Philosophy 148 — Extra-Credit Problems

05/12/08

These extra-credit problems are due at the final exam (May 20 @ 8am). A total of 160 points are possible here. Any points you earn will be super-added to your homework point total for the semester.

1 Proving Some Things About Hempel's Theory of Confirmation

The following problems can be solved in varying degrees of generality. If you are able to prove them in *maximal generality* (*i.e.*, for *all* salient E's and H's) and for *direct or indirect* Hempel-confirmation, then they are worth 10 points each. If you prove them in maximal generality, but only for *direct* Hempel-confirmation, then they are worth 5 points each. And, if you prove them only for *direct* Hempel confirmation, and only for universal hypotheses (*i.e.*, only for H's that are universally quantified sentences), then they are worth 2.5 points each. Make sure to consult my handout on "Some Abstract Properties of ConÞrmation Relations & Four Theories of ConÞrmation" (pages 2 and 3) for the details of Hempel's theory.

1. Explain why Hempel's theory implies (CC): If E confirms H, and E confirms H', then H and H' are logically consistent.
2. Explain why Hempel's theory implies (SCC): If E confirms H, and $H \vDash H'$, then E confirms H'.
3. Explain why Hempel's theory implies (M): If E confirms H, then $E \,\&\, E'$ confirms H, provided that E' contains no individual constants not already contained in E. [Easier version, worth half points: If Fa confirms H, then $Fa \,\&\, Ga$ confirms H, for any consistent predicates F and G.]
4. Explain why Hempel's theory implies (&): If E confirms both H and H', then E confirms $H \,\&\, H'$.
5. Explain why Hempel's theory implies (G): $Ea \,\&\, Ga \,\&\, Oa$ confirms both H_1: $(\forall x)(Ex \supset Gx)$ and H_2: $(\forall x)[Ex \supset (Ox \equiv Gx)]$. [This one's a gimmie — see my lecture notes on "grue".]

2 Generalizing the "Standard Bayesian Ravens Theorem"

2.1 Proving The Bayesian Ravens Theorem from Weaker Assumptions

Let $H = (\forall x)(Rx \supset Bx)$. Recall that the standard Bayesian resolution of the ravens paradox involves showing that the following argument in the probability calculus is valid (assuming a *regular* Pr-function):

(*i*) $\Pr({\sim}Ba) > \Pr(Ra)$
(*ii*) $\Pr(Ra \mid H) = \Pr(Ra)$
(*iii*) $\Pr(Ba \mid H) = \Pr(Ba)$
Therefore, (*iv*) $\Pr(H \mid Ra \,\&\, Ba) > \Pr(H \mid {\sim}Ra \,\&\, {\sim}Ba)$

On HW #5, you were asked to prove this theorem. For extra-credit (worth 20 points), prove that (*iv*) still follows, even if (*ii*) and (*iii*) are replaced by the following, *strictly weaker* assumption:

$(\star)$ $\Pr(H \mid Ra) = \Pr(H \mid {\sim}Ba)$

2.2 Qualitative Consequences of these Two Bayesian Approaches

Consider the following three qualitative claims:

(a) $\Pr(H \mid Ra \,\&\, Ba) > \Pr(H)$

(b) $\Pr(H \mid {\sim}Ba \,\&\, {\sim}Ra) > \Pr(H)$

(c) $\Pr(H \mid Ba \,\&\, {\sim}Ra) < \Pr(H)$

There are six extra-credit problems (10 points each) relating to (a)–(c). The first three are to prove (a)–(c) from the standard Bayesian assumptions (*i*)–(*iii*). The second three are to prove that (a)–(c) do not follow from the weaker pair (*i*) & ($\star$). These last problems require that you give probability model(s) on which both (*i*) and ($\star$) are true, but (a)–(c) are not. [Hint: You may be able to do this with fewer than 3 models.]

3 Three "Odd Properties" of Pr-Relevance Confirmation

Consider the following three possibilities:

(I) E confirms H and E confirms H', but E disconfirms $H \vee H'$.

(II) E disconfirms H and E disconfirms H', but E confirms $H \,\&\, H'$.

(III) E confirms H relative to K and E confirms H relative to ${\sim}K$, but E disconfirms H, relative to $\top$.

Show that each of these three possibilities can be satisfied by the probabilistic relevance confirmation relation. That is, give probability models on which (I)–(III) are true, assuming a probabilistic relevance definition of the confirmation relation. Correct models are worth 10 points each.