

Extended Knowledge-How

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Abstract

According to reductive intellectualists about knowledge-how (e.g. Stanley and Williamson 2001; Stanley 2011; Brogaard 2008; 2009) knowledge-how is a kind of knowledge-that. To the extent that this is right, then insofar as we might conceive of ways knowledge could be extended with reference to active externalist (e.g. Clark and Chalmers 1998; Clark 2008) approaches in the philosophy of mind (e.g. the extended mind thesis and the hypothesis of extended cognition), we should expect no interesting difference between the two. However, insofar as anti-intellectualist approaches to knowledge-how (e.g. Ryle 1946; 1949) are a viable option, there is an overlooked issue of how knowledge-how might be extended, via active externalism, in ways very differently from knowledge-that. This paper explores this overlooked space, and in doing so, illustrates how a novel form of extended knowledge-how emerges from a pairing of active externalism in the philosophy of mind with anti-intellectualism in the theory of knowledge. Crucial to our argument will be a new way of thinking about the extended mind thesis, as it pertains to the kinds of state one is in (on an anti-intellectualist construal) when one knows how to do something, and how this state connects with non-accidentally successful performance.

1 Two kinds of active externalism

A recent and exciting area of research in contemporary philosophy of mind is *active externalism*¹, according to which cognition can be radically extended beyond the bounds of the biological agent. Different varieties of active externalism

¹This term owes to Clark and Chalmers (1998), who distinguish active externalism from ‘passive externalism’, which they use to characterize the kind of externalism that is implied by the view that mental contents are widely individuated (e.g. Putnam (1975); Burge (1986)). For a representative example of some recent defences of active externalist views, see Clark and Chalmers (1998); Clark (2008); Clark (2010); Menary (2006); Theiner, Allen, and Goldstone (2010); Wilson (2000); Wilson (2004); Hutchins (1995); Palermos (2011) and Palermos (2014a; 2014b).

correspond with the different ways cognition can be argued to ‘extend’ beyond familiar bounds².

One particularly strong version of active externalism is the *extended mind thesis* (EMT)³, according to which an agent’s beliefs are claimed to, at least in certain circumstances, supervene partly on things in the world, such as (for instance) entries in a notebook or names saved in an iPhone. The extended mind thesis (EMT) can be distinguished from the comparatively more popular, and as we shall soon suggest, comparatively more defensible *hypothesis of extended cognition* (HEC), according to which some cognitive *processes* (as opposed to beliefs themselves) are argued to be transcranial in nature—*viz.*, some cognitive processes (e.g. such as the memorial process of information storage and retrieval) are said to supervene on parts of the biological agent as well as on parts of the world.

While some philosophers have been tempted to run the extended mind and extended cognition theses together⁴—and particularly in such a way as to suppose that these theses stand or fall together—this turns out to be a mistake. One helpful way to appreciate this point is by considering just what kind of lesson might be plausibly gleaned from Clark and Chalmers (1998) classic case of ‘Otto’, an Alzheimer’s patient who compensates for his failing memory by always carrying a well-organized notebook. The classic case proceeds as follows:

Otto: Otto suffers from Alzheimer’s disease, and like many Alzheimer’s patients, he relies on information in the environment to help structure his life. Otto carries a notebook around with him everywhere he goes. When he learns new information, he writes it down. When he needs some old information, he looks it up. For Otto, his notebook plays the role usually played by a biological memory.

The Otto case has been used to make two related but importantly distinct provocative philosophical points, both of which trade on the idea that Otto is relying on his notebook in a way that is relevantly analogous to the way a non-impaired individual relies on her biological memory. Let’s look at these in turn.

Firstly, the more provocative of the two points—one which Clark and Chalmers opt for, and which concerns the nature of Otto’s *beliefs*—proceeds as follows: with respect to the process of information storage and retrieval, Otto’s notebook in the above case is playing a role that is functionally isomorphic to biological memory storage. In Otto’s case, the relevant storage happens to in-

²Put slightly differently, we might also say that different varieties of active externalism map on to different strategies for combating what Clark calls ‘bioprejudice’—*viz.*, when it is just on account of something’s being located outside the skull and skin that it is excluded from cognition. Active externalism is thus egalitarian in its approach to cognitive theorizing.

³There is a version of active externalism that is perhaps more radical by the lights of orthodoxy than the extended mind thesis. This is the distributed cognition thesis (e.g. Hutchins (1995)). We’ll be setting this view aside for the present purposes.

