# Metaphysics // Fall 2025

## Handout 3

## Fine-tuning: White

**Preliminaries.** The fact of fine-tuning is *prima facie* surprising. But we don't introduce a fine-tuning 261
designer. How to account for this remarkable fact? By introducing the hypothesis $M$ of multiple universes. So we have:

(3-1) Fine-tuning facts are evidence of $M$.

*Remark* 1. We can take the negation $\sim M$ as equivalent to NSU, the naturalistic hypothesis of a single universe (see Collins).

Our discussion is in the framework of the Bayesian theory. The Bayesian theory of confirmation has
the following form (White gives a more general formulation crucial for the discussion in pages 271ff): 261

(3-2) Evidence $E$ *confirms* hypothesis $H$: $\mathrm{P}(H \mid E) > \mathrm{P}(H)$.

From Bayes' Theorem we get:

(P1) $$[\mathrm{P}(H \mid E) > \mathrm{P}(H)] \leftrightarrow [\mathrm{P}(E \mid H) > \mathrm{P}(E \mid \sim H)].$$

*Question* 2. Verify the formula (P1).

**Fallacies.** White wishes to distinguish the status of the claim that *some* universe is life-permitting from the claim that *this* (*our*) universe $\alpha$ is life-permitting. This relates to the question of the nature of
our evidence. We have: 262

$$\begin{aligned} \{T_1, T_1, \ldots, T_n\} &: \text{set of sets of fundamental constants} \\ E = T_1\alpha &: \alpha \text{ is life-permitting, or LPU (see Collins)} \\ E' = \exists x T_1 x &: \text{some universe is life-permitting.} \end{aligned}$$

White shows that the following equations hold:

$$\mathrm{P}(E' \mid M) = \mathrm{P}(E' \mid \sim M)$$
$$\mathrm{P}(E) = 1/n.$$

That is, the probability of our universe is life-permitting does not depend on the number of universes.

The fallacy is essentially the same as the 'inverse gambler's fallacy'. If we see the dice landing 263
double six, this is no evidence for concluding that they have been rolled many times before to yield such a remarkable result. The reason is that the rolls of the dice are stochastically independent.

The situation is analogous to the hypothesis $M$. We observe just one universe—ours—with a remarkable feature $T_1$. This doesn't give us a reason to believe that there are multiple universes spread out 'out there' in an obscure hyperspace, or in hypertime, as in Wheeler's 'oscillating universe'
model. As White says, we have only witnessed a single Big Bang that produced our universe. 265

**OSE.** The inverse gambler's fallacy was argued to have been irrelevant, because it didn't involve OSE. 266
When there is OSE, we should favour $M$. The reasoning is not clear on the face of it, but there are analogies.

In the Case A (see the text), Jane *is* justified to conclude that the dice were rolled at least 25 times: 267
namely, that $\mathrm{P}(W_L \mid W) \geq 0.5$. The reason is that twenty-five is the minimal length of the series where the probability of getting a double six is greater than half.

But this calculation is only valid once she assumes that she will eventually be woken up—namely, that $\mathrm{P}(W) = 1$. This is equivalent to the assumption that the dice *were* rolled many times. However, it would be question-begging to grant this assumption in the case of $M$. Hence, Case A is irrelevant for defending OSE in the case of $M$.

Things get tricky with Cases B and B*. The difference between them is the same difference as 267
between $E$ and $E'$. In the Case B Jane is woken up when some player rolls a double six. Since the

greater number of players increases the chances of her being woken up, she is right to conclude that there are several players. Her evidence is good enough for that.

But it's not good enough in the Case B* where she infers that there are multiple players because 268
*her* partner rolled a double six. In this case, she's woken up simply because her partner got lucky. That he got lucky does not in any way depend on the number of players. In short, in the Case B the analogue of *M* raises the chances of Jane being woken up, but it doesn't do so in the Case B*.

**Surprise and confirmation.** The hypothesis *M* reduces (or eliminates) the surprise we are apt to experience at the fact of fine-tuning. Hence, we might argue with Leslie that this shows the correctness of *M*.

More explicitly, associate the decrease of surprise of the given event (=body of evidence) with the increase in its probability. Then you could argue that the event rendered less surprising (=more probable) by the given hypothesis also confirms that hypothesis. To apply to our case:

$$\mathrm{P}(T_1\alpha \mid M) > \mathrm{P}(T_1\alpha \mid {\sim}M) \Rightarrow \text{(P1)} \Rightarrow \mathrm{P}(M \mid T_1\alpha) > \mathrm{P}(M)\,.$$

Sometimes this indeed is so. If a monkey types, ' I want a banana ', the design hypothesis ' There was 270
a human intervention ' makes the fact of typing this sentence both not surprising and not improbable. And again by (P1), the hypothesis is confirmed if the event is rendered more probable on the assumption of the hypothesis.

But in other cases, this is not so!

**The shooting analogy.** Supposing that you are alone in the field, being shot (*E*) confirms that the shot was intentional and malicious (*D*): 272

$$\mathrm{P}(D \mid E \,\&\, {\sim}M) > \mathrm{P}(D \mid {\sim}M)\,.$$

At the same time, *D* makes *E* less surprising.

But now suppose that you are part of a large crowd (*M*). This would make *E* less surprising: there is no reason to *question* your original assumption that the shot was random. However, it is still 272
improbable, for the shot is *still* random:

$$\text{(3-3)} \qquad \mathrm{P}(E \mid M \,\&\, {\sim}D) = \mathrm{P}(E \mid {\sim}M \,\&\, {\sim}D)\,.$$

Then by (P2):

$$\text{(3-4)} \qquad \mathrm{P}(M \mid E \,\&\, {\sim}D) = \mathrm{P}(M \mid {\sim}D)\,.$$

That is, *M* is not confirmed by *E*.

As White notes, the connection between surprise and confirmation is also due to the explanatory fn17
power of the hypothesis. When the hypothesis reduces the surprisingness of *E*, it also explains why *E* occurred. However, in the crowd shooting case, it seems wrong to say, ' I was shot, because there were many people around me. ' So this is another reason for not thinking that, although *M* reduces surprise, it is not confirmed by *E*.

**Lessons for fine-tuning.** Given that there is a single universe $\alpha$, *E* is surprising. The design 273
hypothesis reduces the surprise.

Supposing now that *M* is true, the design hypothesis does not raise the probability of *E*: for why would the designer make exactly $\alpha$ life-permitting? Thus, supposing that we knew somehow that *M* is 274
true, then some universe would be likely life permitting: that is, $\mathrm{P}(E' \mid M)$ would be high. But this would not affect $\mathrm{P}(E \mid M)$, and the fact that $\alpha$ is life-permitting may still be due to chance. Hence *M* is not supported by *E*.

YSB