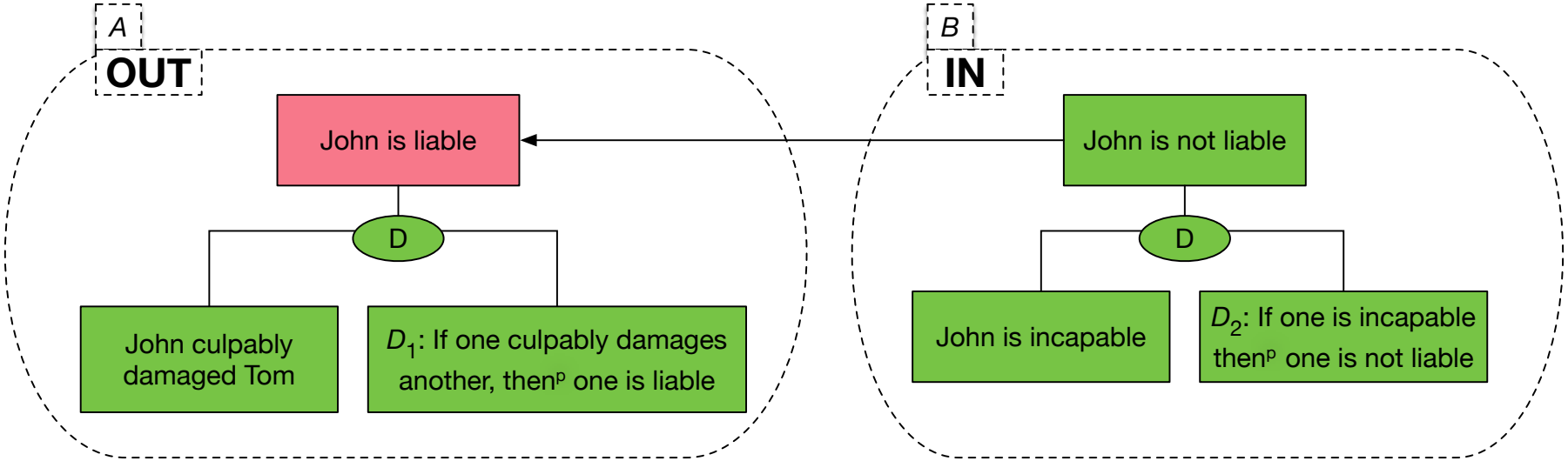
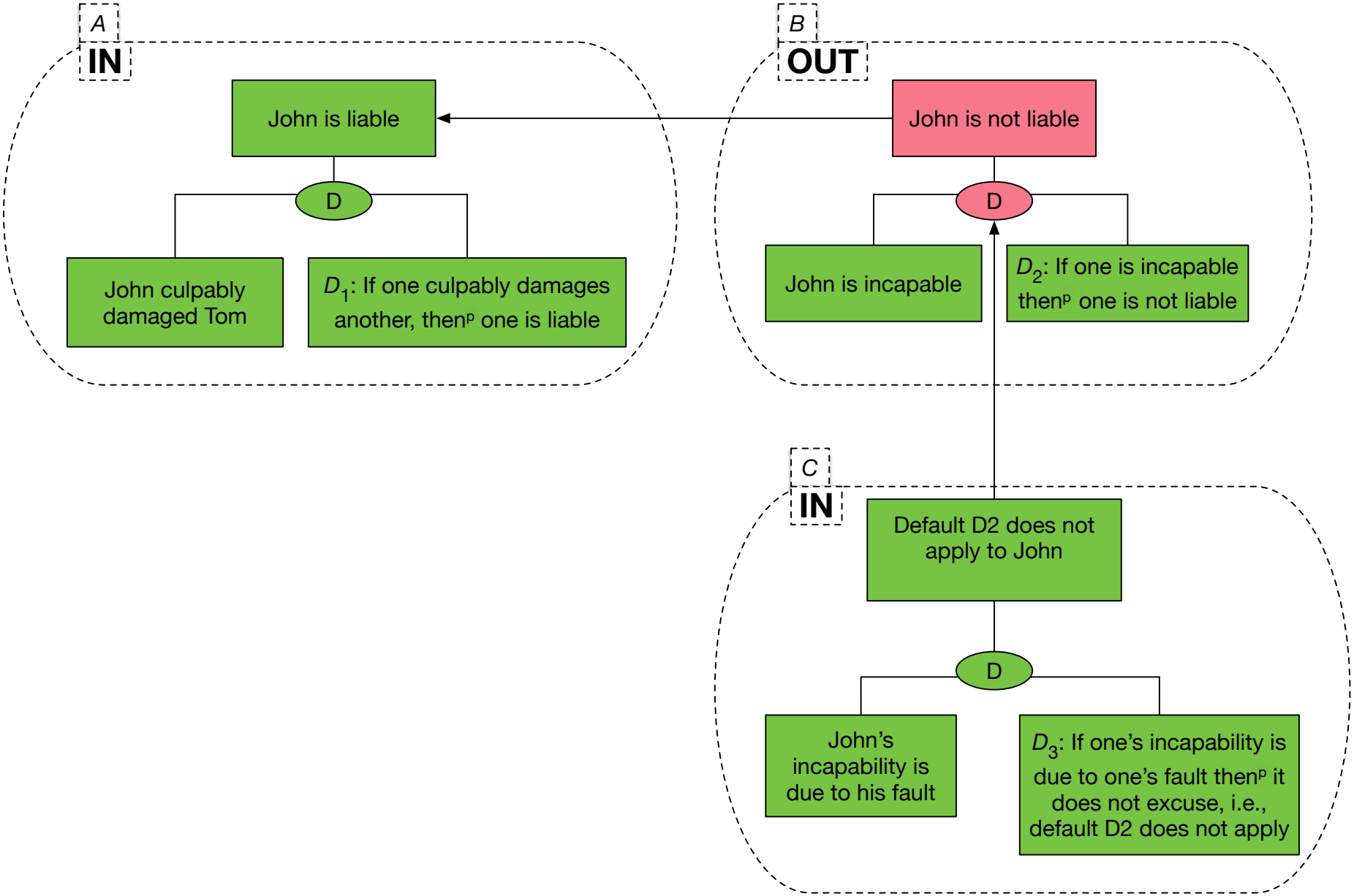


Figure 14: Defeat


A
IN
John is liable
D
John culpably damaged Tom
D_1: If one culpably damages another, then^p one is liable
B
OUT
John is not liable
D
John is incapable
D_2: If one is incapable then^p one is not liable
C
IN
Default D2 does not apply to John
D
John's incapability is due to his fault
D_3: If one's incapability is due to one's fault then^p it does not excuse, i.e., default D2 does not apply

