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Draft: 5-13-15

Forthcoming in: *Explaining Understanding: New Essays in Epistemology and the Philosophy of Science*. Eds. Stephen R. Grimm, Christoph Baumberger, & Sabine Ammon. New York: Routledge.

UNDERSTANDING AND TRANSPARENCY

I. *Introduction*

Interest in the nature of understanding has swelled among philosophers over the last several years, for a few different reasons.

Some have claimed that in order to make sense of science we need an adequate theory of understanding, because science aims not just to acquire isolated bits of knowledge about the world, but to understand it. An epistemology of science that neglected understanding would therefore be importantly incomplete (Elgin 2006; cf. de Regt et. al. 2009).

Moral philosophers have likewise argued that because what we really want in a good or flourishing life is not just knowledge but understanding, a proper theory of the good life needs to give the achievement of understanding a central place (Brewer 2009: ch. 8; Hills 2010: ch. 9).

In this paper I will focus on a related but distinct cluster of reasons why some philosophers have directed their attention to understanding, ones that turn importantly on questions concerning epistemic value. On this way of looking at things, understanding is not just a higher or more valuable accomplishment than knowledge, but it is higher because it involves an element of “reflective accessibility” that makes it more suited to the project of first-person epistemology, or the project of trying to determine, by one’s own best lights, what it is good or proper to believe (see, e.g., Zagzebski 2001; Kvanvig 2003; Pritchard 2010).

I take it that lingering in the background here is something like the following concern: that as externalist, especially reliabilist, theories of knowledge have gained in popularity, knowledge has begun to seem much less impressive than traditionally believed. If it is true that young children and animals can have knowledge simply because they can reliably track how things stand in their environment, then (it is said) knowledge might be good, but it does not seem particularly valuable or laudable. Perhaps it is good in the way that a well-operating thermometer is good (one that reliably tracks the ambient

temperature), or good in the way that a properly functioning supermarket door is good (one that reliably identifies when human beings are nearby). But if this all that it really takes to know then so much the worse for knowledge. As epistemologists, we would do well to focus on other epistemic states, especially the state of understanding, which more obviously represents an impressive epistemic accomplishment and hence is more evidently worth theorizing about.

A related thought is that the really important epistemic states are the ones that can be identified “from the inside”—that is, where one can tell, by reflection alone, whether one has achieved those states. But since knowledge requires an ability to reliably track the world, and since this sort of reliable connection is typically not accessible by reflection alone, knowledge has seemed to many to be much less relevant to our first-person concerns. We would therefore do well to focus on states such as understanding which seem to be more reflectively or internalistically accessible. Understanding has therefore benefited from the growing dissatisfaction with knowledge many have experienced.¹

In this paper I will swim against this trend and argue that understanding is in fact much less transparent or reflectively accessible, and hence much less internalist friendly, than many have supposed. If I am right, although there is *some* sense in which it is fair to say that understanding is transparent in a way that ordinary propositional knowledge is not, it is not the sort of transparency that is likely to give comfort to internalists.

A further question then becomes: if understanding is not the proper home for internalism, where then might it be? In closing I will consider the possibility that the proper home for internalist intuitions is in fact in the state of wisdom, rather than understanding. Perhaps, for internalists, the retreat will therefore end there, with wisdom.

¹ As Duncan Pritchard puts the idea: “Understanding clearly is very amenable to an account along epistemically internalist lines, in the sense that it is hard to make sense of how an agent could possess understanding and yet lack good reflectively accessible grounds in support of that understanding. Understanding thus cannot be ‘opaque’ to the subject in the way that knowledge, by epistemically externalist lights at least, can sometimes be” (p. 105 of 2010 ms). And Pritchard is here explicitly picking up on an earlier thought from Linda Zagzebski: “Understanding has internalist conditions for success, whereas knowledge does not.... It may be possible to know without knowing that one knows, but it is impossible to understand without understanding that one understands.... [U]nderstanding is a state in which I am directly aware of the object of my understanding, and conscious transparency is a criterion for understanding. Those beleaguered by skeptical doubts therefore can be more confident of the trustworthiness of putative understanding states than virtually any other state” (2001: 246-47).

II. *A sketch*

In order to assess the extent to which understanding is transparent to reflection, it will help to first try to get a better sense of what understanding is. In particular, it will help to try to get a better sense of:

- (a) understanding's distinctive object (or objects),
- (b) its distinctive psychology, and
- (c) the distinctive sort of normative relationship that needs to hold between the psychology of the person who understands and the object of his or her understanding.

