Lecture 3: The point of view evolves

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Handout (with references) & appendix: RICHARDPETTIGREW.COM/LOCKE

What came before...

(i) Norms for credences; (ii) teleological justifications; (iii) norms for priors; (iv) norms for awareness growth; (v) whence evidential probabilities?

...and what's to come

(vi) Norms that govern other aspects of our epistemic life: e.g. gathering evidence; undertaking logical and conceptual reasoning; forgetting; coarse-graining doxastic states. Ideal and non-ideal norms.

There is also a question about conceptual learning: when should we acquire concepts, refine them, and develop them. Cf. (Egré & O'Madagain, 2019; Tohidi, 2025; Queloz, 2025; Pérez Carballo, ms).

Modelling evidence acquisition

The standard model of an episode of evidence acquisition: (i) we do something or something happens to us (e.g., we look out the window and see a bird; a bird alights on the tree we're looking at); (ii) this changes something about our cognitive state (e.g., we come to know, believe, or be certain there is a bird in front of us); (iii) a cognitive process takes this change as input and acts on it (e.g., we conditionalize our credences on the proposition we've come to know or believe, or of which we've become certain).

(i) *Event*
↓
(ii) *Change*
↓
(iii) *Update*

Two versions of this model

Hosiasson's version.[1] The episode's *evidence function* takes each possibility and returns the proposition you learn from the episode at that possibility; you conditionalize your priors on this proposition.

[1] (Hosiasson, 1931). I owe the term *evidence function* to Nilanjan Das (2023).

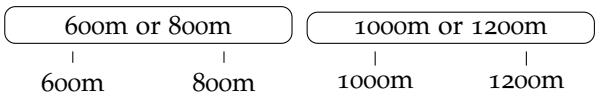

Figure 1: Illustration of the evidence function that represents the episode in which you consult *Scotland's High Points*.

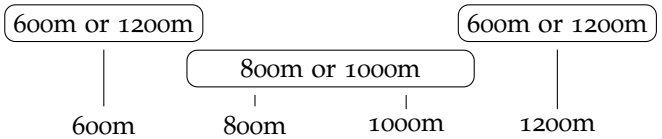

Figure 2: Illustration of the evidence function that represents the episode in which you consult *Challenging but Manageable*.

Blackwell's version.[2] The episode's *information structure* specifies a set of ways your cognitive state might change, together with a probability function that specifies, for each possibility, how likely the episode is to change it in those ways at that possibility; you conditionalize on having changed in that way.

[2] (Blackwell, 1951). See (de Oliveira, 2018) for an accessible introduction to Blackwell's model, and see (Pettigrew, 2025) for an extension of Blackwell's theorem to the epistemic utility case. Jason Konek's (2022) model of learning has something like this structure.

I'll stick with Hosiasson's version, but everything I say can be translated into Blackwell's version.

The value of acquiring evidence

The pragmatic utility of acquiring evidence

Hosiasson's thesis (evidence acquisition version). Given a decision problem, the pragmatic utility, at a particular possibility, of an episode of evidence acquisition is the utility at that possibility of the option you'd choose were you to learn the evidence you would learn at that possibility, update on it, and then pick by maximizing expected utility by the lights of those updated credences.[3]

A decision problem is a set of things you could choose to do; that is, a set of options that are available to you.

[3] Cf. (Ramsey, 1926/1990; Hosiasson, 1931).

E.g. here are your priors and the decision problem:

	600m	*800m*	*1000m*	*1200m*
P	1/8	1/8	1/4	1/2
Climb	10	0	-10	10
Don't Climb	0	0	0	0

These priors would lead you to climb.
But first: you might consult *Scotland's High Points* (Figure 1).
Here are the posteriors to which that would give rise:

	600m	*800m*	*1000m*	*1200m*
P_{12}	1/2	1/2	0	0
P_{34}	0	0	1/3	2/3

Here are the utilities of that inquiry:

Because P_{12} and P_{34} would both lead you climb.

	600m	*800m*	*1000m*	*1200m*
High Points	10	0	-10	10

Alternatively: you might read *Challenging but Manageable* (Figure 2).
Here are the posteriors for that:

	600m	*800m*	*1000m*	*1200m*
P_{14}	1/5	0	0	4/5
P_{23}	0	1/3	2/3	0

Here are the utilities of that inquiry:

Because P_{14} would lead you climb and P_{23} would lead you not to.