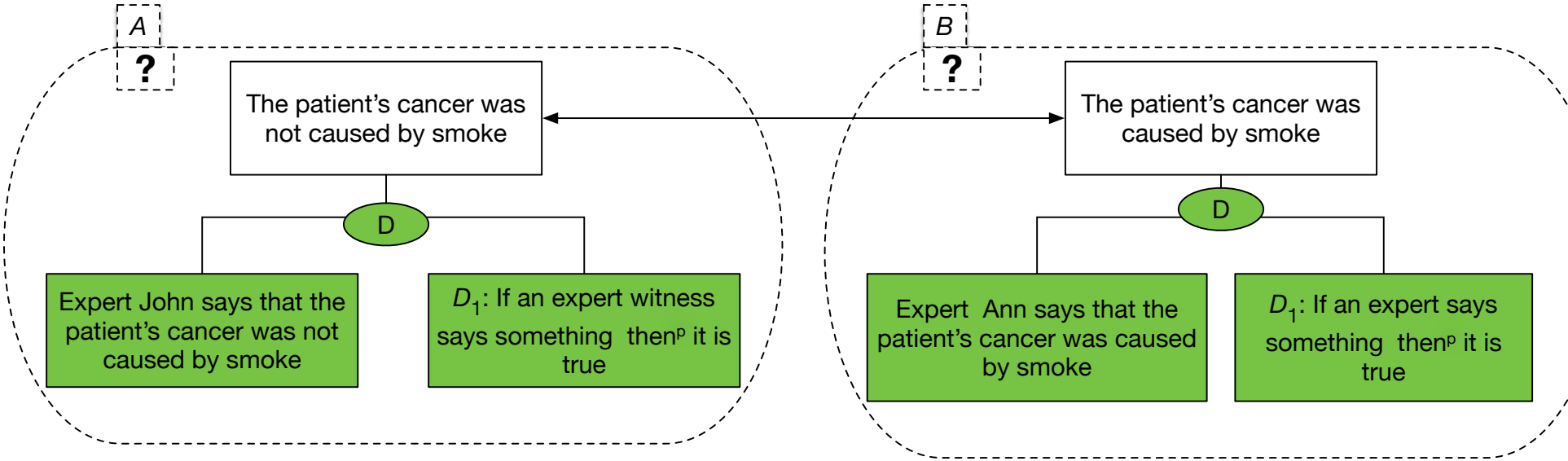


Figure 16: Undecided conflict

Arguments $\mathcal{A}$ and $\mathcal{B}$ defeat each other (and neither of them is OUT on other grounds), then the outcome is undecided: if we assume that $\mathcal{A}$ is IN then $\mathcal{B}$ will be OUT, and if we assume that $\mathcal{B}$

Burden of proof

The conflict between conflicting legal arguments may be decided according to the burden of proof.

- The party (the argument) having the burden of proof looses (is defeated) if it does not meet the burden of persuasion, relatively to the argument to the contrary.
- But if the defeating argument is out, the burden of proof is met.