By way of comparison, think of the traditional “justified true belief” analysis of knowledge. On this account, knowledge involves a distinctive object (a true proposition), a distinctive psychology (the psychological act of belief or assent), and a distinctive normative relationship that needs to hold between the psychology of the believer and the thing believed (namely, that the believing of the true proposition needs to be justified, in some sense). What can we say, in a parallel way, about the elements of understanding?

III. *The Objects of Understanding*

Beginning with the objects of understanding, on the face of they are so varied it is not obvious where one might find a common thread. Thus we can understand subject matters (Fred understands quantum mechanics), or particular states of affairs (Jada understands why the cup spilled), or institutions (the U.S. House of Representatives), or other people (Jada herself), and on and on.

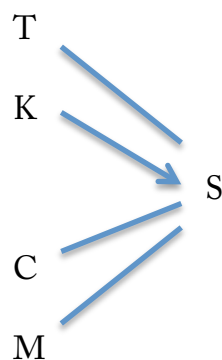
On my view, however, the differences among these various objects of understanding can be (and has been) overstated,² and the reason is that in all of these cases understanding seems to arise from a grasp of what we might call dependency relations. Although when it comes to more complex structures (the House of Representatives, for example) *more* of these relations are grasped

² In particular, I believe it is mistake to distinguish, as Kvanvig and Pritchard have done, between “objectual understanding” and “understanding-why” (Kvanvig 2003; 2009) or between holistic understanding and atomistic understanding (Pritchard 2010). For both Kvanvig and Pritchard, “objectual” or “holistic” understanding has to do with our grasp of large chunks of information, especially as they relate to topics or subject matters. Understanding-why or atomistic understanding, by contrast, is focused on some particular state of affairs: understanding why the cup spilled, for example, or why Fred did poorly on his exam.

than when it comes to understanding particular states of affairs, this does not amount to a difference in kind but instead to a difference in degree.³

To illustrate the basic idea, suppose you are sitting in your local coffee shop, and you observe the person next to you accidentally nudge her table with her knee. The table then jostles, and her cup spills. Understanding why the cup spilled will require the ability to pick out the nudge as the cause of the spill, rather than any of the other potential factors that were in some sense “on the scene” or potentially relevant: the time of day, the music that was playing in the coffee shop, the color of the cup, and so on.

We can also helpfully represent these different variables according to what Alison Gopnik and others have called a “causal map”⁴ with various nodes, as follows:



In this case the time of day (T) is represented by a variable that can take on many possible values, and likewise for the ambient music (M) and the color of the cup (C). The position of the knee (K) relative to the table, by contrast, might be a variable with just two discrete values, nudging or not nudging, and similarly for the contents of the cup, as spilled or not spilled (S).⁵

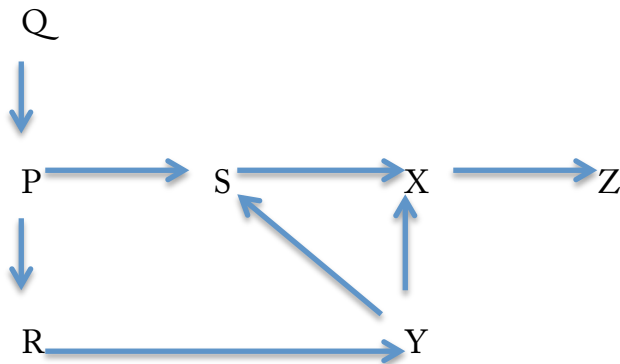
³ On my view the appeal to dependence relations is also the best way to try to illuminate the widespread idea that understanding involves a grasp of *structure* or *pattern* of some kind (see, e.g., Moravcsik 1979, Zagzebski 2001, and Riggs 2003).

⁴ To keep the terminology consistent, we could change Gopnik’s phrase “causal map” to “dependency map,” but I stick with Gopnik’s terminology because it is her idea. I prefer the notion of dependence because, following Jaegwon Kim (1994), I think it includes the notion of causal dependence but more besides (e.g., mereological dependence). For more on this idea see Grimm (2006; 2014).

⁵ We could also seek a more fine-grained explanation—not just spill or not spill, but how much, etc. In that case we could represent a variable that could take on a spectrum of values. (And the same could hold, of course, for the “K” variable—we could represent nudges of varying force, for example.)

