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Towards a Knowledge-Based Account of Understanding

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Abstract

This paper aims to provide support for a knowledge-based account of understanding. More specifically, I will outline an account of understanding according to which, roughly, (i) ideal understanding of phenomenon P is maximal knowledge of P and (ii) degrees of understanding of P are distances from maximal knowledge of P. In addition (iii), (i) and (ii) are combined with a contextualist semantics for outright attributions of understanding. I will argue that there is positive reason to favour this account over the internalist competitors offered by Kvanvig and Elgin as only this account can do proper justice to data concerning comparative degrees of understanding. Finally, it will be shown that this account does not fall prey to a number of attacks on knowledge-based accounts of understanding in recent literature, due to Elgin, Kvanvig and Zagzebski.

1 Introduction

Understanding is among the highest cognitive achievements we, humans, can attain. It is hardly surprising, then, that recent epistemology has witnessed a surge of interest in the nature of understanding. However, this line of epistemological inquiry meets with complications from the very start. The reason for this is that understanding is such a complex matter. For starters, understanding is not only one of the highest but also one of the most complex cognitive achievements we may hope to attain. Moreover one can understand a variety of different things, including *that* something is the case, *why* it is the case

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and *how* to do something. One can also understand various *phenomena* in the world, including persons, events, theories and so on. In order to make this complexity more tractable, I would first like to introduce a distinction, familiar from the literature on the subject, between two broad types of understanding in accordance with two broad categories of objects of understanding: *propositional understanding*—such as understanding that p and understanding why p —on the one hand and *objectual understanding*—i.e. understanding of various phenomena (persons, theories and events)—on the other.¹ I would also like to point out that, in this paper at least, I will focus exclusively on *objectual* understanding (henceforth simply ‘understanding’).

Two questions have been at the forefront of the epistemological debate over the nature of understanding. The first is whether understanding is, in some sense to be specified, *factive*.² Among defenders of the factivity of understanding, there is a further controversy over whether understanding can be analysed in terms of knowledge.³ The aim of this paper is to argue that there is reason to think that both of these questions can be answered in the affirmative. In order to achieve this, I will outline my own preferred knowledge based account of understanding (henceforth also ‘KU’ for short), which I developed in a recent paper (Author 2015) (§2), and produce some evidence favouring KU over its most prominent non-knowledge based competitors (§3). I will then show that KU avoids a number of objections that have been raised against knowledge based accounts (henceforth also ‘K accounts’) in recent literature (§4).

2 The Account

In what follows, I will sketch the main theses of KU. A more detailed discussion can be found in (Author 2015).

The first thesis of KU is about maximal understanding:

¹ Notice that objectual understanding may itself have propositional objects. Crucially, however, these objects will be what Kvanvig (2003, 192) calls “bodies of information” rather than individual propositions.

² Champions of the factivity of understanding include John Greco (see e.g. 2010), Stephen Grimm (see e.g. 2006; 2010), Jonathan Kvanvig (see e.g. 2003; 2009), Peter Lipton (see e.g. 2004; 2009) and Duncan Pritchard (see e.g. 2008 and his contribution to Pritchard *et al.* 2010). Foes of factivity include Catherine Elgin (see e.g. 1996; 2006; 2009), Wayne Riggs (see e.g. 2009) and Linda Zagzebski (see e.g. 2001).

³ Grimm, Greco and Lipton defend knowledge-based accounts of understanding, while Kvanvig and Pritchard maintain that a state weaker than knowledge is sufficient for understanding.

MAXIMAL UNDERSTANDING (MAX-U)

If one has fully comprehensive and maximally well-connected knowledge of a phenomenon P , then one has maximal understanding of P .

A key source of support for Max-U is the intuition that someone who knows everything there is to know about a certain phenomenon, who has fully comprehensive knowledge of it, also understands it as well as it can be understood. For instance, if A knows everything there is to know about the Monty Hall Problem, he understands the Monty Hall Problem as well as it can be understood. And an omniscient God not only knows everything there is to know about all phenomena, but also understands all phenomena as well as they can be understood.

On reflection, it turns out that fully comprehensive knowledge of a phenomenon won't be quite enough for maximal understanding of it. After all, one might have fully comprehensive knowledge of a phenomenon that is entirely unconnected. Perhaps each item of knowledge has been acquired via testimony from a different source and one has not connected the individual pieces of information in one's head. Such unconnected knowledge does not seem to make for much understanding, and certainly falls short of maximal understanding. The well-connectedness proviso at issue in MAX-U deals with this kind of difficulty. The idea is that an agent's fully comprehensive knowledge about some phenomenon, P , is *maximally well-connected* when the basing relations that obtain between the agent's beliefs about P reflect the agent's knowledge about the explanatory and support relations that obtain between the body of true propositions that describe P .

The second thesis of KU concerns (non-maximal) degrees of understanding:

DEGREES OF UNDERSTANDING (DEG-U)

Degree of understanding of P is a function of distance from fully comprehensive and maximally well-connected knowledge of P : the closer one approximates fully comprehensive and maximally well-connected knowledge of P , the higher one's degree of understanding of P .

I must confess that I have done very little to offer a detailed account of degrees of understanding in the earlier paper. What's more, I will not make much progress on this front here either. However, I'd like to say at least the following.

First, I do not mean to suggest that degree of understanding is a function only of the *number* of propositions known. On the contrary, the prospects for a purely quantitative account are dim. To see this, notice that understanding may be assessed along different dimensions including breadth and depth.⁴ As a result, while maximal understanding will be both maximally broad and maximally deep, less than maximal understanding may approximate maximal understanding via different routes, as it were.

