**Inference to the Best Explanation**

**Peter Lipton**

**A. Setup**

1. In broad terms IBE aims to give a *partial* account of inductive inference – both in science and ordinary life.

2. Governing idea: explanatory consideration are a guide to inference, that scientists infer from the available evidence to the hypothesis which would, if correct, best explain that evidence.

**B. Working out the Details (or trying, anyway)**

1. Some questions.

(a) Q1: Under what conditions does a hypothesis explain an observation?

Lot of problems here. None of the standard models really work out for IBE. For example, if we try to use the DN model of explanation, its isomorphism with the HD model of confirmation reduces IBE to a variant of the HD model.

 (b) Q2: What makes one explanation better than another or the best among the lot?

 Let’s look at this in more detail…

2. Question 2 in more detail.

Two possible options: (i) most probable explanation (**likeliest**), or (ii) the explanation, if correct, that would provide the greatest degree of understanding (**loveliest**)?

It can’t be (i) likeliest, since this pushes the IBE model towards triviality. Scientists do infer to the likeliest hypothesis. But we want to say how those judgments of likelihood are made, to give the “symptoms of likeliness.”

“To say that scientists infer the likeliest explanations is perilously similar to saying that great chefs prepare the tastiest meals: true perhaps, but not very informative if one wants to know the secrets of their success.” (6)

So, IBE is **‘Inference to the Loveliest Explanation’**.

*Central Claim*: “Scientists take loveliness as a guide to likeliness, that the explanation that would, if correct, provide the most understanding, is the explanation that is judged likeliest to be correct.” (6)

3. Three Challenges for the Central Claim

**Challenge of Identification**: Identify the explanatory virtues, the features of explanations that contribute to the degree of understanding they provide.

Some plausible candidates: scope, precision, mechanism, unification and simplicity. These are all very difficult to analyze.

Another approach is *contrastive.* Requests for explanations often take the form ‘Why P rather than Q?’ What counts as a good explanation depends not just on P but also on Q. So, we can try to develop a partial account of these virtues by specifying how the choice of foil determines the adequacy of the contrastive explanation. Then, roughly, “a good explanation requires a cause that ‘made the difference’ between the fact and foil.” (7)

Example: Why did Smith rather than Jones get paresis? Well, Smith had untreated syphilis and Jones didn’t. That’s an explanation. But if Doe also had untreated syphilis that isn’t an explanation of why Smith and not Doe.

**Challenge of Matching:** Show that these aspects of loveliness match judgments of likeliness, that the loveliest explanations tend also to be those that are judged likeliest to be correct.

The situation is more promising here since explanatory virtues also seem to be inferential virtues, features which lend support to a hypothesis.

The contrastive approach comes in here as well, because contrasts in why-questions often correspond to contrasts in the available evidence.

Example: Semmelweis’ discovery that disinfecting hands reduced childbed fever. There were two maternity wards, but only women in one contracted the fever. The obvious contrastive question was asked – why this ward and not the other? Once he settled on an explanation that medical students were only conducted obstetrical examinations in one ward after they had been performing autopsies. He introduced a further contrastive procedure, by making the doctors wash their hands before entering the first ward – this suggested the question of why no fever after hand washing and fever before? The hand washing, of course.

This is common anytime a controlled experiment is used.

**Challenge of Guiding**: Show that loveliness is the scientists’ guide to likeliness.

Here we have to establish that scientists judge the hypothesis likely *because* it is lovely.

This is a tough situation. If we meet the challenge of identification (finding the explanatory virtues). Then we expose ourself to the charge that it is some other feature of another account, that matches up with those explanatory virtues, that really allows for the inference to go through. In other words: “Meeting the matching challenge exacerbates the guiding challenge.” (9)

Two ways to argue that loveliness is a guide to likeliness:

1. If IBE is shown to be a better account of inference than any other available account, then we have good reason to suppose that loveliness guides likeliness.

2. The match between likeliness and loveliness (which we are supposing here) itself calls for an explanation. IBE provides this explanation.

“If scientists select hypotheses on the basis of their explanatory virtues, the match between loveliness and judgments of likeliness follows as a matter of course. Unless the opponents of the model can give a better account of the match, the challenge has been met.” (9)

**C. Application to Problems of Justification**

1. *Problem of Induction*:

IBE doesn’t solve it.

“Reports of past observation will never entail that future inferences to the best explanations will in fact select true hypotheses; and any argument that the reliability of inference to the best explanation would itself be the best explanation of what we have observed begs the question.”

2. *Defending Scientific Realism* (no-miracles argument):

Suppose that the predictions of some scientific theory are found to be correct. What is the best explanation of this predictive success?

The best explanation is that the theory itself is true, so by IBE, we can infer that the theory is true.

Three objections:

(i) The explanation for the success of the theory isn’t distinct from the explanations within the theory.

Response: They are distinct. The first explanation for the success of the theory is of logical structure, the second kind of explanation is typically causal.

(ii) The inference to the truth of the theory is circular. The no-miracles argument is an attempt to use IBE to justify scientific IBE.

Possible Response: The IBE explanation in either case has a different structure as above.

(iii) Truth simply isn’t the best explanation of predictive success. Empirical adequacy is a better explanation. All of its observable consequences are true, but not the theory as a whole.

Response: Explanation in terms of empirical adequacy isn’t as lovely as explanation in terms of truth. It comes perilously close to saying the consequences of the theory are true because they are true. Anyway, a theory can be both empirically adequate and true.

We can reform the third objection in terms of underdetermination. Now we have multiple incompatible theories all of which have matching successful predictions. In this case IBE would be in a bind and couldn’t decide which of the competing theories is true.

“Neither of the justificatory applications of IBE we have considered appears promising. If the model can help to solve problems of inductive justification, these are likely to concern more specific aspects of scientists’ inductive practices.” (13)

“The model may be counted a philosophical success if it can be shown to give an illuminating descriptions of some of the general inferential principles that guide scientific practice.” (13)