⁴In fact, the seminal discussion (Clark & Chalmers 1998) is an example of such a running together of EMT and HEC. See Palermos (2014a) for helpful discussion of the differences.

volve the notebook. Thus, they reason that to the extent that we are prepared to attribute to (for instance) an agent with a normally functioning biological memory—Inga—a (non-occurrent, dispositional) belief that *p simply in virtue* of Inga’s storage of *p* in her biological memory, we should likewise be prepared to attribute to Otto an extended belief in virtue of his storage of the relevant content in the notebook which they insist is playing the same functional role as biological memory plays for Inga in the default case. Of course, the striking aspect of this diagnosis of Otto’s case is that Otto’s *belief* is claimed to be partly constituted by something in the world and which is extraorganismic—the entry in the notebook. To the extent that the foregoing diagnosis of Otto’s situation is compelling, EMT gains support, and we should accept that there are extended beliefs.

But the ‘EMT’ reading of the Otto case, according to which we are encouraged to view the entries in the notebook as extended *beliefs*, has faced a number of well-noted objections⁵. The most notable such objection is the *objection from cognitive bloat*, what Allen-Hermanson (2013, 791) refers to as ‘superdupersizing the mind’. Put simply, this objection highlights that functionalist arguments for extended beliefs will be, as the argument goes, forced to countenance an ‘explosion’ of such beliefs; for example, as Rupert (2004) has argued, if we allow that Otto’s notebook contains extended beliefs, then it will be difficult to rule out that—for instance—an individual who consults a phone book under normal circumstances counts as believing everything in the phonebook—an absurd result⁶. Clark has attempted to rebut this kind of objection, by proposing what he calls ‘glue and trust’ criteria,⁷ criteria to be met by any non-biological candidates for inclusion into an individual’s mental life; however, as Palermos (2014a; 2014b) has observed, it’s not obvious that Clark’s stipulated criteria are ultimately nuanced enough to rule—as the proponent of EMT wants—that Otto’s case is one featuring extended beliefs, while satisfactorily ruling *out* cases that fuel the cognitive bloat objection. Thus, for one compelled to appeal to the Otto case in support of a more egalitarian approach to thinking about cognition, it’s not clear that the truth of EMT, specifically, is the philosophical lesson one should be prepared to take from such cases.

Interestingly—and this is a point that often goes overlooked—Clark (2010) himself thinks of *beliefs* as dynamic rather than static, and so in light of this, Clark is happy for his own intents and purposes to run EMT and HEC together, where the latter thesis claims that some cognitive *processes* can be transcranial in nature, even if mental states themselves do not supervene on parts of the world external

⁵See, along with the bloat objection noted here, Adams & Aizawa’s (2008) objection to the extended mind which draws from a distinction between derived and underived content.

⁶See here Rupert (2004, 401-405) and also Carter et al (2014).

⁷Clark’s (2010, 46) criteria are that: (1) “That the resource be reliably available and typically invoked.” (2) “That any information thus retrieved be more-or-less automatically endorsed. It should not usually be subject to critical scrutiny. [...] It should be deemed about as trustworthy as something retrieved clearly from biological memory.” (3) “That information contained in the resource should be easily accessible as and when required.”

to the agent. But of course, if beliefs are antecedently regarded to be dynamic, then HEC can be understood as trivially getting us to EMT.

What is important about this observation is that, for those who take a more traditional view of belief, according to which beliefs are static (e.g. states) as opposed to dynamic *processes*, there is space to endorse HEC, the view that some cognitive processes are transcranial, without going the further step and endorsing propositional attitudes, e.g. beliefs. This is a point one of the authors has defended in several places⁸. Granted, this possibility would be of little relevance if it should turn out that the objections to (and philosophical motivations for) HEC are essentially the same as they are to, and for, EMT. However, as Palermos (2014a; 2014b), Pritchard (2010), & Pritchard & Lynch (*forthcoming*) have stressed in recent work, this is really *not* the case. For one thing—and this point is straightforward—HEC, premised upon a more traditional conception of belief, sidesteps the cognitive bloat objection for the simple reason that the claim that some cognitive processes are extended does not entail the further thesis that some beliefs, understood as static, are thereby extended, and the cognitive bloat objection is premised upon the undesirability of an explosion of *beliefs*. Accordingly, and to stress, any entailment from HEC to EMT would be on the table only if one already, as Clark does, embraces an idiosyncratic dynamic picture of beliefs.

