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Objectual Understanding, Factivity and Belief

1. Introduction

Objectual understanding—*viz.*, the sort of understanding one has when one understands a subject matter or body of information—is often thought to be *factive*, in a way that (for example) mere coherent delusions are not. In short, understanding a subject matter demands we have at least *some* true beliefs about the subject matter in question¹. That being said, it is ubiquitous to claim that we understand some false subject matters or theories. For example, most high-school students have some understanding of Ptolemy’s earth-centred view of the universe, even though the Ptolemaic view is premised on a false conception of what revolves around what. One very natural way to reconcile the kind of factivity demanded of understanding with the datum that we can plausibly count as understanding false theories, models or subject matters is to point out a relevant fact about *the way* we regard ourselves as understanding (for instance) the Ptolemaic view: we understand it *as* false, which is to say, we see how the view holds together while at the same time appreciating *that* the view does not accurately represent what it purports to.

After outlining a rationale for this kind of reply with reference to a particular—and we suggest, very plausible—model on which to think of objectual understanding as *factive*, our primary aim in the paper is to engage with the comparatively more complicated issue of what objectual understanding demands in the *inverse sort of case*. Specifically, our focus will be cases where the central claims of the theory *itself* are true, an individual sees how the theory fits together (in a way that would ordinarily suffice for understanding), and yet does not appreciate the theory’s central claims *as* true. For example, should we regard Lackey’s (2007) ‘Creationist Teacher’ as *understanding* evolution, even though she does not, given her religious convictions, *believe* it? We think this question raises a range of important and unexplored questions about the relationship between understanding, factivity and belief. Our aim will be to diagnose this case in a

¹ The term ‘objectual understanding’ owes to Kvanvig (2003), who distinguishes objectual understanding from understanding-why (where the complement clause is a proposition—*viz.*, ‘S understands why *p*’), and propositional understanding (e.g. S understands that *p*).

principled way, and in doing so, to make some progress toward appreciating what objectual understanding demands of us.

Here is the plan. §2 outlines and motivates a plausible working model—*moderate factivity*—for characterising the sense in which objectual understanding should be regarded as factive. §3 shows how the datum that we can understand false theories can, despite initial suggestions to the contrary, be assimilated straightforwardly within the moderate factivity model. §4 highlights how the *inverse* kind of case to that explored in §3—*viz.*, a variant of Lackey’s creationist teacher case—poses special problems for moderate factivity. With reference to recent work on moral understanding by Hills (2009), §5 proposes a solution to the problem, and §6 attempts to diagnose why it is that we might originally have been led to draw the wrong conclusion.

2. Objectual Understanding and Factivity

It is generally assumed that propositional knowledge is factive (*cf.* Hazlett (2010)) in the sense that S fails to know that p if p is false. However, there is more room for disagreement about whether objectual understanding is factive, where the object of objectual understanding is not a proposition, but rather, is (or can be treated as) a body of information (e.g. S understands Australian rules football; S understands organic chemistry)². While it seems sensible to suppose that some kind of factivity constraint would feature as a necessary condition on objectual understanding, we might wonder just *how* strong a link there must be between the beliefs an agent has about subject matter ϕ and the propositions that are true of ϕ . We shall briefly explore three different strengths that a factivity constraint on objectual understanding might take, and in the course of doing so will make a case for thinking the moderate of the three models is far and away the most plausible³. The relevance of motivating moderate factivity will be to contextualise the puzzles raised in the next two sections, which are perplexing only in so far as they seem to suggest that moderate factivity would (counterintuitively) have to be rejected.

On one end of the factivity spectrum, we can imagine a maximally inclusive account—call this ‘weak factivity’—according to which one can count as understanding a subject matter ϕ even if *none* of one’s beliefs about ϕ are true. Zagzebski (2001) is tacitly committed to this proposal in virtue of allowing that at

² See Kvanvig (2003, chapter 8) for discussion.

³ See Gordon (forthcoming) for a fuller discussion of this topic.

least some cases of understanding do not require any true beliefs; similarly, Elgin (2007), in discussing the role the ideal gas law plays in the acquisition of scientific understanding, allows that at least some items of understanding might be (entirely) non-factive.

There are, we want to emphasise, several very serious problems with this type of view. For one thing, this kind of proposal lacks (entirely) the resources to explain certain elements of our linguistic practices of attributing understanding. For one thing, the weak view has trouble explaining why individuals take facts to be *relevant* at all to adjudicating disagreements about understanding. For example, if A attributes understanding of quantum mechanics to B, and C believes that the books B has read on quantum mechanics were in fact sham books with false information, C will be inclined to disagree with A's attribution of understanding to B. However, if understanding is compatible with all false beliefs, as the weak view under consideration suggests, this disagreement would make no sense. Relatedly, the weak view can't account for our willingness to retract former attributions of understanding, as when we find out that some of our φ -beliefs were false. Even more, and perhaps most problematically, the weak view allows cases of internally coherent delusions (e.g. made up stories that fit together) to count as cases of understanding, no matter how wide the cognitive gap between truths about φ and the delusional agent's beliefs about φ^4 .