Second, quantitative differences can ground differences in degrees of understanding. Roughly, the idea is that if we hold all other factors that affect degree of understanding fixed, differences in quantity of knowledge translate into differences in quality of understanding. Here is a slightly more precise proposal.

Where ' $\beta(_, \dots)$ ' denotes $_$'s set of beliefs about \dots , ' $\kappa(_, \dots)$ ' the set of $_$'s knowledge of \dots that affects $_$'s degree of understanding of \dots , and ' $\gamma(_, \dots)$ ' the set of grounding relations that hold between the members of $_$'s knowledge about \dots :

BETTER UNDERSTANDING (BET-U)

For any phenomenon P and agents A_1 and A_2 , if $\beta(A_2, P) \subseteq \beta(A_1, P)$, $\kappa(A_2, P) \subset \kappa(A_1, P)$ and $\gamma(A_2, P) \subseteq \gamma(A_1, P)$, then A_1 's understanding of P is better than A_2 's.

While this is still a far cry from a fully-fledged account of degrees of understanding, for present purposes, it is all that I will need.

The remaining thesis of KU concerns outright understanding. Or, to be more precise, it concerns attributions of outright understanding, i.e. attributions of sentences of the form " A understands P ":

OUTRIGHT UNDERSTANDING (OUT-U)

" A understands P " is true in context c if and only if A approximates fully comprehensive and maximally well-connected knowledge of P closely enough to be such that A would (be sufficiently likely to) successfully perform any task concerning P determined by c , if, in addition, A were to have the skills needed to do so and to exercise them in suitably favourable conditions.

⁴ As I already mentioned in the earlier paper, one may be tempted by the idea that approximations to fully comprehensive knowledge measure breadth of understanding and approximations to maximally well-connected knowledge measure depth of understanding.

The basic idea here is that in order to count as having outright understanding, one must come close enough to maximal understanding. How close is close enough? The answer is that that depends on context. Context sets a threshold for what it takes to count as approximating maximal knowledge closely enough to count as having outright understanding. Evidence for a contextualist semantics for attributions of outright understanding stems from the fact that our willingness to attribute understanding to one and the same agent varies with context. For instance, we may be happy to attribute outright understanding of a phenomenon—the evolution of humankind, say—to an eight-year-old in a context of a primary school teachers’ discussion of pupil performance in a recent exam. At the same time, we would deny the eight-year-old understanding in a context in which members of a search committee discuss whom to hire for a recently advertised professorship in biology.

KU analyses understanding in terms of knowledge. It is therefore a K account. That said, it may be worth noting that the aim of the earlier paper was to show that KU is preferable to the most prominent accounts of understanding in the philosophy of science literature, to wit, explanationist accounts, which analyse understanding in terms of knowledge of explanations, and manipulationist account, which analyse understanding in terms of abilities to manipulate representations.⁵ While I stated KU in terms of knowledge, for the purposes of the earlier paper this was inessential. As far as that paper is concerned, the account might just as well have been stated in terms of justified or true belief. However, I believe that there are good reasons to opt for a knowledge based account of understanding. The remainder of this paper will be devoted to developing some of these reasons.

3 Evidence

According to the main competitors to K accounts in the literature, the epistemic state in terms of which understanding is analysed is a non-factive state and, as such, weaker than knowledge. Defenders of these accounts appear to share the assumption that the relevant

⁵ For defences of explanationism see e.g. (Hempel 1965; Salmon 1984; Khalifa 2012, 2013). Manipulationist accounts have been defended in e.g. (de Regt & Dieks 2005; de Regt 2009a,b; Grimm 2006, 2014; Wilkenfeld 2013).

epistemic condition on understanding is internalist in nature.⁶ They disagree about what precisely the internalist condition amounts to—a requirement of transparency (Zagzebski) or a coherence condition (Elgin, Kvanvig)—and about what else is needed for understanding apart from the internalist condition—truth (Kvanvig) or some other kind of grounding (Elgin). This section aims to provide some evidence that favours KU over what I take to be its most promising non-knowledge based rivals in the literature, i.e. the specific accounts of Kvanvig and Elgin.

3.1 Kvanvig

Let me begin with a brief characterisation of Kvanvig’s account. He states the core features of his account of understanding in the following passage:

What is distinctive about understanding, once we have satisfied the truth requirement, is internal to cognition. It is the internal seeing or appreciating of explanatory and other coherence-inducing relationships in a body of information that is crucial for understanding.

(Kvanvig 2003, 198)

Understanding a phenomenon, according to Kvanvig, involves (i) having beliefs (perhaps also a theory) about it that (ii) are (by and

⁶ Pritchard’s non-knowledge based account of understanding may be an exception here. True, Pritchard overtly embraces internalism about understanding when he writes: “[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 one has this understanding—in particular, one should have good reflectively accessible grounds in support of the relevant beliefs that undergird that understanding.”

XXXXXXXXX

(?, 82). That said, on perhaps the most prominent way of construing the internalism/externalism divide, Pritchard’s view would appear to come out as externalist. On this view, internalism about a given epistemic property (e.g. justification/understanding) claims that whether or not an agent has that property supervenes on factors internal to the agent alone. But now notice that, according to Pritchard, understanding is a cognitive achievement, which means that it requires cognitive success as well as the exercise (reliable) cognitive ability. Whether or not an agent has understanding does not supervene on factors internal to him/her alone. So, Pritchard’s account is not internalist. Since externalism is defined simply as the denial of internalism, Pritchard’s account comes out on the externalist side of the divide. While I discuss Pritchard’s account in more detail elsewhere (Author 2014a), I won’t be concerned with it here. The main reason for this is that he offers an account of propositional rather than objectual understanding.