In this case, moreover, the arrow represents a genuine relation of dependence while the (arrow-less) lines connecting time and music fail to identify a real dependence and are thus “empty” or non-causal. The person who understands why the cup spilled will therefore be able (at a minimum) to pick out the nudging as the cause of the spill from among all of the other possible factors.⁶

Suppose however that we are concerned not with understanding some particular state of affairs, but rather a larger subject matter. Still, in this case what is required for understanding seems again to be the ability to represent how the various elements of that system depend on one another, a type of representation that can again be depicted via a causal map. Thus to understand a subject such as the House of Representatives, for example, might be to accept or cognitively host a map along the following lines (simplifying significantly):



What someone therefore represents in this case is how the various elements of the House depend upon one another: what it takes for bills to be proposed, or for amendments to be introduced, or for them to become laws; who is entitled to speak, at which times; how committees are formed, and how leadership is determined; and so on.

As all of this suggests, a map that in fact accurately portrays all of the different dependency relations in the House of Representative would be enormously complicated, much more complicated than represented above.⁷ For our

⁶ Of course there are other dependencies lurking in the background here: the nudge would not have led to the spill had the cup been crazy-glued to the table, for example. So does the spill depend on the presence or absence of crazy glue, and should we insert a node portraying this relationship on our map? My inclination is to say no: context will plausibly often/typically determine which factors are mere “background” conditions and which are causally relevant.

⁷ It also gives rise to a number of interesting questions: For instance, how many of these various relationships does one need to accurately represent in order to understand the subject in question? Is it possible to *mis*represent (or have false beliefs about) certain aspects of the system and yet still count as understanding it? And is it more important to accurately represent certain aspects of the subject—what we might call the core aspects—than others? Although I will not defend the point

purposes however the important thing to see is that the differences between the causal maps pertaining to our understanding of states of affairs on the one hand and subject matters on the other do not seem to be as significant as the similarities. They are different, in the sense that (a) *more* relations are represented in the subject matter map, and (b) when it comes to states of affairs, there is a focus on understanding one of the nodes, rather than the system as a whole. But this seems considerably less significant than that in both cases the key to understanding lies in accurately representing dependency relations.

IV. *The Psychology of Understanding*

To this point I have been focusing on the “object of understanding”—i.e., what is understood. And I have been arguing that the object of understanding is dependency relations, which we can mentally represent by means of causal maps. But now the key question is: how should we think about the psychological uptake of these maps, exactly? In other words, is it enough for the mind to represent these relations in, as it were, a static way, where someone might simply assent to the accuracy of the maps, perhaps by deferring to the authority of an expert?

I believe the answer to this question is no, and that someone who merely assented to the accuracy of a map like this would not thereby understand the target system. I have defended this claim at some length elsewhere (Grimm 2010, 2014), but here I will make a case for it by different means, by calling attention to one of the most striking features of the causal maps as described by Gopnik et al: namely, that they are, as it were, “mobile” maps. That is, they are maps that by their very nature can adapt and change as the variables represented on the map take on different values. Or perhaps better, they are “unsaturated” maps, in the sense that they are characterized in terms of unsaturated variables that can *become* saturated by taking on different values.

What this means in terms of cognitive uptake is important, because if the maps are mobile or unsaturated in this way, then the mind that takes them up in a way that yields understanding must itself be mobile or capable of saturation. More exactly, what that means is that in order for a mind to take up a causal map in a way that yields understanding it must be able to anticipate

here, my own guess is that many of the answer to many of these questions will appeal to contextualist elements. Thus relative to certain contexts—a cocktail party, say—a person who accurately represents 40% of the structure will count as understanding it, while in other contexts—an exam situation—we will have doubts about whether the person “really” understands it. I would also not be surprised if pragmatic factors played a role here. For work on all of these questions, see Kvanvig 2003, Riggs (2009), and Carter and Gordon (2014).

how varying or adjusting the value of one of the variables will lead (or fail to lead) to changes in the values of the other variables.⁸

The maps are therefore not static maps, and the mind that genuinely absorbs them in a way that yields understanding will not be a static mind. This is the phenomenon that I have elsewhere described in terms of “grasping” dependencies or grasping causal structure, or of being able to “see” or anticipate how varying the value of one of the variables will lead (or fail to lead) to a change in the value of another variable. What this grasp involves is thus an ability to make modal inferences or to “see” into modal space. More prosaically, it is the ability to identify how changes in one part of the system or structure will lead (or fail to lead) to changes in other parts.

