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### Understanding as Knowledge of Causes

What is the epistemic gain that occurs when we move from knowing that something is the case to understanding why it is the case—for example, from knowing that the eclipse occurred to understanding why it occurred, or from knowing that the coffee spilled to understanding why it spilled? According to one prominent view, with roots at least as far back as Aristotle, the move from knowing that *p* to understanding why *p* occurs when we acquire knowledge of the cause of *p*. As Peter Lipton puts the idea, the transition to understanding why is not accomplished by acquiring “some sort of superknowledge, but simply more knowledge: knowledge of causes” (Lipton 2004, p. 30).<sup>1</sup> Because of its longstanding appeal, we can think of this idea—the idea that understanding derives from knowledge of causes—as the traditional view of understanding.

Over the last several decades, the traditional idea has encountered a number of objections. According to some critics, knowledge of causes is not necessary for understanding— either because some state short of knowledge is enough for understanding,<sup>2</sup> or because understanding can arise from non-causal sources.<sup>3</sup> According to others, the problem is that knowledge of causes is not sufficient; if these critics are right, it is not difficult to produce cases in which one knows the cause of *p* while nonetheless falling short of understanding why *p*.<sup>4</sup>

One thing I will argue in this paper is that all of these concerns turn on an inadequate idea of what it means to have knowledge of the cause. Properly understood, I will claim, the traditional view can avoid the objections that have been leveled against it. My main strategy will therefore be to try to respond to these objections by first spelling out in more detail how I think the “knowledge

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<sup>1</sup> Further contemporary support for the knowledge of causes view can be found in Salmon (1984, pp. 19-20), Miller (1987, p. 60), Woodward (2003), Strevens (2008), and Greco (2010, pp. 8-9; forthcoming).

<sup>2</sup> See e.g. Kvanvig (2003; 2009) and Elgin (2004; 2009).

<sup>3</sup> See e.g. Hempel (1965), Railton (1978), Achinstein (1983), Kitcher (1985), and Ruben (1992).

<sup>4</sup> See e.g. Pritchard (2008; 2009; 2010) and Hills (2009; 2010).

of causes” formula should be understood. Or, perhaps better, I will use these objections to try to gain a better sense of how knowledge of causes gives rise to understanding.

### **I. The Propositional Model**

In trying to fill out the traditional view, let us start with the idea, found in David Lewis (1986) among others, that to understand an event is just to “possess” causal information about that event. But what sort of possession is at issue here, and what sort of causal information, exactly, is most relevant to understanding?

There is one way of possessing causal information that clearly does not seem sufficient for understanding. Suppose that your knee bumps the table at your local coffee shop, leading your cup to spill, and that I am a few tables over, taking this all in. I will now possess a good deal of causal information relevant to the spill, but I might nonetheless possess the information in an “unconnected” way. For example, if my mind is now preoccupied with something else (with the engrossing gossip at the next table, say), then even though I will have registered this information at some level I might nonetheless have failed to do the cognitive work necessary to connect or bring together the information in the appropriate way.

Alternatively, even though I might possess the relevant causal information, I might not be in a position to recognize it as such. Thus, and to switch to a different example, I might know that my son is undergoing an anaphylactic reaction—know that he is breaking out in hives, that he finds it difficult to breathe, and so on—and I might know that (among other things) he just ate some peanuts, but I might not be able to identify the eating of the peanuts as the cause of the reaction. That is, I might not be able to connect up my knowledge about the eating of the peanuts and the reaction in the right way.

But what would “the right way” amount to in these cases? How exactly should these different bits of causal information be connected or brought together? One natural suggestion here is that they should be brought together in the form of a *causal proposition*, that is, a proposition that specifies the causal relationship that holds between the explanandum and the explanans. For

example, it would be to possess the causal proposition *that the coffee spilled because the table was bumped*, or *that my son is undergoing an anaphylactic reaction because he just ate some peanuts*.<sup>5</sup>

The following general picture has therefore seemed very tempting to many, namely, that:

(a) S has knowledge of the cause of p

just in case

(b) S knows that p because of q.

To the extent that philosophers have tried to specify what it means to have knowledge of the cause, this model—what we might call “the propositional model”—seems to be the dominant one in the literature. Thus Lewis is quite clear that what is possessed, when one possesses causal information in a way that is relevant to understanding, is a proposition (Lewis 1986, p. 218), and Jaegwon Kim goes so far as to say that the propositional model is *entailed by* the view that causal relations are real metaphysical relations in the world (a position that Kim calls “explanatory realism”).<sup>6</sup> As Kim puts it, such a realist view “makes ‘having’ an explanation a matter of knowing a certain proposition to be true” (Kim 2010 [1988], p. 157). It is no surprise, then, that when contemporary philosophers such as Duncan Pritchard and Alison Hills have turned to evaluate the traditional knowledge of causes view, it is the propositional model that they have had in mind.