large) true and between the contents of which (iii) coherence-inducing relationships obtain. Moreover, (iv) one must see or appreciate—and this presumably involves belief—that these relations obtain.⁷

How does Kvanvig account for the existence of different degrees of understanding? While he does not go into much detail on this issue, Kvanvig does point out that someone’s beliefs about a subject matter may differ in “degree of coherence” as well as “in terms of the amount of information contained regarding the subject matter” (2003, 196), in other words, in terms of informativeness. Presumably, then, the thought is that degree of understanding is a function of coherence and informativeness of one’s beliefs.⁸

With these considerations in play, I will now argue that Kvanvig’s account gives the wrong predictions of *comparative degrees of understanding* in the following cases:

CASE 1. A_1 , a famous biologist, has conducted careful research into a certain biological phenomenon, P_B , thus arriving at a set of beliefs $\beta(A_1, P_B)$ of beliefs about P_B . Let us suppose that all members of $\beta(A_1, P_B)$ qualify as knowledge and that, in fact, A_1 has attained fully comprehensive and maximally well-connected knowledge of P_B .

CASE 2. A_2 , another biologist and contemporary of A_1 ’s, has conducted careful research into P_B . A_2 has gathered and come to believe a data set about P_B . Moreover, A_2 has also devised and come to believe a theory T_2 of P_B . In this way, A_2 arrives at a set $\beta(A_2, P_B)$ of beliefs about P_B , including the belief that T_2 is plausible in light of δ_2 , that T_2 explains δ_2 and that $\beta(A_2, P_B)$ is highly coherent. Suppose that A_2 ’s beliefs are a proper subset of A_1 ’s beliefs, i.e. $\beta(A_2, P_B) \subset \beta(A_1, P_B)$, that all members of $\beta(A_2, P_B)$ qualify as knowledge and that A_2 ’s knowledge of P_B is as well-connected as they can be.

⁷ Notice that it is a core feature of Kvanvig’s account that there is no external condition on understanding besides the truth condition. This is the crucial difference between understanding and knowledge, which does require satisfaction of some such condition (in order to deal with the likes of Gettier cases).

⁸ In fact, there is reason to believe that the relevant function will have to be more complex. First, Kvanvig allows that understanding tolerates peripheral false beliefs (2003, 201). Second, in order to account for depth and breadth of understanding, Kvanvig will arguably have to distinguish between amount of information and significance of information contained. As a result, there is reason to think that degree of understanding will have to be a function of coherence, informativeness, significance and truth ratio. Since my argument trades on quantitative difference translating into qualitative differences in understanding, these complications are of little consequences for the purposes of this paper. For that reason, in what follows, I will work with the above (simpler) account.

CASE 3. A_3 is the founder of a sect for which P_B is of central importance. On the basis of superstition, wishful thinking and A_3 's views about what sort of theory would best further his interests as sect leader, A_3 has confabulated and also come to believe theory T_3 of P_B . Along the way, A_3 also confabulates and comes to believe a set of data, δ_3 about P_B . (Suppose that A_3 would have believed this of any theory-data combination he might have made up.) In this way, A_3 arrives at a set $\beta(A_3, P_B)$ of beliefs about P_B , including the belief that T_3 is plausible in light of δ_3 , that T_3 explains δ_3 and that $\beta(A_3, P_B)$ is highly coherent, as well as a set $\gamma(A_3, P_B)$ of grounding relations between these beliefs. Incredible as it may be, A_3 arrives at exactly the same beliefs about P_B as A_2 , i.e. $\beta(A_3, P_B) = \beta(A_2, P_B)$.

Recall that one could attain understanding of a variety of different phenomena, including processes that take place in the external world events and theories of these processes.⁹ Let it be agreed that A_1 , A_3 and A_2 have the same degree of understanding of the *theory* of P_B that A_3 and A_2 have arrived at. (By the lights of KU, this will be the case if they approximate fully comprehensive and maximally well-connected knowledge of what the theory says equally closely.) Instead, let's focus on P_B itself, a phenomenon of the mind-independent world we inhabit. I take it that, intuitively, (i) A_1 has a better (because maximal rather than non-maximal) understanding of P_B than A_2 and (ii) A_1 and A_2 both have a better (because well researched rather than confabulated) understanding than A_3 .

The crucial intuitive claim (ii) finds further theoretical support from the following argument: understanding affords the agent cognitive access to its object, that is, in the case of P_B , a phenomenon of mind-independent reality. At the same time, A_3 's beliefs are the products of confabulations, stories with no grounding in, no connection to mind-independent reality whatsoever. Since access requires connection, these confabulations cannot afford A_3 much in the way of cognitive access at all.¹⁰ More importantly, however, they do not afford A_3 the same degree of cognitive access to P_B as A_1 and A_2 whose careful research into the phenomenon establishes just such a connection, thereby giving us (ii).

⁹ Greco flags the importance of this distinction in a recent paper (2014).

¹⁰ Unsurprisingly, I also find it plausible that A_3 does not have much in the way of understanding of P_B at all and that A_2 's understanding of P_B is much better than A_3 's. However, U-BET is, of course, not suited to predict this. In the absence of a more encompassing account of degrees of understanding, KU will not be able to explain this intuition.