More generally, in light of these consequences, a weak, non-factive account seems out of step with the common intuition that understanding is an especially valuable cognitive achievement⁵. For example, as Kvanvig (2003, 206) points out, 'we have an ordinary conception that understanding is a milestone to be achieved by long and sustained efforts at knowledge acquisition' (see e.g. Whitcomb 2012 for agreement, who observes that understanding is often thought of a "higher" epistemic good)⁶.

In response to the apparent failings of the weak view, we might instead move entirely in the opposite direction and embrace a maximally strong view of objec-

⁴ It's also worth noting that such a weak factivity constraint allows two people who deny all of each other's beliefs about some subject matter X might nevertheless be attributed an equally good understanding of the subject matter in question.

⁵ See Pritchard (2014) and Carter & Pritchard (2014; 2015) for discussion.

⁶ Perhaps part of the potential draw of a weak factivity constraint on understanding might be explained by the fact that there are closely related epistemic states that (while similar to understanding) does not involve a factivity constraint. The primary example might be intelligibility (Riggs, 2003) or subjective understanding (Grimm, 2011), which merely requires a grasp of connections between a coherent group of beliefs and lacks a need for truth. We consider this point in more detail in §6.

tual understanding's factivity—one on which understanding φ requires that *all* of one's beliefs about φ be true—and as such tolerates no false beliefs on the subject matter in question. This approach has two advantages over the non-factive account: firstly, it accounts for the apparent epistemic desirability of understanding (e.g. understanding would certainly be epistemically valuable if permitted no error) and, secondly, a strictly factive view could easily explain disagreement and retraction data in the kinds of cases considered. Problematically, though, the strong view renders understanding very rare indeed. Experts who merely happen to have one false belief about a minor area of their subject fail to count as understanding on a strictly factive view. Even if such a view can explain some cases of disagreement and retraction better than the non-factive view, the strictly factive view does not square more generally with our practices of attributing understanding, as we are generally happy to attribute understanding of a subject matter φ to individuals who have some false beliefs about φ ; this is reflected in our tendency to view understanding as a matter of *degree*, with some agents having poorer understanding of a subject than others (who nonetheless we also think of as *having* understanding).

Consequently, it seems like we should reject either of these extremes and embrace something in between—a *moderate* factivity constraint. After all, we have seen that not every belief relevant to an agent's understanding of φ needs to be true, even though there are obviously cases in which false beliefs about φ *will* undermine a potential case of understanding. Kvanvig (2003; 2009) advocates this type of position (as does Wilkenfeld (2015), under the name 'quasi-factivity'⁷). On Kvanvig's view, one can understand subject matter φ provided all of one's *central beliefs* about φ are true, thereby leaving room for degrees of understanding and for attributions of understanding when the agent has false *peripheral* beliefs (without leaving so much room that internally consistent delusions creep in as cases of understanding, as they would on the weak factivity constraint at the beginning of this section). Of course, a moderate factivity constraint invites a range of interesting further questions, which remain underexplored. In particular, we might ask what it is in virtue of which a belief should attain the status of a 'central belief.' Similarly, a plausible substantive moderate factivity account will need to have some principled way to distinguish peripheral beliefs from central beliefs as well as from beliefs which fall outside the subject matter in question entirely. It is beyond the scope of what we can do

7 Wilkenfeld (2015) defends what he calls 'The Contextual Quasi-Factivity (CQF) of objectual understanding' according to which one understands object o only if one's central beliefs about o are true, where a belief's centrality is pragmatically determined.

here to answer these more specific questions about how a moderate factivity view would go. Our aim in this section is rather to show that something *like* the moderate view (suitably embellished) will surely be a necessary condition on understanding.

3. False Theories and Moderate Factivity

Consider the following two cases.

GEOCENTRISM: Helena, along with the other students in her Astronomy class, learns about Ptolemy's geocentric model of the cosmos, according to which the planet Earth is the orbital centre of the solar system—that around which other stars and planets revolved. Moved by the model's simplicity and elegance, Helena goes above and beyond, reading the entire *Almagest* and laboriously drawing out maps of the Ptolemaic epicycles of the planets. On the exam, Helena gets a perfect score.

WESTEROS: Having read (10 times) each of George R.R. Martin's books in the *A Song of Fire and Ice* series, Mark has a deep and extensive appreciation of the inter-familial dynamics of the leading families of Westeros, their lineage and the more general geopolitical climate within which each family is vying for control of the Iron Throne of the Seven Kingdoms.

On the face of things, it would seem as though GEOCENTRISM and WESTEROS are going to pose some obvious problems for a proponent of the kind of moderate factivity account put forward in the previous section. This is for the reason that it *looks* very much like:

- (i) both GEOCENTRISM and WESTEROS are cases where genuine objectual understanding is present; and yet,
- (ii) in light of the falsehood of the central propositions constituting each subject matter, moderate factivity is satisfied in neither case.

In support of claim (i), consider that that it would be very odd to simply deny that Helena actually understands Ptolemy's geocentrism or that Mark understands the geopolitics of Westeros given that, by most any standard of assessment, each has not merely become acquainted with, but has mastered, the subject matter in question. By attributing understanding, rather than something less, in these cases, we are able to mark an important kind of cognitive achieve-

ment that Helena and Mark have attained but which is *not* attained by individuals who (unlike Helena and Mark) merely memorised bits of the relevant subject matter without seeing how the pieces fit together (e.g. as might one who, in WESTEROS, learns *that* the Starks don't trust the Lannisters and commits this to memory, but has no conception of why this is so). Nor for that matter is this cognitive achievement attained by individuals who have mere coherent delusions about the subject matter in question (e.g. as might one who, in GEOCENTRISM, believes the Ptolemaic view postulates the moon, rather than the earth, as the orbital centre of all celestial bodies, and then forms an elaborate, coherent but misguided picture around this false 'moon-centric' belief). So biting the bullet and denying (i) doesn't look like a very promising way out.