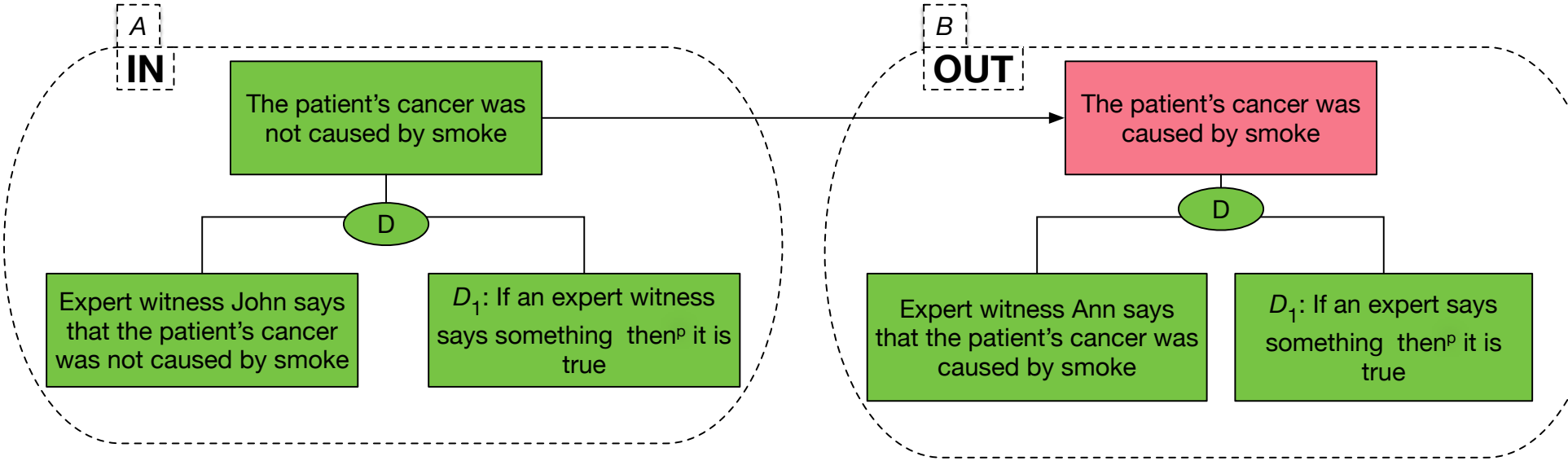


Figure 17: Burden of proof

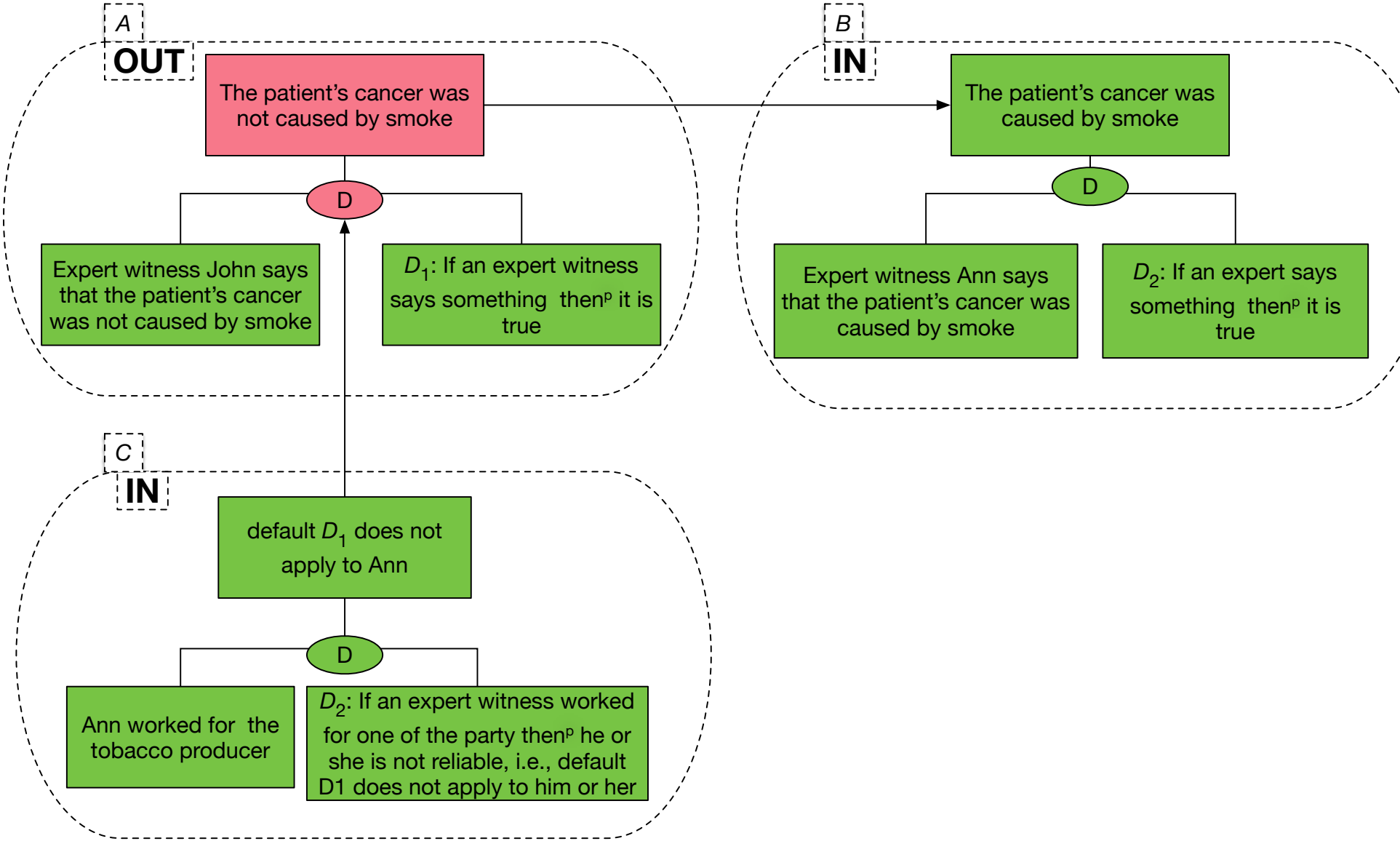


Figure 18: Burden of proof and reinstatement

Dynamic priorities

Priority argument establish the comparative strength of conflicting defaults. They may be based on:

- formal legal principles,i.e., criteria which do not refer to the content of the norms at issue: preference accorded to the more recent laws (*lex posterior derogat legi priori*), to the more specific ones (*lex specialis derogat legi generali*), or to those issued by a higher authority (*lex superior derogat legi inferiori*)
- textual clues, e.g., norms having negative conclusions are usually meant to override previous norms having the corresponding positive conclusions.
- the substantive interests at stake, e.g., assigning priority to the norm that promotes the most important values (legally valuable interests) to a greater extent.

Labellings for dynamic priorities

1. An argument $\mathcal{A}$ or a defeat link d is IN iff no argument which is IN defeats respectively $\mathcal{A}$ or d through a defeat link which is IN.
2. An argument $\mathcal{A}$ or a defeat link d is OUT iff an argument which is IN defeats respectively $\mathcal{A}$ or d through a defeat link which is IN.

We need to specify when a defeat link is defeated: An argument $\mathcal{C}$ defeats the defeat-link d denoting a rebutting attack from $\mathcal{A}$ to $\mathcal{B}$ when $\mathcal{C}$ states that $\mathcal{B}$ prevails over $\mathcal{A}$.

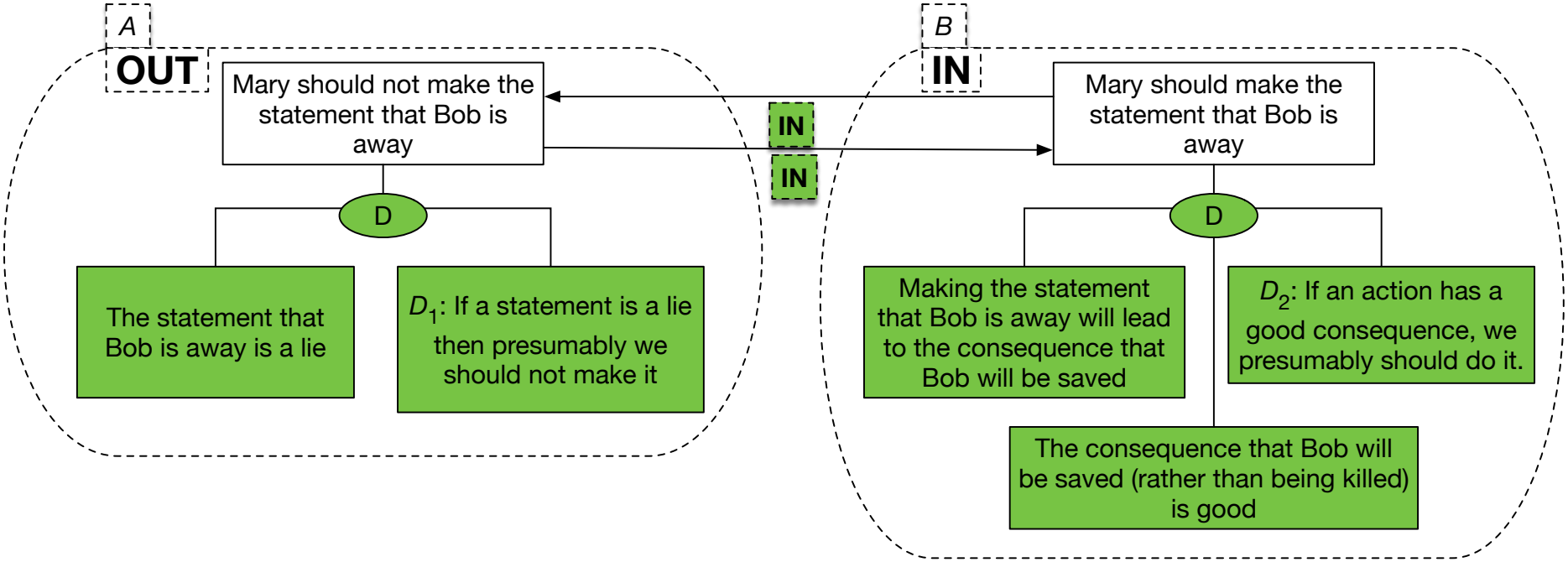
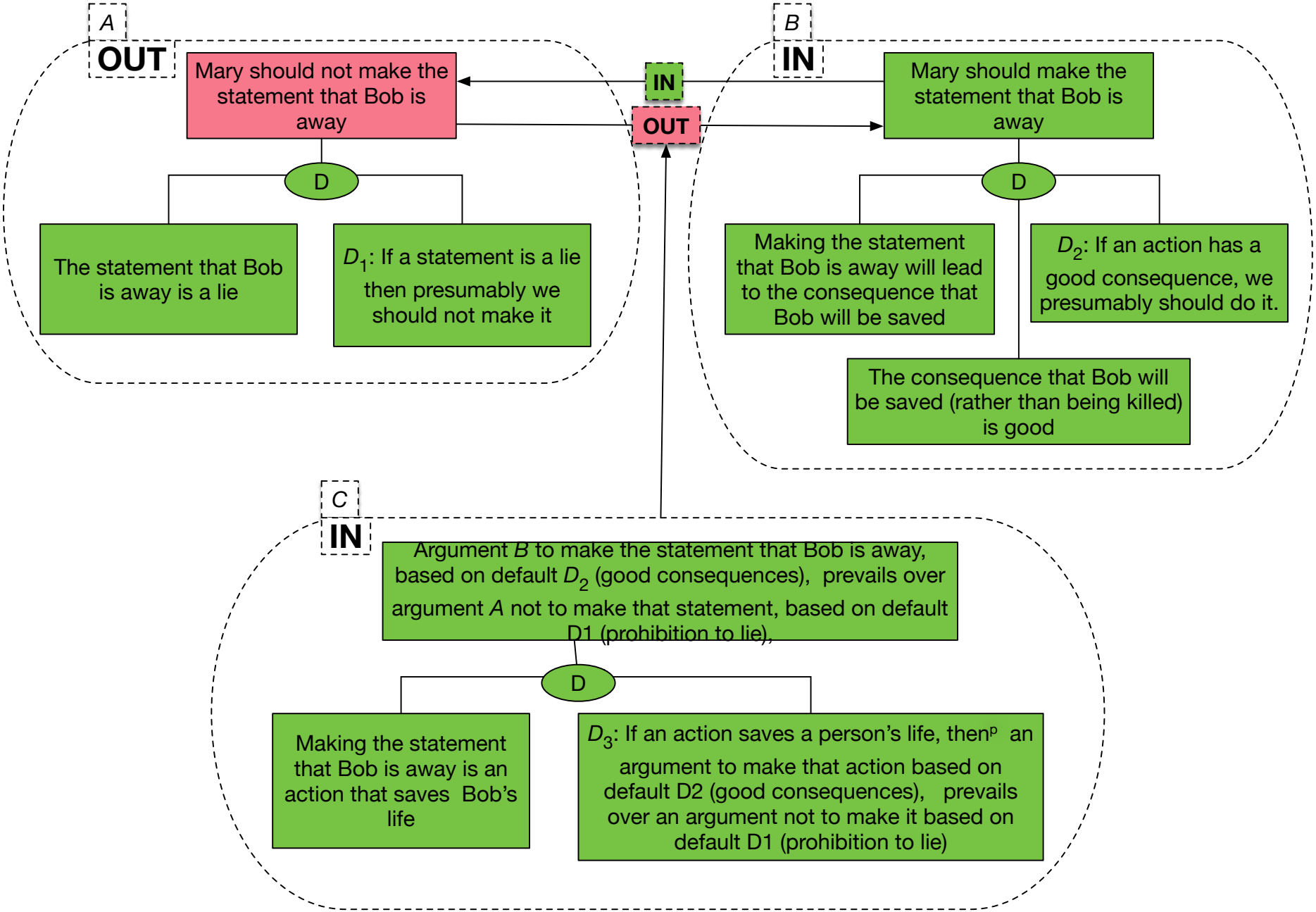