	600m	*800m*	*1000m*	*1200m*
Manageable	10	0	0	10

- The expected utility of consulting *High Points* is the same as the expected utility of not consulting it (i.e. choosing using your prior).
- The expected utility of consulting *Manageable* is greater than the expected utility of not consulting (i.e. choosing using your prior).
- The expected utility of consulting *Manageable* is greater than the expected utility of not consulting *High Points*.

Hosiasson's Theorem

- An evidence function is *factive* if, at any possibility, what you learn is true.

  For any possibility w in W, $w \in e(w)$.

- An evidence function is *partitional* if the set of propositions you might learn forms a partition.

  $\{e(w) \mid w \in W\}$ is a partition.

- Given two evidence functions, the first is a *fine-graining* of the second, if each proposition you might learn from the second is a disjunction of propositions you might learn from the first.

  For any possibility w in W, there are $w_1, \ldots, w_k$ in W such that
  $$e'(w) = e(w_1) \cup \ldots \cup e(w_k).$$

Hosiasson's Theorem Suppose e and e' are evidence functions; suppose both are factive and partitional; and suppose e is a fine-graining of e'. Then (i) for any prior and any decision problem, e has at least as great expected pragmatic utility relative to this decision problem as e'; and (ii) e has strictly greater expected pragmatic utility than e' relative to this decision problem if the prior gives positive credence to a possibility at which e and e' will lead to posteriors that will lead to different choices.

Note: we can represent not acquiring any evidence by the trivial evidence function, which takes every personal possibility to the set of all personal possibilities; conditionalizing on that retains your prior.

Generalizing Hosiasson's Theorem

Recall the measures of the pragmatic and epistemic utility of credences from Lecture 1. Suppose they are strictly proper. Then we get the following generalization of Hosiasson's Theorem:

The Credal Value of Information Theorem Suppose e and e' are evidence functions; suppose both are factive and partitional; and suppose e is a fine-graining of e'. Then (i) for any prior and any decision

problem, e has at least as great expected credal utility as e'; and (ii) e has strictly greater expected credal utility than e' if the prior gives positive credence to a world at which e and e' will lead to different posteriors.[4]

[4] Slight generalization of Graham Oddie (1997). Further generalizations by (Myrvold, 2012; Pérez Carballo, 2018; Dorst et al., 2021).

Other sorts of evidence

What if your evidence is not factive or partitional? For instance, you might eyeball the mountain's height.

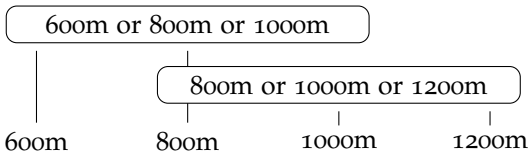

Figure 3: Illustration of the evidence function of eyeballing the mountain's height.

Here are the posteriors:

	600m	*800m*	*1000m*	*1200m*
P_{123}	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	0
P_{234}	0	$\frac{1}{7}$	$\frac{2}{7}$	$\frac{4}{7}$

Here are the utilities for eyeballing:

	600m	*800m*	*1000m*	*1200m*
Eyeball	0	0	-10	10

The expected pragmatic utility of eyeballing relative to this decision problem is lower than the expected utility of not investigating.[5] And indeed there are strictly proper measures of credal utility on which eyeballing decreases your credal utility in expectation.

[5] Compare Nilanjan Das (2023) on Tim Williamson's (2014) example of the unmarked clock.

The norms of evidence acquisition

Even when the Credal Value of Information Theorem does not apply, we can compare episodes of evidence acquisition for their pragmatic and epistemic and all-things-considered value. And we can include costs of different episodes, and even uncertainty about the costs.
The Bayesian totalizer: acquiring evidence is a sort of action; given an account of value, we have a theory of rational action; so we apply our theory.[6]

[6] (Schliesser, 2024).

Norm of inquiry Acquire evidence so as to maximize expected utility.

(i) We can specify whether the utility is pragmatic or epistemic or all-things-considered; (ii) we can specify whether it should include costs or not.

The epistemic version of this norm might be what Flores & Woodard (2023) seek. This version also vindicates Arianna Falbo's (2023) claim that the aim of inquiry is epistemic improvement, rather than some determinate final state, such as knowledge or true belief or certainty. Cf. also (Archer, 2021; Woodard, 2022; Willard-Kyle, 2023).

What happens to inquiry? When we embark on an inquiry, we make a commitment to engage in certain patterns of evidence-gathering. We need to make these commitments as bounded creatures, so that we are not forever reevaluating what we should do.[7]

[7] Thanks to Mikayla Kelley for suggesting this explanation to me, which draws on Michael Bratman's (1987) account of the purpose of intention.