## II. Some Cases

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<sup>5</sup> On this way of looking at things, moreover, the appropriate way to “possess” a causal proposition of this sort would presumably be, not just by assenting to the proposition, but by assenting to it in a way that amounts to knowledge. Although one might mentally possess a causal proposition in some other way (say, by disbelieving, or by withhold judgment about it), supporters of the “knowledge of causes” view would obviously take this possession to be of the knowing kind. Although later we will return to the question of what this knowing might amount to, and whether something less than knowing might do, we can let this stand for now.

<sup>6</sup> See Kim (2010 [1988], esp. pages 156-59). There Kim summarizes his point by claiming “We have also seen that explanatory realism entails the propositional account of explanatory knowledge” (Kim 2010 [1988], p. 158).

If Pritchard and Hills are correct, however, the traditional view needs to be abandoned, or at least supplemented, because one can have knowledge of the cause of *p* while nevertheless not understanding why *p*.<sup>7</sup>

To start with one of Pritchard's examples, suppose that my house burns down while my family and I are away for a few hours, and that as we return home to the scene my young son asks the fire chief why it burned down.<sup>8</sup> The chief then tells him that it burned down because of faulty wiring, and my son accepts this based on his say-so. How much does my son now know? For one thing, he presumably knows that his house just burned down; he can see that with his own eyes. More importantly for our purposes, however, he also seems to know that his house burned down because of faulty wiring. He did, after all, receive this information from a perfectly reliable source, and in a language he could understand. On the propositional model described above, he would therefore have not just knowledge of the cause of the fire but would, thereby, understand why his house burned down.

According to Pritchard, however, this last step is implausible because it seems wrong to say that my son now understands why his house burned down. As he writes: "He has no conception of how faulty wiring might cause a fire, so we could hardly imagine that knowing this much suffices to afford him understanding of why his house burned down. Nevertheless, he surely does know that his house burned down because of faulty wiring, and thus also knows why his house burned down" (Pritchard 2010, p. 81; cf. Pritchard 2009, p. 38). The thought therefore seems to be that understanding requires not just being able to identify the cause, in the sense of knowing a causal proposition that specifies or picks out the cause, but requires some conception of how the cause might bring about the effect in question.

Appealing to a different example, but drawing explicitly on Pritchard's work, Alison Hills likewise claims that one can know that *p* is the case, know that *p* because of *q*, and yet nonetheless

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<sup>7</sup> Unlike Pritchard's, Kvanvig's discussion of understanding focuses on cases of what he calls "objectual understanding" rather than on cases of "understanding why." For more on his distinction, see Kvanvig (2003, ch. 8; 2009). The discussion below will eventually broaden out to include those cases as well.

<sup>8</sup> I have adapted Pritchard's first-person story to my own.

fail to understand why *p*. In her case, to be clear, she does not appeal specifically to the notion of a *cause* but rather to the notion of a *reason*. The basic thrust of the argument, however, is the same.<sup>9</sup>

Here is her example: suppose that eating meat is wrong, that I come to believe this as a result of trusting a reliable authority, and that I likewise come to believe (by trusting that same authority) that eating meat is wrong because of the suffering of animals under modern farming methods. According to Hills, even though I might well know all these things (supposing they are true), it does not follow that I would thereby understand why eating meat is wrong. Why? Because, Hills claims, even armed with this knowledge I might nonetheless not be able to “draw relevant distinctions,” or to “come to correct conclusions about similar cases.” If asked “What about fish?” for example, or “What about animals reared under better conditions?,” I might well draw a blank (Hills 2010, p. 192; cf. Hills 2009, p. 100).

In short, according to both Pritchard and Hills, knowing the cause of *p* or the reason why *p*—in the sense, more generally, of knowing a correct explanation to the effect that *p* because of *q*—is not sufficient for understanding why *p*. In order for genuine understanding to appear on the scene, something else—perhaps some sense of how the cause brings about the effect (Pritchard), or an ability to answer closely related questions (Hills)—is apparently needed.

Of course, one might dispute Pritchard’s and Hills’s judgments about these cases. In particular, and focusing for simplicity on Pritchard’s case, one might disagree with the claim that my son now knows, solely on the basis of the fire chief’s testimony, that his house burned down because of the faulty wiring, because (at least as Pritchard tells the tale) it is not clear he understands the content of that proposition well enough to actually believe it. I will return to this thought at the end of Section 5. In the next few sections, however, what I will argue instead is that even if we grant Pritchard and Hills that there is a way in which someone might know the cause that is not sufficient for understanding, there is another way in which one might know the cause that is. More exactly, what I will suggest is that the place where their objection goes wrong is in its innocent-looking first step, the one that supposes the best way to understand the “knowledge of

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<sup>9</sup> Especially if, as I will recommend in Section 7, we adopt an expansive notion of causation.

causes” formula is according to the propositional model. If this step is mistaken—if there are other viable ways in which the “knowledge of causes” formula might be understood—then it opens up the possibility that there are other ways in which one might have knowledge of the cause that *do* suffice for understanding.