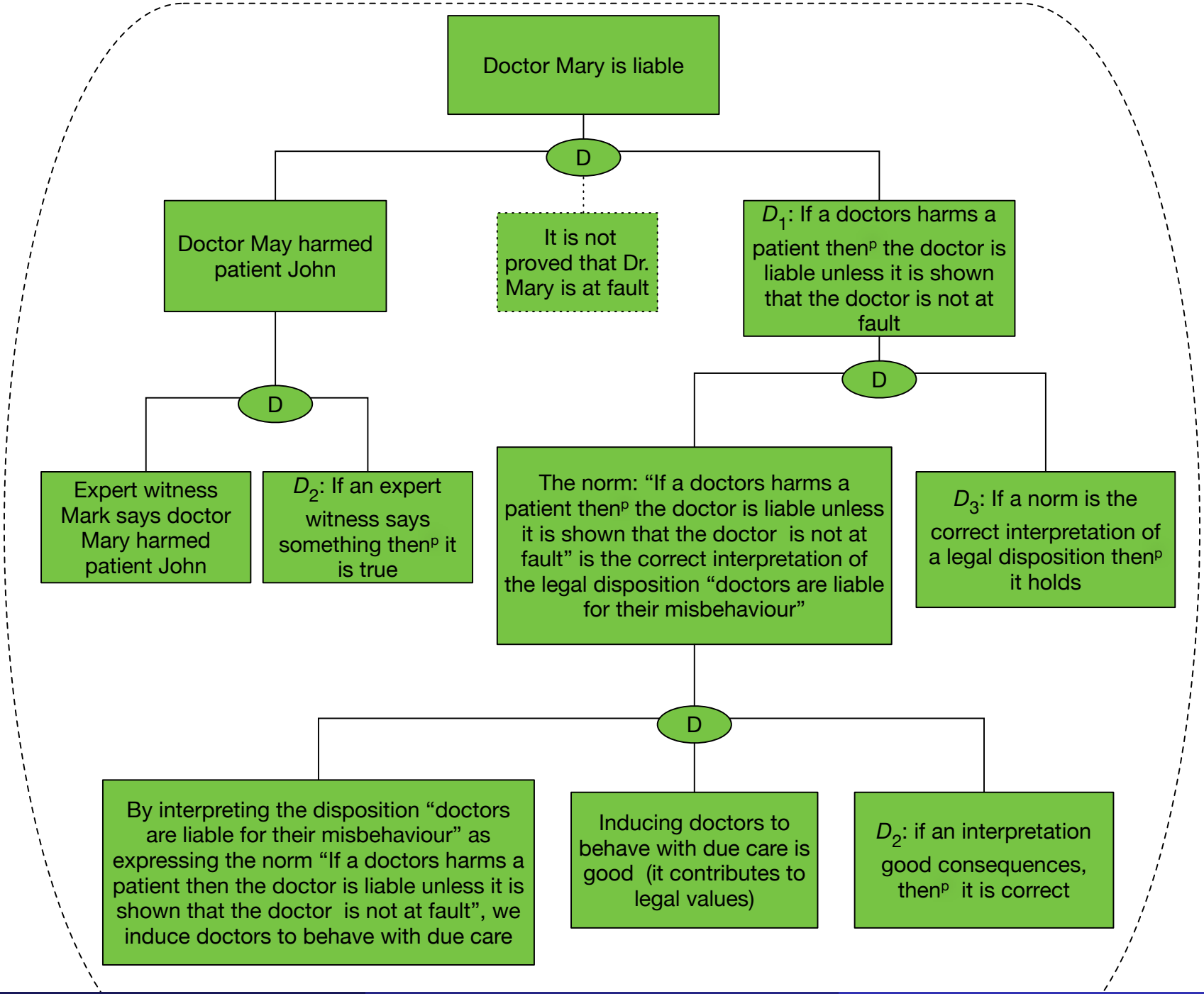
Figure 19: Dynamic priorities


A
OUT
Mary should not make the statement that Bob is away
D
The statement that Bob is away is a lie
D_1: If a statement is a lie then presumably we should not make it
IN
OUT
B
IN
Mary should make the statement that Bob is away
D
Making the statement that Bob is away will lead to the consequence that Bob will be saved
D_2: If an action has a good consequence, we presumably should do it.
The consequence that Bob will be saved (rather than being killed) is good
C
IN
Argument *B* to make the statement that Bob is away, based on default D_2 (good consequences), prevails over argument *A* not to make that statement, based on default D1 (prohibition to lie),
D
Making the statement that Bob is away is an action that saves Bob's life
D_3: If an action saves a person's life, then^p an argument to make that action based on default D2 (good consequences), prevails over an argument not to make it based on default D1 (prohibition to lie)