Likewise, there is strong *prima facie* support for (ii). After all, with respect to GEOCENTRISM, Ptolemy's view is almost entirely false—certainly, the central claims underwriting the Ptolemaic model are false (e.g. the claim that the earth does not move). Meanwhile, in WESTEROS, unqualified geopolitical claims about the place are categorically false because Westeros does not exist. It looks very much like the propositions which Mark pieces together in such sophistication are propositions of the form 'The Lannisters did X' and 'The Starks did Y', and these are, strictly speaking, false propositions, given that there were no Lannisters and there were no Starks.

Obviously, if (i) and (ii) really *are* true, then it simply follows that moderate factivity cannot, despite what was suggested in the previous section, capture a plausible necessary condition on understanding. And so it looks initially like GEOCENTRISM and WESTEROS generate a kind of puzzle: moderate factivity is by far more plausible than the weak and strong alternatives, and yet, if we grant (i) and (ii), we have to reject moderate factivity as a necessary condition on objectual understanding. So *which* of (i) or (ii) must be rejected?

Perhaps there are various ways a proponent of moderate factivity could convincingly explain away the apparent tension posed by cases like GEOCENTRISM and WESTEROS. For our purposes, we submit that a sufficient and appealing way to reconcile these cases with moderate factivity is to accept (i) and then reject (ii).

Rejecting (ii), *via* the kind of rationale we suggest, brings with it the benefit of making it evident why false theories, as such, needn't be *de facto* ruled out as potential objects of objectual understanding, which is a pleasing result.

To a first approximation, what we want to suggest in the case of false theories is that, for an agent S and some subject matter F whose *central* claims are strictly false, S understands F *only if* S understands F *as* (strictly) false. Correspondingly, we suggest S understands F *as* (strictly) false *only if* S has a belief (either occurrent or dispositional) *that* the theory's central claims are false.

Such a belief is important, as it *de facto* qualifies the *mode* under which the agent is grasping the relationship between the propositions that constitute the subject matter (a point we'll unpack shortly). To make this point concrete, consider briefly two variations in GEOCENTRISM:

GEOCENTRISM-Variation 1: Helena, along with the other students in her Astronomy class, learns about Ptolemy's geocentric model of the cosmos, according to which the planet Earth is the orbital centre the solar system, that around which other stars and planets revolved. Moved by the model's simplicity and elegance, Helena goes above and beyond, reading the entire *Almagest* and laboriously drawing out maps of the Ptolemaic epicycles of the planets. On the exam, Helena gets a perfect score. Despite her fascination with the geocentric model, Helena is aware that the earth does not stand still, but in fact (as she appreciates that Copernicus showed with the help of Kelper in the 17th century) revolves around the sun⁸.

GEOCENTRISM-Variation 2: Helena, along with the other students in her Astronomy class, learns about Ptolemy's geocentric model of the cosmos, according to which the planet Earth is the orbital centre the solar system, that around which other stars and planets revolved. Moved by the model's simplicity and elegance, Helena goes above and beyond, reading the entire *Almagest* and laboriously drawing out maps of the Ptolemaic epicycles of the planets. On the exam,

⁸ We could envision a variant on this case, one that is a kind of 'middle ground' between GEOCENTRISM-1 and GEOCENTRISM-2. In this middle-ground variant, let's suppose Helena neither believes nor disbelieves the view's central claims, but withholds judgment. Perhaps, we can suppose, Helena is in the process of comparing the Ptolemaic model with other models, and is waiting for more evidence to come in before making an endorsement. In this case, Helena would satisfy moderate factivity trivially given that she has no false central *beliefs* (i.e., she does not, like Helena in GEOCENTRISM-2 believe the theory's claims accurately represent the Solar System.) However, she would satisfy moderate factivity in a way that differs importantly from the way in which one might satisfy moderate factivity by never entertaining the propositions in the first place. We think the appropriate way to articulate Helena's position, in such a middle-ground case, is as having what we can call *dispositional understanding*; as with dispositional beliefs, where a condition—namely, occurrent endorsement—activates the belief, likewise, actively taking a correct doxastic stand (rather than withholding) with respect to the central propositions about which one was previously agnostic activates the understanding. Given that the variations with GEOCENTRISM involved a subject matter the central claims of which are false, this will mean that Helena (in the envisioned middle-ground case) activates her dispositional understanding upon believing (rather than withholding) of the central claims, that they are false—something she fails to do when withholding judgment. Thanks to Heather Battaly for raising this kind of case.

Helena gets a perfect score. Helena's fascination with the geometric model leaves her blinded to the Copernican evidence against it, and she believes that the theory's claims accurately represent the structure of our Solar System.