But where should we look for these other viable models, for these other ways of thinking about the “knowledge of causes” formula? In the following section I will suggest that an alternative, and more appealing, way of thinking about the traditional view can be gleaned from considering how a parallel debate plays out in the case of *a priori* knowledge. The *a priori* case is particularly worth considering because, just as in discussions of understanding, appeals to the metaphors of “grasping” or “seeing” are nearly ubiquitous in the literature. A look at the *a priori* therefore promises to give us a better sense of how these central metaphors should be understood in the case of understanding as well.

### III. “Grasping” or “Seeing” *A Priori*

Although there are dissenters,<sup>10</sup> perhaps the most common point of agreement among writers on the *a priori* is that *a priori* knowledge is essentially knowledge of necessary truths: knowledge of truths such as that  $2+3=5$ , or that no object can be red all over and green all over at the same time.<sup>11</sup> But even this initial characterization of the *a priori* seems to gloss over something important.

For example, and as several philosophers have noted,<sup>12</sup> one basic problem with this way of characterizing the *a priori* is that not all knowledge of necessary truths amounts to *a priori* knowledge. Suppose that I can’t be bothered to do a particular calculation, so I trust your judgment (or perhaps, my calculator’s) that  $207+86=293$ . Then I will come to have knowledge of a necessary

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<sup>10</sup> For example, Gareth Evans (1979), Saul Kripke (1980), and John Turri (forthcoming) have argued that there can be *a priori* knowledge of contingent propositions. For critical discussion see BonJour (1998) and Casullo (2003)

<sup>11</sup> For defenders of the idea that *a priori* knowledge is knowledge of necessary truths, see (among others) BonJour, Plantinga, Butcharov and others [Chisholm?].

<sup>12</sup> See Chisholm and Plantinga.

truth, but it will not be an instance of *a priori* knowledge. Instead, it seems best to think of it as an instance of testimonial knowledge (or the like).

But what then is needed to transform my knowledge *into* an instance of *a priori* knowledge? Presumably the main problem here is that even though I now have knowledge of a necessary truth, I nonetheless fail to see or grasp or in some way appreciate its necessity. So suppose we add that I learn from you not just that  $207+86=293$ , but also that this is a necessary truth, or perhaps you tell me that necessarily,  $207+86=293$ . Does this bridge the gap? Once again, it seems not, for once again it seems that I can accept these propositions based on your say-so while nonetheless not acquiring an instance of *a priori* knowledge.<sup>13</sup>

The upshot therefore seems to be that to know some necessary truth *a priori* I need to do more than just assent to a necessary proposition,<sup>14</sup> or assent to a necessary proposition along with the further stipulation *that* it is necessary. What I need instead, it seems, is to “see” or “grasp” the necessity itself. But how do I do that?

If philosophers such as Chisholm, Plantinga, and Bonjour are correct, it seems that to manage this seeing or grasping we need to bring a new power of the mind to bear, a power they refer to as *reason* or *rational insight*. When all goes right, moreover, what this power does is “see” or “grasp,” of the sum of 207 and 86, that it could not be otherwise than 293—that there is no possible world where the sum of 207 and 86 does not add up to 293. What the metaphor of “seeing” seems to involve, then, is something like an apprehension of how things stand in modal space—an apprehension, that is, that there are no possible worlds in which the sum of 207 and 86 does not equal 293. Just as, in seeing with one’s eyes, one takes in or apprehends how things stand in the physical terrain, so too the basic idea here seems to be that in “seeing” with the eye of the

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<sup>13</sup> Or, if it is hard to imagine that simple sums of this sort might simply be accepted on the word of another, substitute something more challenging: for instance, that the continuum hypothesis is independent of ordinary set theory (from Plantinga 1993, p. 106). And suppose I learn as well from the authority that this is a necessary truth, and I take that at face value. Here again I don’t have an instance of *a priori* knowledge, but I do have knowledge of a necessary truth (and knowledge that it is necessary, and so on).

<sup>14</sup> Following Bruce Russell, by a necessary proposition I mean a proposition that cannot be false (Russell 2007).

mind, one takes in or apprehends how things stand in the modal terrain: one apprehends what cannot be otherwise, or how certain changes will lead, or fail to lead, to other changes.<sup>15</sup>

If this picture is correct, in any case, then for our purposes the important thing to see is that *what* is grasped or seen, when we grasp or see *a priori*, is not in the first instance a proposition but rather a modal relationship between properties (or objects, or entities) in the world. Put another way, what is primarily grasped or seen is not (e.g.) a proposition such as:

(a) that  $207+86=293$ ; or perhaps that

(b) that  $207+86=293$  is necessarily true.

Rather, what is grasped or seen is (something along the lines of):

(c) Of the sum of 207 and 86, how it could not be otherwise than 293.

