Philosophy 148 — Announcements & Such

- Branden will have office hours on Tuesday May 13 from 2–4.
- Raul will have a review for the final on Thurs. 5/15 @ 6pm (room TBA).
- Before next Tuesday, I will distribute some extra-credit problems (which will be due at the final). These will be worth 100 homework points.
- The final exam is **Tuesday, May 20 @ 8am @ 20 Barrows**.
  - I will hold a review session for the final exam — the day before the final (May 19). It will take place **May 19 @ 4–6pm @ 122 Wheeler**.
  - Before next Tuesday, I will be distributing a “sample” final exam.
- Today’s Agenda
  - The Grue Paradox (aftermath — and consequences for IL and IE)
  - Farewell
  - Course Evaluations

"Carnapian" Counterexamples to (NC) and (M)

(*K*) Either: (*H*) there are 100 black ravens, no nonblack ravens, and 1 million other things, or ($\sim H$) there are 1,000 black ravens, 1 white raven, and 1 million other things.

- Let $E \overset{\text{def}}{=} Ra \,\&\, Ba$ (*a* randomly sampled from universe). Then:

$$\Pr(E \mid H \,\&\, K) = \frac{100}{1000100} \ll \frac{1000}{1001001} = \Pr(E \mid \sim H \,\&\, K)$$

- $\therefore$ This *K*/Pr constitute a counterexample to (NC), assuming a "Carnapian" theory of confirmation. This model can be emulated in the later Carnapian λ/γ-systems [13].

- Let $Bx \overset{\text{def}}{=} x$ is a black card, $Ax \overset{\text{def}}{=} x$ is the ace of spades, $Jx \overset{\text{def}}{=} x$ is the jack of clubs, and $K \overset{\text{def}}{=}$ a card *a* is sampled at random from a standard deck (where Pr is also standard):
  - $\Pr(Aa \mid Ba \,\&\, K) = \frac{1}{26} > \frac{1}{52} = \Pr(Aa \mid K)$.
  - $\Pr(Aa \mid Ba \,\&\, Ja \,\&\, K) = 0 < \frac{1}{52} = \Pr(Aa \mid K)$.

A "Carnapian" Counterexample to (‡)

(*K*) Either: (H_1) there are 1000 green emeralds 900 of which have been examined before *t*, no non-green emeralds, and 1 million other things in the universe, or (H_2) there are 100 green emeralds that have been examined before *t*, no green emeralds that have not been examined before *t*, 900 non-green emeralds that have not been examined before *t*, and 1 million other things.

- Imagine an urn containing true descriptions of each object in the universe (Pr $\overset{\text{def}}{=}$ urn model). Let $\mathcal{E} \overset{\text{def}}{=}$ "$Ea \,\&\, Oa \,\&\, Ga$" be drawn. $\mathcal{E}$ confirms H_1 but $\mathcal{E}$ *dis*confirms H_2, relative to *K*:

$$\Pr(\mathcal{E} \mid H_1 \,\&\, K) = \frac{900}{1001000} > \frac{100}{1001000} = \Pr(\mathcal{E} \mid H_2 \,\&\, K)$$

- This *K*/Pr constitute a counterexample to (‡), assuming a "Carnapian" theory of confirmation. This probability model can be emulated in the later Carnapian λ/γ-systems [13].

Is "Grue" an Observation Selection Effect? Part I

- **Canonical Example of an OSE**: I use a fishing net to capture samples of fish from various (randomly selected) parts of a lake. Let *E* be the claim that all of the sampled fish were over one foot in length. Let *H* be the hypothesis that all the fish in the lake are over one foot $[(\forall x)((Fx \,\&\, Lx) \supset Ox))]$.
- Intuitively, one might think *E* should evidentially support *H*. This may be so for an agent who knows *only* the above information (*K*) about the observation process. That is, it seems plausible that $\Pr(E \mid H \,\&\, K) > \Pr(E \mid \sim H \,\&\, K)$, where Pr is taken to be "evidential" (or "epistemic") probability.
- But, what if I *also* tell you that (*D*) the net I used to sample the fish from the lake (which generated *E*) has holes that are all over one foot in diameter? It seems that *D defeats* the support *E* provides for *H* (relative to *K*), because *D ensures* *O*. Thus, intuitively, $\Pr(E \mid H \,\&\, D \,\&\, K) = \Pr(E \mid \sim H \,\&\, D \,\&\, K)$.

Is "Grue" an Observation Selection Effect? Part II

- Note: the "grue" hypothesis (H_2) entails the following claim, which is not entailed by the green hypothesis (H_1):

  (H') All green emeralds have been (or will have been) examined prior to *t*. $[(\forall x)((Ex \,\&\, Gx) \supset Ox))]$.
- Now, consider the following two observation processes:
  - **Process 1**. For each green emerald in the universe, a slip of paper is created, on which is written a true description of that object as to whether it has property *O*. All the slips are placed in an urn, and one slip is sampled at random from the urn. By *this* process, we learn ($\mathcal{E}$) that $Ea \,\&\, Ga \,\&\, Oa$.
  - **Process 2**. Suppose all the green emeralds in the universe are placed in an urn. We sample an emerald (*a*) at random from this urn, and we examine it. [We know *antecedently* that the examination of *a* will take place prior to *t*, *i.e.*, that *Oa* is true.] By *this* process, we learn ($\mathcal{E}$) that $Ea \,\&\, Ga \,\&\, Oa$.
- Goodman seems to presuppose Process 2 in his set-up.