Multistep Arguments

Legal arguments can include multiple steps:

- the application of rules
- the interpretation of norms
- the determination of facts


Doctor Mary is liable
D
Doctor May harmed patient John
It is not proved that Dr. Mary is at fault
D_1: If a doctors harms a patient then^p the doctor is liable unless it is shown that the doctor is not at fault
D
Expert witness Mark says doctor Mary harmed patient John
D_2: If an expert witness says something then^p it is true
The norm: "If a doctors harms a patient then^p the doctor is liable unless it is shown that the doctor is not at fault" is the correct interpretation of the legal disposition "doctors are liable for their misbehaviour"
D_3: If a norm is the correct interpretation of a legal disposition then^p it holds
D
By interpreting the disposition "doctors are liable for their misbehaviour" as expressing the norm "If a doctors harms a patient then the doctor is liable unless it is shown that the doctor is not at fault", we induce doctors to behave with due care
Inducing doctors to behave with due care is good (it contributes to legal values)
D_2: if an interpretation good consequences, then^p it is correct

Legal systems in the argumentation perspective

- It is an *argumentation basis* of norms + facts, in the sense of a knowledge base (a set of premises) that can be used for constructing an
- *argumentation framework* (a set of interacting arguments) which
- are assessed as *justified, defensible or overruled*
- and identify a set of *justified, defensible and overruled legal conclusion*