In other words, on this view what *a priori* knowledge amounts to is a kind of *de re* knowledge—a knowledge that comes from grasping or seeing, of certain properties (objects, entities) that they are modally related in a particular way. As Laurence Bonjour puts the idea, *a priori* insights, “are thus putative insights into the essential nature of things or situations of the relevant kind, into the way reality in the respect in question *must* be.... [I]t is often and quite possibly always a mistake to construe them as propositional in form” (Bonjour 2005, pp. 99-100).<sup>16</sup>

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<sup>15</sup> Cf. Panayot Butchvarov: “While both necessary and contingent truths have fundamentally different objects, in both cases such objects are, in a very general sense, *perceived*” (Butchvarov 1970, p. 179).

<sup>16</sup> Given our purposes here, it is also worth pointing out that Bonjour’s position in this quote represents a conspicuous and deliberate change from his earlier 1998 book on the *a priori*. While in that book he essentially took for granted that propositions were the object of *a priori* knowledge, he subsequently (as in the 2005 article just quoted) came to believe that this was “a serious mistake” (Bonjour 2001, p. 673, and again on p. 678). Bonjour credits Paul Boghossian (2001) with helping him to see the shortcomings of the propositional view, because it was Boghossian who pointed that no amount of assenting to propositions *about* necessary facts could add up to a single act of *a priori* insight, a single apprehension of how the constituents of these facts were necessarily related. According to Boghossian, this is the lesson we should have learned from Lewis Carroll’s famous dialogue between the Tortoise and Achilles, where the Tortoise effectively notes that it is one thing to assent to the premises of an inference, and quite another to see or grasp how the conclusion follows from the premises. But once this fact is appreciated, Bonjour came to think, we should give up the idea that *a priori* insight—at least in many cases—is directed at propositions at all. As he writes: “Moreover, once this possibility is appreciated, it becomes clear at once that at least many other *a priori* insights are also of this non-propositional sort. Consider the one involved in the color incompatibility case. What is most fundamentally grasped or apprehended there, I would now suggest, is the actual relation of incompatibility between the two colors, the way in which the presence of one excludes the presence of the other, with the propositional awareness that this is so, that nothing can be red and green all over at the same time, being again secondary and derivative. And something similar seems to me to be true in many, many other cases. Indeed, the question that arises, but which I will not try to answer here, is whether there are any cases where the most basic insight is propositional in form” (Bonjour 2001, p. 677).



The basic idea here is therefore not that propositions have no role to play in *a priori* knowledge, but rather that they play a secondary or derivative role. If Bonjour is right—and I think he is—the primary object of *a priori* knowledge is the modal reality itself that is grasped by the mind, and it is on the basis of this grasp that we then (typically) go on to assent to the proposition that describes or depicts these relationships.

#### IV. Parallels

Suppose that these thoughts about the *a priori* are on target. How does this shed light on our question about how the “knowledge of causes” formula might best be understood?

What the parallel debate concerning the *a priori*—with its parallel notions of “grasping” and “seeing”—suggests is that just as the “knowledge of necessary truths” formula can be understood in a variety of ways, a similar ambiguity can be seen in the traditional “knowledge of causes” formula. In other words, just as the notion of “knowledge of necessary truths” can pick out either the state of:

(a) assenting to a necessary proposition on reliable grounds (on the basis, say, of reliable testimony, or reliable memory),<sup>17</sup>

or the state of:

(b) grasping or seeing the necessary relatedness of certain properties (objects, entities).<sup>18</sup>

so too the notion of “knowledge of causes” can refer either to:

(a\*) assenting to a causal proposition on reliable grounds (on the basis, say, of reliable testimony, or reliable memory),

(b\*) seeing or grasping the modal relatedness of the terms of the causal relation.<sup>19</sup>

In both cases of (b), moreover, the object of knowledge seems to be different than it is in the (a) cases, where the objects are propositions. More exactly, with the (b)s, what is grasped or seen is something like the modal relationships that obtain between the properties (objects, entities) at issue. In the case of knowledge of causes in particular, what would be seen or grasped would be

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<sup>17</sup> Or, perhaps, to a necessary proposition, along with the further information that it is necessary, etc.

<sup>18</sup> Alternatively, one might say here “grasping or seeing, of certain properties (objects, entities), how they are necessarily related.”

<sup>19</sup> Or again, one might say here “grasping or seeing, of certain properties (objects, entities), how they are modally related.”

how changes in the value of one of the terms of the causal relata would lead (or fail to lead) to a change in the other.

It is worth emphasizing that even though this “b\*” way of thinking about the knowledge of causes formula parallels the “b” way of thinking about the *a priori*, the success or failure of the “b\*” claim should not be thought to stand or fall on the success of the “b” claim (a good thing, given that debates about the *a priori* do not seem like they will be resolved any time soon). As I will try to show throughout the remainder of the paper, this “b\*” way of thinking about the knowledge of causes formula is defensible in its own right, and apart from any connection to the *a priori*. Nevertheless, as I noted earlier, given how pervasive the appeals are to notions such as “grasping” and “seeing” in both the literature on the *a priori* as well as the literature on understanding, it would be good if our theory of understanding helped to shed some light on this connection, and this is one thing that I take that the “knowledge of causes” approach to understanding (properly construed) promises to do.