What Could "Carnapian" Inductive Logic Be? Part I

- The early Carnap dreamt that probabilistic inductive logic (confirmation theory) could be formulated in such a way that it *supervenes* on deductive logic in a *very strong* sense.
  - **Strong Supervenience** (SS). All confirmation relations involving sentences of a first-order language $\mathcal{L}$ supervene on the deductive relations involving sentences ***of*** $\mathcal{L}$.
- Hempel clearly saw (SS) as a *desideratum* for confirmation theory. The early Carnap also seems to have (SS) in mind.
- I think it is fair to say that Carnap's project — understood as requiring (SS) — was unsuccessful. [I think *this* is true for reasons that are *independent* of "grue" considerations.]
- The later Carnap seems to be aware of this. Most commentators interpret this shift as the later Carnap simply *giving up* on inductive logic (*qua logic*) altogether.
- I want to resist this "standard" reading of the history.

What Could "Carnapian" Inductive Logic Be? Part II

- I propose a different reading of the later Carnap, which makes him much more coherent with the early Carnap.
- I propose *weakening* the supervenience requirement in such a way that it (a) ensures this coherence, and (b) maintains the "logicality" of confirmation relations in Carnap's sense.
- Let $\mathfrak{L}$ be a formal language strong enough to express the fragment of probability theory Carnap needs for his later, more sophisticated confirmation-theoretic framework.
  - **Weak Supervenience** (WS). All confirmation relations involving sentences of a first-order language $\mathcal{L}$ supervene on the deductive relations involving sentences ***of*** $\mathfrak{L}$.
- As it turns out, $\mathfrak{L}$ needn't be very strong (in fact, one can get away with PRA!). So, even by early (*logicist*) Carnapian lights, satisfying (WS) is all that is *really* required for "logicality".
- The specific (WS) approach I propose takes confirmation to be a *four*-place relation: between E, H, K, *and a function* Pr.

What Could "Carnapian" Inductive Logic Be? Part III

- Consequences of moving to a 4-place confirmation relation:
  - We need not try to "construct" "logical" probability functions from the syntax of $\mathcal{L}$. This is a dead-end anyhow.
  - Indeed, on this view, inductive logic has nothing to say about the *interpretation/origin* of Pr. That is *not* a *logical* question, but a question about the *application* of logic.
    - Analogy: Deductive logicians don't owe us a "logical interpretation" of the truth value assignment function v.
  - Moreover, this leads to a vast increase in the *generality* of inductive logic. Carnap was stuck with an impoverished set of "logical" probability functions (in his λ/γ-continuum).
    - On my approach, *any* probability function can be part of a confirmation relation. Which functions are "suitable" or "appropriate" or "interesting" will depend on *applications*.
    - So, some confirmation relations will not be "interesting", *etc.* But, this is (already) true of *entailments*, as Harman showed.
  - Questions: Now, what *is* the job of the inductive logician, and how (if at all) do they interact with *epistemologists*?

What Could "Carnapian" Inductive Logic Be? Part IV

- The inductive logician must explain how it is that inductive logic can satisfy the following Carnapian *desiderata*.
  - The confirmation function $\mathfrak{c}(H, E \mid K)$ quantifies a *logical* (in a Carnapian sense) relation among statements E, H, and K.
    - ($\mathcal{D}_1$) One aspect of "logicality" is ensured by moving from (SS) to (WS) [from an $\mathcal{L}$-determinate to an $\mathfrak{L}$-determinate concept].
    - ($\mathcal{D}_2$) Another aspect of "logicality" insisted upon by Carnap is that $\mathfrak{c}(H, E \mid K)$ should *generalize* the entailment relation.
      - This means (at least) that we need $\mathfrak{c}(H, E \mid K)$ to take a maximum (minimum) value when $E \,\&\, K \vDash H$ ($E \,\&\, K \vDash {\sim}H$).
      - Very few *relevance* measures $\mathfrak{c}$ satisfy this "generalizing $\vDash$" requirement. That's another job for the inductive logician.
  - ($\mathcal{D}_3$) There must be *some* interesting "bridge principles" linking $\mathfrak{c}$ and *some* relations of evidential support, in *some* contexts.
    - ($\mathcal{D}_2$) implies that *if* there are any such bridge principles linking *entailment* and *conclusive evidence*, these should be *inherited by* $\mathfrak{c}$. This brings us back to Harman's problem!

Three Salient Quotes from Goodman [7]

☞ The "new riddle" is *about* inductive *logic* (*not epistemology*).

Quote #1 (page 67): "Just as deductive logic is concerned primarily with a relation between statements — namely the consequence relation — that is independent of their truth or falsity, so inductive logic . . . is concerned primarily with a comparable relation of confirmation between statements. Thus the problem is to define the relation that obtains between any statement S_1 and another S_2 if and only if S_1 may properly be said to confirm S_2 in any degree."

Quote #2 (73): "Confirmation of a hypothesis by an instance depends . . . upon features of the hypothesis other than its syntactical form".

☞ But, Goodman's *methodology* appeals to *epistemic* intuitions.

Quote #3 (page 73): ". . . the fact that a given man now in this room is a third son *does not increase the credibility of* statements asserting that other men now in this room are third sons, *and so does not confirm* the hypothesis that all men now in this room are third sons."