V. The Normativity of Understanding

Suppose we grant for the moment that two central elements of understanding have now been identified: the object of understanding, characterized in terms of dependency relations, and the cognitive or psychological element of understanding, characterized in terms of appropriately taking up the causal maps that accurately represent how things stand in the world. Is that all there is? According to Jonathan Kvanvig’s influential 2003 work on understanding, the answer is: very nearly so. Beyond satisfying the accuracy condition, Kvanvig then argued, what understanding centrally requires is an internal grasp of how the various elements of a topic or subject matter are related:

What is distinctive about understanding has to do with the way in which an individual combines pieces of information into a unified body. This point is not meant to imply that truth is not important for understanding, for we have noted already the factive character of both knowledge and understanding. But once we move past its facticity, the grasping of relations between items of information is central to the nature of understanding. By contrast, when we move past the facticity of knowledge, the central features involve non-accidental connections between mind and world. (Kvanvig 2003: 197)

The final ingredient in Kvanvig’s 2003 puzzle is an element of subjective justification: one cannot understand some target system if by one’s own lights there is something awry about one’s epistemic position.

⁸ James Woodward (2003) has helpfully characterized this in terms of the ability to answer “What if things had been different?” questions.

The key point for 2003 Kvanvig, however, is that so long as the accuracy, grasping, and subjective justification conditions are satisfied, *how one came by* one's accurate grasp is irrelevant to the achievement of understanding. Suppose that one reads a history book full of inaccurate facts but one's dyslexia miraculously transforms them all into truths. According to Kvanvig, one could then come to an understanding of a subject matter thereby.⁹ Or suppose that someone intent on deceiving you fabricates a story about how a particular disease progresses through the body, a story that happens by a complete fluke to be accurate. According to Kvanvig, one can then come to understand how the disease progresses, even though the accuracy of one's grasp is based on sheer luck or accident.

Others, however, have balked at this claim, and apparently with good reason. As Pritchard notes, it is deeply implausible to think you can come to understand the world through lucky guesses or through being the victim of massive deception (2010). To add cases: suppose you are duped into thinking that reading animal entrails is a reliable way of learning about the world, and are thereby subjectively justified in accepting their results. On Kvanvig's view, on the one-in-a-million chance that the entrails accurately explain something about the world (e.g., pick out a real causal relationship in the world), you could thereby understand that thing.¹⁰ And similarly for trusting Ouija boards, tea leaves, and so on.¹¹ Since it is hard to believe that these sorts of methods can lead to genuine understanding of the world, what seems needed *in addition to* an accurate, subjectively justified grasp of the world is some sort of reliable connection between one's grasp and how the world is. Or, as Pritchard claims, one needs to acquire one's accurate grasp "in the right fashion" (2010: 108) or "in the right kind of way" (2010: 110)—in others words, by means of a reliable source of method.¹²

VI. *How Internalist?*

⁹ Kvanvig offers this example in his (2009) and (2015). He seems to offer it as a more streamlined version of his Comanche case from (2003: 198-99).

¹⁰ Or, if you want to keep the topic appropriately "objectual," imagine that the entrails revealed something about a subject matter rather than a state of affairs. As argued above, I do not find this distinction helpful, but the example could be easily modified.

¹¹ So long, again, as one was subjectively justified in accepting those deliverances. But it is easy enough to come up with a case where someone is simply duped into believing these sources are reliable.

¹² I have been referring to Kvanvig (2003) throughout because in Kvanvig (2009a) he claims that the conditions he earlier articulated might not be sufficient, and that he may need to make a "minor revision" to his theory by adding a reliability condition (2009a: 105). In my view this would not amount to a minor revision because it would mean that understanding would become a deeply externalist state.

Suppose that the distinctive objects, psychology, and normative properties of understanding are roughly as described. We can now ask: in what sense is understanding thus an “essentially internalist” notion, or the proper home for internalist ideas? For instance, with respect to which of these elements of understanding—possessing an accurate causal picture of the world, grasping how it works, and having a reliable connection between one’s map and the world—can one tell by reflection alone that they are possessed?