Jane the Glazier

Jane the Glazier. Jane stands at the Chrysler building in Manhattan counting the windows. This takes time and concentration. While she does this, she receives other evidence irrelevant to that inquiry. E.g., she overhears someone say that Madison Ave runs from north-east to south-west. She receives this evidence; she becomes certain of it; but, she doesn't draw out its consequences. She could reason from other evidence she has, together with this evidence, to the conclusion that Park Ave runs NE-SW. But that would require time and effort, and she needs to keep her attention on the windows to complete that inquiry.[8]

[8] Paraphrased from Jane Friedman (2020).

The following norms clash because her resources are limited.

EP$_a$ If one has excellent evidence for X at t, then one is permitted to judge X at t.

ZIP If one wants to figure out [the answer to a question], then one ought to take the necessary means to figuring out [that answer].[9]

[9] (Friedman, 2020).

A logical learning solution

Jane's choice is this: count the windows, or reason from her evidence.
How does she do the latter?
In Lecture 1, we presented Verity's personal possibilities as ways the world could be, described at the finest level of grain possible using her representational apparatus. We didn't specify the modality. Here, we allow logical and metaphysical impossibilities alongside logical and metaphysical possibilities.[10]
For instance, after Jane learns Madison Avenue runs NE-SW, she has some positive credence in each of the following sentences:

[10] (Hacking, 1967; Chalmers, 2011; Williams, 2018; Pettigrew, 2020; Mahtani, 2024).

'Madison runs NE-SW & Madison $\|$ Park & Park runs NE-SW'

'Madison runs NE-SW & Madison $\|$ Park & Park runs N-S'

'Madison runs NE-SW & Madison $\|$ Park & Park runs NW-SE'

'Madison runs NE-SW & Madison $\|$ Park & Park runs E-W'

She knows reasoning from her evidence will teach her which is true. So, she appeals to the value of information framework to choose between reasoning and continuing to count the windows.

The problem of logical obtuseness

For certain very simple logical truths, we are rationally required to be certain of them.
Hacking: the value of information theorems entail this.[11]

[11] (Hacking, 1967).

Resistance to evidence

> **DTB** A subject S has an epistemic duty to form a belief that X if there is sufficient and undefeated evidence for S supporting X.[12]

[12] (Simion, 2023, 2024).

Our norm of inquiry covers this, and says when 'there is' evidence. But: what if the sexist who resists evidence of a woman's competence does not care much about the accuracy of their credences in these propositions, or assigns a high cost to losing their sexist belief, such that resisting the evidence maximizes their expected utility? Use the value of information framework to evaluate subjects from a variety of perspective, e.g., the utilities that reflect what they *should* care about.

Rational forgetfulness

Rain	*Sunny*	*V Sunny*	*Learn*	*Rain*	*Sunny*	*V Sunny*	*Forget*	*Rain*	*Sunny*	*V Sunny*
$4/9$	$4/9$	$1/9$	$\longrightarrow$	$1/2$	$1/2$	0	$\longrightarrow$	$4/9$	$4/9$	$1/9$

Is the expected loss of pragmatic/epistemic/all-things-considered utility in the transition from $(1/2, 1/2, 0)$ to $(4/9, 4/9, 1/9)$ worth the saving in storage capacity?

Coarse-graining our doxastic states

Rain	*Sunny*	*V Sunny*	*Coarse-grain*	*Rain*	*Sunny*	*V Sunny*
$98/100$	$1/100$	$1/100$	$\longrightarrow$	Believe	Disbelieve	Disbelieve

Is the expected loss of pragmatic/epistemic/all-things-considered utility in the transition from $(98/100, 1/100, 1/100)$ to $(\text{Believe}, \text{Disbelieve}, \text{Disbelieve})$ worth the saving in storage capacity?[13]

[13] See (Hempel, 1962; Kelly, 2014; Easwaran, 2016; Dorst, 2019) for a natural account of the epistemic utility of belief, disbelief, and suspension. E.g., for $R > 0 > -W$,

	A	$\overline{A}$
Believe A	R	$-W$
Disbelieve A	$-W$	R
Suspend on A	0	0

Epistemology's search for norms

Epistemology has often sought broad general norms. But the circumstances under which we should form a belief or undertake an inquiry are too diverse to capture using precise general norms obtained by adding more and more caveats to norms for ideal agents, such as $\mathbf{EP}_o$ and $\mathbf{ZIP}_o$. Instead, we need a more general sort of norm from which the facts about permissibility follow. This is what the Bayesian teleological account offers.