

(Innocent?) Bias in Argumentation

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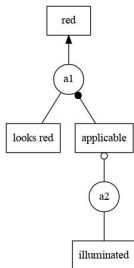
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When people observe intentional behavior, we assume that they attempt to understand it as implementing a plan intended to achieve some outcome.

(Jara-Ettinger, Schulz, and Tenenbaum 2020, p. 2)

Introduction I

- Triviality: when we speak, in some/many circumstances, we ‘argue’.
- A standard view of argumentation (Pollock 1995; Walton 2013, a.o.)

**Legend**

Circled a1,a2: arguments

Boxed items: premises

Arrow: support

Closed-dot arrows: presumptions

Open-dot arrows: attack

From (Gordon and Walton 2006)

Introduction II

- Non-trivial: many/most utterances ‘argue’ without any claim.
 - Their interpretation is biased in a certain direction, often pretty vague.
 - ‘Arguing’ without claim.
- (1) **Context:** A wants to know whether Paul intends to join his birthday party. It’s vacation time, so Paul is perhaps not in town.
- A – *Can Paul come to the party?*
B – *No idea. He is in town.*
- Elements of interpretation:
 - ① B cannot solve the issue (no claim).
 - ② *No idea* ⇒ We cannot attribute to B the intention of *implying* that Paul could come.
 - ③ B *mentions* (≠ endorses) a possible reason for believing that Paul could come.

Introduction III

- Not an isolated example (Anscombe and Ducrot 1983; Jayez 1988; Jayez 2005; Winterstein 2010; Winterstein 2013).
- The *but/however/although* test.

Paul is tall but (less/??taller) than his sister.

Paul is tall, (less/??taller) than his sister however.

Paul is tall, although he is (less/??taller) than his sister.

Paul read some of the papers but not all.

Paul read some of the papers, not all of them however.

Paul read some of the papers, not all of them, though.

Paul walked but (not very far/??very far).

Paul walked, (not very far/??very far) however

Paul walked, (not very far/??very far), though

Introduction IV

- Certain utterances seem to create open-ended expectations well beyond their accessible entailments.
- [Paul is tall] \nrightarrow [Paul is perhaps taller than his sister]
[Paul is in town] \nrightarrow [Paul could come to the party].
- No commitment to a claim.
- Intrinsic *argumentative orientation* (Anscombe and Ducrot 1983)?
- This talk: what determines this type of orientation?
 - ① Bayesian dependency.
 - ② Not just Bayesian dependency (Utility).

Dependency and CT I

- Intuition: ‘probability’.
- [in town] influences *positively* the possibility of [could come] = if we learn that [in town] the probability of [could come] increases.
- A flexible option: Confirmation Theory (CT), detailed soa in (Fitelson 2001).

E (evidence) confirms H (hypothesis) in K (common knowledge) iff $C(E, H, K) > 0$ for some confirmation measure C .

(Adapt for disconfirmation and irrelevance)

Dependency and CT II

- Examples of measures (Fitelson 2001; Tentori et al. 2007):

E = evidence, H = theory, K = common ground knowledge.

$$d(H, E|K) =_{\text{df}} \Pr(H|E \ \& \ K) - \Pr(H|K).$$

$$l(H|E, K) =_{\text{df}} \frac{\Pr(E|H \ \& \ K)}{\Pr(E|\neg H \ \& \ K)}$$

$$r(H, E|K) =_{\text{df}} \frac{\Pr(H|E \ \& \ K)}{\Pr(H|K)}$$

etc.

- Probabilities can be discretized (orderings for events)

Dependency and CT III

- The idea: $\Pr(H|E \& K) > \Pr(H|K)$.
- $\Pr([\text{could come}]|[\text{in town}] \& K) > \Pr([\text{could come}]|K)$.

$$C([\text{could come}], [\text{in town}]|K) > 0$$

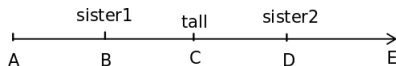
- Three questions/problems.
 - 1 Explain the change in probability.
 - 2 Paradoxes of CT.
 - 3 Role of K?

Probability change I

- Idea: change in proportions.

If updating with p raises the *proportion* of situations where p' is true and $\Pr(p') > 0$, $\Pr(p'|p) > \Pr(p')$.

