

Deduction	Carnap	Subjective Bayesians	Goodman	References
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- Here is a (naïve) “*reductio*” of classical deductive logic:
 - (1) For all sets of statements X and all statements p , if X is inconsistent, then p is a logical consequence of X .
 - (2) If an agent S 's belief set B entails p (and S knows $B \models p$), then it would be reasonable for S to infer/believe p .
 - (3) Even if S knows their belief set B is inconsistent (and, hence, that $B \models p$, for any p), there are still some p 's such that it would *not* be reasonable for S to infer/believe p .
 - (4) ∴ Since (1)–(3) lead to absurdity, our initial assumption (1) must have been false — *reductio* of the “explosion” rule (1).
- Harman [8] would concede that (1)–(3) are inconsistent, and (as a result) that *something* is wrong with premises (1)–(3).
- But, he would reject the relevantists’ diagnosis that (1) must be rejected. I take it he’d say it’s (2) that is to blame here.
- ☞ (2) is a *bridge principle* [10] linking *entailment* and *inference*.
- (2) is correct *only* for *consistent* B 's — even if B is consistent, the correct response *may* be to *reject* some $B_i \in B$. [Indeed, I bet *any plausible* BP will be *too weak* to undergird this *reductio*.]

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- Carnap [1] distinguishes two kinds of *inductive-logical* (viz., *confirmation*) relations, each explicated probabilistically:
 - E confirms _{f} H relative to K iff $\Pr_{\top}(H | E \& K) \geq t > 1/2$.
 - E confirms _{i} H relative to K iff $\Pr_{\top}(H | E \& K) > \Pr_{\top}(H | K)$.
 - For Carnap, it was important that $\Pr_{\top}(\cdot | \cdot)$ was *itself* “logical” (i.e., some sort of “partial entailment” relation).
- Carnap thought that there were *bridge principles* connecting these *logical* concepts with (suitable) *epistemic* concepts.
- In the first edition of LFP, Carnap only discusses BPs for confirmation _{f} . Unfortunately, the second edition does not contain a *re-examination* of those BPs for confirmation _{i} .
 - ☞ This is where the seeds of the OEP were sown.
- Carnap’s central BP for confirmation _{f} is (in modern parlance) (RTE _{f}) *If* (1) S 's total evidence (in context C) is K , *and* (2) S knows (in C) that E confirms _{f} H relative to K , *then* S 's *conditional degree of belief* in H , given E (in C) should be $> 1/2$.
- There are various problems with (RTE _{f}), but Old Evidence [6] is *not* one of them. Next, I’ll propose a candidate (RTE _{i}), and explain why OEP refutes it. Then, I’ll return to (RTE _{f}).

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- Because Carnap never explicitly discussed BPs for confirmation _{i} , we are left to speculate about (RTE _{i}).
- I think the most natural candidate for (RTE _{i}) is the following BP which connects confirmation _{i} and the epistemic relation of *evidential support* (in a context C).
- (RTE _{i} ⁰) E evidentially supports H for S in C iff E confirms _{i} H relative to K , where K is S 's *total evidence* in C .
 - Carnap never explicitly defends (RTE _{i} ⁰), and I think there is good reason to believe that he would not have (more below).
- I think (RTE _{i} ⁰) has been (usually only implicitly) presupposed by various Bayesian epistemologists over the years.
- But, the Old Evidence Problem provides a counterexample to (RTE _{i} ⁰). As Tim Williamson points out in [11, ch. 9]:
 - (†) (RTE _{i} ⁰) entails that *nothing* S already knows (i.e., no E such that $K \models E$) can evidentially support anything (for S).
- In light of (†), nobody should accept (RTE _{i} ⁰). But, is *this* a problem for inductive *logic*? [Think: analogy w/Deduction.]


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- Let’s return to (RTE _{f}) for a moment. I claimed that the OEP poses a problem for (RTE _{i}), but not (RTE _{f}). Here’s why:
 - If $K \models E$, then E does *not* confirm _{i} (any) H , relative to K , since $\Pr(E | K) = 1$ entails $H \perp E | K$, for *any* H and *any* \Pr .
 - But, $K \models E$ is perfectly compatible with the claim that E confirms _{f} H relative to K , since $\Pr(E | K) = 1$ does *not* entail that $\Pr(H | E \& K) < t$ (for *any* fixed threshold t).
- This is why Carnap never discussed the OEP. I bet that if he had re-worked his BP for confirmation _{i} , he would have.
- And, I suspect that Carnap might have offered something similar to Tim Williamson’s [11, ch. 9] alternative to (RTE _{i} ⁰).
- In his discussion of Hempel’s c -theory [1, p. 472], Carnap introduces a relation called “initial” confirmation _{i} , which naturally suggests the following Williamson-like BP:
- (RTE _{i} [†]) E evidentially supports H for S in C iff S possesses E as evidence in C and $\Pr_{\top}(H | E \& K_{\top}) > \Pr_{\top}(H | K_{\top})$.
 - Here, K_{\top} is “empty/a prior”, and $\Pr_{\top}(\cdot | \cdot)$ is “logical”. [Williamson’s \Pr/K are different, but also “impoverished”.]

