

**Green Cheese, Red Herrings and Dead Kennedys: why questions, relevance relations and epistemic interests**

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### **1. Introduction**

The erotetic model of explanation regards explanations as answers to why-questions. The first philosopher to develop this idea was Bas van Fraassen (1980). A why-question typically has the form “Why A rather than B”? Such questions have three important features: the *topic* (in this case A) which is taken to be true, the *foil* (in this case B) which is taken to be false, and a *relevance relation*. The topic represents the fact in need of explanation. A why-question thus contrasts the topic with the foil, although the foil is not always explicitly mentioned. For example, we might ask “Why does John paint a portrait of the Queen?”. Stated like this, the question is ambiguous. We might want to know why John paints a portrait of the *Queen* rather than a landscape. Or perhaps our interest is still different, and we would like to know why *John* paints a portrait of the Queen (perhaps it is public knowledge that John has never finished art school). To remove this kind of ambiguity, it is necessary to explicate the foil as well as the topic.

But even then there is a danger of ambiguity: why-questions can be formulated with identical topics and foils, yet still demand different answers. Suppose that, at the end of a trial conducted somewhere in the U.S., a defendant is sentenced to a year

imprisonment. We might ask: “Why is the defendant sentenced to a year imprisonment, rather than acquitted?” Now for someone who is unfamiliar with the American legal system, the answer “Because the jury found him guilty” can be informative. Yet for another person well acquainted with American law, this answer is entirely unsatisfactory. For him, the answer should probably say something as to *how* the jury came to their decision. It seems then, that explicating the foil is not always sufficient to remove the ambiguity from a why-question. In these cases, the third element, the relevance relation is to be specified. In our example, two relevance relations come into play. In the first case the explainees expects causal factors as answers (because he/she does not know them), in the second case the explainees expects a description of the (unknown) causal mechanism linking (known) causal factors to the effect to be explained.

The erotetic model has been charged of “excessive liberalism”: it admits some answers to why-questions to the category of explanations that clearly do not belong there. According to the critics, the erotetic model allows too much choice when it comes to the foil and relevance relation and this makes it vulnerable to objections. Two of these problems are the so-called “green cheese” and “red herring” problems (the labels are from Risjord 2000).

First, the green cheese problem. Some foils are not only false, but downright irrelevant. Thus, we might well ask the question “Why is the defendant sentenced to a year imprisonment, rather than the moon made of green cheese?” Surely an answer to this question cannot be counted as an explanation.

Second, the red herring problem. This problem arises, as one might have guessed, from the liberal attitude towards the relevance relation (the original formulation can be

found in Kitcher & Salmon 1987). If any relation is allowed, then even if a relevant, non-ridiculous foil has been chosen, any true statement can explain any true topic: “Why is the defendant sentenced to a year imprisonment?” can be explained by the statement: “red herrings have gills” if the relevance relation is specified as “the answer must have more *rs* in it than the question”. Or, to borrow Kitcher and Salmon’s original example, suppose we ask why John F. Kennedy died on November 22, 1963, rather than November 23. Now if there is no restriction on the relevance relation, then we cannot exclude statements based on astrological theory as answers: a true description of the positions of stars and planets at the time of Kennedy’s birth could count as a relevant answer for the question why Kennedy died on November 22, 1963.<sup>1</sup> Clearly we want to exclude such inappropriate answers as explanations.

Now the standard way of coping with this problem is to point at the context in which a certain question is asked. In this paper we show that both problems can be solved by taking into account the epistemic interests people have when asking why-questions. In the section 2 we will show how different interests lead to different types of questions: we distinguish between questions motivated by therapeutic interests (I- and I’-type questions) and those motivated by surprise (E- and T-type questions). Each of these pairs of question-types are then considered in more detail in sections 3 and 4 respectively. A conclusion will recapitulate the progress we have made.

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1 It should be noted that some philosophers have construed incorrect examples of the red herring problem. Thus, it has been argued that if the relevance relation states that the answer must have three *rs* and two *gs* in it, then the answer “Red herrings have gills” explains why Bush is president (Khalifa 2004). This however is a wrong example, for ‘having three *rs* and two *gs*’ is a property of the explanans, *not* a relation between explanans and explanandum. The confusion stems, we think, because of a shift in terminology: Khalifa follows Risjord’s substitution of the term ‘relevance relation’ with ‘relevance criterion’ (Risjord 2000), and of course, though not a relation, ‘having three *rs* and two *gs*’ can be a criterion. Although this is not a serious problem (as we have just shown, the relevance criterion can easily be reformulated into “the answer must have more *rs* in it than the question”), nevertheless we feel that to avoid such confusions, it is best to stick to van Fraassen’s original term; especially since the shift was not made on principal grounds (Risjord 2000 p. 71 note 4).

Generally, we will show that epistemic interests can provide insight into why people ask certain why-questions (rather than other ones) and why causation is the relevance relation we expect to be satisfied in many contexts. In so far as we take into account these epistemic interests, our approach could be labelled pragmatist. However, as the question types provide us with general solutions to the problems mentioned above, our approach differs from contextualist accounts like Risjord's.

