

Implicit changes in plausibility conditionals

P.G.L. Porta Mana

[<piero.mana@ntnu.no>](mailto:piero.mana@ntnu.no)

Draft of 7 January 2019 (first drafted 6 January 2019)

Some remarks on additional implicit changes in the conditional of a plausibility upon updates.

Note: Dear Reader and Peer, this manuscript is being peer-reviewed by you. Thank you.

The arguments of a plausibility are propositions. A proposition is, roughly speaking, something for which it is meaningful to say that it is true or false (Copi et al. 1990; Copi 1979). Propositions are represented by statements, for example “It rained today”. The two are not the same thing. A statement may have different interpretations depending on the context; for example, on which day ‘today’ exactly refers to and the place where the statement was made. Only when a context is precisely understood we do have a proposition.

The propositions we consider in inference problems often regard values observed in experiments; for example, the outcome of a specific coin toss. So when we write $p(\text{heads} | I)$, where I is our initial knowledge, the argument of the probability is not just ‘heads’ but a proposition like $O_h :=$ “The outcome of the coin toss made by the coin-tossing machine at 15:24 on 6 June 2004 in room C6 at the Department of Statistics of Stanford University, USA, was heads”. If we say that ‘heads’ and ‘tails’ were exhaustive and mutually exclusive outcomes, what we mean is that the plausibility of the previous proposition and that of $O_t :=$ “The outcome of the coin toss made by the coin-tossing machine at 15:24 on 6 June 2004 in room C6 at the Department of Statistics of Stanford University, USA, was tails” sum up to one. In particular, the plausibility of the disjunction $O_h \vee O_t$ is one.

Note that the disjunction $O_h \vee O_t$ logically implies the proposition $T :=$ “A coin was tossed by the coin-tossing machine at 15:24 on 6 June 2004 in room C6 at the Department of Statistics of Stanford University, USA”, which therefore also has unit plausibility on information I , that is, $P(T | I) = 1$. Thus our initial information I states that a coin toss would be made at that time and place.

But it may well be that our initial information didn’t state anything so precise when we formulated the problem before 6 June 2004. Maybe it stated only that some coin tosses would be made by that machine,

but not when and where. Thus the proposition T on information I was actually uncertain: $P(T|I) < 1$.

Thanks

... to Mari & Miri for continuous encouragement and affection, and to Buster Keaton and Saitama for filling life with awe and inspiration. To the developers and maintainers of L^AT_EX, Emacs, AUC_TE_X, Open Science Framework, Python, Inkscape, Sci-Hub for making a free and unfiltered scientific exchange possible. ☒

Bibliography

(‘de *X*’ is listed under D, ‘van *X*’ under V, and so on, regardless of national conventions.)

Copi, I. M. (1979): *Symbolic Logic*, 5th ed. (Macmillan, New York). First publ. 1954.

Copi, I. M., Cohen, C. (1990): *Introduction to Logic*, 8th ed. (Macmillan, New York). First publ. 1953.