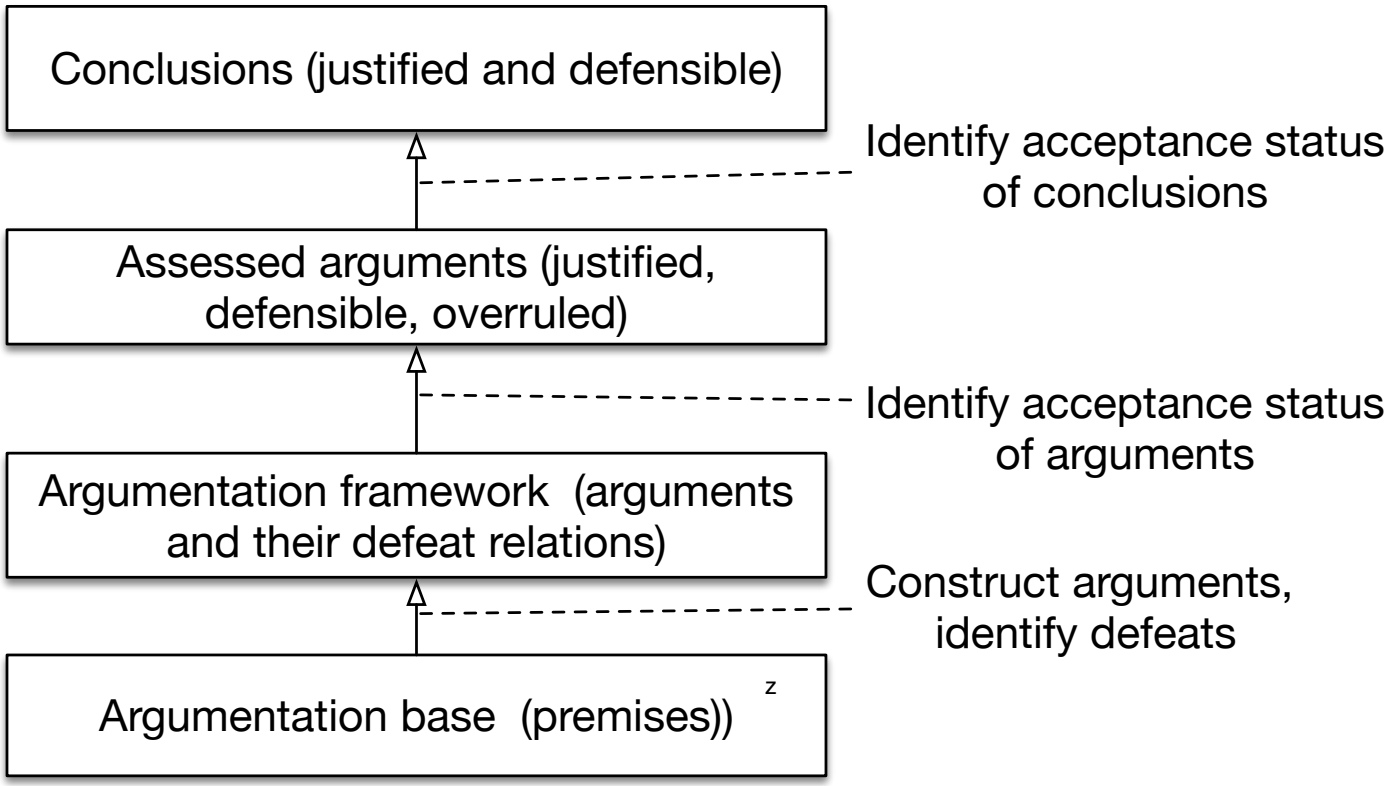


Figure 22: Inferential semantics of an argumentation basis

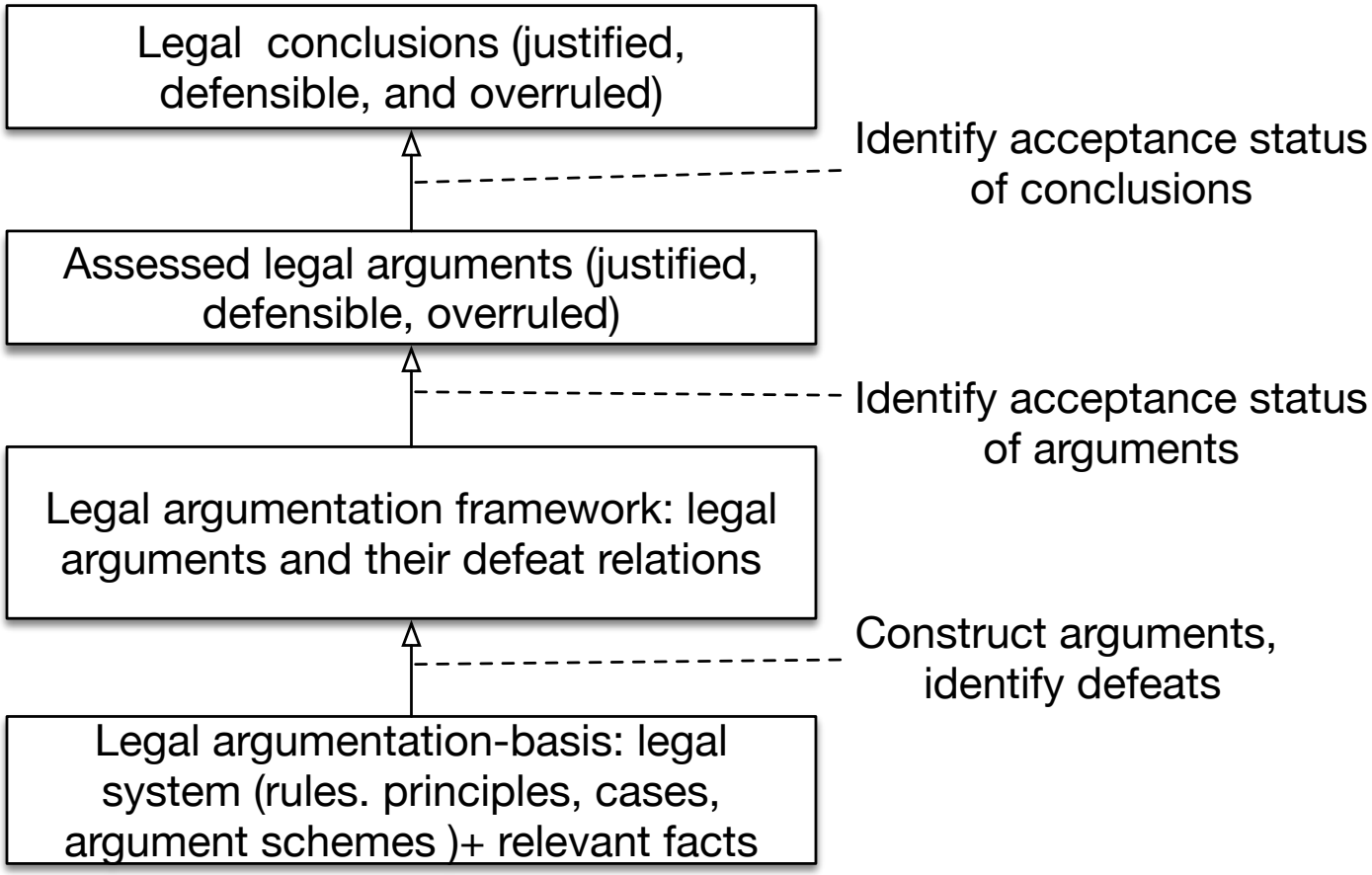


Figure 23: Inferential semantics for the law

A legal argumentation basis

D_1: *If one culpably damages another, one is liable:*
$CulpablyDamages(x, y) \Rightarrow Liable(x)$.
D_2: *If one is incapable, one is not liable:*
$Incapable(x) \Rightarrow \neg Liable\ (x)$.
D_3: *If one's incapability is due to one's fault, then it does not excuse, i.e., default D_2 does not apply:*
$IncapableByFault(x) \Rightarrow \neg D_2(x)$.

The three factual propositions (possible operative facts) that match the antecedents of these three rules are the following:

P_1: *John culpably damages Tom:* $CulpablyDamages(John, Tom.$
P_2: *John was incapable:* $Incapable(John)$.
P_3: *John's incapability is due to his fault:*
$IncapableByFault(John)$.

By expanding D_1, D_2, D_3 with P_1, P_2, or P_3 we obtain different argumentation bases.

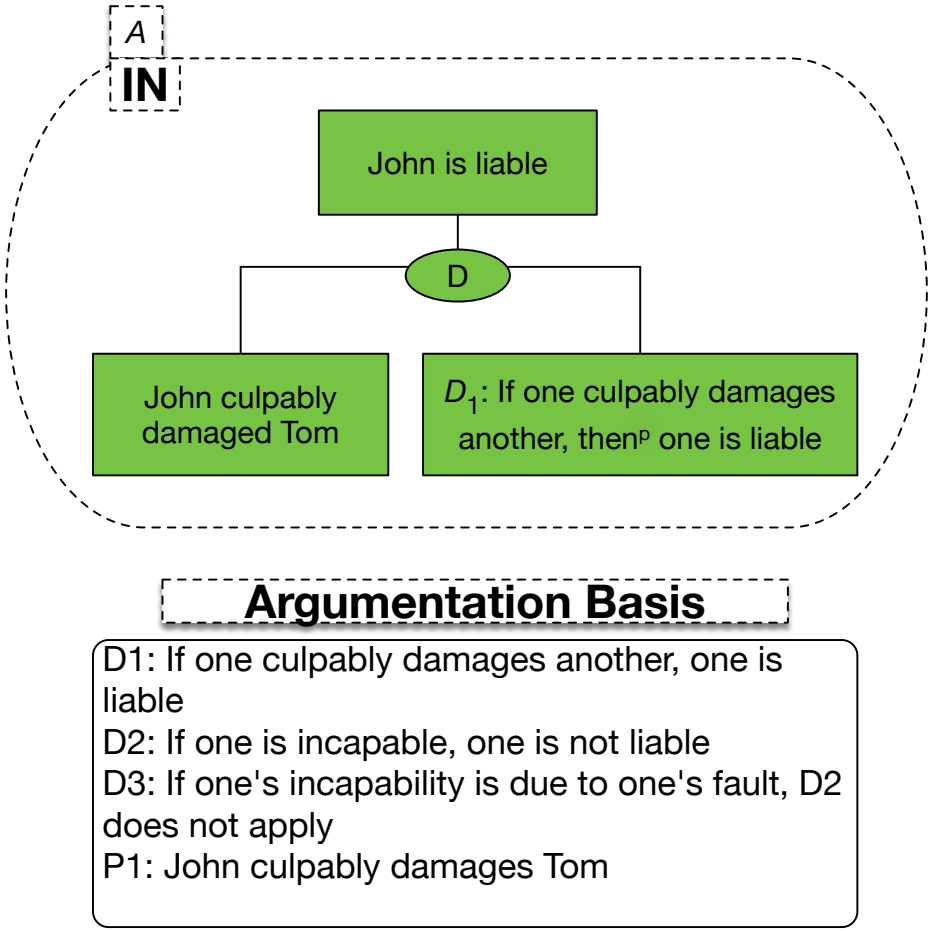
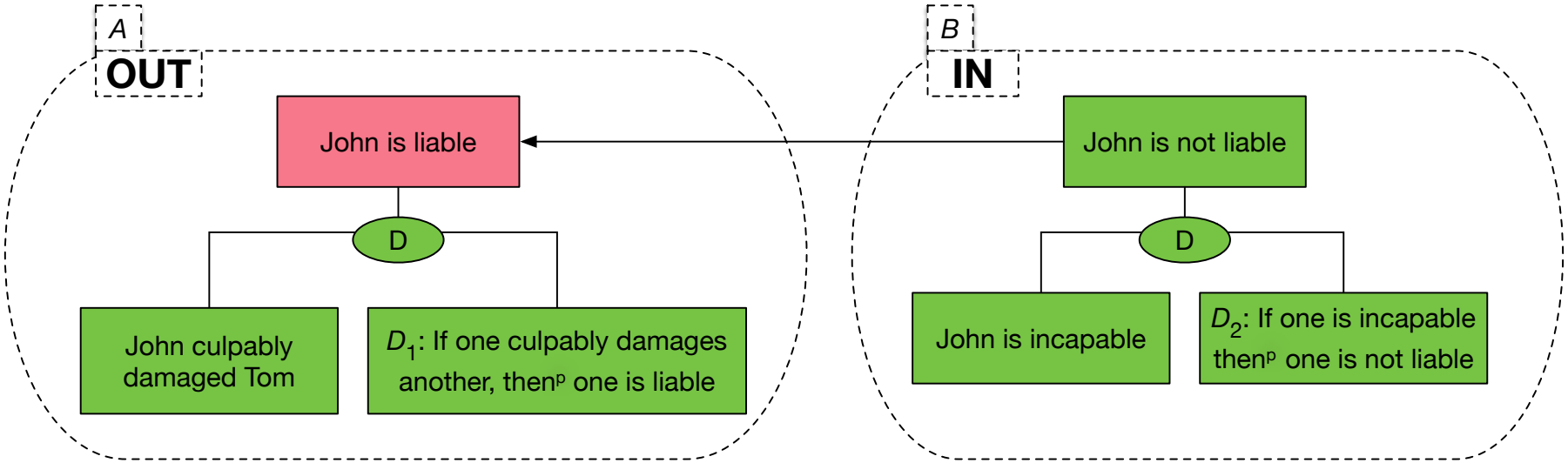