## 2. Different interests, different questions

Again, according to the erotetic model, explanations are answers to why-questions, and are motivated by the particular interests a given researcher has. However, as there are different kinds of interests, there are different kinds of why-questions to be distinguished. Suppose that  $x$  has property  $P$  at time  $t$ . This could precipitate the basic question:

Why does  $x$  have property  $P$ ?

However, as we have already seen, a question like this is ambiguous: typically, a foil or contrast class is explicated. Thus, the question can be reformulated into different types of questions, each individuated by spelling out their contrastive part:

Why does  $x$  have property  $P$ , rather than the ideal property  $P^*$ ? (I-type)<sup>2</sup>

Why does  $x$  have property  $P$ , while  $y$  has the ideal property  $P^*$ ? (I'-type)

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<sup>2</sup>  $P$  and  $P^*$  are mutually exclusive properties.

Why does  $x$  have property  $P$ , rather than the expected property  $P^*$ ? (E-type)

Why does  $x$  have property  $P$  at time  $t$ , but property  $P^*$  at time  $t'$ ? (T-Type)

As we shall see, I- and I'-type questions are typically motivated by therapeutic interests, E- and T-type questions by surprise. There are more divisions to be made, but these will be sufficient for our present purposes. In what follows, we will consider all these kinds of questions, pair them up according to the interest they serve (the I/I' types and the E-/T-types respectively), and illuminate each pair with an example.

### 3. I- and I'-type questions

A particularly common type of why-question that is posed by researchers are what we call I-type questions. I-type questions are often motivated by preventative and/or therapeutic interests. Let's consider a historical example.

According to an article in Time Magazine of January 1, 1945, the US army, fighting on the European continent in the last wet months of the previous year, suffered an outbreak of *foot immersion syndrome*, also known as trench foot (after its devastating impact at the western front during the first world war). Trench foot is a condition brought on by poor vascular supply to the feet, due to prolonged exposure to damp and cold conditions. Symptoms include numbness, swelling and early stages of necrosis in affected areas. According to the article, approximately 17,500 U.S. soldiers developed the condition. An I-type question would be:

Why did the American army suffer from trench foot, rather than stay healthy?

This type of question contrasts an actual fact with an ideal one. Obviously, the motive for posing this kind of question is therapeutic: we want the soldiers to stay healthy, and discovering the cause of trench foot is of course instrumental in doing so. This last point is important: in posing this type of question with a therapeutic motivation, the researcher effectively defines the relevance relation as causal relevance. In the case at hand, causal factors in developing trench foot are prolonged exposure of feet to cold and damp conditions; conditions that are typical of northwest Europe during November and December.

But there is more. The article goes in to say that in contrast, the British army, even though it made its way through the damp plains of Holland, reported no similar problems, as its soldiers wore robust gum boots, which they were required to keep waxed, and were instructed to regularly massage their feet and change their socks. In general, the British were ordered to take care of their feet, while the Americans were not. Now this information makes it possible to pose an I'-type question:

Why did the American army suffer from trench foot, while the British army did not?

Again, in many cases the interest behind an I'-question is therapeutic, but the added bonus over the regular I-type question is that the answer you get to the former typically suggests that the therapeutic measure in question is not beyond our reach. Anyway, the explanation might look like this:

The American army experienced an outbreak of trench foot because:

- 1) the conditions were damp and cold; and
- 2) the soldiers did not take care of their feet.

The British army did not experience an outbreak of trench foot even though:

- 1) the conditions were damp and cold, because
- 2) the soldiers took care of their feet.

The contrast is caused by human intervention that is absent in the former, while present in the latter case. The explanation explicates this difference as a causal factor. Apart from manipulability, probability values also play a role in assessing the value of an explanation. If it is the case that soldiers who follow the British rules never develop trench foot, while those that neglect their feet (in damp and cold conditions) always do, then the explanation just sketched would be ideal, in that it cites the one and only effective treatment. In our example, this is clearly not the case, which means that the explanation is to be judged by (among other things) the degree of probability it confers upon the conclusion.

In general then, I- and I'-type questions are posed with therapeutic or preventative interests in mind and as such they have a normative dimension. The answers to these questions cite possible human interventions and are judged with respect to manipulability and the effectiveness of the manipulations they suggest as therapy.

Two points are important here. First, a researcher posing I- and I'-type questions does not have a green cheese problem, because ridiculous foils about the moon being made of green cheese do not describe ideal facts (states of events we want to bring

about). The contrastive part of the question specifies a state of affairs the researcher wants to achieve. Even if there are people who want the moon to be of green cheese, this is still no relevant alternative for e.g. the occurrence of trench foot.