- Comparatives: *Paul is tall but less tall than his sister*



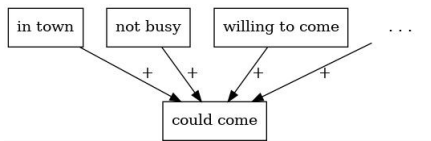
$$\begin{aligned}
 & [\text{tall}] \ \& \ [\text{taller than sister}]/[\text{tall}] \ \text{compared to} \ [\text{taller than sister}] \\
 & |CE|/|CE| > |BE|/|AE| \ (\text{sister1}) \\
 & |DE|/|CE| > |DE|/|AE| \ (\text{sister2})
 \end{aligned}$$

Probability change II

- Remark: some examples (*some but not all*) interact with *layering*.
- Probabilistic change operates only at the at-issue level (Dargnat and Jayez 2020; Ducrot 1972; Jayez 2005; Winterstein 2013) \Rightarrow no redundancy between the implicature and the *but* clause.

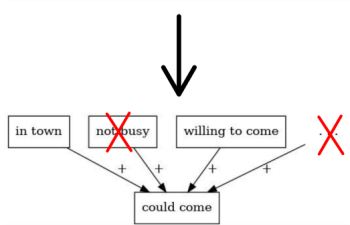
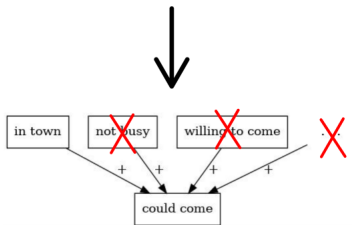
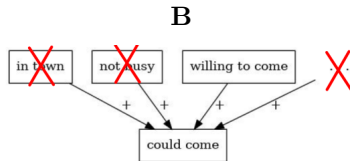
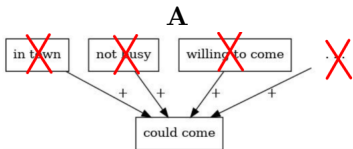
Probability change III

- Non-scalar cases: causal ‘cumulative’ networks.
- Probability raises as more conditions hold: $C \not\subseteq C' \Rightarrow \Pr(A|C) < \Pr(A|C')$.
- No miracle: smallest probability if no condition obtains.
- No conflict: conditions are compatible.



Probability change IV

- Two possibilities on initial situation: no condition holds (A) or at least one condition obtains (B). (Go back)



The tacking problem I

- Unintuitive side-effects (paradoxes).
- Ex.: the *tacking problem*. ($A \rightsquigarrow B$ for $C(B, A) > 0$)
- Intuitively: in abductive reasoning, whenever $E \rightsquigarrow H$, and $H \Rightarrow E$, $E \rightsquigarrow H \& H'$ for any H' compatible with H .
- **If** [rain] \rightsquigarrow [garden wet] **and** [garden wet] \Rightarrow [rain], **then** [garden wet] \rightsquigarrow [rain] & [cats in the garden].

The tacking problem II

- An even stronger result (Chandler 2007, th. 2).
- if $H+ \Rightarrow H$ and $H+$ is an irrelevant premise as to $\Pr(E|H)$, E confirms $H+$.

If_a the garden is wet (E) probably because it has been raining (H) and if_b, under the assumption_c that it has been raining and there are cats in the garden, then_c it has been raining, then_{a,b} the fact that the garden is wet confirms that it has been raining and there are cats in the garden.

The tacking problem III

- Two alternative approaches.
- 1. Keep a binary relation but change the measure (Fitelson 2001; Hawthorne and Fitelson 2004).
- 2. Contrastive ternary relation

Hitchcock 1996

$$C(H_1, H_2, E) =_{\text{df}} \Pr(H_1|H_2) = 0 \text{ and } \Pr(H_1|E \ \& \ (H_1 \vee H_2)) > \Pr(H_1|\neg E \ \& \ (H_1 \vee H_2))$$

But,

$$\Pr([\text{cats}]|[\text{wet}] \ \& \ [[\text{cats}] \vee [\text{no cat}]]) \not> \Pr([\text{cats}]|[\neg\text{wet}] \ \& \ [[\text{cats}] \vee [\text{no cat}]])$$

The tacking problem IV

- Complexity of the account (similar problem with the probabilistic account of *Conjunctive Fallacy* in (Crupi, Fitelson, and Tentori 2008)).
- Looking into the proof by Chandler.