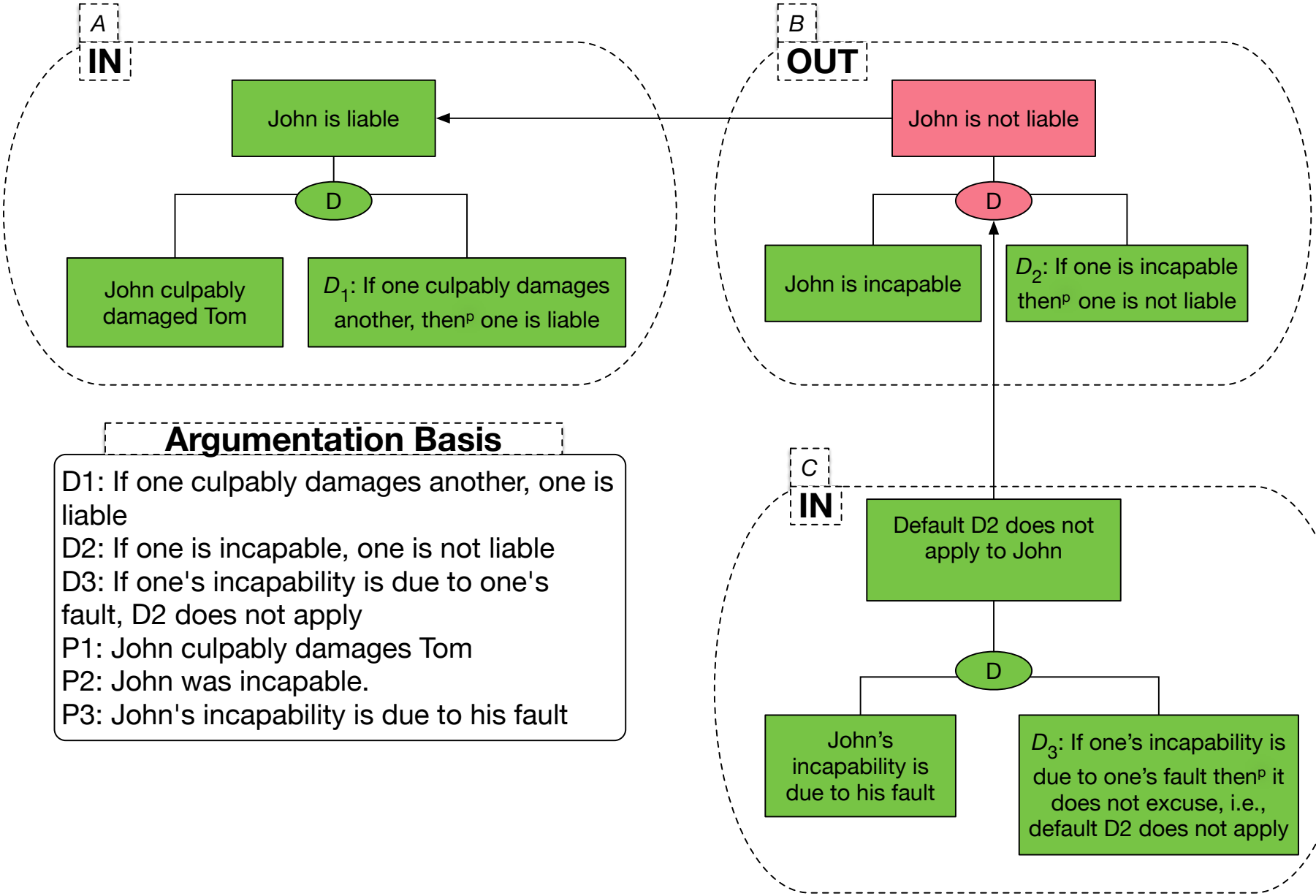
Figure 24: Argument from argumentation basis I



Argumentation Basis

D1: If one culpably damages another, one is liable
D2: If one is incapable, one is not liable
D3: If one's incapability is due to one's fault, D2 does not apply
P1: John culpably damages Tom
P2: John was incapable.