Second, red herring problems are also avoided: the relevance relation one is after in posing these questions is *causal*: at the very minimum, it is causally relevant in that the therapeutic measures the explanation suggest raise the probability of reaching the desired effect. The fact that the relevance relation is causal dispels any worries about red herrings. Not every statement will count as a satisfactory answer to an I- or I'-type question, because not every statement describes an event that is causally relevant to the topic occurring and the foil not occurring, and it is only causality that the researcher is interested in. Recall Kitcher and Salmon's example of Kennedy's death: the pseudo-scientific answer about the astrological circumstances at the time of his birth is ruled out by the fact that there is no evidence that positions of celestial bodies are causally relevant to Kennedy dying.

#### **4. T- and E-type questions**

Next, we will consider T- and E-type questions. These questions are often posed if observations yield data that are not expected: the motivation is surprise or unexpectedness.

We will discuss T- and E-type explanations with an example of the social sciences: the explanation of the *gender gap*. The term gender gap refers to a shift in voting behaviour of American women over time (Chaney, Alvarez & Nagler, 1998; Manza &

Brooks 1998): while American women voted more consistently right-wing in the fifties and sixties, in the eighties and nineties, women were reported to offer disproportionate support to left-wing parties. About this phenomenon, researchers asked a T-type why-question of the form:

Why did American women on average vote more conservative in the 1950s and 1960s, while they offered more support to left-wing parties in the 1980s and 1990s?

This question is motivated by surprise, as we have an unexpected contrast (namely an unexpected evolution in time) to explain. An answer to a question like this should tell us why things are differently from what we expected them to be.

Initially, the answers researchers provided cited causes that were located at the level of U.S. politics. That is, social scientists tried to explain this shift in political preferences by referring to factors specific to the U.S. political situation, such as party differences on the ERA (a proposed amendment to the American constitution guaranteeing equal rights for women under federal, state and local law) and strong divisions on topics as abortion and welfare reform policies (Costain & Berggren 1998; Mueller 1988). An answer like this leads to further expectations: insofar as the causes of the gender gap are specific to the political situation in the U.S., we would not expect to find a similar pattern in other countries, where these factors are absent.

However, this is not the case. In a recent paper, Giger argued that evidence obtained from the EuroBarometer suggests that in most Western-European countries, a similar shift in political preference among women is discernible, though appearing somewhat later and in varying degrees across countries (Giger, 2009). Thus, Giger

was led to ask an E-type question:

Why does voting behaviour among women of Western European countries display a similar shift as in the U.S., rather than remain unaltered?

Again, this type of question is motivated by surprise: given the fact that the gender gap was previously explained by referring to conditions specific of the U.S., the result was unexpected. An answer to this question should ideally indicate what led us to the wrong expectation in the first place: it should refer to factors that were previously ignored. Giger argues that the developmental theory of gender realignment (henceforth DTGR) by Inglehart and Norris (2000, 2003) does a better job of explaining the phenomenon of the gender gap, to the extent that it also explains its occurrence in Western Europe. Rather than pointing at specific circumstances of any one country, DTGR points at structural and cultural developments that are common to wealthy, post-industrial societies. These include: reforms in the paid labour force for women, more equal opportunities of education and a shift in traditional family values. By referring to these factors, the theory explains why the gender gap also manifests itself in Western European countries and the developed world in general (rather than post-communist or third world societies), and reveals what features were left out the original explanation and why this omission led us to wrong expectations.

As we have seen, T- and E-type questions are motivated by surprise: unexpected results are in need of explanation. However, the unexpected result is of specific type: an unexpected difference between two objects or systems who were expected to behave similarly with respect to some property (E-type) or an unexpected evolution

(rather than stability) within an object or system. In this way, problematic green-cheese-like foils are avoided. Moreover, in assessing the merits of specific answers to T- and E-type questions, the causal factors that bring about the explanandum are of great importance: the difference (between objects/systems or over time) is explained by a causal factor we have overlooked. A satisfactory answer is one that gives us this missing causal factor. As with I- and I'-type questions, this restriction on the relevance relation means that scientists need not worry about the red herring problem either.

## 5. Conclusion

In this paper we have considered various types of why-questions researchers are prone to ask. The appropriateness of these questions can only be judged in relation to the purpose or interests they are meant to serve. The answers lay bare the causal factors that bring about the explanandum; or, in erotetic terms, that explain the truth of the topic and the falsehood of the foil. It is only in so far as these answers succeed in so doing, that they can be considered successful or not. We have effectively defined the relevance relation in terms of causal relevance, which, at least initially, seems conducive to scientific practice

By defining the relevance relation in terms of causal relevance, our approach allows a pragmatic account of scientific explanation to avoid problems connected with excessive liberalism, more particular the green cheese and red herring problems. Moreover, it does so in a non-contextual way, for although the approach is pragmatic in that it takes into account the interests researchers have in asking explanation-seeking questions, the relevance of the contrastive elements of their questions as well as that of the answers is guaranteed, not by contextual factors, but by the demand of causal relevance, which is a feature of scientific explanation that is shared across a wide range of disciplines and research environments. Again, our approach is pragmatic in that we take into account the reasons researchers have for posing certain types of why-questions, but as these types adhere to a general format, transcending the particular context in which problems of relevance may arise, our solution is non-contextual. Further work is needed to confirm whether these conclusions hold across a broad range of scientific disciplines.

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