Perhaps more interestingly, though, HEC gains support from both *common-sense functionalism*—from which EMT draws the thrust of its support—but even more, by dynamical systems theory, which motivates HEC directly and is silent with respect to EMT (we’ll return to this shortly). This constitutes another reason to think that EMT is not the most promising candidate view to take for one who wants to avoid a ‘biologically prejudiced’ picture of human cognizing.

To appreciate these points, consider firstly, the point about functionalism. Just as one might attempt to use the Otto case to motivate extended *beliefs* on functionalist grounds, so one might use the case to motivate on such grounds extended cognitive processes. Here it will be helpful to consider Clark & Chalmers’ ‘Parity Principle’:

Parity Principle: If, as we confront some task, a part of the world functions as a process which, were it to go on in the head, we would have no hesitation in accepting as part of the cognitive process, then that part of the world is part of the cognitive process (Clark and Chalmers (1998, 8)).

With reference to the parity principle, there is a simple functionalist line of argument for HEC, one which proceeds as follows: given that Otto’s notebook plays for him the same functional role as biological memory plays for Inga (who, recall, consults her normally functioning biological memory), we must

⁸See Carter (2013), Carter & Palermos (2014), Carter & Kallestrup (2015) and Carter & Pritchard (*forthcoming*). See also Menary (2006) and Pritchard (2010).

count Otto's process of consulting his notebook as a part of a cognitive process provided we count Inga's process of consulting her biological memory as part of a cognitive process—and the latter is of course paradigmatically a cognitive process. The parity principle thus offers a straightforward way to reach HEC—the claim that some cognitive processes can supervene at least partly on what goes on beyond the biological agent. Thus HEC provides a neat way to respect common sense functionalism in so far as it recommends an egalitarian approach to theorizing about cognition, but without incurring the well-worn problem of fending off the cognitive bloat objection which many critics take to be the undoing of EMT.

But there may well be independent reasons to favour HEC over EMT which go beyond the kind of commonsense functionalism that Clark & Chalmers take to recommend EMT. As Palermos (2011; 2014a; 2014b) in particular has noted, HEC, though not EMT, can be motivated on the basis of dynamical systems theory (DST), the leading mathematical framework for studying the behaviour of dynamical systems, construed more generally. In short, according to DST, in order to claim that two (or more) systems give rise to an overall extended or coupled system, what is needed, as Palermos notes, is the existence of *non-linear relations* where non-linear relations that arise out of mutual interactions between the contributing parts⁹. With reference to DST, we have a rationale to countenance an extended *cognitive* system, provided the internal and external parts interact mutually with each other; and, as Palermos argues, this is precisely what we have in cases like that of Otto, where Otto goes back and forth to the notebook, shaping its entries, where the entries then inform his behavior, when then leads to new entries, etc., in a way where the causation is reciprocal, or two-way, rather than one-way¹⁰.

Given the extent to which HEC constitutes an egalitarian approach to thinking about cognition, is motivated by philosophical considerations that go beyond those which motivate EMT, and avoids the most significant philosophical objection to EMT, it's unsurprising that HEC has gained considerable traction in both the philosophy of mind and more recently in epistemology as the most viable active externalist position on the table. In fact, one of the more lively research programs at the intersection of the philosophy of mind and epistemology over the past several years has focused on potential implications of HEC (rather than specifically EMT) for epistemological theory. Examples here include Brogaard (2014), Hetherington (2012), Farkas (*forthcoming*), Menary (2012), Pritchard (2010), Pritchard & Lynch (*forthcoming*), Jarvis (2014, *forth-*

⁹See here, along with Palermos 2011; 2014a; 2014b, Carter, et al. *forthcoming*, Chemero 2009, Froese et al. 2013; Sutton et al. 2008; Theiner et al. 2010 and Tollefsen & Dale 2011.