Where ' $U(_, \dots)$ ' denotes $_$'s the degree of understanding of \dots , there is thus reason to believe that the correct order of comparative degrees of understanding for CASE 1 – CASE 3 is this:

$$U(A_1, P_B) > U(A_2, P_B) > U(A_3, P_B) \quad [1]$$

However, Kvanvig's account does not deliver this result. Recall that, by Kvanvig's lights, degree of understanding is a function of coherence and informativeness of beliefs. Since A_1 's beliefs about P_B are more informative (and, we may assume, are no less coherent) than A_2 's, Kvanvig can secure the intuitive result that A_1 's understanding is better than A_2 . However, since A_2 and A_3 have exactly the same beliefs about P_B , they are equally informative and coherent. In consequence, his account predicts the following order of degrees of understanding:

$$U(A_1, P_B) > U(A_2, P_B) = U(A_3, P_B) \quad [2]$$

In contrast with Kvanvig's account, KU delivers the correct results. Since A_1 and A_2 's beliefs about P_B all qualify as knowledge, we get that $\beta(A_1, P_B) = \kappa(A_1, P_B)$ and $\beta(A_2, P_B) = \kappa(A_2, P_B)$. Since, as already saw, $\beta(A_2, P_B) \subset \beta(A_1, P_B)$, it follows that $\kappa(A_2, P_B) \subset \kappa(A_1, P_B)$. In addition, since A_1 's fully comprehensive knowledge of P_B is also maximally well-connected, the grounding relations that hold between the members of A_2 's knowledge about P_B is a subset of the ones that hold between the members of A_1 's knowledge about P_B , i.e. $\gamma(A_2, P_B) \subseteq \gamma(A_1, P_B)$. In this way, we get $\beta(A_2, P_B) \subseteq \beta(A_1, P_B)$, $\gamma(A_2, P_B) \subseteq \gamma(A_1, P_B)$ and $\kappa(A_2, P_B) \subset \kappa(A_1, P_B)$. By U-BET, it follows that A_1 's understanding of P_B is better than A_2 's.

What about A_2 and A_3 ? We already have $\beta(A_2, P_B) = \kappa(A_2, P_B)$ and $\beta(A_2, P_B) = \beta(A_3, P_B)$. Since a subset of $\beta(A_3, P_B)$ is arrived at via confabulation and so falls short of knowledge, $\kappa(A_3, P_B) \subset \beta(A_3, P_B)$. This gives us $\kappa(A_3, P_B) \subset \kappa(A_2, P_B)$. In addition, since A_2 's knowledge about P_B is as well-connected as it can be, the grounding relations that hold between the members of A_3 's knowledge about P_B is a subset of the ones that hold between the members of A_2 's knowledge about P_B , i.e. $\gamma(A_3, P_B) \subseteq \gamma(A_2, P_B)$. In this way, we get $\beta(A_3, P_B) \subseteq \beta(A_2, P_B)$, $\gamma(A_3, P_B) \subseteq \gamma(A_2, P_B)$ and $\kappa(A_3, P_B) \subset \kappa(A_2, P_B)$. By U-BET, it follows that A_2 's understanding of P_B is better than A_3 's. KU makes the correct predictions in CASE 1 – CASE 3, to wit, [1]. In this way these cases constitute evidence favouring KU

over Kvanvig’s account.¹¹

3.2 Elgin

Elgin’s account of understanding is even weaker than Kvanvig’s in that Elgin drops the factivity condition on understanding. Elgin provides a rough characterisation of her view in the following passage:

As a very crude first approximation, I suggest that understanding is a grasp of a comprehensive general body of information that is grounded in fact, is duly responsive to evidence, and enables non-trivial inference, argument, and perhaps action regarding that subject the information pertains to.

(Elgin 2009, 327)

As Elgin herself aptly notes, her characterisation is “hideously rough”. For present purposes, what I would like to focus on is Elgin’s groundedness condition on understanding according to which understanding must be grounded in fact. What could she mean by “groundedness” here? The candidates that first spring to mind—causal and modal accounts—won’t do the job because they are bound to render understanding of *a priori* necessary phenomena problematic. Fortunately, Elgin doesn’t seem to have any such account in mind. While Elgin doesn’t provide a detailed account of groundedness in this paper, her earlier book fills the gap. The account offered there is fittingly internalist: grounding of understanding is explained in terms

¹¹ Suppose my claim in fn.10 is correct in that A_3 does not have much understanding about P_B at all and that A_2 ’s understanding of P_B is much better than A_3 ’s. Then there is further trouble on the horizon for Kvanvig. To see this consider another agent, A_3' who via confabulation arrives at a set $\beta(A_3', P_B)$ about P_B such that $\beta(A_3', P_B) = \beta(A_1, P_B)$. In that case, it would seem that the intuitively correct order of degrees of understanding is as follows:

$$U(A_1, P_B) > U(A_2, P_B) > U(A_3', P_B) \geq U(A_3, P_B) \quad [3]$$

However, Kvanvig’s account would seem to predict the following:

$$U(A_1, P_B) = U(A_3', P_B) > U(A_2, P_B) = U(A_3, P_B) \quad [4]$$

In particular, the prediction that A_3' ’s confabulated understanding is better than A_2 ’s well-researched understanding seems highly problematic. In contrast, KU seems to be compatible with the correct ordering. After all, it seems that well-researched understanding will plausibly involve more knowledge than confabulated understanding. However, in the absence of a more developed account of degrees of understanding and a more detailed account of what agents like A_3 and A_3' may actually still know about the relevant phenomena, KU does not make any determinate predictions on this case.

of accommodation of *prior beliefs*. More specifically, the basic picture Elgin (1996, ch. 4) has in mind is this: We start with a set of beliefs (or “commitments” as Elgin calls them). These beliefs enjoy *prima facie* justification (in Elgin’s terms they are “initially tenable”), but may be in tension with each other or may not explain everything we want explained. In order to resolve the tension/meet our explanatory needs we construct theories, thereby arriving at a new set of beliefs the justification of which is a function of two factors, *viz.* (a) internal coherence and (b) accommodation of prior beliefs. Even a set of beliefs that enjoys all things considered justification (in Elgin’s terms a “system in reflective equilibrium”) at a certain time might have to be revised at some future time, for instance because our explanatory needs change due to new discoveries. When this happens we return to theory construction and so on.