red = assumptions

blue = probability calculus

$$\Pr(H|E) > \Pr(H)$$

$$\frac{\Pr(E|H)\Pr(H)/\Pr(E) > \Pr[H]}{\Pr(E|H)/\Pr(E) > 1}$$

$$\Pr(E|H) > \Pr[E]$$

$$\Pr(E|H) > \Pr[E]$$

$$\Pr(H|H+) = 1 \quad \Leftrightarrow \Pr(E|H \ \& \ H+) = \Pr(E|H)$$

$$\frac{\Pr(E|H+) = \Pr(E|H) \quad \Pr(H+|E) = \Pr(E|H+)\Pr(H+)/\Pr(E)}{\Pr(H+|E) = \Pr(E|H)\Pr(H+)/\Pr(E)}$$

$$\Pr(H+|E) = \Pr(E|H)\Pr(H+)/\Pr(E)$$

$$\Pr(H+|E)\Pr(E) = \Pr(H+)\Pr(E|H)$$

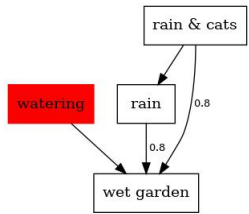
$$\Pr(H+|E) > \Pr(H+)$$

$$C(B, A) \text{ iff } \Pr(B|A) > \Pr(B)$$

$$C(H+, E)$$

Utility I

- Causal Bayesian network (null probability for red nodes).
- Misses something akin to relevance/economy



$$\Pr([\text{watering}]) = 0$$

$$\Pr([\text{rain}] | [\text{wet garden}]) = x$$

$$\Pr([\text{rain}]) = y$$

$$y < x, 0 < y < 1$$

$$\Pr([\text{rain}] | [\text{rain \& roses}]) = \Pr([\text{rain}] | [\text{rain}]) = 0.8$$

Utility II

- What is wrong: *Left Weakening/Monotony*.
- LW in classical (= Boolean) logic: if $\Sigma \vdash p$ then $\Sigma' \vdash p$ for *any* Σ' containing Σ .
- Analogous problem with Right Weakening ($A \vdash A \vee B$).
- Systems without left and/or right weakening (Restall 2000; Sperber and Wilson 1986).

Utility I

- A dominant paradigm: analysing communication as regulated by *utility* (Horn 2001; Sperber and Wilson 1986; Zipf 1949).
- Utility = a trade-off between reward (gain) and cost, e.g. (Jara-Ettinger, Schulz, and Tenenbaum 2020, NUC).
- Assumption: for every utterance,
 - some processing load (cost),
 - possibly, some informational update (reward).
- An elementary game of guessing causes where reward covaries with explanatory power.

Rules of the game

Observing an event C

Finding a possible cause A

(reward1 + cost c1)

Finding a possible cause A & B

(reward2 + cost c2)

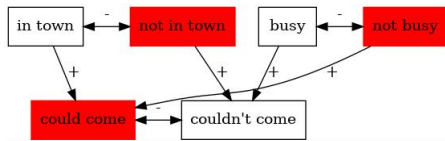
$$c1 < c2$$

$$\Pr(C|A \ \& \ B) = \Pr(C|A)$$

$$\left. \begin{array}{l} \\ \\ \end{array} \right\} \Rightarrow \begin{array}{l} \langle \text{reward1, cost1} \rangle \\ \text{preferred over} \\ \langle \text{reward2, cost2} \rangle \end{array}$$

Utility II

- A new version of the birthday party example.
- (2) **Context:** A wants to know whether Paul intends to join his birthday party. It's vacation time, so Paul is perhaps not in town.
- A – *Is Paul coming to the party?*
 B – *No. He is in town, **but** he is busy*
- A Bayesian network for B's answer (red nodes = null probability)



Utility III

- A thing to remember.

Problem

- 1 According to a **previous assumption**, orientation corresponds to a rise in probability.
- 2 [could come] is declared to be false.
- 3 We perceive an orientation (see the *but*).
- 4 So, what B's answer amounts to?

Utility IV

- Utility: give a reason ([busy]), exclude a reason [not in town].
- Orientation not dependent on *real* probability.
- Momentary perspective shift to comply with utility criteria.

 goal: explain \neg [could come]

reward

explain by [busy]

exclude \neg [in town]

only if [in town] relevant to [could come]

cost

process








process

Conclusion










- Intrinsic argumentative orientation is hybrid.
- An open-ended argumentative potential structured by Bayesian relations and utility.
- Utility demands that:
 - ① Bayesian networks be ‘minimal’ (no spurious information).
 - ② Relevance evaluation can access alternative (counterfactual) versions of background information.
- Argumentation pervasive in discourse? Yes (< Anscombe & Ducrot).
- Separate dimension? Implausible for the type of argumentation examined here.
- What about ‘sophisticated’ argumentation (analogy, schemes, etc.)?

Thank you !

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