## V. Back to the Fire

Applied back to Pritchard’s case of the house fire, what the previous section suggests is that whether or not we take my son to understand will depend a great deal on which of these ways of “knowing the cause” we have in mind. On the first way of looking at things, the way that Pritchard presumably has in mind, what we would be imagining is that my son “simply assents” to the causal proposition relayed by the fire chief—that is, he accepts the information, he gives a mental “yes” to it, he is ready and willing to repeat it to his friends, and so on—but that he then, as it were, cognitively leaves it at that.

On the second way, however, we would be imagining that my son does not leave it at that, but that he processes the information at a deeper level, so that he sees or grasps, of the terms of the explanation, how they are related. In this case, he would be bringing a new and different power of the mind to bear: one that is sensitive not just to how things are, but to how things stand modally, and in particular to how things might have been, if certain conditions had been different. For

example, on this way of looking at things my son would now see or grasp that if the condition of the wires had been different—if the wires had not been faulty—then the house would not have burned down (*ceteris paribus*).

Now, one might object (along with Pritchard, it seems) that even on this second way of looking at things more must be required of my son, if we are to credit him with understanding—that he must not simply grasp that if the wiring had been in order, the fire would not have occurred (*ceteris paribus*), but he must also be able to identify what it was about the faulty wiring that led to the fire. This, after all, seems to be what the fire chief himself grasps, and thus it might seem that this is what is really essential to understanding. But rather than conclude, on the basis of this difference, that the fire chief understands why the fire occurred while my son does not, it seems better to say that the difference between the chief and my son is not one of kind but of degree; in particular, the idea would be that while my son has *some* understanding of why the fire occurred, the chief has a much deeper or more sophisticated sort of understanding.

Consider the following parallel: when I start chopping onions and my eyes begin to water, I think I understand why my eyes are beginning to water, namely, because I am chopping the onions. I don't think it is because of the time of day, or the color of the shirt I am wearing, or anything like that; it's because of the onions. But obviously someone with a greater understanding of onion (and eyeball) chemistry would be able not just to identify the onions as the cause but would be able to say what it was about the onions that was bringing this about—in this case, the particular sulfur compounds that were being broken down and released into the air when I did the chopping. What such a person would therefore grasp, which I would not, is that I if were to chop some other vegetable with these same compounds, my eyes would likewise begin to water (*ceteris paribus*); or perhaps, that if were to chop an onion specially designed to lack these compounds, my eyes would not water; and so on. But again, what these facts seem to illustrate is not that the person who appeals to the compounds understands while I fail to understand, but that understanding comes in

degrees; I have less of it, and he has more. And similarly, it seems best to say, for the case of my son and the fire chief.<sup>20</sup>

All that said, one might still object that my portrayal of the two ways in which one might have knowledge of the cause of the fire is misleading (or inadequate or in some other way misguided) because it hardly seems possible for my son to know the cause in the first way I suggested—where my son simply assents to the causal proposition and then mentally “leaves it at that.” The main concern here, I take it, is that my son’s attitude in this imagined case would seem to be so simple—so mentally thin—that it is not even clear that he would be assenting to the proposition at all. Instead, he might simply be accepting the information as a parrot might—ready to repeat it, but without really grasping *what* is being said (or being repeated). Or again, it might be thought that what my son is assenting to is not the proposition *that my house burned down because of the faulty wiring* but rather a “nearby” proposition, such as *that whatever the fire chief just said is true* (or, a bit more formally, that *whatever proposition his sentence just expressed is true*). Either way, it seems that my son would not genuinely know the causal proposition at issue for the simple reason that he would not genuinely assent to it.

What these last thoughts suggest is that it is hard—perhaps impossible—to genuinely assent to a causal proposition without doing the sort of extra cognitive work that I claimed was characteristic of the second way in which one might have knowledge of the cause. That is, that it is hard—perhaps impossible—to genuinely assent to a causal proposition without in some way grasping that what it means for these two items to stand in the “because” relation is that a change in the state of the former will lead to a change in the state of the later (*ceteris paribus*).

For our purposes, however, it is not necessary to try to settle this question. Indeed, if it turns out that it is impossible for someone genuinely to assent to a causal proposition while mentally leaving it at that, then so much the better for our view, because it would imply that

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<sup>20</sup> Among other reasons that it seems best to say this is because otherwise a massive scepticism about understanding seems to threaten. Why, for example, think that the chemical story is sufficient for understanding? Why not insist that we go all the way down to basic physical properties? But if this is really required, much of the ordinary understanding we take ourselves to have would disappear.

genuinely assenting to a causal proposition automatically generates the sort of modal grasping or seeing ability that is (on the view here) characteristic of understanding. Put another way, it would imply that there are not two ways in which have knowledge of the cause—one “thinner,” leaving-it-at-that way, which is not sufficient for understanding, and one “thicker,” modal-grasping way, which is—but only one, viz., the thicker way. And if that’s right, then Pritchard and Hills would not have identified a genuine way in which one might have knowledge of the cause that does not suffice for understanding in the first place.