The key to Elgin’s account of grounding can be found in the following passage:

No mere castles in the air, systems in reflective equilibrium are tethered—not to Things in Themselves but to our antecedent understanding of and interest in the matter at hand. Coherence provides justification *in* the system; the tie to initially tenable commitments, justification *of* the system.

(Elgin 1996, 107)

Here Elgin is very clear that what grounds the relevant sets of beliefs (what “tethers” them, what prevents them from being “mere castles in the air”) is the fact that they accommodate our prior beliefs (“the tie to initially tenable commitments”).

Notice furthermore that Elgin can make sense of degrees of understanding in a way similar to Kvanvig, by maintaining that degree of understanding is a function of coherence and informativeness of one’s set of beliefs and the degree to which it accommodates prior beliefs.¹²

Unsurprisingly, Elgin’s account faces similar problems as Kvanvig’s. Thus consider the following cases:

CASE 4. A_4 , a famous political scientist, has conducted careful research into a certain recent political phenomenon, P_p , thus arriving at a set of beliefs $\beta(A_4, P_p)$ of beliefs about P_p . Let us suppose that all members of $\beta(A_4, P_p)$ qualify as knowledge and that, in fact, A_4 has attained fully comprehensive and maximally well-connected knowledge of P_p .

¹² Again, we might have to add significance to the mix here. Again, for present purposes, these complications are of little consequence.

CASE 5. A_5 , another political scientist and contemporary of A_4 's, has conducted careful research into P_p . A_5 has gathered and come to believe a set of data, δ_5 , about P_p . Moreover, A_5 has devised and come to believe a theory T_5 of P_p . In this way, A_5 arrives at a set $\beta(A_5, P_p)$ of beliefs about P_p , including the belief that T_5 is plausible in light of δ_5 , that T_5 explains δ_5 , that $\beta(A_5, P_p)$ is highly coherent and that T_5 accommodates A_5 's prior beliefs. Suppose that A_5 's beliefs are a proper subset of A_4 's beliefs, i.e. $\beta(A_5, P_p) \subset \beta(A_4, P_p)$, that all members of $\beta(A_5, P_p)$ qualify as knowledge and that A_5 's knowledge of P_p is as well-connected as it can be.

CASE 6. A_6 is a lone brain in a vat that is hosting deceptive experiences as of a physical world involving other agents. Now suppose that A_6 is mental duplicate of A_5 in the sense that throughout their personal histories A_5 and A_6 have had exactly the same experiences, beliefs etc.¹³

Intuitively, A_4 's understanding here is (i) better than A_5 's (because maximal rather than non-maximal) and (ii) A_4 and A_5 's understanding is better than A_6 's. Again, claim (ii) can be backed by argument. In CASE 6, there are no other human beings and hence no political phenomena. In particular P_p doesn't even occur. As a result, A_6 's inquiries, however well intentioned and virtuously carried out, cannot grant her cognitive access to P_p either. More importantly, her inquiries don't afford her the same degree of cognitive access as A_4 and A_5 , whose inquiries establish a connection with and thereby afford them cognitive access to P_p , which gives us (ii).

There is thus reason to believe that the correct order of degree of understanding is:

$$U(A_4, P_p) > U(A_5, P_p) > U(A_6, P_p) \quad [5]$$

Recall that, by Elgin's lights, degree of understanding is a function of coherence and informativeness of beliefs as well as the degree to which it accommodates prior beliefs. Since A_4 's beliefs about P_p are more informative (and, we may assume, are no less coherent and

¹³ If anti-individualism (Putnam 1975; Burge 1979) is true, the story will have to be slightly more complicated. We will have to suppose that A_6 led a normal life up until the contents of her relevant mental states were fixed and was then abducted and envatted. We will also have to suppose that A_6 acquires the beliefs about P_p after her envatment and before the contents of her mental states change. However, there is no obstacle in principle to this. Moreover, given Elgin's internalist inclinations, it would be surprising, to say the least, if she were an anti-individualist.

accommodating of prior beliefs) than A_5 's, Elgin can secure the intuitive result that A_4 's understanding is better than A_5 . However, since A_5 and A_6 are mental duplicates, their beliefs score equally high on all of these counts. In consequence, Elgin's account predicts the following order of degrees of understanding:

$$U(A_4, P_p) > U(A_5, P_p) = U(A_6, P_p) \quad [6]$$

Since Elgin's account passes the wrong verdicts here, the cases constitute evidence against her account.

In contrast with Elgin's account, KU delivers the correct results. Since A_4 and A_5 's beliefs about P_p all qualify as knowledge, we get that $\beta(A_4, P_p) = \kappa(A_4, P_p)$ and $\beta(A_5, P_p) = \kappa(A_5, P_p)$. Since, as already saw, $\beta(A_5, P_p) \subset \beta(A_4, P_p)$, it follows that $\kappa(A_5, P_p) \subset \kappa(A_4, P_p)$. In addition, since A_4 's fully comprehensive knowledge of P_p is also maximally well-connected, the grounding relations that hold between the members of A_5 's knowledge about P_p is a subset of the ones that hold between the members of A_4 's knowledge about P_p , i.e. $\gamma(A_5, P_p) \subseteq \gamma(A_4, P_p)$. In this way, we get $\beta(A_5, P_p) \subseteq \beta(A_4, P_p)$, $\gamma(A_5, P_p) \subseteq \gamma(A_4, P_p)$ and $\kappa(A_5, P_p) \subset \kappa(A_4, P_p)$. By U-BET, it follows that A_4 's understanding of P_p is better than A_5 's.

