

COMMUTATIVITY OR HOLISM?  
A DILEMMA FOR JEFFREY CONDITIONALIZERS

## TWO DESIDERATA

**Commutativity:** The order in which you learn information shouldn't matter to your final epistemic state, provided the same total information is gleaned in the end.

- ▷ Whether you read the *Times* editorial or the *Post* editorial first shouldn't matter to your ultimate conclusion about the President's competence.

**Holism:** The effect an experience should have on your beliefs doesn't just depend on what the experience is like — it depends on your background beliefs too.

- ▷ The room feels hot. Whether you should think it really is depends on whether you have a fever, are wearing a sweater, etc.

# JEFFERY CONDITIONALIZATION

**Jeffrey Conditionalization (JC)** When an experience directly affects your credences over a partition  $\{E_i\}$ , setting them to the values  $q(E_i)$ , your new credence in any  $H$  should be:

$$q(H) = \sum_i p(H|E_i)q(E_i)$$

- ▷  $\{E_i\}$  is the *input partition*, the  $q(E_i)$  are the *input values*.
- ▷ JC is equivalent to the conjunction of
  - Success*: keep the input numbers as posteriors.
  - Rigidity*: keep the  $p(H|E_i)$  as the  $q(H|E_i)$ .
- ▷ We'll often simplify by just talking about the special case where the input partition is  $\{E, \bar{E}\}$ .

## JC FOR DUMMIES

▷ In the special case where the input partition is  $\{E, \bar{E}\}$ ,

$$q(H) = p(H|E)q(E) + p(H|\bar{E})q(\bar{E})$$

We'll simplify by doing everything in terms this special case.

## JC AND COMMUTATIVITY

- ▷ JC is not commutative on input numbers.
  - Suppose we do a JC update on  $E$  with the input number  $1/3$ , and then again with input  $2/3$ .  $E$ 's final probability is  $2/3$ .
  - But if we do the same updates in reverse order,  $E$ 's final probability is  $1/3$ .
  
- ▷ But reversing the input numbers doesn't amount to reversing the experiences. (Lange, 2000)
  - Let  $E = \textit{The raven is black}$ .
  - To go from  $1/2$  to  $1/3$  to  $2/3$  requires a not-so-black appearance followed by a substantially more black appearance.
  - Reversing those experiences would lead to a sequence more like  $1/2$  to  $4/5$  to  $2/3$ .

## JC AND HOLISM

Christensen worried whether JC is sufficiently holistic.

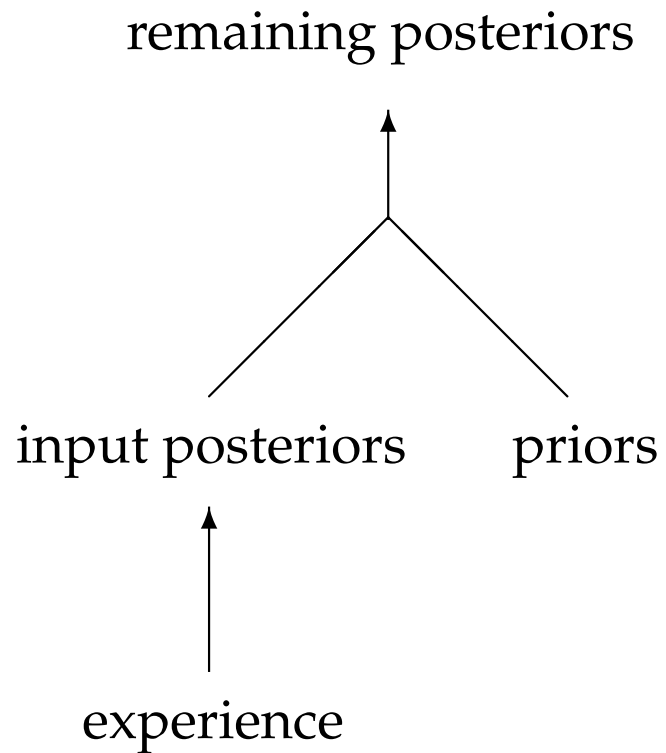
- ▷ The worry: Holism says that there are no foundational, theory-free beliefs. The epistemic import of experience cannot be isolated because there is no clean line between the experiential and the theoretical.
  - But JC assumes that the import of experience can be isolated, as input values over a partition.
- ▷ The resolution: JC allows the input values to depend on background belief. In that sense, they don't have to represent the theory-free import of experience.

