When is Evidence of Evidence Evidence?

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- Richard Feldman [3, 4, 5] has been defending a principle whose slogan is: "evidence of evidence is evidence" (EEE).
- He uses the (EEE) principle to support a conciliationist position regarding the epistemology of peer disagreement.

> …even if it is true that the theists and the atheists have private evidence, this does not get us out of the problem. Each may have his or her own special insight or sense of obviousness. But each knows about the other's insight. Each knows that this insight has evidential force. And now I see no basis for either of them justifying his own belief simply because the one insight happens to occur inside of him. **A point about evidence that plays a role here is this: evidence of evidence is evidence. More carefully, evidence that there is evidence for p is evidence for p. Knowing that the other has an insight provides each of them with evidence.**

- My aim today will be to take you through the recent dialectic concerning (EEE). I will focus on recent work by myself, Tal & Comesaña [12, 13], Roche [9], and Moretti [7].
- I'll adopt the conventions of Tal & Comesaña [12].

- I'll use T&C-style notation for expressing variants of (EEE).
  - E evidentially supports p to degree $\alpha \triangleq^{\text{def}} \mathsf{S}(E, p, \alpha)$.
    - $\alpha > 0$ is *support*; $\alpha < 0$ is *counter*-support; and, $\alpha = 0$ is *neutrality*.
  - E is true $\triangleq^{\text{def}} \mathsf{T}(E)$.
  - S possesses evidence $E \triangleq^{\text{def}} \mathsf{P}(S, E)$.
    - Following T&C, we'll assume that (all) evidence is *factive* — *i.e.*, that $\mathsf{P}(S, E)$ and $\mathsf{S}(E, p, \alpha)$ each *entail* $\mathsf{T}(E)$. This allows us to drop $\mathsf{T}(E)$ from evidential claims, for simplicity
  - When we make statements involving these three primitives, we'll assume that all implicit quantification is universal — *i.e.*, we'll explicitly state only the existential quantifiers.
- Here are 2 simple examples, expressed in our T&C-language.
  - "There exists some evidence *for* p" $\mapsto (\exists_E)(\exists_{\alpha>0})\,\mathsf{S}(E, p, \alpha)$.
  - "S possesses some evidence *against* p" (*de dicto*) $\mapsto (\exists_E)(\exists_{\beta<0})\,[\mathsf{P}(S, E)\,\&\,\mathsf{S}(E, p, \beta)]$.
- With our language in place, we're ready to examine (EEE).

- Initial renditions of (EEE) — as discussed by Feldman [5] and myself [6] — were both naïve and ambiguous. For instance:

(EEE) If E is evidence for the claim that S possesses some evidence for p, then E is evidence for p.

- As T&C point out, this initial statement of (EEE) is ambigious between a *de re* reading and a *de dicto* reading.
- First, the *de re* and *de dicto* readings of (EEE) in English.

(EEE_{dr}) If (a) E is evidence for the claim that S possesses E', and (b) E' is evidence for p, then E is evidence for p.

(EEE_{dd}) If E is evidence for: $\exists_{E'}$ such that (a) S possesses E' and (b) E' is evidence for p, then E is evidence for p.

- In our T&C-style formalization, these renditions of (EEE) are:

(EEE_{dr}) $\mathsf{S}(E, \mathsf{P}(S, E'), \beta > 0)\,\&\,\mathsf{S}(E', p, \alpha > 0) \Longrightarrow (\exists_{\gamma>0})\,\mathsf{S}(E, p, \gamma)$.

(EEE_{dd}) $\mathsf{S}(E, (\exists_{E'})(\exists_{\alpha>0})\,[\mathsf{P}(S, E')\,\&\,\mathsf{S}(E', p, \alpha)], \beta > 0) \Longrightarrow (\exists_{\gamma>0})\,\mathsf{S}(E, p, \gamma)$.

- Both of these naïve renditions of (EEE) are false. My proposed counterexample to (EEE) was as follows [6, 12].

> **Card**. John (S) has observed a card that was drawn at random from a standard deck. Let $E \stackrel{\text{def}}{=}$ the card is black, $E' \stackrel{\text{def}}{=}$ the card is the ace of spades, and $p \stackrel{\text{def}}{=}$ the card is an ace.

- E is evidence for (X) John observed the ace of spades [$\Pr(X \mid E) = 1/26 > 1/52 = \Pr(X)$], which *entails* p. But, E is (evidentially) *neutral* regarding p [$\Pr(p \mid E) = 1/13 = \Pr(p)$].
- So, **Card** is a counterexample to (EEE_{dr}). Unfortunately, I did not distinguish (EEE_{dr}) and (EEE_{dd}). And, as T&C point out, **Card** is *not* a counterexample to (EEE_{dd}).