On the rationale for rejecting (ii) which we want to propose, Helena satisfies moderate factivity in Variation-1 but *not* in Variation-2. Given that, on Variation-1, Helena *believes* that the central claims characterising the Ptolemaic view are false, the unqualified claims such as:

The earth is the orbital centre of the solar system
and
The sun revolves around the earth

which are false claims, do not accurately characterise the propositions Helena (in Variation 1) actually believes, and the relationships between which she competently grasps.

Rather, and to draw analogy from Sebastian Kletzl's (2011) work on assertion and testimony, the deeper structure of Helena's beliefs in Variation-1 are (in light of her belief in Copernicanism) to be read as qualified in the same sense that—for example, and to use Kletzl's case—a teacher leading a discussion on Plato's *Parmenides* might baldly assert 'X' where the content of the teacher's assertion should be best understood as *indirect* testimony to the effect that:

According to Plato in the *Parmenides*, X⁹.

Analogously, in light of Helena's belief in Variation-1 *that* the central claims of Ptolemy's geocentric model are false, the particular propositions Helena believes are best understood as *not* the false unqualified propositions (the corresponding beliefs of which would be in conflict with moderate factivity), but rather, *true qualified propositions* (the belief-analogues of Kletzl-style indirect assertions) to the effect that:

According to Ptolemy, the earth is the orbital centre of the solar system
and
According to Ptolemy, the sun revolves around the earth

⁹ See Carter & Nickel (2014) for further discussion on these kinds of cases.

Understood as qualified in this respect, the original tension—premised upon the idea that Helena’s understanding of geocentrism must involve false beliefs on Helena’s part, given the falsehood of the theory, is dissolved.

Of course, an implication of our escaping the puzzle by rejecting (ii) on the basis of the rationale we’ve suggested is that someone who pieces together the Ptolemaic view of the heavens, *while believing as the Ptolemaic view says that the earth is the centre of the universe*, lacks understanding of the Ptolemaic view. (And, likewise, one fails to understand the geopolitics of the seven kingdoms of Westeros if one actually thinks that these kingdoms really existed, as might one who was utterly clueless that this was a work of fiction by George R.R. Martin, and thought instead the structure of the actual world includes supernatural White Walkers, etc.¹⁰) But this, we think, is just as it should be.

It’s plausible to suppose that understanding, in the special case where the object of the understanding is a false theory, simply can *not permit* a false meta-belief (as Helena has in Variation 2 of GEOCENTRISM) *about* the subject matter to the effect that the subject matter’s central claims are correct (when these claims are false), even if we grant that the false meta-belief, itself, is not *part* of the subject matter in question (and so wouldn’t itself violate moderate factivity, which applies to central beliefs *of* the subject matter). The reasoning here is that such a false meta-belief will entail that the agent’s first-order beliefs (in Helena’s case in Variation-2, beliefs about the cosmos) are not *merely* qualified propositions of the form (according to theory the Ptolemaic view, X...) which are *true*, but *also* false propositions of the form ‘X’ (where these are unqualified claims about the structure of the cosmos, which are false). And false propositions of *this* form fail to satisfy moderate factivity.

4. Creationist Teacher Case

Consider now, the following case:

CREATIONIST TEACHER: Stella is a devoutly Christian fourth-grade teacher, and her religious beliefs are grounded in a deep faith that she has had since she was a very young child. Part of this faith includes a belief in the truth of creationism and, accordingly, a belief in the falsity of evolutionary theory. Despite

¹⁰ And, correspondingly in WESTEROS: Mark understands the geopolitics of Westeros provided he is aware the work is in fact a fiction (in which case the propositions the relationships between which he grasps are best understood as true propositions of the form According to Martin’s novels... [X] and not false propositions of the form The Lannisters ... [X]).

this, she fully recognizes that there is an overwhelming amount of scientific evidence against both of these beliefs. Indeed, she readily admits that she is not basing her own commitment to creationism on evidence at all but, rather, on the personal faith that she has in an all-powerful Creator. Because of this, Stella does not think that religion is something that she should impose on those around her, and this is especially true with respect to her fourth-grade students. Instead, she regards her duty as a teacher to involve presenting material that is best supported by the available evidence, which clearly includes the truth of evolutionary theory. As a result, after consulting reliable sources in the library and developing reliable lecture notes, Stella asserts to her students, “Modern-day *Homo sapiens* evolved from *Homo erectus*,” while presenting her biology lesson today. Though Stella herself neither believes nor knows this proposition, she never shares her own personal faith-based views with her students, and so they form the corresponding true belief solely on the basis of her reliable testimony. (Lackey 2008: 48).

Lackey’s case has been used to argue, among other things¹¹, that the following principle concerning the transmission of epistemic properties is false:

TEP-N: For every speaker, S, and hearer, A, A knows (believes with justification/warrant) that p on the basis of S’s testimony that p only if S knows (believes with justification/warrant) that p. (Lackey 2008: 39–40).

Lackey’s key point in adverting to CREATIONIST TEACHER¹² in the service of challenging TEP-N is that Stella’s failing to believe evolutionary theory is not, contrary to what TEP-N says, a barrier to students’ coming to acquire knowledge of the theory on the basis of Stella’s testimony. While Lackey’s much-discussed case has been (unsurprisingly) controversial among social epistemologists as a counterexample against TEP-N¹³, it is usually taken for granted by both sides that Stella herself would not know evolutionary theory *if* she believed it was false¹⁴ (and so this is taken for granted apart from the more contentious issue

¹¹ Lackey (2007) has also used the case to argue against the knowledge norm of assertion (e.g. Williamson 2000). See Carter & Gordon (2011) and Lackey (2011) for related discussion. Cf. Benton (2014).

