

## **Comments for Stefan**

**General:** Stefan, can I ask about the order of the chapters? I can see that 1-3 must come first. Beyond that, the chapters are more or less independent essays. What is the rationale for the order in which you put them?

Here is an alternative ordering: put the counterexamples first, then the discussion of vague credences, then the discussion of geometry of reason (which is the most open-ended chapter and leads naturally into the conclusion and prospects for further work). So:

Ch. 4 = Wagner

Ch. 5 = Judy Benjamin

Ch. 6 = Augustin's concessions

Ch. 7 = Geometry of Reason

Your Introduction should have a section that offers a brief road map of the chapters. This way, we have:

Chaps 2-3: explaining the debate about PME, providing the basics about updating partial beliefs and the basic ideas of information theory, discussion of justification.

Chaps 4-5: defusing two leading counterexamples. [Explain in the Intro why you pick these two: each connects to one or two specific broader issues, e.g., epistemic entrenchment for JB. Thus, they are not merely accomplishing the “negative task” of defusing the objection – they are also showing how we can think about these broader issues in a positive and coherent way using information theory.] The Wagner should have a forward reference to the “Augustin's concessions” chapter.

Chaps 6-7: Analysis of two major “current debates” connected to information theory (and where bringing information theory to bear provides illumination) – vague credences and geometry of reason.

Chapter 8: Conclusion.

## **Chapter 1**

### **General comments:**

The chapter is short, but complicated enough that it might benefit from sub-sections. I think it also needs some re-organization. Themes are taken up, set aside, then taken up again. The strands should be separated where this is possible.

#### 1.1 Information theory and probability kinematics

- p. 1 First paragraph should just be sentence 1 (also – do vague credences belong here as a major claim, since they get just one chapter?). Put “A Bayesian framework...” with the second paragraph. But then I would try to add something like what you have at the bottom of p. 3 (the “powerful and simple idea” that is the core intuition of information theory), since that motivates the whole thesis.

The entire final paragraph (running on pages 1-2) should be a footnote to the first sentence of paragraph 3. As it stands, this interrupts the flow.

The discussion on pages 1-2 is about updating. Then you have two paragraphs that distinguish between the problem of priors and the problem of updating. And then you go back to updating and PME. I suggest that, right around the start of paragraph 3, you introduce the distinction between the two problems, even before you start talking about PME, and indicate that you will focus on the latter. Move the two paragraphs on priors to this spot.

Top of p. 4: Good place to start a new section

Section 1.2 The Principle of Maximum Entropy (PME): a short history.

Then end with:

Section 1.3 Dissertation outline

Here, you can group together some of the material on pages 4-5 with the material on pages 7-9 in your chapter outline.

### **Specific comments:**

- p. 3 Reference to the ‘full employment theorem’ is too cryptic – they won’t know what you mean.
- p. 4 van Fraassen  
“probabilities (or ranks)”: should “or ranks” be in a footnote, which also mentions that there are lots of ways to represent uncertainty?  
Not sure about the Susan Haack reference, if you can’t find a text.

End the sentence about Haack earlier: “years ago. This issue is also related...  
“... the double task for indeterminate credences...”: too cryptic. How about:  
“...also related to a dilemma for indeterminate credences that I develop in chapter  
NN: they cannot perform the double task of representing both epistemic  
uncertainty and all relevant features of the evidence.”  
Last sentence of this paragraph (“A large part”...) belongs with the next  
paragraph.

pp. 5-6 How does this material relate to the thesis?

- p. 6 At the bottom of p. 6, you go back to epistemic entrenchment. Again, you should find a way to group this material together.
- p. 7 Section 1.3 (Dissertation outline) should start here. But you need to say something about chapters 2 and 3.
- p. 8 “...indeterminate creedal states.”  
Note: you brought up counterexamples, then you moved beyond counterexamples, and now you are back to counterexamples. Hence my earlier suggestion to group this with material on pages 4-5.
- p. 9 First reference to JUP – won’t be obvious to the reader that this is Jeffrey conditioning.

## Chapter 2

### **General comments:**

Most important: in a chapter that introduces PME and discusses its history, there is no statement of PME! Either it needs to be here (in section 2.2), or you need to explain why you are deferring this to a later chapter.

In the same light: do you want a brief review of standard conditioning and maybe even Jeffrey conditioning in this chapter (instead of appearing first in chapter 3 – it seems odd to consider them first and foremost as principles of information theory, as they appear in sections 3.2.4 and 3.2.5)?

It might be good to consolidate some of the things here with similar things in chapter 1 (e.g., discussion of epistemic entrenchment; reference to ‘full employment’).

Minor but annoying: most of the references are coming out: DATE, ), as in (de Finetti, 1931, and 1937, ). Should end as: ...1937). This happens throughout the chapter.

### **Specific comments:**

p. 10 ...19<sup>th</sup> and 20<sup>th</sup> century bring us two responses...

delete and on decision problems

Some references on this page are partial – you just have a list of names, but no dates.