¹⁰Compare the case of Otto, who mutually interacts with his notebook, with 'one-way' or non-reciprocal causation, as we might have in an amended case where Otto does not interact himself with the notebook by writing entries in it, but rather, simply relies on an external signal to tell him what to do at each juncture. In a case where Otto simply accepts the instructions of the signaler, the signaler is not (according to DST at least) a part of Otto's extended cognitive process, as the relevant causal relations are not mutually directed but one-way.

coming) and Palermos (2014a; 2014b) to name a few.¹¹

2 Extended knowledge—initial observations

Question: how might *knowledge itself* be extended? We submit, in an initial response to this question, a relatively simple picture—one which, as we shall argue in further sections, must be crucially amended. Firstly, if EMT (despite the objections that face it) is true, then since belief is a component of propositional knowledge, it looks like knowledge will obviously be *extended* in the following sense: EMT claims that belief is radically extended, and so if EMT is true, knowledge inherits belief's extendedness. For example, when Otto knows that his doctor's appointment is at 10:00, his knowledge can (according to EMT) supervene in part on the entry in the notebook, which is itself, by EMT, part of Otto's extended belief.

Of course, one might attempt to undercut this point about the implication EMT has for extending propositional knowledge by suggesting, as Myers-Schulz & Schwitzgebel (2013) have in recent work, that contrary to orthodoxy within mainstream epistemology, belief is not necessary for knowledge, even if belief usually features in cases of knowing. Or, one might opt for knowledge-first approach (e.g. Williamson 2000) and deny that belief is ever a component of knowledge. But unless one wants to take either of these heterodox routes, it looks as though a direct answer to the question of how knowledge might be extended is to simply point out that if EMT is true, then propositional knowledge will be extended *via* its belief component.

Along with this straightforward observation comes a connected 'negative' observation, which is HEC, *without EMT*, does not *prima facie* look on its own sufficient to motivating the view that some knowledge can be extended. After all, and again unless we follow Clark and embrace a radically dynamic conception of belief, all that really follows from HEC with respect to propositional knowledge is that some knowledge will be the product of processes that themselves can be transcranial in character. *However, to say that some known proposition, p, could be the output or deliverance of process that is itself extended is not to say that p, the known proposition, is extended.* And thus, as things appear, the following best answers the question of how knowledge might be extended: knowledge—at least, *propositional* knowledge—is going to be extended only if EMT is true, but not if HEC is true.

Now, to combine this observation with the conclusion from the previous section: given that HEC is comparatively a (much) better philosophically motivated position than EMT, the prospects to not look very likely that we should end up with anything like extended knowledge. And if that's right, then the kind of active externalist programme¹², more generally, might not have as significant

¹¹See also Carter (2013), Carter & Palermos (2014), Carter & Kallestrup (2015) and Carter & Pritchard (forthcoming).

¹²See fn. 1. This programme consists of the extended mind, extended cognition and dis-

an impact in epistemological theory as we'd initially suspect.

However, in what follows, we want to suggest that this conclusion is far too quick. Attention to knowledge-*how* reveals how a potential variety of extended knowledge-how might be possible, and without the need to posit the kind of extended mental states that lead EMT to face the objections which leave it comparatively less well motivated than HEC.

3 Knowledge How

Over the past 15 years or so—and indeed around the time Clark & Chalmers first wrote their seminal paper on the extended mind—Stanley & Williamson (2001) ignited in mainstream epistemology a revisiting of the presumed distinction, a distinction widely assumed valid since (Ryle (1949); Ryle (1946)), between knowing-how and knowing-that.

Ryle, in the service of challenging what he took at the time to be an antiquated and over-intellectualised picture of intelligent action¹³, had insisted that when one knows how to φ , this will be in virtue of one's relevant *abilities* to φ , and not in virtue of any propositional attitudes one has¹⁴. Regardless of whether Ryle's arguments for this view in the middle of the 20th century were apt ones¹⁵,

tributed cognition programs. See Pritchard (2010), Palermos (2014a; 2014b) and Carter et al. (2014) for more on this distinction.

¹³Ryle of course took himself to be challenging more generally Descartes' picture of the mind as a 'ghost in the machine' a picture on which action has intelligence properties only when guided by acts of the mind—*viz.*, the consideration of regulatory propositions. However, what matters for the present purposes is that Chapter 2 of *The Concept of Mind* as well as Ryle's 1945 Aristotelian Society Address constitute the seminal case for thinking, in particular, that knowing how to do something is grounded in abilities, not (propositional) knowledge, and it is this picture that has been inherited in mainstream epistemology, more or less, until recent challenges by Stanley & Williamson and others on linguistic grounds.