What about A_5 and A_6 ? We already have $\beta(A_5, P_p) = \kappa(A_5, P_p)$ and $\beta(A_5, P_p) = \beta(A_6, P_p)$. Since A_6 is a radically deceived brain in a vat, a subset of her beliefs falls short of knowledge, i.e. $\kappa(A_6, P_p) \subset \beta(A_6, P_p)$. This gives us $\kappa(A_6, P_p) \subset \kappa(A_5, P_p)$. In addition, since A_5 's knowledge about P_p is as well-connected as it can be, the grounding relations that hold between the members of A_6 's knowledge about P_p is a subset of the ones that hold between the members of A_5 's knowledge about P_p , i.e. $\gamma(A_6, P_p) \subseteq \gamma(A_5, P_p)$. In this way, we get $\beta(A_6, P_p) \subseteq \beta(A_5, P_p)$, $\gamma(A_6, P_p) \subseteq \gamma(A_5, P_p)$ and $\kappa(A_6, P_p) \subset \kappa(A_5, P_p)$. By U-BET, it follows that A_5 's understanding of P_p is better than A_6 's. KU makes the correct predictions in CASE 1 – CASE 3, to wit, [5]. In this way these cases constitute evidence favouring KU over Elgin's account as well.¹⁴

¹⁴ Again, in much the same way as in the case of Kvanvig before (see fn.11), further trouble arises from a case involving an agent, A'_6 , who, like A_6 , is a lone brain in a vat but is a mental duplicate of A_1 . The intuitive order of understanding is the following:

$$U(A_4, P_p) > U(A_5, P_p) > U(A'_6, P_p) \geq U(A_6, P_p) \quad [7]$$

4 Objections

KU carries some promise in that it at least seems to fare better than its most prominent non-knowledge based competitors in the literature. Nonetheless, opponents of K accounts have adduced a number of objections to this kind of view. In this section, I will sketch the most prominent such objections in the literature and show how they can be dealt with by KU.

4.1 Gettiered Understanding

The first objection against K accounts of understanding is due to Kvanvig (2003) who argues that understanding but not knowledge is compatible with (a certain form of) gettierisation. To bring this point home, Kvanvig invites us to consider the following case:

Consider, say, someone's historical understanding of the Comanche dominance of the southern plains of North America [henceforth also 'COMANCHE'] from the late seventeenth until the late nineteenth centuries. Suppose that if you asked this person any question about this matter, she would answer correctly. Assume further that the person is answering from stored information; she is not guessing or making up answers, but is honestly averring what she confidently believes the truth to be. Such an ability is surely constitutive of understanding, and the experience of query and answer, if sustained for a long enough period of time, would generate convincing evidence that the person in question understood the phenomenon of Comanche dominance of the southern plains."

(Kvanvig 2003, 197-8)

Crucially, Kvanvig points out that while the history aficionado's beliefs will normally also qualify as knowledge, they need not. The case can be set up as a Gettier case and so the history aficionado's

However, Elgin's account would seem to predict the following:

$$U(A_4, P_P) = U(A'_6, P_P) > U(A_5, P_P) = U(A_6, P_P) \quad [8]$$

Again, the prediction that the understanding of a brain in a vat, A'_6 is better than A_5 's well-researched understanding seems highly problematic. Again, whilst compatible with the correct ordering, in the absence of a more developed account of degrees of understanding and a more detailed account of what agents like A_6 and A'_6 may actually still know about the relevant phenomena, KU does not make any determinate predictions on this case.

beliefs are only luckily true. Here's how Kvanvig ventures to achieve this:

For example, most history books might have been mistaken, with only the correct ones being the sources of the understanding in question and with no basis in the subject for preferring the sources consulted over those ignored.

(Kvanvig 2003, 198)

The thought here is that the case is relevantly analogous to the notorious Ginet/Goldman fake barn case (see Goldman 1976), in which the agent acquires a true belief that he is facing a barn whilst driving alongside a field that otherwise contains only cleverly constructed fakes. For that reason, the history aficionado understands COMANCHE even though the beliefs that constitute his understanding are gettiered and hence do not qualify as knowledge.

One problem I have with this case is that it is actually not clear that the fake barn case is the correct model for it. After all, in the fake barn case, the agent (i) comes to truly believe *one proposition*, to wit, that he is looking at a barn. Moreover, (ii) he might easily have believed the *same proposition*, but (iii) that belief would have been *false*. In contrast, in the Comanche case, the history aficionado (i) acquires a *body of interconnected true beliefs* about COMANCHE. What might easily have happened is (ii) that he might have come by a *different body of interconnected beliefs*. Finally, (iii) while some members of the body of interconnected beliefs the history aficionado might have arrived at, including some central ones, would have been false, it is far from clear that *all* of them would have been false (or even unknown).

Here is a more adequate model for the Comanche case: Someone selects a particular school for his daughter on the ground that it is housed in a nicer building than all the other schools in the neighbourhood. Suppose, furthermore, the school selected happens to be the only school in the neighbourhood that teaches evolutionary theory instead of creationism. Note that this case parallels the Comanche case closely, much more closely than the fake barns case. After all, just as in the Comanche case, in this case, (i) the daughter acquires a *body of interconnected true beliefs* about a certain phenomenon, here the origin of species. What's more, (ii) she might easily have come by a *different body of interconnected beliefs* about it, that is, if she had been sent to a different school. Finally, (iii) while some members of the body of interconnected beliefs, including central ones, would have

been false, it is far from clear that *all* of them would have been false (or even unknown).

