Metaphysics // Fall 2017

Handout 3

Design argument: Sober

Preliminaries. Distinguish first between individual intervention and single intervention. You may think that each observable event is a direct result of God's intervention. Or you may think that God decrees laws that 'produce' individual processes.

Similarly, you have a distinction between the theories of intelligent design and theistic evolutionism. According to Intelligent Design, each complex adaptation is a direct result of God's intervention. According to theistic evolutionism, God decrees sets in motion evolutionary processes that are responsible for complex adaptations. Theistic evolutionism is a thesis about the origin of the universe, and is consistent with the atheist evolutionary theory.

The best formulation of the design argument is *probabilistic*. We can never get a logical inference that would show a contradiction in the chance hypothesis. Rather, we should say that, if a mindless system appears teleological, it probably was made by an intelligent designer.

Some basic notions. To assess the design argument probabilistically, we need to introduce some notions first:

(1) $\mathrm{P}(H \mid E)$: posterior probability of H. This is the probability of the hypothesis H given the body of evidence E.
(2) $\mathrm{P}(E \mid H)$: likelihood of H. This is the probability of the evidence E given the hypothesis H.
(3) Bayes's Theorem:

$$\mathrm{P}(H \mid E) = \frac{\mathrm{P}(H)\,\mathrm{P}(E \mid H)}{\mathrm{P}(E)}.$$

The problem with posterior probabilities. Suppose we wish to claim that one hypothesis is 'probabilistically better' than another. This might mean that available evidence favours that hypothesis. Applying this idea to our case, one way to go would be this:

$$\mathrm{P}(\mathrm{ID} \mid O) \gg \mathrm{P}(\mathrm{Chance} \mid O)\,.$$

But this involves assessing $\mathrm{P}(\mathrm{ID})$ and $\mathrm{P}(\mathrm{Chance})$.

Question 1. Explain the last claim.

The likelihood principle. Sober proposes a way around the difficulty with posterior probabilities. Say that observation O supports hypothesis H_1 more than it supports H_2 just in case:

$$\mathrm{P}(O \mid H_1) > \mathrm{P}(O \mid H_2)\,.$$

Again, this is a claim of how to interpret evidence: namely, how much empirical support a hypothesis gets from the given observation. In evaluating the posterior probability we evaluate the probability of a hypothesis *given* the already available evidence. In evaluating 'likelihood' we evaluate the probability of the event *given* the hypothesis.

Example 2. Suppose I am driving on the Eskisehir yolu and the lights are out. This is our evidence O. This event would be expected (unsurprising) if the aliens were charging their spaceship batteries from the Ankara city power station (hypothesis H). So:

$$\mathrm{P}(O \mid H) \approx 1.$$

However, $\mathrm{P}(H \mid O)$ is still very low. Intuitively, the evidence need not increase the probability of my inane hypothesis. Why? Because it is too inane. Formally:

$$\mathrm{P}(H \mid O) = \frac{\mathrm{P}(O \mid H)\,\mathrm{P}(H)}{\mathrm{P}(O)}$$

and $\mathrm{P}(H) \approx 0$. Of course, this requires us to assign prior probabilities to hypotheses—and on what basis?

The likelihood principle departs from the influential Bayesian approach. It does *not* tell you which hypothesis you ought to believe, or which hypothesis is likely to be true. (Sober says that it is called to tell us how observations 'discriminate' between hypotheses. But as far as I can tell, the same can be said of the principle based on posterior probabilities.)

In particular, we get: Observation favours Intelligent Design over Chance if and only if $\mathrm{P}(O \mid \mathrm{ID}) \gg \mathrm{P}(O \mid \mathrm{Chance})$. But we won't be able to conclude whether design is more or less probable than chance. To do that we would have to evaluate the prior probabilities of these hypotheses, and this cannot be done (according to Sober, not according to Bayesianism).

It is useful to think of likelihoods as reflecting the surprisingness of a given event. That is, available observations are much *less* surprising if ID is true than if Chance is true.

We can now paraphrase the familiar views in terms of the likelihood principle:

Modern science $\mathrm{P}(O \mid \mathrm{Darwin}) \gg \mathrm{P}(O \mid \mathrm{ID})$.

Creationism $\mathrm{P}(O \mid \mathrm{ID}) \gg \mathrm{P}(O \mid \mathrm{Darwin})$.

The third way One conclusion is that there is *some* designer, another conclusion is that there is the *perfect* designer. The traditional design argument (e.g., Paley's) can only establish the first conclusion.

Alternative chancy processes. ID defenders often represent the issue as a choice between ID and Chance. However, we should also watch out for *different* hypotheses involving chance. 30

Example 3 (Sex ratio). Empirical evidence suggests that there are more boys than girls born every year. Say that according to the chance hypothesis, the probability that either a boy or a girl is born is $1/2$. Then:

$$\mathrm{P}(B > G \mid \mathrm{Chance}) = \mathrm{P}((G > B \mid \mathrm{Chance}) \gg \mathrm{P}(B = G \mid \mathrm{Chance})\,.$$

But $\mathrm{P}(B = G \mid \mathrm{Chance})$ is very small. So $\mathrm{P}(B > G \mid \mathrm{Chance}) \approx 1/2$ in every given year. So $\mathrm{P}(B > G \mid \mathrm{Chance}) < (1/2)^n$ in n years. There is another piece of evidence, that boys die earlier than girls. So, in order to offset this inequality, the good Providence instituted the uneven sex ratio at birth: it is by design that $B > G$. (Therefore, also, polygamy is wrong.)