## TWO TYPES OF FOUNDATIONISM

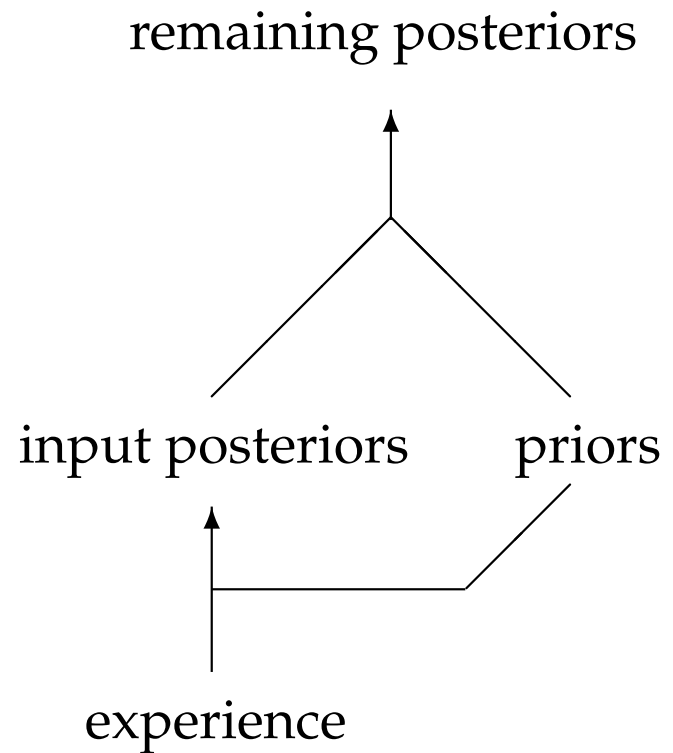
Christensen is applying an important distinction between two types of foundationism:

1. **Externalist Foundationism:** experience fixes posteriors over a foundational partition, and all other posteriors are determined from there (with the help of priors).
2. **Internalist Foundationism:** experience *and priors* fix posteriors over a foundational partition, and all other posteriors are determined from there (with the help of priors).

# EXTERNALIST AND INTERNALIST FOUNDATIONISM



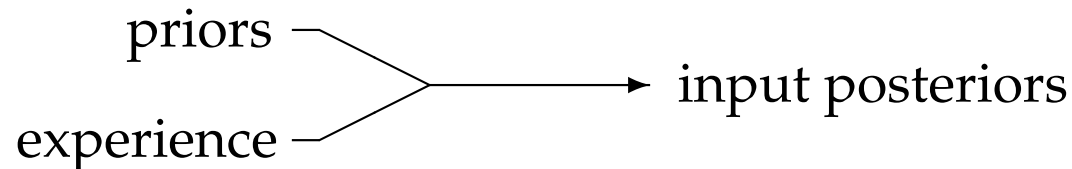
EXTERNALISM



INTERNALISM

## THE OPEN QUESTION

- ▷ Christensen and Lange have put down arguments that JC is non-commutative and anti-holistic.
- ▷ This leaves open the question whether there is a solution to the *inputs problem* that satisfies both commutativity and holism.
  - That is, can we give a rule for the



component of the internalist picture, such that the order of experience doesn't matter.

## FIELD'S PROPOSAL

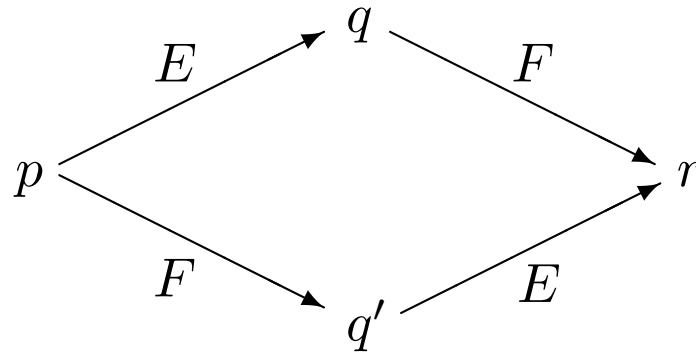
- ▷ The contribution of an experience is represented by a positive real number,  $\alpha$ .
- ▷ To determine  $q(E)$  based on  $\alpha$  and the priors, assume that  $\alpha$  is the bayes-factor:

$$\alpha = \beta_{q,p}(E, \bar{E}) =_{df} \frac{q(E)/q(\bar{E})}{p(E)/p(\bar{E})}$$

- ▷ Pro: makes JC commutative.
- ▷ Con: repeating the same experience yields unlimited support for  $E$ . (Garber, 1980)

## WAGNER'S RESULT

▷ In the following update scheme:



if the updates happen by JC on the propositions indicated then

$$\beta_{q,p}(E, \overline{E}) = \beta_{r,q'}(E, \overline{E})$$

$$\beta_{q',p}(F, \overline{F}) = \beta_{r,q}(F, \overline{F}).$$

▷ Only Field's proposal can make JC commutative!