¹⁴An even more simplified picture of the distinction between intellectualism and anti-intellectualism goes like this: knowing how to do something just is having a certain ability or disposition to do that thing; by contrast, intellectualism claims that knowing how to do something just is a kind of propositional knowledge. While Ryle probably endorsed something like this simplified view of anti-intellectualism and Stanley and Williamson (2001), as well as Stanley (2011) endorse this simplified statement of intellectualism, we have resisted this kind of characterization. This is because, following 1, we think the simplified picture runs together two issues that can come apart. On the one hand, there is the issue of what grounds knowledge how—e.g. what is it *in virtue of which* one knows how to do something. This is we think the key question separating anti-intellectualist and intellectualists. One says propositional attitudes, the other abilities. A separate matter altogether is what is the metaphysical nature of knowing how to do something: here, for instance, an intellectualist can say that the nature of knowing how to do something is a relation between an agent and a proposition, though this need not be one's answer to the nature question, simply in virtue of being an intellectualist about what grounds knowledge how. For an example of an intellectualist proposal that is not 'reductive' (e.g. which does not simply reduce the nature of knowing how to a propositional attitude relation), see Bengson and Moffett (2011a).

¹⁵The recent emergence of linguistically-driven intellectualism has led a number of writers to go back and give sustained critiques of Ryle's original 'regress'-style arguments for anti-

a consequence has been that mainstream epistemologists have widely taken for granted that knowledge-how is something like ‘ability knowledge’ and crucially, something that is very different from propositional knowledge. And it is this picture inherited from Ryle that Stanley & Williamson (2001) influentially tried to turn on its head—on the basis of linguistic arguments—around the turn of the 21st century—bringing knowledge-how back on epistemologists’ radar.

This quick and dirty overview will help to set the stage for how—we think—it is that EMT might not be needed, after all, to get the result that knowledge (or, at least, one important variety of knowledge) is radically extended. Consider that the most popular form of intellectualism—*reductive intellectualism*—insists that it’s not just that knowing how to do something is grounded in one’s propositional attitudes, but moreover, that knowing how to do something just *is* knowing some fact—propositional knowledge¹⁶.

Obviously, if reductive intellectualism about knowledge how is correct, then it will take EMT to generate the result that knowledge-how is extended. This is because, to emphasise, on reductive intellectualist proposals, knowledge-how is a kind of knowledge that—*propositional* knowledge—and as we saw in the previous section, for propositional knowledge to supervene on parts of the (extra organismic) world, what would be needed is specifically EMT, and not HEC. The line to this effect was just that, while a view (EMT) that claims that mental states extend will generate the result that propositional knowledge is extended *via* its extended *belief* condition, a view (HEC) that claims merely that processes delivering beliefs extend will not generate this result. And thus, the result that if reductive intellectualism about knowledge-how is correct, then the answer to the question of how propositional knowledge might be extended is the same for knowledge-how as for propositional knowledge.

However, things turn out to be different, and we think very interestingly so, on an anti-intellectualist, rather than an intellectualist, construal of knowledge-how. On the anti-intellectualist picture, the knowledge you have, for instance, concerning how to ride a bike, is knowledge you have *not* in virtue of your propositional attitudes about the way for you to ride a bike, as the intellectualist would tell us, but rather, in virtue of your possessing certain *abilities*. If this picture of knowledge how is right, then while having certain beliefs might well be *necessary*, for knowing how to do something (e.g. one can’t know how to fly a plane to Paris without believing that a plane is the sort of thing that goes in the air¹⁷), it will not be *in virtue* of any beliefs one has that one knows how to fly a plane to Paris when one does. It will rather be in virtue of one’s abilities to do so.

Given that anti-intellectualists needn’t reduce knowledge-how to a kind of propositional knowledge, the question of just how knowledge (of any sort) might

intellectualism about knowledge how. See here, for instance, Bengson and Moffett (2011b).

¹⁶For some examples of reductive intellectualism, see Stanley and Williamson (2001); Stanley (2011); Brogaard (2008) and Brogaard (2009). Cf. Bengson and Moffett (2011a); Bengson and Moffett (2007) for some examples of non-reductive intellectualism.

¹⁷This point has been noted by Paul Snowdon (2004).

be extended could potentially at least receive a very different kind of answer when explored, specifically, through the lens of anti-intellectualist thinking about knowledge-how. That is, it might well be that knowledge-how, on an anti-intellectualist construal, could itself be defended as a variety of extended knowledge *even if* one isn't already impressed by arguments for EMT which aim to establish the thesis that *beliefs* can be extended.