It comes to light that the Comanche case parallels the school case much more closely than the fake barns case. Now, the crucial question is whether, in the school case, the daughter's beliefs about the origin of species qualify as knowledge. In my view, the answer here is yes. Surely, the daughter can come to know things she learns at school about the origin of species, even if different schools she might easily have attended instead would have taught her falsehoods. If so, Kvanvig has failed to make a compelling case that, in the Comanche case, the beliefs about COMANCHE the history aficionado arrives at fall short of knowledge. On the contrary, if anything, there is reason to think, *pace* Kvanvig, that the history aficionado's beliefs about COMANCHE do qualify as knowledge, even if different books he might easily have read instead would have led him to believe falsehoods. As a result, Kvanvig's case fails to make a compelling case against knowledge based accounts of understanding.

That said, it may be worth noting that KU has the resources to provide yet another account of the Comanche case, one that can concede that many of the history aficionado's beliefs in the Comanche case fall short of knowledge. Recall that, according to U-OUT, attributions of understanding are given a contextualist semantics. Roughly, one understands a phenomenon just in case one knows enough about it to satisfy a contextually determined standard. Notice next that even if, in the Comanche case, some of the history aficionado's beliefs about COMANCHE are gettiered, others may qualify as knowledge, including (i) what the relevant theory about COMANCHE says and (ii) that it is a highly plausible theory. Now, this knowledge might be enough in the sense required by U-OUT if the contextually determined standards are sufficiently low. Consider, for instance, a context in which all we are looking for is someone who will correctly answer a number of questions about COMANCHE. In such a context, it would seem that someone who, like the history aficionado, knows what the correct theory about COMANCHE says and knows it to be highly plausible, will know enough to meet our needs.¹⁵ Given that this is so, it is also plausible that the standards operative in this context should

¹⁵ We might have to add that this person is not aware of any alternative theories that she believes to be equally or almost equally plausible. Otherwise she might not be prepared to answer in accordance with what the theory says. Notice, however, that the history aficionado also satisfies this additional requirement.

be low enough to allow us to truly attribute this agent understanding of the phenomenon. But now notice that the context just described fits the context that Kvanvig sets up like a glove. After all, what Kvanvig takes to be the crucial evidence that the history aficionado understands COMANCHE is that the history aficionado such that “if you asked [her] any question about this matter, she would answer correctly” (Kvanvig 2003, 197). In consequence, KU may be able to secure the result that, in the relevant context, the history aficionado can truly be attributed understanding of COMANCHE even if many of his beliefs about the issue are gettiered.

4.2 Models, Idealisations and Thought Experiments in Science

A second set of objections to K accounts venture to show that, as opposed to knowledge, understanding is not factive. That is to say, one can come to understand something even though some of the beliefs that constitute one’s understanding are false. Elgin presents a number of arguments along these lines one of which concerns the role of idealisation, models and thought experiments in science. She considers a variety of examples including the ideal gas law:

The ideal gas law, for example, accounts for the behaviour of gases by characterizing the behaviour of a gas composed of dimensionless, spherical molecules that are not subject to friction and exhibit no intermolecular attraction. There is no such gas. Indeed, there could be no such gas. Nonetheless, scientists purport to understand the behaviour of actual gases by reference to the ideal gas law.

(Elgin 2009, 326)

As the case of the ideal gas law illustrates, idealisations, simplified models and thought experiments play a central role in scientific theorising and constitute a crucial part of our understanding of the subject matter. Our understanding of the behaviour of gases rests crucially on the ideal gas law. At the same time, these idealisations, models and thought experiments do not describe any part of the natural world and so are not literally true. The ideal gas law is a case in point: the natural world features no gases with the properties the ideal gas law assumes gases to have. It is therefore not literally true.

It goes without saying that if idealisations, models and thought experiments are not literally true, then no one can know them to be literally true. At the same time, it is simply not part of KU that a

proposition or theory can contribute to our understanding of various scientific phenomena only if it is known to be literally true. Instead, by the lights of KU, it will so contribute if it allows us to make progress in the direction of fully comprehensive and maximally well-connected knowledge of the phenomena. And there is excellent reason to think that idealisations, models and thought experiments do this much for us. After all, we can still know what (theories including) these idealisations, models and thought experiments say. For instance, we can know what a theory including the ideal gas law says. We can also know that actual scientific entities approximate the idealisations, etc. in various respects and to various degrees. For instance, we can know that actual gases approximate ‘ideal gases’ in various respects. Finally, we can know the limitations of idealisations, etc. Since this knowledge advances us in the direction of fully comprehensive and maximally well-connected knowledge of the relevant phenomena—in the case of the ideal gas law of the physics of gases—by KU, it constitutes part of our understanding of them. It thus comes to light that while the fact that idealisations, etc. are not true of any actual scientific entities may mean that they cannot be part of our understanding of the relevant scientific phenomena in the most straightforward way, it does not follow that they cannot constitute part of our relevant understanding at all.

4.3 Scientific Progress

Another argument against K accounts, also due to Elgin (2009, 325-6), proceeds along the following lines: Scientific understanding progresses from the crude to the sophisticated. For instance, the first seed of a great evolutionary biologist’s understanding of the evolution of humankind may consist in a belief that human beings evolved from apes. Throughout his education his beliefs about the evolution of humankind became refined. The crude belief was replaced by a belief that humans and apes had a common hominid ancestor. It also became embedded in a web of beliefs about evolution that make him the expert he is now. On a social level, our contemporary understanding of astronomy developed from Ptolemy’s theory of the movement of the planets, via Kepler, Newton and relativity theory to string theory.

Elgin claims that developments like these may manifest and often do manifest genuine cognitive progress, genuine progress in understanding. Throughout the various stages of the development, our

understanding of the subject matter—e.g. of the origin of species or astronomy—is embodied by the theory of the subject matter we accept at that stage. Crucially, however, not only the crude beginnings of scientific theorising on a subject matter, but also even the best theories science has produced thus far are all false. In consequence, on any account on which understanding is factive, the sophisticated are on par with the unsophisticated: neither has achieved understanding.