¹² For related cases, see DISTRAUGHT DOCTOR and RACIST JUROR.

¹³ See Carter & Nickel (2014) for a defence of this kind of counterexample against TEP-N against recent attempts to defend TEP-N. Cf. however Wright (forthcoming) for a reply to Carter & Nickel.

¹⁴ For a heterodox position on this point, see Myers-Schultz & Schwitzgebel (2013).

of whether Stella's students could gain knowledge of Stella's testimony *despite* Stella's failing to believe it).

Things with objectual understanding are quite a bit more complex, however: that is, it's less clear that the analogue to the point about knowledge accepted on both sides of the TEP-N debate would also hold equally for (objectual) understanding. And this is because it seems Stella might very well be a candidate for understanding evolution, in CREATIONIST TEACHER, even if we grant that she fails to know the proposition 'Modern-day *Homo sapiens* evolved from *Homo erectus*' because she doesn't believe it.

But in order to make this point, it will be helpful to make an amendment to CREATIONIST TEACHER, so that features typically associated with objectual understanding are made more explicit, and then we'll hold fixed that Stella, due to her Christian faith, fails to believe that evolution is true. Consider now the following abridged version of the case (in which we promote her to university professor, with a stronger pedigree in the subject matter than we'd attribute to a fourth grade teacher), focusing only on Stella's own epistemic situation with respect to evolutionary theory.

CREATIONIST TEACHER*: Stella is a devoutly Christian university professor, and her religious beliefs are grounded in a deep faith that she has had since she was a very young child. Part of this faith includes a belief in the truth of creationism and, accordingly, a belief in the falsity of evolutionary theory. Despite this, she fully recognizes that there is an overwhelming amount of scientific evidence against both of these beliefs. Stella, in fact, reads contemporary scientific journals and regularly teaches advanced graduate seminars on evolution, where students and colleagues alike admire the deep appreciation Stella has of how the theory holds together. Moreover, Stella readily admits that she is not basing her own commitment to creationism on evidence at all but, rather, on the personal faith that she has in an all-powerful Creator.

Here's a structural explanation of how CREATIONIST TEACHER* seems to pose a problem for moderate factivity—in short, it seems very much like both of the following claims are true:

- (i) CREATIONIST TEACHER* is a case where genuine objectual understanding is present; and yet,
- (ii) moderate factivity is not satisfied, even though the propositions constituting evolutionary theory are themselves true

And if (i) and (ii) are right, then we have to reject moderate factivity. Because rejecting moderate factivity is tantamount to embracing the very implausible weak factivity account (one which fails to save the difference between understanding and coherent delusions) the question is: should we reject (i), (ii), or both?

We've already suggested that it's at least *prima facie* very intuitive to attribute understanding of evolution to Stella. It's tempting to say that Stella's demonstration of her competence (in teaching and in her scholarship) *retroindicates* understanding—*viz.*, one cannot plausibly get to the point Stella has got without understanding evolution.

On the matter of (ii): Support for this claim can be made with reference to two kinds of doxastic claims—a *negative* doxastic claim, about what Stella does not believe, and a *positive* doxastic claim, about what she does believe. (The relationship between these points involves some delicacy). The negative doxastic claim is that Stella *does not* believe various propositions that are themselves true and central to the subject matter. For instance, Stella does not believe that modern-day *Homo sapiens* evolved from *Homo erectus*. (Compare: someone plausibly does not understand the geography of the Great Lakes if that individual does *not* believe that these lakes are located in the North American continent).

One retort to the negative doxastic claim is that Stella does possess a range of true beliefs which, drawing from Kletzl's indirect testimony analogy discussed in the previous section, take the form:

According to evolutionary theory, [X]

where 'X' represents such propositions as *Modern-day Homo sapiens evolved from Homo erectus*. As the retort goes, since qualified propositions of these sort are good enough for Helena to satisfy moderate factivity in GEOCENTRISM (Variation-1) in virtue of believing, then surely they'd have to be good enough for Stella to satisfy moderate factivity in virtue of believing, in CREATIONIST TEACHER*.

We think this retort is misguided. The Kletzl line was useful in showing how, in the cases of false subject matters, the central beliefs the agents (e.g. Helena and Mark) actually have are best described not as false unqualified beliefs but as true qualified beliefs. *Merely* showing that Stella has some true qualified beliefs about the subject matter in question (e.g. such as *According to evolutionary theory, X, Y, Z ...*) does not suffice for demonstrating that Stella *thereby does not have any false central beliefs*.

But at this point we can imagine a rejoinder. Suppose the proponent of the retort considered were to argue: "Okay, so even if we grant that there are true central propositions (unqualified claims such as *Modern-day Homo sapiens*

evolved from Homo erectus) which Stella does not believe, it wouldn't follow from moderate factivity that Stella doesn't understand evolution. Moderate factivity says understanding is incompatible with *false central beliefs*, where as Stella's attitude with respect to the true unqualified propositions is just that she *does not believe* them."