With respect to the accuracy condition—that one can only understand the world if one grasps its actual structure or relations—it should be clear that one cannot tell from the inside, or by reflection alone, whether one has gotten the world right. For instance, one cannot tell from the inside whether one’s house has burned down from faulty wiring or from some other cause; or again, one cannot tell from the inside whether one has suffered a “causal illusion” of the sort illustrated by Simpson’s paradox (see Gopnik et. al. 2004: 13). What about the reliability condition? Here too I take it that it is hard to see how this could be transparent to reflection. Perhaps I can tell, on the basis of a given set of evidence or data and in light of my *a priori* knowledge of Bayes’s theorem, that certain variables are more likely to be causally relevant than others. But I can hardly tell by reflection alone that the data is representative or accurate and so on. In other words, perhaps what I can tell from the inside is that a particular causal inference might be conditionally reliable—reliable given the representativeness and accuracy of my data. But I cannot tell from the inside that my causal inference is actually reliable. And since the actual reliability of an inference seems to be needed for understanding, this important element too will be opaque to reflection.

VII. *Articulacy*

The prospects for the full transparency of understanding do not therefore appear promising, and it is hard to see how it could even be something like a “mainly” or “primarily” internalist notion, given the importance of the accuracy and reliability conditions. Nonetheless, the fact that a wide range of respected epistemologists—including Zagzebski, Kvanvig, and Pritchard—have taken there to be an important internalist dimension to understanding suggests that we should look harder to try to get at the source of this idea.

Consider for instance the following passage from Pritchard, a variant of his earlier quote above:

[U]nderstanding seems to be essentially an epistemically internalist notion, in the sense that if one has understanding then it should not be

opaque to one that that one has this understanding—in particular, one should have good reflectively accessible grounds in support of the relevant beliefs that undergird that understanding. (p. 112 of 2010 ms)

For Pritchard, then, even though understanding is not a “purely” internalist notion because of the accuracy requirement and its susceptibility to certain kinds of luck, it is still an “essentially” internalist notion.

Why? As suggested above, I take it that what Pritchard is impressed by in contrasting knowledge with understanding is the fact that sometimes one can genuinely know something and yet be unable to offer any grounds in support of one’s knowledge. A chicken sexer, for example, might genuinely know a certain chick is male (because of his reliable ability to discriminate males from females) yet be unable to offer any grounds in support of his belief. He might just shrug his shoulders when asked “Why do you think that?” And of course if one thinks animals can know—that your dog can know you are about to go for a walk, or that the squirrel just ran up a tree—then there are many, many cases of knowledge where “reflectively accessible grounds” are lacking, simply because the knower lacks the meta-cognitive ability to reflect on, or to articulate, his or her grounds.

On Pritchard’s view, however, understanding is not like that. And while he does not spell out why exactly he thinks that understanding is importantly transparent (non-opaque), it is not hard to imagine what is driving him. For instance, when I understand why the cup spilled, it is not a mystery to me—not opaque to me—why the cup spilled. I can point to the nudge as the cause of the spill. Or again, when I understand how the House of Representatives works I will presumably be able to answer a number of different questions about it works. Put in terms familiar from Aristotle, the guiding thought seems to be that someone who understands does not simply know that such-and-such is the case but knows “the why” of that thing. If she understands why *p*, for instance, she can always say something on behalf of *p*, or point to *grounds* for her understanding, in a way the chicken sexer cannot.

Of course the grounds here are quite distinctive. They are grounds in the sense of being answers to “Why?” questions, or perhaps “What if things had been different?” questions. They are not grounds that will enable one to ward off a critic who might ask: “How do you know you’re not suffering from a causal illusion? Or that your data was really representative? Etc.” Understanding is therefore not transparent in the sense that it would allow one to ward off radical sceptical attack. But perhaps it is transparent in the sense that one seems to be able to “see” the correct answer to “Why?” or “What if things had been different?” questions. It would therefore count, as Pritchard

suggests, as partially or essentially transparent, even if it is not fully transparent.

Let us think of this, for the time being, as an *articulacy* requirement on understanding: namely, that when one understands one can offer some grounds on behalf of one's understanding—not necessarily grounds that would ward off sceptical doubts, but grounds in the sense of answers to why questions.

VIII. *Young children, animals, and understanding*

Although one can appreciate the intuitive pull of this idea, ultimately I believe it is not the case that articulacy is a necessary condition on understanding, or that one needs to have reflectively accessible grounds in support of one's understanding. And the main reason to reject this claim when it comes to understanding is closely tied to—perhaps just identical to—the main reason many have rejected this idea when it comes to knowledge: namely, that understanding (like knowledge) seems to be available to animals and young children, even though animals and young children apparently lack the meta-cognitive ability to identify the grounds of their understanding. If this is right, the very same sorts of cases involving animals and young children that led epistemologists to think that knowledge could sometimes be unreflective or opaque or inarticulate also seem to show the same thing about understanding.