## VI. Another Model

So far I have claimed a few things. First, that the propositional way of thinking about the “knowledge of causes” formula is not mandatory, and that it instead seems possible to know the cause in such a way that the object of one’s knowledge—of one’s grasp—is the modal relationship that obtains between the terms of the explanation.<sup>21</sup> Second, that knowing the cause in this second way appears to be sufficient for understanding—at least, that it appears to be sufficient for *some* degree of understanding. For convenience, let us think of this second way of thinking about the “knowledge of causes” formula as the modal-model—that is, a model on which what is grasped when one has knowledge of the cause is the modal relationship that obtains between the terms of the explanation.

The modal model therefore seems not just to be not a possible way of construing the “knowledge of causes” formula, but a more charitable way, because it frees the view from counterexamples (at least, of the sort described above). Another strength of the view is that it ties in naturally with claims about the nature of understanding which have been independently popular among philosophers. According to Linda Zagzebski, for example, “understanding is not directed towards a discrete proposition, but involves grasping relations of parts to other parts and perhaps

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<sup>21</sup> This is not to deny the fallibility of whatever power of the mind it is that evaluates how things stand modally. One might therefore “see” or “grasp” (or seem to see or grasp?) modal relationships that do not obtain. It might therefore be better to say that the object of understanding in these cases, and perhaps in all cases, is our abstract representation of the relationships that we take to obtain in the world—as it were, our “mental model” of these relationships—so long as one recognizes a difference between abstract representations which take the form of models and those which take the form of propositions. For more on different ways of construing the object of understanding, see Grimm (2010) and Greco (forthcoming).

the relations of part to wholes” (2009, p. 142; cf. 2001, p. 242). And according to Julius Moravcsik, “What we understand are systems of various sorts; in a world in which elements do not constitute the relevant structures there can be no understanding” (1979, p. 56). Although put in different ways, the common thought here seems to be that the primary objects of understanding are the relationships (or structures) that hold among the various elements of reality—that it is in grasping how things are related in this way that we grasp how the world is structured.<sup>22</sup> But then this way of thinking about the object of understanding naturally accords with the way we construed the knowledge of causes formula above, on which the objects of that knowledge were the modal relationship that obtained between the terms of the explanation, rather than the propositions that described those relationships.

Our proposal also accords with the common idea that to have understanding is to have a kind of *ability* or *know how*.<sup>23</sup> On our proposal, “seeing” or “grasping” would count as a kind of ability, because the person who sees or grasps how certain properties (objects, entities) are modally related will characteristically have the ability to answer a variety of what James Woodward (2003) has called “What if things were different?” questions. That is, the person will be able to see or grasp how changes in some of these items will lead (or fail to lead) to changes in the others. Of course, as we noted earlier, some of us will be able to answer many more of these “What if things had been different?” questions than others. But again, what this illustrates is simply the truism that understanding comes in degrees; and indeed, it is a further virtue of our proposal that it naturally accommodates this fact.

## VII. Causation and Dependence

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<sup>22</sup> For further defenses of the idea that the object of understanding is non-propositional, see Riggs (2003), Kvanvig (2003, p. 192), Brewer (2009, pp. 298-99), and Grimm (2010b). Roberts and Wood (2007, pp. 46-47) claim that the object of understanding could be either propositional or nonpropositional, though when it comes to propositional understanding they seem to have in mind the sort of “semantic grasping”—the grasping of words or concepts—that is not our main focus here.

<sup>23</sup> See, for example, Zagzebski (2001, pp. 241-43), Hills (2009; 2010, ch. 9), and Grimm (2010; 2011). De Regt and Dieks (2005), as well as de Regt (2009), argue for a more idiosyncratic version of the understanding as know how view, according to which someone who understands a theory “can recognize qualitatively characteristic consequences of T without performing exact calculations” (de Regt 2009, p. 33).

We therefore have good grounds for thinking that knowledge of causes, suitably understood, is sufficient for understanding. But is it necessary? Recall again the beginning of the paper, where we noted two problems for this claim. On the one hand, there was the objection that understanding can come from non-causal means. If this is right, it would be the “of causes” part of the “knowledge of causes” formula that spells trouble, because one could acquire understanding by means of knowing something other than causes. On the other hand, and more recently, there is the objection from Kvanvig that one can have understanding in the absence of knowledge. If this is right, it would be the “knowledge” part of the “knowledge of causes” formula that spells trouble.

The question of whether understanding can come from non-causal means (or, as it is sometimes put in the literature, whether non-causal explanations are legitimate) is a large one, and I will not attempt to settle the debate here.<sup>24</sup> In this section I will instead piggyback on what I take to be the most promising response to this concern, in order to show I think how the “knowledge of causes” formula needs to be refined (or, perhaps better, clarified) to address this issue.