☞ E is *not* evidence for the claim that John possesses *some* p-entailing evidence. That is, E is *not* evidence for

(X') John observed an ace.

- For E is *neutral* regarding X' [$\Pr(X' \mid E) = 1/13 = \Pr(X')$].

- William Roche [9] has shown how to modify **Card**, so as to transform it into a counterexample to (EEE_{dd}).

> **Card***. Just like **Card**, except that, unbeknownst to John, the card will be shown to him *iff* it is the Ace of Spades.

- In **Card***, E *is* evidence for the claim that John possesses *some* p-entailing evidence. That is, now E *is* evidence for X'. This is because, in **Card***, $\Pr(X' \mid E) = 1/26 > 1/52 = \Pr(X')$.
- Roche also shows (borrowing a result of Eells & Sober, from the literature on the transitivity of probabilistic causation [2]) that even (EEE_{dr}) is true *if X screens-off E from p*.
- To see why this screening-off condition *fails* in **Card**, note:
  - $\Pr(p \mid E \,\&\, X) = 1 = \Pr(p \mid X)$.
  - *But*, $\Pr(p \mid E \,\&\, {\sim}X) = 1/25 < 3/51 = \Pr(p \mid {\sim}X)$.
- T&C urge us to consider different renditions of (EEE). They distinguish *possessive vs. existential* renditions of (EEE).

- T&C's *existential* versions of (EEE_{dr}) and (EEE_{dd}) are:

($\text{EEE}^{\exists}_{dr}$) If E is evidence for E' and E' is evidence for p, then E is evidence for p.

($\text{EEE}^{\exists}_{dd}$) If E is evidence for: $\exists_{E'}$ such that E' is evidence for p, then E is evidence for p.

- Counterexamples to ($\text{EEE}^{\exists}_{dr}$) are well-known [11, 1, 10]. My own (*de re*) examples in [6] were modeled after them.

☞ As T&C point out, ($\text{EEE}^{\exists}_{dd}$) is (a) immune from existing (EEE)-counterexamples (both *de dicto* and *de re*), and (b) closer to Feldman's original idea regarding disagreement.

- First, let's see why ($\text{EEE}^{\exists}_{dd}$) avoids Roche's counterexample to (EEE_{dd}). In **Card***, E is evidence for X', but *not* for the claim (X^*) *there exists* entailing evidence for p.
- Note that (X^*) is equivalent to the claim (p) that the card *is* an ace. Thus, $\Pr(X^* \mid E) = 1/13 = \Pr(X^*)$. So, E is X^**-neutral*.

- While ($\text{EEE}^{\exists}_{dd}$) avoids Roche's counterexample (and mine), it has counterexamples of its own — *i.e.*, ($\text{EEE}^{\exists}_{dd}$) is false. Let p be a contingent truth, and let E be a contingent falsehood.

($\mathbb{N}$) $\exists$ evidence for p, and $\exists$ evidence against p [$\mathbb{F}$ & $\mathbb{A}$].
[Formally: $(\exists_{E^+})(\exists_{\alpha>0})\,\mathsf{S}(E^+, p, \alpha)$ & $(\exists_{E^-})(\exists_{\beta<0})\,\mathsf{S}(E^-, p, \beta)$.]

- ($\mathbb{N}$) *entails* that ($\mathbb{F}$) there exists evidence for p. But, clearly ($\mathbb{N}$) is p*-neutral* (hence, *not evidence for* p). Thus — so long as ($\mathbb{N}$) is *true* — it will be a counterexample to ($\text{EEE}^{\exists}_{dd}$).
- To see that ($\mathbb{N}$) *must* be true (in *almost all* cases), reason as follows. Provided only that no logical combination of $\{p, E\}$ has zero (*a priori*, evidential) probability, $p \vee E$ will be evidence for p, and ${\sim}p \vee {\sim}E$ will be evidence against p.[1]

[1] T&C discuss claims like ($\mathbb{N}$), but they neglect to provide arguments that their versions of ($\mathbb{N}$) are *true*. More recently, T&C [13] have emphasized the threat of *triviality* that is caused by the kinds of ($p \vee E$ style) constructions I used here to show that ($\mathbb{N}$) is true. I'll return to trivialities on the last 2 slides.

- At this point in the dialectic, T&C introduce the notion of a *defeater of the evidential support that E provides to p*.