## THE DILEMMA

- ▷ Field's proposal is the only way to get commutativity on experiences, but it's almost completely anti-holistic.
  - The only prior that influences the impact of the experience on an input proposition  $E$  is  $p(E)$ .
    - ▷ Garber's repeated experience objection exploits this flaw — your belief that you just had such an experience, and already drew conclusions from it, can't undercut the experience's support when repeated.
- ▷ So we have to choose: commutativity or holism?

## SOME DETAILS

- ▷ Wagner's result only applies when  $E$  and  $F$  are probabilistically consistent, but that condition is usually satisfied.
- ▷ We don't always want experience commutativity.
  - Watching someone walk into a room suggests very different things from watching them back out.
- ▷ But we do want limited commutativity on experiences; sometimes the order of experiences won't matter to some hypotheses.
  - Whether I see or hear the rain first, I'll conclude that it's raining with the same level of confidence.
  - All we need for the theorem is a case where the order of experience shouldn't matter to the distribution over  $\{E, \bar{E}\} \times \{F, \bar{F}\}$ .

## CONSTRUCTING A PROBLEM CASE

- ▷ The structure of a problem case:
  - The final values over  $\{E, \bar{E}\} \times \{F, \bar{F}\}$  should be order-invariant
  - But the support for  $E$  should depend on  $F$ .
  - E.g., an experience supports  $E$ , but  $F$  defeats that support.
- ▷ So: the cloth looks blue, suggesting that it is blue ( $E$ ), but then we notice that the lighting is deceptive ( $F$ ).
  - Whether we see the cloth or the light fixtures first shouldn't make a difference to our final credences.
  - If the appearance of the blue cloth supports  $E$  before the tricky lighting is spotted, it must have a  $\alpha > 1$ .
  - But then it supports  $E$  even after the tricky lighting is spotted — goodbye holism.

## POINTING THE FINGER

- ▷ Where does JC go wrong? Rigidity breeds anti-holism.
- ▷ If an experience can't change the input proposition's conditional probabilities, it can't set up a defeater:
  - Given rigidity, if  $q(E|F) < q(E)$  then  $p(E|F) < p(E)$ .
  - So as long as  $F$  didn't tell against  $E$  to begin with, it can't eliminate the support that the experience gave to  $E$ .
  - Thus learning about a defeater of the experience's support after the fact can't undo that support.
- ▷ Commutativity just serves to make the problem time-symmetric:
  - If we demand the same final state even if the defeater is discovered first, defeaters get ignored entirely.

## ANOTHER WAY OF PUTTING IT

- ▷ Suppose we measure how much  $F$  confirms  $E$  using the likelihood-ratio measure:

$$l_p(E, F) =_{df} \frac{p(F|E)}{p(F|\overline{E})}$$

- ▷ Then rigidity prevents JC from altering the extent to which  $F$  confirms/disconfirms  $E$ .
- ▷ So, however much  $F$  counteracts the support  $E$  got from the first experience is just the degree to which  $F$  was evidence against  $E$  itself in the first place.
- ▷ JC can't express the difference between these two scenarios:
  1.  $F$  is an opposing defeater for  $E$ .
  2.  $F$  is an undercutting defeater for  $E$ .

## MORAL OF THE STORY

- ▷ JC was designed to free probabilism from strong foundationism, but foundationism had several distinct problematic features.
- ▷ JC frees probabilism from *certaintism*, but not *givenism*.
  - We still assume that foundational beliefs are the stems of all inference — their evidential connections determine *everything* we learn from experience.
- ▷ What we can't learn, then, is that a foundational proposition has an evidential connection that we didn't see before.
- ▷ Because experience is screened off at the foundations, the extent to which it can be doxastically examined and managed is drastically limited.

## TURNING THE TABLES?

- ▷ A commutativity-based defense of rigidity:
  - A defeater learned after the fact shouldn't undercut support unless the source of the support was recorded.
  - But if the support is recorded then something else was learned and we haven't properly chosen the input partition.
  - By commutativity then, if the defeater is discovered first, it should only undermine the support if the source is recorded.
  - In no case, then, do we have doxastic defeat of non-doxastic reasons, i.e. radical holism.
  
- ▷ In general: if the  $e \rightarrow E$  connection can be undercut, it must be mediated by an  $E^*$ . The correct representation is  $e \rightarrow E^* \rightarrow E$  and what gets undercut is the  $E^* \rightarrow E$  connection.

## FORMAL MEETS TRADITIONAL

- ▷ Whether or not this general picture is defensible takes us straight into the foundationism/internalism debates in traditional epistemology.
  - Maybe we can argue that arguments for holism trade on reflective intuitions — intuitions about reflective cases.
  - Treatment of Norman cases:
    - ▷ Norman fails to attend and reflect as required.
    - ▷ Given that failure, what Norman does is rational.
  - Etc.
- ▷ Bottom line, looks like JC takes a stand on one major debate in traditional epistemology.