In response to this retort, it will be helpful to compare CREATIONIST TEACHER* with THEORETICALLY NIHILISTIC TEACHER*:

THEORETICALLY NIHILISTIC TEACHER*: Bella desires above all financial security and a comfortable life. While she recognises that she lacks many practical and entrepreneurial skills that would be useful in the service of achieving these aims, she comes to recognise (on the basis of theoretical aptitude scores) that she has a natural proclivity for appreciating the nuances of evolutionary theory—something which does not in itself interest her in the slightest. Her desire for financial security and a comfortable life leads her to publish extensively on evolutionary theory and to receive an endowed professorship, which affords her the financial security and comfort she desired. Bella has never cared whether the theory is *true* and has not stopped to contemplate whether it's *actually* the case that *Modern-day Homo sapiens evolved from Homo erectus*.

We want to remain non-committal on the matter of whether Bella counts as understanding evolutionary theory, in virtue of simply *not* believing the central true propositions of evolutionary theory. We may suppose that Bella's beliefs in THEORETICALLY NIHILISTIC TEACHER* are best understood as *qualified*, just like the true beliefs we can attribute to Stella, which take the form

According to evolutionary theory, [X].

Importantly, though—and this connects with the *positive doxastic claim* in support of (ii)—Stella is actually *not* like Bella in one very important respect. Stella not *only* (like Bella) is such that she fails to believe various true (unqualified) central propositions about evolutionary theory (e.g. *Modern-day Homo sapiens evolved from Homo erectus*), but moreover, Stella *positively* holds central unqualified propositions to be false. After all, Stella, due to her deeply held Christian faith, while believing *According to evolutionary theory, Modern-day Homo sapiens evolved from Homo erectus* is true, believes *Modern-day Homo sapiens evolved from Homo erectus* is false. And so, in support of (ii), *regardless of whether* failing to believe true propositions central to a subject matter violates moderate factivity, positively believing (as Stella does) that propositions central to the subject matter in question are false, would be in violation with moderate factiv-

ity, understood as a constraint to the effect that understanding is incompatible with any central false beliefs.

Putting this all together, it should be clear now why CREATIONIST TEACHER* looks like a much more difficult challenge for one wishing to uphold moderate factivity than do the inverse sort of cases involving understanding of false theories (GEOCENTRISM and WESTEROS). And so the remaining question is: in light of the support we've seen for both (i) and (ii), and given that (i) and (ii) entail that moderate factivity must be rejected as a necessary condition on understanding, *which* should we give up, (i) or (ii)?

What we want to now suggest is that the way out of the puzzle is to deny (i) and thus, contrary to what is admittedly plausible, to deny that Stella (in CREATIONIST TEACHER*) does understand evolutionary theory. A satisfactory answer will of course require a residual explanation for why it is nonetheless attempting to attribute to Stella understanding in CREATIONIST TEACHER* despite the fact that, as we'll argue, this attribution would be mistaken.

5. Diagnosis

Of course, one kind of argument for why we should refrain from attributing understanding evolutionary theory to Stella in CREATIONIST TEACHER* is very simple: the simple argument proceeds as follows: moderate factivity is a necessary condition on understanding; Stella (as suggested in the previous section, in the support of claim (ii)) violates moderate factivity, and so therefore Stella doesn't understand evolutionary theory.

This kind of argument, however, would be *dialectically ineffective* in the context of the puzzle raised in the previous section. The puzzle took the following form: two prima facie claims (e. g. that understanding is present in CREATIONIST TEACHER* and that moderate factivity is violated in CREATIONIST TEACHER*) imply that moderate factivity is false; and so as the puzzle went, because we don't want to reject moderate factivity (given that it fails to save the difference between understanding and coherent delusion), we need to show *which one* is false. An explanation for why either (i) or (ii) is false should thus be *neutral* with respect to the truth of moderate factivity in the sense that any such explanation must not appeal to the truth of moderate factivity. And so this simple argument is off limits in the present context.

What is needed is an *independent* reason, one which does not *rely* on the truth of moderate factivity, to suggest that Stella fails to understand in CREATIONIST TEACHER*. We now turn to providing such an independent reason,

one which draws some inspiration from recent work on understanding by Hills (2009).

Firstly, Hills' (2009) discussion of understanding is situated within the context of *moral* understanding, though the lessons that can be learned from her discussion can be *applied mutatis mutandis* to understanding more generally. Hills' particular interest is to suggest why moral *knowledge* should be thought of as different from moral understanding, the latter of which she takes to be more valuable; in drawing this distinction, Hills highlights a range of abilities the possession of which she regards as distinctive of understanding but not knowledge.

While Hills' discussion of understanding and abilities is situated specifically within the framework of understanding-why, rather than objectual understanding, we can very plausibly generalise from these conditions. Of understanding-why, Hills (2009, 102) writes:

The grasp of the reasons why p that is essential to understanding involves a number of abilities: to understand why p, you need to be able to *treat* q as the reason why p, not merely *believe* or *know that* q is the reason why p. If you understand why p (and q is why p), then in the right sort of circumstances you can successfully:

- (i) follow an explanation of why p given by someone else
- (ii) explain why p in your own words
- (iii) draw the conclusion that p (or that probably p) from the information that q
- (iv) draw the conclusion that p' (or that probably p') from the information that q' (where p' and q' are similar to but not identical to p and q)
- (v) given the information that p, give the right explanation, q;
- (vi) given the information that p', give the right explanation, q'

For Hills, possessing the abilities in (i)–(vi) are part of what is required to treat p as the reason why q, something one must be able to do in order to understand why p.