  D is a defeater of E's evidential support for p
  $\stackrel{\text{def}}{=}$
  E is evidence for p, but $E \,\&\, D$ is either neutral or against p
  $\stackrel{\text{def}}{=}$
  $(\exists_{\alpha>0})\, \mathsf{S}(E, p, \alpha) \,\&\, (\exists_{\beta\leq 0})\, \mathsf{S}(E \,\&\, D, p, \beta)$

- With this notion in hand, T&C give a diagnosis of what is going wrong with $(\text{EEE}^{\exists}_{dd})$ and its counterexample(s) ($\mathbb{N}$).
- The problem, according to T&C, is that, while

  (i) ($\mathbb{N}$) entails — and $\therefore$ supports — ($\mathbb{F}$) there is evidence for p.

  it is *also* true that

  (ii) ($\mathbb{N}$) entails ($\mathbb{A}$) there is evidence against p, and this *defeats* — in this case, *neutralizes* — ($\mathbb{F}$)'s support for p.

- More formally: (i) $(\exists_{\alpha>0})\, \mathsf{S}(\mathbb{F}, p, \alpha)$, *but* (ii) $\mathsf{S}(\mathbb{F} \,\&\, \mathbb{A}, p, 0)$.

- This diagnosis leads T&C to conjecture that the following rendition of (EEE) — which adds a "no defeat" clause to their $(\text{EEE}^{\exists}_{dd})$ — is what Feldman *should have* endorsed.

($\text{EEE}_{\text{T\&C}}$) If (a) E is evidence that ($\mathbb{F}$) there is evidence for p **and (b)** E **is not a defeater of** ($\mathbb{F}$)**'s support for** p, then E is evidence for p.

- Moretti [8] has recently argued that ($\text{EEE}_{\text{T\&C}}$) is false.
- Consider any two true, contingent propositions E and Q such that E does *not* support Q. In general, we'll have:
  - E is evidence that $\mathbb{F}$ there is evidence for Q. This is because E supports the claim that there exists a true proposition which *entails both* E and Q (*e.g.*, the conjunction $E \,\&\, Q$).
  - E does not (intuitively) defeat $\mathbb{F}$'s support for Q. This is because $E \,\&\, \mathbb{F}$ is equivalent to $\mathbb{F}$. So, intuitively, in this situation, $E \,\&\, \mathbb{F}$ should (still) support Q.
- This objection can be generalized, so as to reveal some key features of Pr-*relevance* approaches to "support" [11].

- Consider the following three general probabilistic facts (where "supports" means "is positively Pr-relevant to"):

  (1) For all p, E: E supports $p \vee E$ $(E \,\&\, p)$.

  (2) For all p, E: $p \vee E$ $(E \,\&\, p)$ supports p.

  (3) For all p, E: E does *not* support *both* p *and* $\sim p$.

- If we instantiate p in (1) and (2) twice: once to P and then again to $\sim P$, then we get these two "support ($\rightsquigarrow$) chains."

  (4) $E \rightsquigarrow P \vee E$ $(E \,\&\, P) \rightsquigarrow P$.

  (5) $E \rightsquigarrow \sim P \vee E$ $(E \,\&\, \sim P) \rightsquigarrow \sim P$.

- By (3), the transitivity of $\rightsquigarrow$ *must fail along at least one of these paths.* Moretti's objection reveals that this failure need not be due to E's "defeating" the second $\rightsquigarrow$ in the chain.
- So, it appears that T&C's "defeat clause" is not doing the theoretical work that it was intended to do. [Note: Roche's screening-off condition will fail along the second support chain, but not in an illuminating/explanatory way.]

[1] Douven, I. 2011. "Further results on the intransitivity of evidential support," *Review of Symbolic Logic*.

[2] Eells, E. and Sober, E. 1983. "Probabilistic causality and the question of transitivity," *Philosophy of Science*.

[3] Feldman, R. 2007. "Reasonable religious disagreements," In L. Antony (*ed.*), *Philosophers without God: Meditations on Atheism and the Secular Life*, OUP.

[4] _____. 2011. "Evidence of evidence is evidence," Keynote lecture at *Feldmania: A Conference in Honor of Richard Feldman*, UT–San Antonio, March 2011.

[5] _____. 2014. "Evidence of evidence is evidence," in Matheson and Vitz (*eds.*), *The Ethics of Belief*, Oxford University Press, 284–300.

[6] Fitelson, B. 2012. "Evidence of Evidence is Not (Necessarily) Evidence," *Analysis*.

[7] Moretti, L. 2015. "Tal and Comesaña on evidence of evidence," *The Reasoner*.

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[9] Roche, W. 2014. "Evidence of Evidence Is Evidence under Screening-Off," *Episteme*.

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[11] Salmon, W.C. 1975. "Confirmation and Relevance", In G. Maxwell & R.M. Anderson (*eds.*), *Induction, Probability, and Confirmation, Minnesota Studies in the Philosophy of Science, Vol. VI*, University of Minnesota.

[12] Tal, E. and Comesaña, J. 2015. "Is Evidence of Evidence Evidence?," *Noûs*.

[13] _____. 2015. "Evidence of Evidence is Evidence (Trivially)," *Analysis*.