The Wrong Problem

Relevance and Irrelevance in Bayesian Confirmation Theory

Michael Strevens

Formal Epistemology Workshop
May 2004

Two Problems of Irrelevant Conjunction

Irrelevant Conjunction

Evidence *e* confirms hypothesis *h*

Hypothesis *j* irrelevant (intuitively)

Bayesianly, *e* will tend to confirm *hj*

Irrelevant conjunctions are confirmed

Why worry?

History

Converse consequence If *e* confirms *h*, then *e* confirms any entailer of *h*.

Special consequence If *e* confirms *h*, then *e* confirms any entailee of *h*.

Hypothetico-Deductivism

1. Implies converse consequence
2. Converse consequence implies confirmation of irrelevant conjunctions (since *hj* entails *h*).
3. Special consequence and confirmation of *hj* implies confirmation of *j*.

Two Problems

1. Irrelevant conjunctions are confirmed.
2. Wherever there is special consequence, irrelevant conjuncts may be confirmed.

Form of a Bayesian Approach

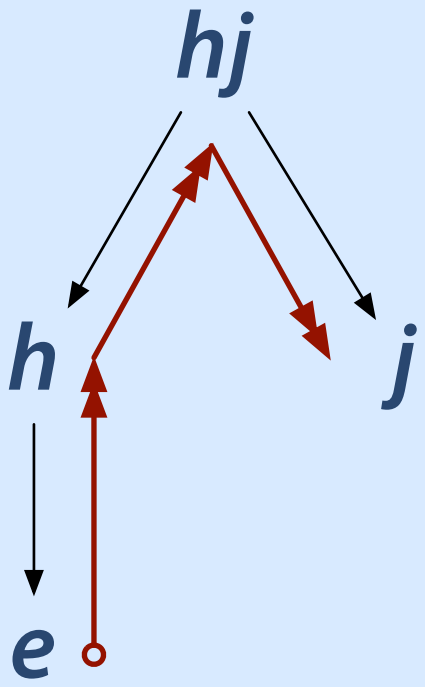
1. Probabilistic definition of relevance, thus irrelevance
2. Demonstration that irrelevant conjuncts are not confirmed

Relevance and Confirmation Flow

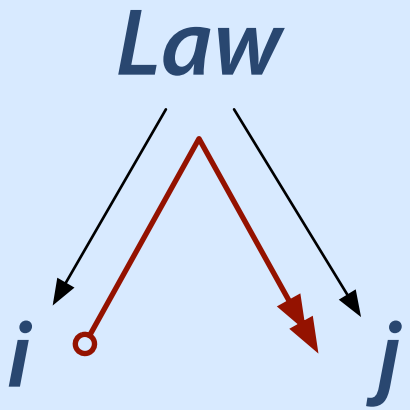
Aim

To understand and predict the “flow of confirmation” as a (partial) consequence of a relevance relation

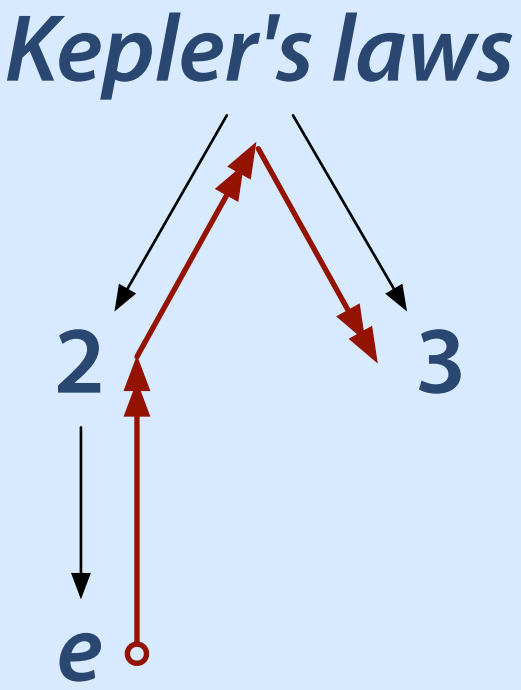
Flow in Irrelevant Conjunct Disaster



Flow in Ampliative Inference



Flow in Glymour Cases



An Understanding of Relevance Might…

1. Allay worries about irrelevant conjuncts,
2. Solve Glymour's relevance problem,
3. Show when confirmation *should* "flow" from one consequence of a theory to another.

Bayesian Solutions to the Real Problem

Strong Irrelevance

Hypothesis *j* is irrelevant to *h* and *e* if

- *j* is probabilistically independent of *h*, *e*, and *he*

so that $P(h|j) = P(h)$ etc.

Strongly Irrelevant Conjuncts

Are not confirmed because the definition of strong irrelevance requires that

- $P(j|e) = P(j)$

No explanation!

Weaker Irrelevance

For example (Fitelson and Hawthorne):

- $P(e|hj) = P(e|h)$

Claim: captures case where *j* (and "interaction" of *h* and *j*) contain no information about *e* not contained in *h*.

Two Paths to Weak Irrelevance

1. The weakly irrelevant conjunct *j* says nothing about *e* that *h* doesn't say.

2. The weakly irrelevant conjunct *j* says a lot about *e*, both on its own and through interaction with *h*, but it all cancels out.

Not an intuitive irrelevance relation

Bold Conjectures

True for all kinds of weak irrelevance:

1. No mathematical condition captures intuitive relevance/irrelevance
2. No interesting mathematical condition for irrelevance guarantees non-confirmation

Abandon All Hope?

Bayesians have nothing interesting to say about irrelevant conjuncts?

The Wrong Problem—Again

Irrelevant Conjuncts Often Confirmed

All ravens are black
The provost of Stanford is infallible
Black raven

Newton's law of gravitation
Coulomb's law
Observation of comet

Morals

1. Irrelevance in the intuitive sense does not guarantee non-confirmation
2. No interesting, systematic facts about which conjuncts are not confirmed—all depends on background

No Formal Theory of "Special Consequence"

No interesting "local" fact about probabilistic relevance can be leveraged to gain information about (global) confirmation relations

No Probabilistic Definition of Relevance

Need a definition of relevance that goes beyond probability: defines a structure through which probability (ceteris paribus) flows.