4 Extending Knowledge-How

A initial problem for the purposes of envisaging extended knowledge-how materializes: Framed against the background of HEC and EMT as our salient active externalist options on the table, it looks as though the only way to motivate extended knowledge-how would be, on intellectualist lines, to embrace the implausible EMT and say that mental states such as beliefs (understood as constituents of propositional knowledge) are extended. And given the implausibility of EMT, this as we've suggested is not promising.

However, and this is the other side of the dilemma, things don't look much more promising—again, at least initially—in so far as we are going to make sense of extended knowledge-how on *anti*-intellectualist lines, either. The reason is that, firstly, HEC does not on the face of things seem capable of generating extended knowledge, *per se*, but only extended cognitive *processes*. And EMT seems, in an obvious respect, entirely *orthogonal* to anti-intellectualist knowledge how. After all, if knowledge-how is a matter of ability possession rather than the possession of mental states such as propositional attitudes, then why think (*a la* EMT) it could be extended *through* the extension of exactly the sort of thing the anti-intellectualist insist does *not* ground knowledge-how? The prospects for extended knowledge-how then seem to have run quickly into a dead end.

We think that the first step out of the puzzle is to attempt to reimagine (first in the abstract, and then more concretely) just how the anti-intellectualist might make sense of something in the neighbourhood of the extended mind thesis, something that (as indicated above) isn't initially clear given that the anti-intellectualist explicitly distances herself from propositional attitudes in her approach to theorizing about knowledge-how and its connection to skilled (intelligent) action.

To this end, the sketch we want to propose will be drawn by reference to an adapted version of Bengson & Moffett's (2011b) framework for presenting—and in doing so distinguishing between—intellectualism and anti-intellectualism about knowledge-how, where each view is presented as a conjunction of two *kinds* of claims:

- (i) firstly, a claim that specifies when a given state is a state of knowing how to do something, and
- (ii) secondly, a claim that specifies when one counts as *exercising* one's state of knowing how to do something, e.g. as when performing an action.

To emphasise the difference between the ways that intellectualism and anti-intellectualism might interface with the extended mind thesis, we will use the label “EM*” for the anti-intellectualist variant of EM. When fleshed with relevant abstract template-particulars, the difference may be presented as follows (*cf.* Bengson & Moffett, 2011b, pp. 7–9; 14–15):

EM-intellectualism

[ExtI_{KH STATE}] A state σ of an individual S is an extended state of knowledge-how to φ if and only if σ is or involves S’s having some relevant *extended* propositional attitude (e.g. reliably produced belief that p) regarding φ -ing.

[ExtI_{KH ACTION}] S exercises extended knowledge-how to φ in performing an action φ if and only if S φ -s and S has some state σ such that (i) σ is or involves some relevant extended propositional attitude regarding φ -ing and (ii) σ is appropriately causally related to the production of S’s φ -ing.

EM-anti-intellectualism*

[ExtAI_{KH STATE}] A state σ of an individual S is an extended state of knowledge-how to φ if and only if σ is or involves S’s having a certain type of extended ability or disposition (e.g. a trained, trainable, multitrack disposition) to φ , rather than propositional attitudes.

[ExtAI_{KH ACTION}] S exercises extended knowledge-how to φ in performing an action φ if and only if S φ -s and S has some state σ such that (i) σ is or involves a certain type of extended ability or disposition to φ , rather than propositional attitudes, and (ii) S’s φ -ing is the actualization of σ .

The first and most obvious difference between EM-intellectualism and EM*-anti-intellectualism is that although the former associates mental states in the traditional way, with propositional attitudes (or even attempts their reduction to such attitudes), the latter ties mental states with abilities or dispositions. This difference alone, however, need not be particularly illuminating if we approach propositional attitudes themselves as (vacuously coarse-grained) dispositions to act. It is, therefore, crucial to point to the second and much deeper difference which, in conjunction with the first, enables us to pinpoint EM*—what is the anti-intellectualist’s distinctive variant of EM. The crucial difference, we suggest, concerns how *states posited by the intellectualist and anti-intellectualist are brought to bear on action*.

To put it crudely—and far from exhaustively—on the intellectualist picture, knowledge-how, as brought to bear on action, involves a propositional-attitude state σ such that the relevant propositional attitude is, in one way or another, tied to the *causal-antecedent* of a chain of causally linked components within which one finds some target component or a collection φ (e.g. bodily movement(s))

to be achieved. The component or collection φ becomes non-accidentally successful (in action), in virtue of σ , where σ itself is understood as *extrinsic* to φ .

