Probabilities-of-Conditionals-as-Conditional Probabilities and Desire-as-Belief

Alan Hájek

- “Stalnaker’s Hypothesis”, “the Equation” (bad names!)
- Some parallels to Desire-as-Belief (Lewis, quantifiers, triviality results, fighting back, more triviality results…)
- Why care about the Equation?
    - Stalnaker
    - Adams
    - de Finetti
    - Judy Benjamin
- Why believe the Equation?
    - It sounds right
    - Ramsey’s test
    - Adams’ thesis
    - Stalnaker validity
    - Adams’ probabilistic soundness
- Why disbelieve: sources of suspicion
    - Material conditional
    - Probabilistic conditional excluded middle
    - Causal decision theory, and my suspicions
- Four quantified versions
- Lewis’ triviality results
- Fighting back:
    - Import-export
    - van Fraassen, and indexicality
    - Domain-shrinking
    - Approximate equality, going vague
- Hájek’s perturbation argument
- Fighting back:
    - Radical indexicality
    - Restrictions on compounds involving $\rightarrow$
- Hájek’s wallflower argument: an example, and overview

- Desire-as-Belief
    - Lewis
    - Indexical Desire-as-Belief
    - Hájek’s perturbation argument
    - Radical indexicality can save the day
    - Hájek’s cardinality argument

- Most counterfactuals are false

Probabilities-of-Conditionals-as-Conditional Probabilities

and Desire-as-Belief

(PCCP) $P(A \rightarrow B) = P(B|A)$ for all A, B in the domain of P, with $P(A) > 0$.

("$\rightarrow$" is a conditional connective.)

Universal version: There is some $\rightarrow$ such that for all P, (PCCP) holds.

Rational Probability Function version: There is some $\rightarrow$ such that for all P that could represent a rational agent's system of beliefs, (PCCP) holds.

Universal Tailoring version: For each P there is some $\rightarrow$ such that (PCCP) holds.

Rational Probability Function tailoring version: For each P that could represent a rational agent's system of beliefs, there is some $\rightarrow_{\square}$ such that (PCCP) holds.

We will say that a probability function P_C is derived from P by *conditionalizing* if there is some proposition C such that for all X, $P_C(X) = P(X|C)$. If (PCCP) holds, we will say that $\rightarrow$ is a *PCCP-conditional for* P. If (PCCP) holds for each member P of a class of probability functions $\mathcal{P}$, we will say that $\rightarrow$ is a *PCCP-conditional for* $\mathcal{P}$

Lewis (1976):

First triviality result: There is no PCCP-conditional for the class of all probability functions.

Second triviality result: There is no PCCP-conditional for any class of probability functions closed under conditionalizing, unless the class consists entirely of trivial functions.

Hájek (1994) gives a perturbation argument that strengthens these results further.

Hájek (1989, here slightly strengthened):

Finite models result: Any non-trivial probability function with finite range has no PCCP-conditional.

Desire as Belief

(Desire-as-Belief) $\forall A\ \exists A^{\circ}\ \forall \langle P, V\rangle\ \ V(A) = P(A^{\circ})$.

(Indexical Desire-as-Belief) $\forall \langle P, V\rangle\ \forall A\ \exists\ A_{\langle P,V\rangle}{}^{\circ}\ V(A) = P(A_{\langle P,V\rangle}{}^{\circ})$.