It is not hard to see that Elgin's objection will work only on the assumption that, according to K accounts, there can be progress in scientific understanding of a phenomenon as we move from one theory to another only if at least the successor theory is (known to be) true. Again, however, KU is simply not committed to this assumption. By KU, progress in scientific understanding of a phenomenon will occur if we make progress towards fully comprehensive and maximally well-connected knowledge of the phenomenon in question. Moving from one false theory to another may do the trick. In fact, Elgin's own case of moving to a theory including the ideal gas law plausibly constitutes a case in point here. Even if we grant that, just like its predecessor, this theory is false, it may nonetheless serve to increase our knowledge about the physics of gases, as we have just seen. Again, just because the contribution to progress is not made in the most straightforward way, it does not follow that no contribution to progress is made at all.¹⁶

4.4 Understanding via Incompatible Theories

The last objection I will discuss within the scope of this paper is due to Zagzebski who argues that incompatible theories can give their champions understanding of some phenomena. Here is Zagzebski:

More than one alternative theory may give understanding of the same subject matter. This makes sense if we think of a theory as a representation of reality, where alternative representations can be better or worse, more or less accurate. But more than one may be equally good, equally accurate. This form of understanding does not presuppose knowledge or even true belief, and if we assume that two competing representations of the same part of reality cannot both constitute knowledge, it cannot

¹⁶ It may be worth noting that, in a recent paper, Alexander Bird (2007) forcefully argues that scientific progress must be understood in terms of accumulation of knowledge. If successful, Bird's argument turns the tables on those who think that K accounts have difficulties in explaining progress in science.

be a form of knowledge.

(Zagzebski 2001, 244)

Just as Elgin before, Zagzebski presupposes that, according to K accounts, champions of a theory can attain understanding of the underlying phenomenon only if they know the theory to be true. As I have already pointed out, KU is not committed to this kind of claim. In fact, is not hard to see that KU can allow that more than one alternative theory can deliver an equal degree of understanding. After all, it is possible for adherents of two (or more) distinct theories to be equidistant from fully comprehensive and maximally well-connected knowledge of a certain phenomenon.¹⁷ In that case, KU predicts that they have the same degree of understanding of the phenomenon.

5 Conclusion

There is thus reason to believe that KU has an edge over its most prominent non-knowledge based competitors. KU passes the correct verdict in CASE 1 – CASE 6 with at least a subset of which each of its most prominent non-knowledge based competitors struggle. At the same time, by disavowing the claim that, in order to have some positive degree of understanding of a certain phenomenon, all of one's beliefs about it must qualify as knowledge or that one must know that one's theory of the phenomenon is true, KU can avoid at least some of the most prominent problems for K accounts in the literature.

Of course, the arguments presented here do not show that KU is the *only* viable account of understanding. After all, I have not argued that there aren't any non-knowledge based accounts other than the one's discussed in §3 that avoid the problems raised there. And I also haven't shown that there aren't any other K accounts that avoid the problems discussed in §4.

However, I believe that, whether or not the arguments presented ultimately serve to establish the truth of KU, the paper gets at least a number of fundamental things right. Perhaps most importantly, it extends the range of relevant data by considering comparative degrees of understanding across cases rather than focusing exclusively on outright understanding in a single case. I think this is a step in

¹⁷ Furthermore, two agents may be equidistant from fully comprehensive and maximally well-connected knowledge of a phenomenon because they are approximating such knowledge via different routes (e.g. breadth vs. depth).

the right direction because because in so many cases judgements of comparative degree are less complex and thus may be expected to be easier to get right than outright judgements.¹⁸ This suggests that it surely can't hurt to consider comparative degrees of understanding across cases. Indeed, it provides some reason to accord intuitive judgements about comparative degrees of understanding more weight than intuitive judgements of outright understanding.

Considering comparative degrees of understanding also delivers one main insight, *viz.* that, *pace* Kvanvig, etiology of belief matters to degree of understanding. As cases (CASE 1) – (CASE 6) suggest, the quality of one's understanding varies with how the relevant beliefs are acquired: for instance, careful research yields better understanding than confabulations. Whether or not KU is true, this is good news for K accounts. After all, it is just what one would expect if understanding affords an analysis in terms of knowledge.

Finally, I would like to briefly mention another line that I think is promising for defenders of K accounts. As I have argued elsewhere (Author 2014b,c), again *pace* Kvanvig, knowledge is the aim of inquiry into particular propositions. And suppose furthermore, as has been argued by a number of philosophers of science¹⁹, that understanding is the aim of scientific inquiry. Then further support for K accounts will flow from the fact that only K accounts will be able to provide a unified account of the aims of scientific inquiry and of inquiry into particular propositions. If successful, the argument will provide powerful support for K accounts because it will provide a solid theoretical reason for accepting some such account. I am optimistic about the prospects of this argument. However, in view of limitations of space, I will leave a detailed investigation of this line for another occasion.

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¹⁸ For instance, the judgement that *A* is taller than *B* is arguably less complex than the judgement that *A* and *B* are both tall. Typically, all we need to get the former right is some way of knowing the height of *A* and *B*. As opposed to that, in case of the latter, we need to know not only the height of *A* and *B* but also various facts about the conversational context such as comparison class and standard of comparison.

¹⁹ See, for example, Salmon (1998), Lipton (2004), de Regt & Dieks (2005) and Strevens (2006). It may be worth noting that Elgin and Zagzebski also appear to be at least sympathetic to this thesis.

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