Let me try to illustrate this with the case of young children first, appealing to recent work by psychologists studying infant cognition. Thus studies conducted by Susan Carey and her colleagues seem to show that infants between the age of 7 to 10 months are able to make accurate inferences about causal relationships. For instance, when infants observe a bean bag being tossed from behind a screen, they act surprised if the screen is subsequently removed to find no one there (Carey 2009: 234-40; Saxe, Tzelnic, & Carey, 2007; Saxe, Tenebaum, and Carey 2005). More exactly, they look noticeably longer in cases where the screen is removed and no one is present than when the screen is removed and someone is there. The children therefore seem to have inferred a dependence between the appearance of the bean bag and human agency, and formed a causal map to this effect.¹³ When this map is undercut in the (wholly artificial, contrived) case when no one is behind the screen, the children pause to try to make sense of this disparate piece of evidence about how the world works, or how its various elements depend upon one another. Or, put another way, in answer to the implicit question: “Why is

¹³ Another possibility is that causal understanding along these lines is hardwired. I take it this will not affect the basic point that pre-articulate children have causal understanding.

the bag moving through the air?” the children seem to have instinctively inferred *because someone is throwing it*. They also seem to have inferred *if there is no one to throw the bag, it should not move like that*. And this even though in both cases they were not at a level where they could articulate these thoughts.

Similarly, in a series of studies Alison Gopnik has shown that children as young as 2 or 3 are adept at identifying the “real” cause of a situation (Gopnik 2000, 2004, 2012). For example, when experimenters in Gopnik’s lab introduced children to a “Blicket machine,” and told them that by placing some blocks but not others on the machine they could make the machine “go” (in this case, play music), the children were able to reliably identify the sorts of blocks that were capable of activating the machine. Through observation and occasional hands-on manipulation, they were able to determine, for instance, whether it was the shape of the block or instead its color or its size that was responsible for making the machine go.

Psychological studies aside, I take it the basic idea will seem familiar from common experience. Imagine an 11-month-old toddler who sees a toy on top of a stand. The toddler pushes the stand, and the toy drops to the floor: the desired result. The toddler will then not be at a loss, most likely, the next time she encounters a toy on the top of the stand. She will not suppose that it was the ambient music that caused the toy to fall, or the time of day, or the fact that another playmate was nearby, looking at the stand. She will suppose that it was her pushing that led—that caused—the toy to fall, and she will thereby have formed an accurate causal map to the effect that pushing things of this sort characteristically leads to toppling or falling. No doubt many of the causal inferences she makes will not be as straightforward as this, and some will be mistaken. But the accurate ones will often be reinforced through repetition and gain more stability over time.

Now, if this is a correct picture of how children come to understand the world, it would not be at all surprising if non-human animals possessed a similar ability. After all, they, like us, are actors in the world, and actors in the world are at an advantage when they can identify how the various elements of the world depend on one another, and hence how certain elements can be manipulated to bring about certain (desirable) effects. Recent studies on rats and crows, moreover, have indicated precisely such an ability to identify causal relationships.

According to Blaisdell et. al. (2006), for example, rats are able to correctly differentiate between common-cause models of influence, causal chains, and direct causal links. Put another way, they are able to distinguish between cases involving mere covariation between variables (as in a common-cause model)

and cases where the covariation is evidence of a causal relationship. Similarly, New Caledonian crows appear able to infer causal relationships in ways that go beyond mere conditioning (Taylor et. al. 2009; Taylor et. al. 2012). For instance, in a series of experiments the crows were able to discriminate cases where human beings were responsible for moving a stick from cases where a stick was being moved by an unknown source. Just as in Susan Carey's experiments with the infants and the bean bags, the crows seem to have accurately inferred (in the first case) that agents were responsible for the movement of the stick, and when the agents were absent but the (contrived) movement still occurred, their causal map was called into question, leading to more cautious and wary behavior.