By contrast, even though the anti-intellectualist may countenance, in her story of how a state of knowing-how is exercised, some appropriately linked chain of components, the anti-intellectualist shifts the focus from some highlighted components to the structure thereof *and that in virtue of which this structure is non-accidentally stable and success-conducive*. For many anti-intellectualists the locus of knowledge-how will be ability or disposition and that, with causal flavour added, generates an importantly different picture of the way in which knowledge-how bears on action—that is, as an *intrinsic* rather than extrinsic element of φ .¹⁸

A more simple way to think about this difference is that, rather than as the intellectualist does, positing a two-element relation where the only type of relata are cause and effect, the anti-intellectualist builds in a further element to underpin the two. This element, when *actualised* by the structure of the two elements, plays the role of warrant for that structure's stability which is conducive to success. And further, if the structure forms a *process*, then *non-accidental success in action* will function as an effect of that process. Most importantly, however, insofar as the process provides the actualisation of the underpinning element in question (i.e. ability or disposition), it will not suffice to say that the success simply results from some *antecedent* component of the process¹⁹.

With this picture in hand, we are now in a much better position to render EM*T intelligible (i.e. the extended mind thesis *vis-à-vis* anti-intellectualism); that is, having sketched the idea that within EM*-anti-intellectualism abilities can be modelled as mental states, we can return to the question: how might such states *extend*?

We suggest that the most straightforward answer to the above question²⁰, with respect to knowledge-how to φ , is that a state of this sort extends through the *hybridisation of the biological categorical base for the requisite ability or disposition*. By that we do not wish to say—as could be suggested—that dispositions are simply reducible to their categorical bases. Indeed, for the present purposes all we need here is the relevant functional characterisation of that which such bases—which, when extended, form biological-non-biological substrates—afford to the agent, when the agent has an ability or disposition to φ .

Now, to positively motivate EM*T we propose the following parity principle for mental states.

¹⁸Recently Carter & Pritchard (2014) have offered a different approach featuring (actual) achievement as candidate for knowledge-how.

¹⁹For more on this difference see, for example, Stout (2005).

²⁰Note that, when EMT is applied to mental states, the claim about propositional knowledge-how is that it may be—among other available options—an appropriately formed true belief with some φ -relevant content. But if in formulating EM*T we attempted to draw on a strict analogy with EMT, we would arrive at the thesis whereby appropriately successful *action* is extended. Although, actions seem to make good candidates for extension, there is no straightforward way of construing them as mental states. This is why it seems more natural to attend to dispositions.

Epistemic Parity Principle for States of Knowledge How: If S has the ability to φ , such that, were that ability biologically based, S knows how to φ , then S knows-how to φ .

To make the connection with action clearer, consider a somewhat artificial formulation of parity for exercises of knowledge-how in which parity for states is already embedded. This is indeed how the anti-intellectualist may complement the story in which the move from [ExtAI_{KH STATE}] to [ExtAI_{KH ACTION}] is made.

Epistemic Parity for Exercises of Knowledge-how: If S exercises an ability to φ in such a way that, were that exercise a process ψ grounded in that ability *and* that ability biologically-based, S exercises knowledge-how to φ , THEN S exercises knowledge-how to φ .²¹

The pieces are now in place to see how knowledge-how can be extended in the sense of EM*T *even if mental states (e.g. beliefs) aren't extended in the sense of EMT*; if knowledge how is at least in part a matter of possessing the ability to φ , then extended knowledge will most plausibly, though not exclusively, feature in cases as the ones below.²²

Case I: Suppose Inga knows how to use an ATM machine to withdraw money from her bank account. Call this, for short, knowing how to φ . On the anti-intellectualist line, Inga's knowing how to do this is largely a matter of her having an ability to do so. The ability to use an ATM machine in virtue of which Inga knows how to use an ATM machine is exercised by the intracranial cognitive process whose one component involves consulting her biological memory for her PIN number (other plausible components being: identifying an ATM machine, inserting her card, and entering her PIN number). Now, suppose Clark and Chalmers' hero Otto is like Inga in all respects related to ATM machine operation, except that he stores his PIN number in his notebook. Let $C_1(\psi)$ be the process component which consists in storing/retrieving the PIN number in the notebook. (i) $C_1(\psi)$ counts as part of a cognitive process, with reference to epistemic parity for exercises and (ii) with reference the Epistemic Parity Principle for Knowledge How states, Otto knows how to use an ATM machine in virtue of having extended ability based in part on his notebook.