Figure 25: Argument from argumentation basis II

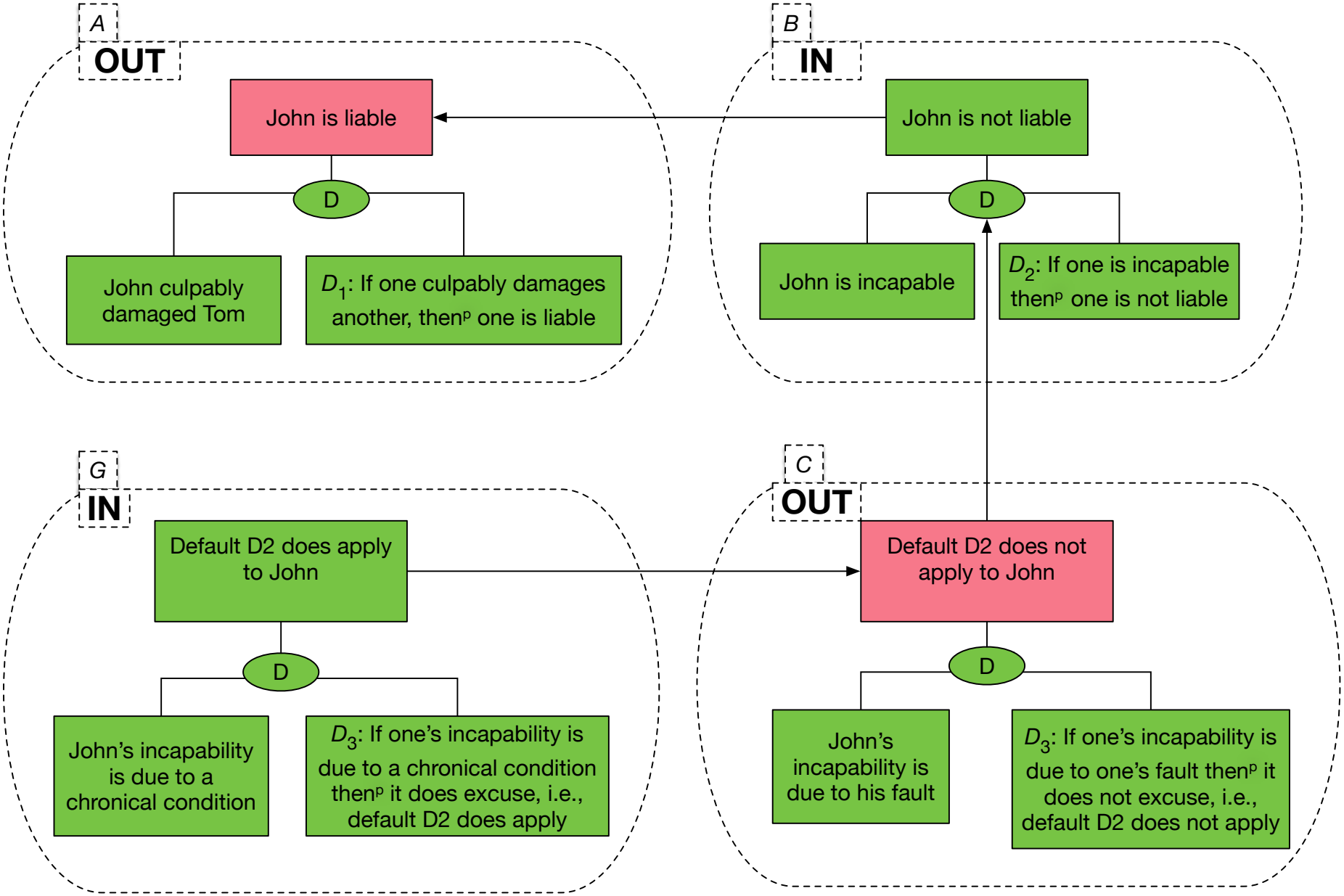


Argumentation Basis

D1: If one culpably damages another, one is liable
D2: If one is incapable, one is not liable
D3: If one's incapability is due to one's fault, D2 does not apply
P1: John culpably damages Tom
P2: John was incapable.
P3: John's incapability is due to his fault

To defeat argument C we need to add a new rule and fact:

- D_4: If one's incapacity is due to a chronic condition (alcoholism or drug addiction), then the incapacity excuse, i.e., default D_2, does apply: $\mathit{IncapableByChronicalCondition}(x) \Rightarrow \ D_2(x)$.
- P_4: John is incapable by a chronical condition (e.g.,alcoholism): $\mathit{IncapableByChronicalCondition}(\mathit{John})$


A
OUT
John is liable
D
John culpably damaged Tom
D_1: If one culpably damages another, then^p one is liable
B
IN
John is not liable
D
John is incapable
D_2: If one is incapable then^p one is not liable
G
IN
Default D2 does apply to John
D
John's incapability is due to a chronical condition
D_3: If one's incapability is due to a chronical condition then^p it does excuse, i.e., default D2 does apply
C
OUT
Default D2 does not apply to John
D
John's incapability is due to his fault
D_3: If one's incapability is due to one's fault then^p it does not excuse, i.e., default D2 does not apply

Defeasibility in the law: In legal language

- *Unless clause*. One is liable if one voluntarily causes damage, unless one acts in self-defence or in a state of necessity.
- *Explicit exception*. One is liable if one voluntarily causes damage. One is not liable for damages if one acts in self-defence or in a state of necessity.
- *Presumption*. One is liable if one voluntarily causes damage and one does not act out of self-defence or a state of necessity. The absence of both is presumed.

Aristotle 384–322 BC

All law is universal, and there are some things about which it is not possible to pronounce rightly in general terms; therefore, in cases where it is necessary to make a general pronouncement, but impossible to do so rightly, the law takes account of the majority of cases, though not unaware that in this way errors are made. [. . .]
So, when the law states a general rule, and a case arises under this that is exceptional, then it is right, where the legislator, owing to the generality of his language, has erred in not covering that case, to correct the omission by a ruling such as the legislator himself would have given (Aristotle, *Nicomachean Ethics*, 1137b).

Cicero 106-43 BC

All argumentation is refuted when one or more of its assumptions is non granted, or when, the assumptions having been granted, it is denied that the conclusion follows from them, or when it is shown that the kind itself of the argumentation is faulty, or when against a strong argumentation another argumentation equally strong or stronger is put forward (Cicero, *De inventione* , Book 1, Section 79).

Aquinas 1225-1274

[I]t is right and true for all to act according to reason: And from this principle it follows as a proper conclusion, that goods entrusted to another should be restored to their owner. Now this is true for the majority of cases: But it may happen in a particular case that it would be injurious, and therefore unreasonable, to restore goods held in trust; for instance, if they are claimed for the purpose of fighting against one's country. (Aquinas, *Summa theologica*, I–II, q. 94, a. 4])

Leibniz 1646-1716

every law has a presumption, and applies in any given case, unless it is proved that some impediment or contradiction has emerged, which would generate an exception extracted from another law. But in that case the charge of proof is transferred to the person who adduces the exception. (Leibniz 1923, De Legum Interpretatione, A VI iv C)

David Ross 1877-1971

Moral intuitions are not principles by the immediate application of which our duty in particular circumstances can be deduced. They state [. . .] prima facie obligations. [. . .] [We] are not obliged to do that which is only prima facie obligatory. We are only bound to do that act whose prima facie obligatoriness in those respects in which it is prima facie obligatory most outweighs its prima facie disobligatoriness in those aspects in which it is prima facie disobligatory. (Ross 1939,84–5)

H.L.A Hart

When the student has learnt that in English law there are positive conditions required for the existence of a valid contract, [. . .] he has still to learn what can defeat a claim that there is a valid contract, even though all these conditions are satisfied. The student has still to learn what can follow on the word "unless," which should accompany the statement of these conditions. This characteristic of legal concepts is one for which no word exists in ordinary English. [. . .] [T]he law has a word which with some hesitation I borrow and extend: This is the word "defeasible," used of a legal interest in property which is subject to termination of "defeat" in a number of different contingencies but remains intact if no such contingencies mature (Hart 1951,152)

Stephen Toulmin 1922-2009

Again, it is often necessary in the law-courts, not just to appeal to a given statute or common-law doctrine, but to discuss explicitly the extent to which this particular law fits the case under consideration, whether it must inevitably be applied in this particular case, or whether special facts may make the case an exception to the rule or one in which the law can be applied only subject to certain qualifications

Now

Many contributions to defeasible reasoning from:

- philosophy
- logic
- computing
- argumentation studies
- legal theory
- moral philosophy
- ecc.

Some books from AI and Law: Gordon (1995), Prakken (1997), Hage (1997), Verheij (2005), Sartor (2005), Horty (2012)

Thanks for your attention!

giovanni.sartor@unibo.it

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