With reference to Hills' criteria, we can straightforwardly show why Stella would fail to count as understand-*why* evolutionary theory explains the presence of modern day *Homo sapiens*, and from this, we want to suggest why an analogous move suggests Stella doesn't understand (in the objectual sense) evolutionary theory.

With reference to Hills' criteria, Stella (in CREATIONIST TEACHER*) satisfies (i) and (ii) but fails (iii) and (iv). She fails (iii) because she is not disposed to draw the conclusion that *that evolutionary theory is true* (or that probably, evolutionary theory is true) from the information about the presence of modern day *Homo sapiens*. Likewise, where p' and q' are similar to but not identical to 'evolutionary theory' and 'facts about the presence of modern day homo sapiens' respectively, Stella is not disposed to draw the conclusion that p' (or that probably

p') from the information that q'. In light of the facts about present day homo sapiens, Stella in fact has drawn a strikingly different conclusion from evolutionary theory, one involving an all-powerful god¹⁵.

Putting this altogether, on Hills' model, Stella doesn't understand why evolution explains the presence of modern-day *Homo sapiens* because Stella (in virtue of failing (iii) and (iv)) lacks certain dispositions needed to treat evolution as a reason for the presence of modern-day *Homo sapiens*.

Let's now transpose this kind of philosophical point to the arena of *objectual* understanding. One helpful way to do so will be to consider Hills' (2009, 102–3) remarks, shortly after noting these various abilities, of what they—but not mere propositional knowledge—afford an individual.

But I think that having these abilities is not the same as having extra pieces of knowledge. Gaining this extra knowledge may help you acquire the requisite abilities, but you might have the extra pieces of knowledge without having the kind of good judgement that enables you to *generate new true moral beliefs yourself*. Surely no extra piece or pieces of knowledge guarantee that you have these abilities.¹⁶ (Hills 2009, 103).

Transposing now the relevant context to *evolutionary* beliefs (rather than moral beliefs). Is Stella (in light of her epistemic position with respect to the subject matter of evolution and the corresponding abilities plausibly attributed to her) able to generate *new true evolutionary beliefs*? We want to consider the case

15 Consider, though, the following potential 'contextualist'-style objection: that Stella could potentially meet all of Hills' conditions, if Stella was *presupposing* evolutionary theory within the context of teaching. If she presupposes evolutionary theory, then she is in the position to draw the relevant inferences, satisfying (iii) and (iv). However, when Stella is not in that context and isn't presupposing evolutionary theory, she won't draw those inferences. On this kind of rationale, (iii) and (iv) are failed outside of the classroom but satisfied within it. And so, contrary to the line we suggest, Stella does understand, by Hills criteria, evolutionary theory, at least when it is being presupposed. While we aren't in principle opposed to a contextualist-style treatment of understanding (though see Carter 2014 for some reservations), we have two reasons to resist the above diagnosis. Firstly, if being disposed to draw the relevant inferences is something that would simply follow from (genuinely or properly) presupposing evolutionary theory, then it seems unclear that Stella is presupposing evolutionary theory in the classroom. *Ex hypothesi*, Stella is not disposed to treat evolution as a reason for the presence of modern-day *Homo sapiens*, even if she is disposed, in the classroom, to teach what the theory says. If, by contrast, presupposing the theory in the classroom does *not* entail having the disposition to draw the relevant (i.e., to (iii) and (iv)) inferences, then it's hard to see what work the inclusion of presupposing in Stella's narrative would do in the service of undermining the suggestion that Stella fails (iii) and (iv) in the context of the classroom. Thanks to Heather Battaly for pressing us on this point.

16 Our italics.

for ‘yes’ and then to show why this case is problematic (and, in doing so, we’ll offer some initial suggestions for why individuals might be *tempted* to attribute Stella understanding even though she lacks it).

The case for thinking Stella *can* generate new true evolutionary beliefs (in light of the situation described in CREATIONIST TEACHER*) is, firstly, that Stella seems to be clearly in a better position to form new true evolutionary beliefs than would be, say, a teacher who has merely memorised a teaching book but has failed (as Stella does) to appreciate the intricate way the pieces of the theory fit together. Following from Hills’, we might think such an individual (provided she holds the relevant beliefs in question) would be a candidate for items of evolutionary *knowledge* but not understanding, as we’d be inclined to attribute Stella. The second part of the ‘yes’ case insists that Stella (despite not believing evolutionary theory) has the ability to draw new true evolutionary beliefs *because* she can (in virtue of the coherent picture of evolution she possesses) draw new true beliefs of the form:

According to evolutionary theory, [X].

and further that these *are* new, true, evolutionary beliefs. It strikes us as a trap to get bogged down in the semantic point of whether beliefs of the form *According to evolutionary theory, [X]* is *itself* a ‘new true evolutionary belief’ (in the sense that is relevant to Hills’ point about what understanding affords us) or whether only learning new unqualified propositions about evolution would qualify.

