Comments on "Testimony as Evidence" by Katie Steele

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1. How can linear averaging be combined with Bayesianism?

There are two main ways linear averaging can be combined with the Bayesian picture: I) as a constraint on conditional credences, or II) as an alternative to standard conditionalization

I) Using linear averaging to determine what your conditional credences should be

One very natural way in which linear averaging can be combined with Bayesianism is by interpreting it as a constraint on an agent's conditional credences. This is what proponent's of the disagreement literature, for example Elga, seem to have in mind.

Suppose the equal weight view is correct, and suppose Jill is in a situation where she wants determine what her credence should be in some proposition p, given that her credence in p is x, and her epistemic peer Jane's credence is y. The equal weight view prescribes that Jill should have the following conditional credence, which she should update on in case she encounters the relevant case of peer disagreement:

$P(p \mid \text{Jane's cred. in } p = y \text{ \& Jane is Jill's peer}) = 1/2\, x + 1/2y = z$

If we adopt this picture, it also follows that an agent's unconditional credences are constrained by the equal weight view, insofar as they must be coherent with the agent's conditional credences. This way of using linear averaging is compatible with the Bayesian picture.

II) Using linear averaging as an updating rule instead of standard Bayesian conditionalization (the case Steele seems to have in mind)

By contrast, Steele discusses linear averaging as an alternative updating procedure that can be used instead of Bayesian conditionalization. If this is how it is used, we can encounter two scenarios:

a) The agent's conditional credences are such that updating on them results in the same new credence function as some linear averaging procedure. Using linear averaging is rational by the agent's own lights.

b) The agent's conditional credences are such that updating on them results in a different new credence function than some linear averaging procedure. Using linear averaging is irrational by the agent's own lights.

Steele discusses some disadvantages of linear averaging when used as a default replacement of conditionalization in testimony cases. Problems arise specifically in cases in which a number of experts have opinions that are independent of each other for some events, but not for other events in the domain, because according to linear averaging, the experts have to be assigned constant respect weights for all their opinions. Similar problems arise if an expert has different amounts of expertise on different events in the domain.

Steele argues that some of the problems of this approach can be solved by adopting a two-step updating procedure: using linear averaging on a restricted partition of the agent's credence function, and then adjusting the rest of her credence function via Jeffrey-conditionalization. Steele's main criticism of this procedure is that it is not commutative.

However, there is also a more basic problem with this proposal. It was presented as an initial motivation for using linear averaging to update on testimony that it is simpler than using conditionalization. But it is not clear that new two-step rule has this advantage.

2. Consequences of the updating rule in section 5

Steele proposes a number of constraints for an updating method for testimonial evidence. The constraints are as follows:

- The method should be compatible with Jeffrey conditionalization.
- The method should treat testimony as incremental evidence, and thus be commutative. This is implemented by requiring that the same testimony must always have the same Bayes factor.

Steele proposes a rule schema, which is incompatible with linear (and geometric) averaging, and a rule that fits the schema:

$$P'_{0,B} = normalize\left[P_{0,B} \times \sum_{i=1}^{n} w_1 \times P_{i,B}\right]$$

Problems with this rule:

a) It is not a plausible desideratum that the Bayes factor of a piece of testimony must always be constant.

b) The new rule leads to implausible posterior credences in certain cases of iterated updating.

Suppose I have a flat credence distribution with regards to some proposition and its negation in physics, call that proposition p. I meet two experts, a physics undergraduate student and Stephen Hawking. Of course, Hawking is much more competent than the undergraduate, so if I know what Hawking believes, I defer to him. However, the undergraduate is still in a much better epistemic position than me with respect to p, so as long as I have only his testimony, I defer to him. I assume that I have the relevant priors and conditional credences required by the standard Bayesian model.

I have the following initial credences:	P(p) = 0.5, P(~p) = 0.5
The undergrad has the following credences:	U(p) = 0.6, U(~p) = 0.4
Stephen Hawking:	S(p) = 0.9, S(~p) = 0.1

Case 1: meet undergrad first, meet Hawking second

P(p) = 0.5, P(~p) = 0.5 → P′(p) = 0.6, P′(~p) = 0.4 → P′′(p) = 0.9, P′′(~p) = 0.1

Bayes factor of the undergrad's credence: $\frac{0.6}{0.4} / \frac{0.5}{0.5} = 1.5$

Case 2: meet Hawking first, meet undergrad second

P(p) = 0.5, P(~p) = 0.5 → P′(p) = 0.9, P′(~p) = 0.1 → P′′(p) = 0.9, P′′(~p) = 0.1

Bayes factor of the undergrad's credence: $\frac{0.9}{0.1} / \frac{0.9}{0.1} = 1$

Modeling the case with Steele's updating rule:

Case 1:

P(p) = 0.5, P(~p) = 0.5 → P′(p) = 0.6, P′(~p) = 0.4 → P′′(p) = 0.93, P′′(~p) = 0.067

Case 2:

P(p) = 0.5, P(~p) = 0.5 → P′(p) = 0.9, P′(~p) = 0.1 → P′′(p) = 0.93, P′′(~p) = 0.067

The student's testimony has a constant Bayes factor of 1.5.

Problem: I end up being even more confident than Stephen Hawking in p, even though I know nothing about physics. This is clearly an unpalatable consequence of the updating rule Steele suggests, so the rule cannot be correct.