But there is an alternative explanation based on natural selection. Here is a simplified sketch (due to Carl Düsing and in part to Darwin). The key idea is to consider three generations: the parental generation, offspring, and grandoffspring. Suppose there are m males and f females in the offspring generation. They produce N individuals in the grandoffspring generation. Then each male and female offspring will respectively produce N/m and N/f individuals in the grandoffspring generation. So the minority sex in the offspring generation will have a higher reproductive success! Thus a parent wishing to maximize his success in the *grandoffspring* generation will overproduce offspring of the minority sex. Clearly an equilibrium should be reached: this happens when there is an equal distribution of sexes at the age of reproduction. Notice that monogamy is not demanded here: even if occasionally some males will have more than N/m offspring and some will have none, on average the number will be the same.

Remark 4. A more adequate solution is due to Ronald Fisher. It involves an additional idea of *parental expenditure*. Ignoring fathers, we imagine that a mother has a certain energy to spend on her offspring. Let E_m be the energy spent on male offspring and E_f be the energy spent on female offspring. We also assume that a mother invests equally in sons and daughters. Then we have: $mE_m = fE_f$. But since, as Arbuthnot already noticed, male mortality is higher, we have $E_m < E_f$. Then to preserve the equilibrium we should have $m > f$.

Evaluating the ID argument. In general, the design argument has two premisses: that $\mathrm{P}(O \mid \mathrm{Chance})$ is very low and that $\mathrm{P}(O \mid \mathrm{ID})$ is higher. Let us see whether $\mathrm{P}(O \mid \mathrm{Chance})$ very low. It is highly probable that the universe has order and adaptation somewhere. But it is highly improbable that the universe has order and adaptation *here*.

Compare the inverse gambler's fallacy:

$$\mathrm{P}(6 \star 6(\text{now}) \mid \text{Many rolls}) > \mathrm{P}(6 \star 6(\text{now}) \mid \text{One roll})$$

is false. This is because the rollings of dice are stochastic: their probabilities are insensitive to the state of the system in the past.

But:

$$\mathrm{P}(6 \star 6(\text{sometime}) \mid \text{Many rolls}) > \mathrm{P}(6 \star 6(\text{sometime}) \mid \text{One roll})$$

is true. This result is irrelevant, however: we observe *our* planet, so the likelihoods of the two hypotheses should be judged equal.

Now, is $P(O \mid \text{ID}) > P(O \mid \text{Chance})$? We need to make assumptions about the designer. Perhaps he was incompetent and could not create the vertebrate eye. Or perhaps he was not interested. Or perhaps he was. And so forth.

Herein is a lack of analogy with the watch on the heath where we assumed the existence of a human designer with transparent goals and abilities. The moral we are to draw is to assume the existence of such a designer whose goals/abilities we understand.

Gould's panda argument is vulnerable to the same criticism. Pandas have a thumb serving them to peel off bamboo. This thumb is an imperfect tool. This fact sits well with the evolutionary theory: adaptations are often imperfect. So:

$$P(\text{Thumb} \mid \text{ID}) < P(\text{Thumb} \mid \text{Evolution})\,.$$

But this assumes that we know why the designer would design such a thumb. I.e. we reason (probabilisticall): the designer should have wanted to make panda's life easy, but the thumb does not make it so, so there is no designer. Sober: the assumption is unjustified, we may be in the dark about the designer's goals. Also: The designer need not be perfectly competent either (as in the Hitchhiker's Guide to the Galaxy).

Preliminaries on the fine-tuning arguments. Evolutionary theory has no say on the origins of the universe as a whole. And currently theistic proponents of ID rarely invoke the design argument in the creation of the universe. At least in large part this is due to the common perception that the causal laws of physics are adequate in explaining the workings of inorganic matter, and that there is no felt need to invoke final causes. Yet there is one particular area where the cosmic version of ID has experienced a revival: the fine-tuning of fundamental constants. The idea is that the fundamental laws of nature contain fundamental constants (such as the proton and neutron mass difference) that allow life to emerge, and indeed, prevent the whole universe from collapsing.

Let us touch on a few points in this debate. First, there is the principle of observational selection 41ff effect (OSE): likelihoods depend on the way you got your evidence. Let the observation be that all 50 fish in my net are more than 10 inches long. We have:

H_1: all the fish in the lake are more than 10 inches long.
H_2: only half of all the fish in the lake are more than 10 inches long. (3-1)

Then:

$$P(O \mid H_1) > P(O \mid H_2)\,.$$

But suppose there is also:

N: My net can only catch fish larger than 10 inches, and I left the net till there were 50 fish. (3-2)

Then:

$$P(O \mid H_1 \,\&\, N) = P(O \mid H_2 \,\&\, N) = 1.$$

My sample, in other words, was not random.

A similar reasoning is at work in the *Anthropic principle*:

$$P(\text{Constants are right} \mid \text{ID}) > P(\text{Constants are right} \mid \text{Chance})\,.$$

But suppose there is also:

E: We exist, and if we exist, then the constants are right. (3-3)

Then:

$$P(\text{Constants are right} \mid \text{ID} \,\&\, E) = P(\text{Constants are right} \mid \text{Chance} \,\&\, E) = 1.$$

My sample, again, is not random.

YSB