For our purposes, we want to highlight a very important *limit* on Stella’s abilities to acquire new true evolutionary beliefs, a limit in place specifically *because* Stella believes *Not-[X]* for most all the beliefs she has which take the form *According to evolutionary theory, [X]*. Consider that a full description of most of Stella’s evolutionary-related doxastic attitudes takes the following conjunctive form:

According to evolutionary theory, [X] and Not-[X]

For example:

According to evolutionary theory, Homo sapiens evolved from Homo erectus AND It’s not the case that Homo sapiens evolved from Homo erectus.

Because for every ‘X’ claim (where X is a claim of evolutionary theory) Stella believes this conjunction, Stella is deeply limited in the new true evolutionary beliefs she can *learn* via her competence with the theory. For every unqualified proposition which she could learn about evolutionary theory (e.g. by applying

what she grasps to new cases and new information) she fails to do so. She merely acquires new beliefs in qualified propositions. Even if these new beliefs in qualified propositions ‘count’ as new beliefs about evolutionary theory, there is in each case, exactly one corresponding belief (expressed by the unqualified proposition) which Stella lacks the ability to learn, and this precisely because she believes evolutionary theory is false.

To summarise the reasoning just put forward: to the extent that (*a la* Hills) understanding *involves* the ability to learn new (relevant) propositions, Stella is profoundly limited in what she is able to learn, and on the basis of this, we think there is good cause to place an important wedge between Stella and individuals who (unencumbered with her mistaken belief that evolutionary theory is false) are able to learn *unrestrictedly* in light of the grasp they have on evolutionary theory. To the extent that this is right, we have a principled explanation for how we can escape the puzzle, without (illicitly) *relying* on the truth of moderate factivity to make the point.

Moderate factivity, recall, looked in trouble because the following two claims looked very plausible:

- (i) CREATIONIST TEACHER* is a case where genuine objectual understanding is present; and yet,
- (ii) moderate factivity is not satisfied, even though the propositions constituting evolutionary theory are themselves true

We’ve suggested that the best way to vitiate the threat to moderate factivity posed by CREATIONIST TEACHER* is to deny (i), and so to say, contrary to what might have seemed originally compelling, that Stella in fact does not understand evolutionary theory.

6. Concluding Remarks

We want to conclude with two final points, both aimed at diagnosing why we might originally be inclined to attribute understanding in CREATIONIST TEACHER* even though this is a mistake. The first point is that, at least in her capacity as a teacher and academic, Stella is *acting* as if evolutionary theory is true, by carrying on her intellectual activities as though the view is true. To the extent that she does this, we naturally get the sense that evolutionary theory is something Stella uses regularly as a premise in practical reasoning and deliberations (as these deliberations and reasoning would play out in the classroom). But then, given the tight connection between practical deliberation and belief, it be-

comes hard to see how Stella doesn't (contrary to her protestations) simply *believe* the theory. Of course, and setting aside the psychological plausibility, it is stipulated in the case that she does not believe the theory. The point here is to suggest that one reason we might be inclined to attribute to her something she'd have only if she actually believed the theory (i.e. understanding) is that she is (in light of the details of the case) one we easily imagine as possessing all the trappings of one who did believe the theory.

The second concluding remark is that we might be mistakenly tempted to attribute to Stella understanding because Stella seems to attain a kind of cognitive achievement which is lacked by individuals who (for example) merely believe the key propositions of evolutionary theory on the basis of testimony but fail to see how they fit together, or for that matter people who have a coherent grasp on what they *take* to be evolutionary theory while (and unlike Stella) confused about what evolutionary theory actually says. Stella's epistemic situation is defective in neither of these ways, and so this might lead us to think that understanding rather than something less would rightly mark Stella's achievement not shared in the other two kinds of contrast cases.

Following Riggs' (2004) terminology—particularly his distinction between understanding and *intelligibility*—we think the explanation for the attractiveness of the line of thinking just stated is best accounted for by the fact that Stella has achieved a kind of intelligibility that is plausibly a necessary (but not sufficient) condition for understanding. Intelligibility is attained when one pieces together or grasps the items of information in a subject matter but regardless of whether the agent has *any* true beliefs. For example, a defense attorney might offer a tightly spun and very believable account of a series of events surrounding a murder in 'Case X' which helps the individuals of the jury to make sense very nicely of all the evidence shown in a courtroom over the course of Case X. By appreciating the way the defense attorney's story fits together, a juror might well attain a kind of intelligibility she lacked previously, when confused about how the evidence fit together. And this is so even if the defense attorney is clever but deceitful, and so even if the story told is one that was simply made up. Such an ability to grasp the relationships between the propositions is widely taken to be a hallmark of objectual understanding¹⁷, and so the presence of intelligibility attained by Stella in CREATIONIST TEACHER* might plausibly explain part of the initial pull to think Stella can understand EVOLUTIONARY THEORY* without believing it: because she has attained a certain thing that one understands only if one attains.

17 See for example Grimm (2011) and Kvanvig (2004, Chapter 8).

In conclusion, while ‘CREATIONIST TEACHER’-style cases pose a much more difficult kind of problem for a moderate factivity constraint on understanding than did the false-understanding style cases canvassed in §3, ultimately, moderate factivity remains unscathed.¹⁸

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