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Towards an experimental philosophy of argumentation

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Introduction

Goal:

Expanding the domain of Experimental Philosophy (XΦ) to argumentation theory to

- ... describe and explain what makes a strong argument
- ... understand how argumentation actually proceeds and should proceed in a rational way
- ... build bridges among relevant research disciplines and traditions (e.g., philosophy, psychology, AI)

Example: Intuitions about argument strength

People (laymen) and experts have some intuitions about what makes a strong argument, they can easily make sense of qualifiers like

- "... *this is a strong argument* ..."
- "... *this argument is weaker than the other argument* ..."
- "... *holding a high degree of belief in this conclusion* ..."

Thus, an XΦ of argumentation should account for classifying and comparing arguments (according to their strength) and how degrees of belief in conclusions are/should be formed.

Coherence-based probability logic

- By argument I mean the ordered tripel:

  <premises, conclusion indicator, conclusion>

  (... and not "argument" in the sense of a premise)
- Coherence-based probability logic (short: CPL) combines logic (rule-based qualitative reasoning) with probability (quantitative reasoning) and is based on coherence. Coherence was originated by Bruno de Finetti (see, e.g., [3, 4]) and later generalised to conditional probability (see, e.g., [1, 2]). Further features include:
  - probability is interpreted by degrees of belief
  - reducibility to proper scoring rules or avoidance of Dutch books
  - a complete algebra is not required
  - conditional probability, $P(B|A)$, is primitive (and not defined by $P(A \wedge B)/P(A)$, which presupposes $P(A) > 0$)
  - zero probability antecedents are defined and properly managed (while the fraction definition is undefined if $P(A) > 0$)
  - allows for imprecision (probability intervals), nonmonotonicity, etc.
- CPL is about transmitting the uncertainty from the premises to the conclusion in a coherent way.

Five postulates for an XΦ of argumentation

Postulate 1: The research questions should be philosophical (e.g., what *is* argument strength?).

Postulate 2: Key concepts should be empirically validated (e.g., by controlled psychological experiments).

Postulate 3: Key concepts should be made explicit by formalisation.

Postulate 4: Truth-functional binary logic is an inappropriate rationality framework for argumentation. Rather, I suggest using CPL.

Postulate 5: The focus in argumentation should be on the conclusion or on argument strength but not on validity.

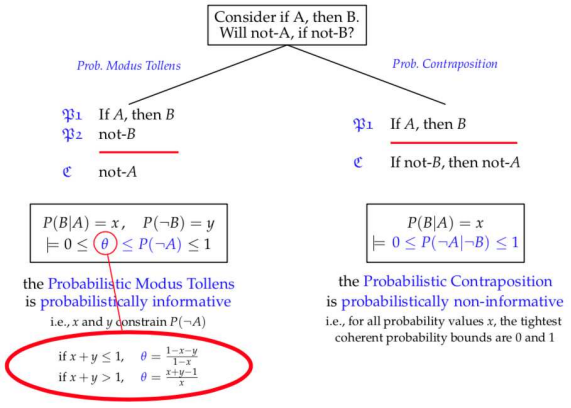
Justification of Postulates 1 and 2

Postulates 1 and 2 are analytically true (as they follow from XΦ).

Justification of Postulate 3

Formalisation:

- can make ideas clear (linguistic ambiguities and unclarities can be avoided)
- informal mathematical derivations are hard or even unintelligible in ordinary language
- allows to make subtle differences explicit (which would get lost in ordinary language). For instance consider the following argument, which lacks a clear conclusion indicator ([9]):



Here, "if A, then B" is obviously a premise. But it is unclear whether "not-A, if not-B" itself or a part of it constitutes the conclusion. Thus, depending on the interpretation, this argument may either be probabilistically informative or non-informative.

Justification of Postulate 4

	CPL	Logic
Conclusions are retractible?	yes (nonmonotonic)	no (monotonic)
Able to express uncertainty?	yes (by degrees of belief)	no (only *true/false*)
Conditionals are properly formalised?	yes (cond. probability, $p(\cdot\|\cdot)$)	no (material conditional, $\cdot \supset \cdot$)

Since logic is monotonic, bivalent, and is unable to formalize conditionals properly, I propose CPL, which avoids these problems. This is also justified by experimental evidence (e.g., [6, 7, 10, 12, 13, 14, 15, 17]).

Justification of Postulate 5

People argue *for* something (i.e., the conclusion) but are not interested in abstract formal properties like logical validity. Thus, the focus should be on the *conclusion* or on the overall strength of the argument.
Argument strength measure $\mathfrak{s}$ means tight probability bounds on the conclusion which are located close to one, as explained in [5, 8].

XΦ: Bridging disciplines

We showed that the measure of argument strength $\mathfrak{s}$ is (i) confirmed experimentally and (ii) offers a new solution to the Ellsberg Paradox ([16]). This is an example where XΦ bridges argumentation theory (i.e., argument strength) and decision theory (Ellsberg Paradox).
For formal experimental philosophical work on basic rationality principles of argumentative attacks, which builds bridges to argumentation in AI see [11].

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