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- I mentioned that (RTE_f) had *other* problems. Mainly, these other problems have to do with the *existence of* (and/or our access to) “logical” (or even “*a priori*”) *probabilities* $Pr_{\tau}(\cdot | \cdot)$.
- *That* problem also plagues the Carnap/Williamson (RTE_i^T) principle (as does the intelligibility and probative value of “empty” background corpora K_{τ} — whatever *those* are).
- These reasons (and others) lead me to reject the Carnap/Williamson (RTE_i^T) -line on old-evidence.
- I won’t have time to discuss this today, but my alternative approach to inductive-logic [4, 5] involves making probability models \mathcal{M} *parameters* of c_i -functions.
- So, on my view, the choice of model \mathcal{M} (for *applications* of IL) *not* a *logical* choice, but an *epistemic/empirical* choice.
- Thus, I think the (*epistemic!*) moral of the OEP is as follows:
 - (\ddagger) Probability models \mathcal{M} on which E (or H for that matter!) has an extreme probability are (typically) inappropriate for assessing E ’s evidential relevance (regarding H).

 (\ddagger) is no problem for inductive-logic (properly construed).

- Most subjective Bayesians (*not Jim* [9]!) accept (\ddagger). So, they need an *alternative* to S ’s *own subjective probability model* \mathcal{M}_S , which *does* assign extreme probability to E in OEP C ’s.
- There is a vast literature on this [2]. Most of it involves various forms of “surgery” on \mathcal{M}_S , to yield a “nearby” model \mathcal{M}'_S for the purpose of *evidential relevance assessments*.
- I find this literature very unsatisfying. I also think it underestimates the scope of the underlying problem.
- I have recently argued [3] that Goodman’s “grue” argument against Carnapian inductive logic trades on the naïve BP (RTE_i^0) connecting $confirmation_i$ and evidential support.
- What my reconstruction of Goodman’s argument (included on the next slide) reveals is that the OEP and the “grue” problem both provide (similar) reasons to reject (RTE_i^0) .
- I think this suggests that the kinds of “surgery” subjective Bayesians need to practice may be more subtle than OEP implies.  I suspect an *inoperable* underlying problem.

- Let $Gx \stackrel{\text{def}}{=} x$ is green, $Ox \stackrel{\text{def}}{=} x$ is examined prior to t , and $Ex \stackrel{\text{def}}{=} x$ is an emerald. Then, $Gx \stackrel{\text{def}}{=} x$ is grue $\stackrel{\text{def}}{=} Ox \equiv Gx$. And:
 - (H_1) All emeralds are green. $[(\forall x)(Ex \supset Gx)]$
 - (H_2) All emeralds are grue. $[(\forall x)[Ex \supset (Ox \equiv Gx)]]$
 - (E) $Ea \ \& \ Oa \ \& \ Ga$
 - Here is Goodman’s [7, *ch.* 3] “*reductio*” of “Carnapian” IL — in fact, it’s a “*reductio*” of *any* Pr-explication of $confirms_i$!
 - (i) E confirms $_i$ H , relative to K iff $Pr(H | E \ \& \ K) > Pr(H | K)$.
 - (ii) E evidentially supports H for S in C iff E confirms $_i$ H , relative to K , where K is S ’s *total evidence* in C . $[(RTE_i^0)]$
 - (iii) The agent S who is assessing the evidential support \mathcal{E} provides for H_1 vs H_2 in a Goodmanian “grue” context C_G has Oa as part of their total evidence in C_G [*i.e.*, $K \equiv Oa$].
 - (iv) If $K \equiv Oa$, then—*c.p.*— \mathcal{E} confirms $_i$ H_1 relative to K iff \mathcal{E} confirms $_i$ H_2 relative to K , for **any** $Pr(\cdot | \cdot)$.
 - (v) Therefore, \mathcal{E} evidentially supports H_1 for S in C_G if and only if \mathcal{E} evidentially supports H_2 for S in C_G .
 - (vi) But, intuitively, \mathcal{E} evidentially supports H_1 for S in C_G , and \mathcal{E} does *not* evidentially support H_2 for S in C_G .
- Contradiction. *Reductio* of (i)? No. Another counterexample to (ii).

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