...justifies entertaining...

p. 11 ...begins with John Maynard...

What about Carnap (under logical interpretation)?

Question: since you have indicated that you aren’t going to talk about priors, does the contrast between Jeffreys and de Finetti make any difference to your project? That is: couldn’t they both agree that there is a *logic* for updating? (I see that you clarify this point on the very next page: you don’t care about priors.) However: did you not go over this distinction, and your decision to focus only on updating, in the Introduction? Maybe you need to check for repetition.

Why a Pyrrhic victory?

p. 12 Missing footnote TBD.

Alan H also considers conditional probability ...

“on page 315”: what does this mean?

p. 13 (For a more systematic... objectivism.) THIS SHOULD BE A FOOTNOTE.

Not sure the analogy with geometry helps – it’s such a complex topic, and you have already given the analogy with deductive logic.

p. 13-14 Again, it seems odd to have this whirlwind survey of techniques for justifying standard conditioning and Jeffrey conditioning, without ever having reviewed (even very briefly) what these are. In one page, you could insert them

- here as the core (at least, standard conditioning) of Bayesian updating and hence the best Bayesian candidate for inductive logic.
- p. 14 Final remark about the logical interpretation is missing a footnote. But I'm not sure what this final paragraph of section 2.1 is doing here, since you have a) just been talking about ideas for justifying Bayesian updating principles, and b) you have been stressing that you are not committed to the full program of logical probability, and that what you are committed to is largely shared by the logical approach and the subjective approach.
- p. 15 You need some definitions here (entropy, a statement of PME), or else you need to explain why they aren't here and will be given later.  
There is a breathless quality about this section 2.2. You skip through the names very quickly but not really pausing long enough to explain things. If you have the chance, you can add some content.  
"two epistemological dimensions": can you state what they are?
- p. 16-17 I just want to say the same thing again. I seem to remember you explaining very well, somewhere, the sequence from standard conditioning to Jeffrey conditioning (a generalization) and then to PME (another generalization). A reader who starts this section expecting to be enlightened about information theory and PME will be puzzled not to see these things.
- p. 17 "By then": can you explain what this means, or give a date?  
"has been launched"? Actually, this is a good place to mention that the choice of the present tense for a chapter that is recounting a sequence of developments is a little awkward. It may be that you have no time now to change this – it is not that bad, and this is low priority, but I found it sometimes got in the way of my focusing on the ideas.  
This would be a good place to distinguish between criticism that takes the form of counterexamples (Shimony, Judy Benjamin, Wagner) and more theoretical opposition (Uffink and Seidenfeld -- what is Seidenfeld's complaint, actually? – you don't tell us).  
It's interesting that the late criticism does not produce any new counterexamples! Perhaps none are thought to be needed. But it's worth noting this.
- p. 18 Again, this part is a bit breathless. Would it be possible, instead of running through the names quickly, instead to identify the main criticisms and devote a paragraph to each one? You could make formatting work for you: use bullet points or even numbered paragraphs, as in:
- 1) **Coarsening at random.** Grunwald...
  - 2) **Excessive apriorism.** This is the concern...

Finally, why not mention epistemic entrenchment here as a third major late criticism (picking up on Judy Benjamin)? This would provide a bridge to the next

- sub-section – otherwise, it's not clear why you are suddenly bringing in acceptance vs. probabilistic belief.
- P 19 Section 2.4: you need to add an opening paragraph that motivates this section. Where does information theory fit in? Is it about acceptance, partial belief, or both? Somehow, we need to see why the debate is relevant for you. We get there by the last couple of sentences, but we need to see something at the start.
- p. 20 I would divide the final paragraph of section 2.4 into two paragraphs, with the last one explaining how you think information theory can make a contribution to the reconciliation project.
- p. 20, section 2.5  
 You need to explain something about why determinate vs. imprecise credences is a big distinction for your project. Maybe start out by framing the issue in terms of representation of uncertainty: then we have the two issues about priors – whether they are sharp, and whether they are objective.  
 Up to this point, you've wanted to be very non-committal about priors, so it comes as a surprise that you are so strongly wedded to determinate priors. Is this a form of apriorism? Maybe you can explain that it is not!
- p. 21 ...much as Jaynes intended it...  
 ...of probabilities; see for example Zabell [insert semi-colon]
- p. 22 ...making one of information theory or probability...  
 ...not robust, neither in quantity nor in quality... : what does this mean?  
 “information theory delivers the unique and across the board successful candidate for an objective updating mechanism in probability kinematics: PME and the companion principle of minimum cross-entropy. [you need to state what the candidate is]  
 The paragraph on Carnap may be too much detail in the wrong place. Just think about it.
- p. 23 Regarding Shimony: maybe you can state why you aren't going to talk about his example.  
 ... a good example of the kind of cross-fertilization...  
 A nice discussion of epistemic entrenchment – should this have come earlier on, since you have referred to epistemic entrenchment a number of times?
- p. 24-5 The reference to full employment is a bit repetitive of what you said in chapter 1.