I take it that the basic concern behind the first objection is that the appeal to causation is too limited, because causes are most naturally understood as the pushers and pullers of the world, and yet some of our understanding does not appeal to pushers or pullers at all but rather to other sorts of relationships that seem to obtain between the explanans and the explanandum. To appeal to some of David-Hillel Ruben’s examples: Why was St. Francis a good man? Because he was benevolent. Or again: Why is that painting beautiful? Because of its color composition. And so on.<sup>25</sup> As Ruben notes, it is through grasping these relationships that we come to understand the thing in question, but the relationship grasped does not seem to be a causal one. It is not as if, for example, St. Francis’s benevolence *caused* him to be a good man; it seems more natural instead to say that his goodness was in some sense constituted by his benevolence.

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<sup>24</sup> As noted earlier, for examples of those who favor non-causal explanations, see Hempel (1965), Railton (1978), Achinstein (1983), Kitcher (1985), and Ruben (1992). For some responses on behalf of the causal view, see Salmon (1984), Lewis (1986, pp. 221-24), and Woodward (2003, pp. 5-7).

<sup>25</sup> For further discussion and examples, see Ruben (1992, ch. 7).

What should we make of examples of this sort? One attractive way for the causal theorist to respond is by thinking of our notion of causation more expansively. In particular, the strategy would be to expand the notion of causation so that, as Woodward claims, “any explanation that proceeds by showing how an outcome depends... on other variables counts as causal” (2003, p. 6).<sup>26</sup> So understood, Ruben’s examples would properly count as “causal” because they capture how the one property (goodness or beauty) metaphysically depends on the other property (benevolence or color composition).

Alternatively, and given how closely our notion of causation is tied to pushing and pulling<sup>27</sup>—to exerting causal force—a perhaps more attractive strategy would be to demote the notion of causation from its central role and instead to appeal more generally to the notion of dependence. On this view, dependence would be the genus category, with different kinds of dependence—causal dependence being but one—playing the role of species. As Jaegwon Kim puts the idea:

[M]y claim will be that dependence relations of various kinds serve as objective correlates of explanations. Dependence, as I will use the notion here, is a relation between individual states and events; however, it can also relate facts, properties, regularities between events, and even entities. We speak of the “causal dependence” of one event or state on another; that is one type of dependence, obviously of central importance. Another dependence relation, orthogonal to causal dependence and equally central to our scheme of things, is *mereological dependence* (or “mereological supervenience,” as it has been called): the properties of a whole, or the fact that the whole instantiates a certain property, may depend on the properties had by its parts. (Kim 2010 [1994], p. 183)

As Kim goes on to note, moreover, there seem to be a variety of further dependence relations beyond the causal and the mereological: thus the widowing of Xanthippe seems to depend on the death of Socrates, evaluative facts (such as considered just above) seem to depend on the non-evaluative facts on which they supervene, and so on (Kim 2010 [1994], pp. 183-84).<sup>28</sup>

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<sup>26</sup> Greco likewise argues for a broad reading of the causal relation: “Understanding involves ‘grasping,’ ‘appreciating,’ or knowing causal relations taken in the broad sense: i.e., the sort of relations that ground explanation” (Greco 2010, p. 9; cf. Greco 2002).

<sup>27</sup> Our modern notion of causation at least; Aristotle’s notion of causation was more expansive, along the lines developed here.

<sup>28</sup> For another advocate of this approach, see Strevens: “I suggest that while the causal influence relation is one kind of raw metaphysical dependence relation that can serve as the basis of the difference-making relation, there are others as well, and that any of the difference-making relations so based is explanatory” (2008, pp. 178-79).



Since understanding seems to arise from a grasp of all these different types of dependence, it might therefore be better, or perhaps less misleading, to adapt our original way of putting things and claim that understanding consists not of “knowledge of causes” but rather of something like “knowledge of dependency relations” or perhaps just “knowledge of dependencies.”<sup>29</sup> Although I can see why one would be tempted by this description,<sup>30</sup> the point worth emphasizing here is that the difference between the “knowledge of dependencies” formula and the “knowledge of causes (broadly understood)” formula is not a substantive philosophical one but rather simply comes down to a difference in terminology, or perhaps in marketing. Since the traditional use of the word “cause” has a certain elegance and simplicity about it, however, I see no great danger in continuing to support the “knowledge of causes” formula, provided the term “causes” is thought of in the broader or more expansive way just noted. For those who would prefer to use the term “dependencies” to pick out this grounding relation, I have no complaint.

### **VIII. Kvanvig on Understanding**

A second way in which one might think that knowledge of causes is not necessary for understanding would be if one thinks, along with Kvanvig, that something less than knowledge of the cause is sufficient for understanding.

To illustrate why one might think this, suppose that, in a room full of elaborately falsified history books, you randomly pick out the sole accurate book in the room and come to believe all of its claims about the past.<sup>31</sup> To focus on one claim in particular, suppose that you start to read the part of the book describing the Comanche dominance of the southern plains of North America during the 18<sup>th</sup> century, and that you come to believe that the Comanches dominated because of their superior horsemanship.