All in all, there is thus good reason to think that children and animals have the ability to form accurate causal maps about the world—to accurately represent how various elements of the world depend upon others—even though they might lack reflective access to these representations, perhaps simply because they lack the meta-cognitive ability to reflect at all, and hence even though they cannot articulate how these dependencies work. Reflectively accessible grounds do not therefore appear to be essential for understanding in the way Pritchard and others have suggested.

IX. *Some concerns*

How might an advocate of an essentially internalist conception of understanding respond to these sorts of cases? Perhaps most obviously, some might say that as alluring as the examples involving animals and young children might seem, there is no real understanding present in these cases. This is for a few different reasons. For example, some might argue that real understanding requires the ability to identify causal *mechanisms*, or the causal processes actually responsible for bringing about events, and that inferences based on things like manipulation or observed covariation are not enough.¹⁴ Alternatively, it might be thought that genuine understanding requires the ability to subsume events under laws, and that the ability to formulate laws is beyond children and animals. We can address both these concerns in turn.

¹⁴ Wesley Salmon defends this view in his *Scientific Explanation and the Causal Structure of the World*: “[C]ausal processes, causal interactions, and causal laws provide the mechanisms by which the world works; to understand why certain things happen, we need to see how they are produced by these mechanisms” (1984: 132); “To understand the world and what goes on in it, we must expose its inner workings. To the extent that causal mechanisms operate, they explain how the world works” (1984: 133).

To the point that understanding requires the identification of causal mechanisms, my reply is that this is too demanding. Suppose I am chopping carrots and onions in the kitchen while preparing a meal, and in the midst of the chopping my eyes start to water. Given my past experience, I can now surely understand why *my* eyes are watering—because I am chopping onions—even though I might not have a clue about the particulars of onion and eyeball chemistry that underlie the watering (cf. Grimm 2014). I do not think, for example, that it was the carrots or the time of day or the color of my shirt that was the cause of the watering. It was the onions. And it is the ability to pick out or grasp the cause in this way that presumably yields understanding, even absent knowledge of the underlying mechanism. Or again, suppose I am wondering why the TV just sprang to life, and then I notice that my daughter just entered the room with the remote control in her hand, pointed at the TV. I can now presumably understand why TV just sprang to life—because she just pressed the “On” button on the remote control—even though I might be unable to tell any story about the physical mechanisms (radio waves etc.) linking remote control to set. This is not to deny that the ability to identify mechanisms might be relevant to understanding (it might, for example, be relevant to having a deeper understanding of the world). It is simply to deny that the ability to identify mechanisms is required for much of the understanding we seem to enjoy throughout the day.

Another worry might be that understanding requires an appeal to laws in a way that exceeds the power of children or animals. Thomas Hurka describes this concern as follows:

You understand a truth when you can place it in a larger context and connect it to more fundamental principles that explain why it holds. That connection and the understanding it leads to are precisely what generality in the explanatory sense finds good, and the idea that they’re good is again intuitive. To match your mind to the world you have to match not only the separate facts it contains but also the explanatory relations between them. If you know only what’s true but not why, you don’t know everything there is to know because you don’t know what accounts for what. And the capacity to know this again distinguishes us from other animals. Maybe a dog can know that a ball is falling, but it can’t understand why it’s falling by connecting that fact to more abstract truths about why bodies in general fall. (Hurka 2011: 82-83)

According to Hurka, understanding thus requires an appeal to “abstract truths” or “more fundamental principles”—by which, I take it, Hurka seems to mean something like general laws—and animals lack the ability to make such an appeal. Although he does not mention them, I would not be surprised if he

thinks young children too lack this ability, at least at their level of development.

My reply in this case is not (as before) that an appeal to laws or law-like generalizations is too demanding, but rather that the reason why laws and generalizations provide understanding is that they encode information about dependencies, the grasp of which we have taken to be crucial to understanding. Thus Newton's Second Law, $f=ma$, encodes information about how the variables force, mass, and acceleration depend upon one another; for instance, the law depicts how changing the value of a variable such as acceleration will lead to a change in the value or amount of force (*ceteris paribus*). Even though young children and animals might not be able to grasp these relationships at a high level of abstraction, the results above suggest that they can appeal to generalizations that are relatively invariant or stable across contexts, and can subsume particular events under these generalizations (for more on invariance see Woodward 2003: ch. 6). If we are willing to think of these generalizations as laws, or at least as proto-laws or as law-like, then it seems that young children and animals will be capable of understanding even by Hurka's standards.