²¹Note that insofar as this latter formulation is intended as expository rather than motivational, it does not attain the status of a principle. EM*T, as we envisage it here, is motivated by Epistemic Parity Principle for States of Knowledge-How. Granting that Epistemic Parity Principle for States of Knowledge-How holds, it simply entails the parity of exercises.

²²This is because, one is in a position to speak about extended knowledge how in those cases where it is not exercised. We will not rehearse examples to this effect here.

Case II: Anna knows how to paint a (figurative) landscape. Again, on the anti-intellectualist reading, her knowing how to paint landscapes is in part a matter of her having an ability to do so. Anna's ability to paint landscapes is exercised in part by the biological visual cognitive process of identifying and matching colours for adequately representing what she sees in her visual field (other components of this process including: spotting landscapes, using a selection of brushes, preparing the relevant palette by combining colours in distinct ways). Compare Jens who resembles Anna in all respects related to landscape painting, except that he suffers from deuteranopia, i.e. red-green type colour vision deficiency, and has to use glasses with advanced colour identification software when picking out reds and greens from within his visual field. Take $C_2(\psi)$ to be the process component which consists in identifying colours of the landscape and matching them with those on the palette or canvass. We suggest that, other things equal, (i) $C_2(\psi)$ counts as part of a cognitive process, with reference to epistemic parity for exercises and (ii) with reference the Epistemic Parity Principle for Knowledge How, Jens knows how to paint a landscape in virtue of having an extended ability based in part on his glasses.

Although cases I and II are analogous, there are differences to be appreciated. In line with the rulings of the Epistemic Parity Principle for States of Knowledge How, Otto (Case I) and Jens (Case II) know how to use an ATM and paint a (figurative) landscape, respectively. In so far as we are thinking of these abilities as warrants of stability for success-conducive performances of both protagonists, Jens has the ability to paint landscapes which is no different from Anna's. However, when juxtaposed with Jens's, Anna's ability is biologically-based in an important respect: her own (biologically situated) eyes afford to her—in a primitive enabling sense—the development and preservation of her ability to paint. Although, clearly, Jens's ability isn't entirely non-biologically based, his original biological basis *alone* would not have afforded to him the development and/or preservation of the ability to paint in the full spectrum of colours had the basis not been supplemented, in this case, non-biologically.²³ Only once an appropriate supplementation is provided, will Jens have a sufficient base to enable him to develop and preserve an ability to paint, such that colours in the full spectrum²⁴ were functionally available to him as if he really experienced them. In other words, Jens would not have been able to attain and preserve *the same level of ability* as Anna without an appropriate supplementation.

Now, Otto's situation, while similar to Jens's in that his biological base re-

²³Earlier we have mentioned hybridization of categorical base. Nonetheless, in cases such as Jens's it is easy to imagine that continuous advancements in the stem cell research will facilitate the production of medium wavelength cones.

²⁴By which we mean the range of colours available to an agent with normally functioning visual system.

quires supplementation as well, differs in one vital aspect: unlike Jens, Otto would not have been fit to *develop* the relevant ability at all, and not just to a different degree. To that extent that he would presumably develop *some* ability, it would fall short of ability to use an ATM.

Accordingly, then, the relevant sense in which Otto's and Jens's abilities count plausibly as extended now becomes clearer. Prior to the supplementation of the biological base, Otto and Jens were only in a position to develop and/or preserve *partial* abilities. Whatever Otto's ability would count as an ability *to do*, it would have fallen short of the threshold for abilities in the market for knowledge-how to φ ; accordingly, there would be no point in even asking whether the parity principle for states applies to him. Although Jens's ability would count as ability to φ and hence pertain to knowledge-how, there would still be a sense in which Jens ability would fail to count as on a par with Anna's. This, at any rate, constitutes we think a plausible synopsis of the case pairs considered.

5 Concluding remarks

We've here developed a new way knowledge can be radically extended. In particular, we've shown that by turning our attention to knowledge-how, a thus-far unconsidered avenue opens for seeing how knowledge itself can supervene on parts of the world, and in a way that does not rely on the controversial thesis that there are extended mental states of the sort that the traditional extended mind thesis recommends. As such, our paper has attempted to carve out new territory, both with respect to how knowledge-how might be conceived of as extended, and more generally, with respect to the kind of implications theses in the philosophy of mind can have for projects in mainstream epistemology²⁵.

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