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<sup>29</sup> In addition to avoiding misleading connotations, such an approach would also make it easier to see cases such as Hills’s from Section 2—in which she claimed that the wrongness of eating meat supervened on, or depended upon, the suffering of the animals involved—as falling into the same category as more “overtly” causal cases such as Pritchard’s.

<sup>30</sup> And indeed, it is a temptation I have given into on other occasions; see Grimm XXX.

<sup>31</sup> For concreteness, we can imagine that you are living in some sort of Orwellian regime, intent on falsifying the past, and that by chance you pick up the one accurate book not destroyed by the regime. In this and the following paragraph I am adapting the example developed by Kvanvig in his (2003, pp. 197-98).

Suppose that you grasp this explanation, it makes sense to you, and so on. Would you then understand why the Comanches dominated the southern plains during this period? According to Kvanvig, it seems that you would. After all, he notes, you can now correctly answer a wide range of questions about the Comanche dominance, pointing (let's say) to some particular aspects of their horsemanship that brought about this result, and so on.

But now suppose we ask not whether you understand these various things about the Comanches but whether you *know* them. As Kvanvig points out, there is considerable pressure here to say that you do not, for one of the standard lessons of the Gettier literature seems to be that if your beliefs might easily have been mistaken, then even if they are both justified and true they will nonetheless not amount to knowledge. To have knowledge, it looks like a more secure connection to the truth is required; acquiring the truth by chance, through history books or otherwise, is not enough.

If Kvanvig is right, understanding is therefore in a way less demanding than knowledge and in another way more. It is less demanding, because it seems that one can have understanding of some subject even though one might easily have been mistaken about that subject. But it is more demanding in that it requires that the internal connections among one's beliefs actually be "seen" or "grasped" by the person doing the understanding. When it comes to knowledge, by contrast, especially knowledge of propositions, no such internal grasp seems required.

Kvanvig's objection is therefore directed at a particular kind of knowledge—propositional knowledge—for which the elements of grasping, seeing, and the like do not seem obligatory.<sup>32</sup> How then does it bear on our way of thinking about the "knowledge of the cause" formula, on which grasping or seeing how the explanandum is connected to, or depends upon, the explanans is crucial?

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<sup>32</sup> As Kvanvig notes in his recent comment on his 2003 book: "In my book on the value of knowledge, I argued in favor of a conception of epistemology that gives strong place to what I termed "objectual understanding".... I argued that such understanding was not explicable in terms of propositional knowledge, and thus does better than propositional knowledge in addressing a certain value problem about various epistemic states. It is this type of understanding that I want to argue here has special value" (Kvanvig forthcoming, pp. 1-2, typescript).

I think that the genuine answer here is that it is not easy to say. Consider, for example, Kvanvig's oft-repeated claim that what we "focus on" when we are considering whether someone understands is different from what we "focus on" when we are considering whether someone knows, and now ask: What do we focus on, when we are considering whether someone has knowledge of the cause in the sense defended above?<sup>33</sup> Again, I find it hard to say. Or rather, insofar as I have a good idea of what this "focus" test amounts to, I think that what I focus on is the "internal" element of grasping or seeing how the different causal elements depend upon one another in our representation of the world, rather than on "external" facts about the etiology of the grasping or the like.

If this is right,<sup>34</sup> then it looks like the standard claim that knowledge is incompatible with luck is mistaken, at least in its unrestricted form. I say "in its unrestricted form" because what these points suggest is that while there might be some forms of knowledge—perhaps all examples of propositional knowledge fall into this category—that are incompatible with luck, there are other forms which are not. For example, according to Kvanvig's "focus" test, knowing the cause in the way that we have construed it above would seem to be compatible with luck, and if Ted Poston is right, cases of "know how" are compatible with luck as well (see Poston 2009). Indeed, it is perhaps not surprising that philosophers have regularly been tempted by the thought that epistemic states which emphasize the notion of an ability—in the way that understanding, know-how, and knowledge of the cause (in our sense) all seem to—are compatible with luck in a way that states which do not emphasize this ability are not. Why? Perhaps because Kvanvig is right that our main concern, in evaluating these states, is whether the ability in question is actually present, and we are less concerned with whether the ability came to exist in a chancy or haphazard way.<sup>35</sup>

In short, for the very same reasons that it seems that there can be lucky understanding it seems that there can be lucky knowledge of causes as well. But then what Kvanvig's examples seem

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<sup>33</sup> For Kvanvig's "focus" test, see his (2003, p. 198) and (2009, pp. 98-99).

<sup>34</sup> And again, I'm not sure it is, because Kvanvig's "focus" test is not so clear to me.

<sup>35</sup> Compare the view of Greco (2010) and Sosa (2011), on which what matters is not whether the ability was acquired by chance (think of the Swampman case), but rather whether the ability, however acquired, is reliably employed.

to show is not that understanding is not a species of knowledge, but rather that it is particular kind of knowledge. On our view, a knowledge of causes.<sup>36</sup>

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