A final way one might try to preserve the idea that understanding requires articulacy would be by trying to distinguish different *kinds* or *varieties* of understanding, and saying that articulacy goes along with the higher or more reflective brands of understanding. Thus (in line with Ernest Sosa's distinction between animal and reflective knowledge) one might say that while there is something like animal understanding, which simply requires an ability to grasp or identify dependencies, there is also reflective understanding, or perhaps mature or properly adult understanding, where one can also articulate the reason why.

While I do not want to deny that one could make a distinction along these lines, I would only point out that it would now not be understanding *per se* that would be deserving of newfound attention, but rather a particular brand of understanding: reflective understanding, or understanding where one can articulate the why. This sort of articulacy would also not be the exclusive possession of understanding. As noted, the sort of reflective knowledge described by Sosa would be another place where articulacy about grounds could be found. So perhaps what is really of interest to epistemologists trying to capture internalist intuitions are first-person reasons (involving articulacy about grounds) wherever they might be found, not necessarily the states of knowledge or understanding *per se*—a point worth bearing in mind as we develop our accounts of these states.

X. Conclusion

I want to close by making three suggestions. First, that there is a way of thinking about even the sort of low-level, animal understanding I have described in this paper so that it contains an interesting and important element of transparency—perhaps not the sort that advocates of the articulacy condition would like, but transparency nonetheless. Second, that appreciating the way in which understanding is transparent helps to shed light on the distinctive value of understanding. And finally, that perhaps the true home for internalist intuitions is not in the state of understanding but instead in wisdom.

Consider first that what it means for something to be transparent is that it can be “seen through.” With this in mind, my suggestion is that if there is a sort of transparency that is essential to all types of understanding it involves the ability to “see through” the here and now and into how things stand in modal space, or in counterfactual situations. For notice that when I grasp that the spill was caused by the nudging, then if I consider whether the spill would have occurred in the absence of the nudge (*ceteris paribus*), then I can in some sense “see” that the answer is no. But this sort of seeing or transparency arguably requires no meta-cognitive abilities. It is the sort of seeing that seems to be available to any creatures with the ability to reason counterfactually, young children and animals included.

Regarding the second point, thinking of transparency along these lines also helps to reveal why understanding is especially valuable—why it is a particularly prized epistemic good. For notice that on this way of thinking about transparency, someone who understands will be in a remarkable position not just to predict how the world will unfold, but possibly to control how it will unfold. Since the person who understands grasps how various elements of the world depend upon one another, he or she will know for instance that in order to bring about state of affairs *r* rather than *s*, a change needs to be made to *y*. It is arguably this great power that would therefore help to explain why, as Pritchard puts it, “we would surely rather understand than merely know” (2010: 74), or as Aristotle and Aquinas claim, that human beings are not satisfied until they have found the why. On the view defended here, what explains this preference for understanding is not that understanding brings with it articulacy, or the ability to respond to the sceptic, or internalist prizes along those lines. Instead, the special value of understanding derives from our natural interest in predicting and possibly controlling how the world will unfold. At least, I want to argue, that goes a long way towards explaining the sorts of intuitions in favor of understanding offered by Pritchard, Aristotle, and others, even if we should grant that it does not exhaust them.

Finally, I want to close by suggesting that perhaps the proper home of the articulacy condition is not knowledge or understanding but instead wisdom, arguably the greatest of epistemic goods. Why? For two main reasons. First, because it seems to be one of the hallmarks of wisdom that the wise person is a source of advice, someone to whom we can turn when we need assistance. The inarticulate wise person therefore seems like a contradiction in terms.

Second, it seems that wisdom is essentially meta-cognitive in a way that is not the case with knowledge or understanding. Suppose that the wise person is someone who knows the best way to act in a certain situation, and suppose that the best way to act is course B. If someone simply chooses B by instinct or by chance, then it does not seem that the person demonstrates wisdom in choosing B. Instead, for the course of action to count as wise it seems like the person needs to be able to identify course B *as best*—that is, he or she needs to be able to recognize what it is about B that makes it superior to alternatives A or C. Wisdom therefore seems to require a sort of perspective or reflective distance from one's beliefs that we do not necessarily find with knowledge or understanding. It is therefore arguably the proper home for internalist intuitions that were first sought in knowledge, and then later in understanding.

That said, since finding a proper home for internalist intuitions has proven difficult before, we should be alive to the possibility that when we look more closely at wisdom too we will find cases where the internalist element is lacking. That, at least, seems to have been the track record so far.

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