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Extending the extended mind: the case for extended affectivity

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Abstract The thesis of the extended mind (ExM) holds that the material underpinnings of an individual's mental states and processes need not be restricted to those contained within biological boundaries: when conditions are right, material artefacts can be incorporated by the thinking subject in such a way as to become a component of her extended mind. Up to this point, the focus of this approach has been on phenomena of a distinctively cognitive nature, such as states of dispositional belief, and processes of planning and calculation. In this paper, we aim to expand the scope of ExM by considering the case for extended affectivity. We begin by clarifying the central commitments of ExM, before investigating its applicability to a range of affective phenomena, both dispositional and occurrent. We argue that proponents of ExM should also accept that the vehicles of emotions, moods, sentiments, temperaments, and character traits can extend beyond skull and skin.

Keywords Extended mind · Affectivity · Emotion · Mood

1 Introduction

According to the thesis of the extended mind (ExM henceforth), under certain circumstances we should see the material vehicles that realize the mind as encompassing not just brain activity, but also that of the body and the material environment. This “vehicle externalist” thesis was formulated by Clark and Chalmers (1998) and has been further elaborated by Andy Clark in subsequent works (e.g., Clark 2003, 2008, 2010a, b), partly in response to critical engagement by those sympathetic to internalism (for example by Adams and Aizawa 2001, 2010a, b; Rupert 2004; Weiskopf 2008).

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Due to its focus on beliefs and other cognitive states and processes, ExM is best known as the hypothesis of extended cognition (HEC; see Rupert 2004). It is not clear, however, that only states with a distinctively cognitive character fall under the purview of the theory. Indeed Chalmers (2008, p. xiv), in his foreword to Clark's book *Supersizing the Mind*, remarks in passing that

It is natural to ask whether the extended mind thesis might itself be extended. What about extended desires, extended reasoning, extended perception, extended imagination, and extended emotions? I think there is something to be said for each of these. Perhaps the camera on my iPhone can serve as an external perceptual mechanism. And perhaps one might have something akin to an extended mood, if not an extended emotion, when one's environment is always nudging one toward happiness or sadness.

Our aim in this paper is to take up this lead and address, specifically, the question of whether affectivity can be extended. To anticipate, our answer is that, indeed, it can. More precisely, we propose that the arguments that have been provided so far to extend cognitive states apply also to a variety of affective states, such as—as we shall see—emotions, moods, sentiments, and others. Thus if one buys ExM, or better HEC, one should also buy HEA—the Hypothesis of Extended Affectivity.

In arguing for this conditional claim, we will not offer a defence of ExM. We are aware that, as mentioned, several criticisms have been raised against this hypothesis, and we suspect that those who are critical of ExM in the first place are likely to be critical of HEA as well. On our part, we are broadly sympathetic to ExM, and think that most of the critical challenges it has faced have been rebutted adequately (see Clark 2008, 2010a, b; Hurley 2010). Our most general aim in this paper, then, is to enrich the debate over ExM further, partly by clarifying its central commitments and implications, and partly (and more interestingly) by developing it in a novel context.

To this purpose, we begin with an overview of ExM in Sect. 2, distinguishing in particular two of its targets: standing dispositional mental states, and temporary, occurrent cognitive processes. In Sect. 3 we introduce and define a variety of affective states as standardly formulated in the philosophy of emotion, again distinguishing between occurrent and dispositional varieties. In Sect. 4 we argue that dispositional affective states can be extended, and in Sect. 5 we discuss occurrent states, arguing that they can also be extended.

2 The extended mind thesis

It is important to distinguish two targets of ExM: (1) standing, enduring mental states, such as dispositional beliefs; and (2) temporary, fleeting occurrent cognitive processes, such as calculating a complex sum at a certain moment. ExM is the thesis that, sometimes, the material vehicles that realize both (1) and (2) extend beyond skull and skin, into the world. Wilson and Clark (2010) make this point particularly clearly (see also Sutton 2006). In their view, most of our cognitive extensions involve “transient creations, geared towards a specific purpose”, which “combine

core neural resources with temporary add-ons” (64). Some of these transient creations may involve one-off integrations between organism and external resources, or repeated ones. Both are distinguished, however, from the “more stable and permanent relationships between biological agents and extended cognitive resources” (64). In this latter case, it seems appropriate to talk of extended *mental* states, to refer to more stable and robust cognitive capacities. The distinction between transient cognitive states and more permanent mental ones is one of degree rather than kind: “the notion of an extended mind is nothing more than the notion of a cognitive extension ... that scores rather higher on the ... dimension of durability and reliability” (Wilson and Clark 2010, p. 64).

Importantly, the arguments provided in the relevant literature to support the extension of (1) and (2) are not exactly the same. One needs to keep this in mind when considering how to apply ExM to affectivity, given that, as we shall see in the next section, the realm of the affective includes dispositional as well as occurrent phenomena.

The argument for the extension of standing, non-occurrent mental states is the one provided by Clark and Chalmers (1998) with the famous and much-discussed example of two imaginary (but plausible) characters, Otto and Inga. Inga is a healthy adult, whereas Otto suffers from a mild form of Alzheimer’s. In order not to lose important information, Otto continually maintains, updates, and consults a notebook that he carries with him wherever he goes. One day, both Inga and Otto hear of an interesting exhibition at the Museum of Modern Art (MoMA) in New York, and decide to go and see it. Inga thinks briefly, remembers that the MoMA is on 53rd Street, and sets off. Otto, on his part, looks up the address of the MoMA in his notebook, and then sets off as well.

Clark and Chalmers (1998, p. 13) point out that “in relevant respects, the cases [of Inga and Otto] are entirely analogous: the information plays for Otto the same role that memory plays for Inga”; namely, information in the notebook is retrieved when needed and guides Otto’s intentional behaviour, just as information in Inga’s brain does for her. Specifically, the example shows that the information in Otto’s notebook is functionally equivalent to Inga’s standing, non-occurrent belief that the MoMA is on 53rd Street. The notebook entries meet the so-called criteria of glue-and-trust (Clark 2010a, p. 83): they are constant (although not always consciously entertained), easily accessed when needed, and automatically endorsed.¹ This equivalence of role is the basis for Clark and Chalmers’ claim that Otto’s notebook can be seen as, literally, part of the material vehicles realizing his standing belief that the MoMA is on 53rd Street: “when it comes to belief, there is nothing sacred about skull and skin. What makes some information count as a belief is the role it plays, and there is no reason why the relevant role can be played only from inside the body” (14). Otto’s standing belief that the MoMA is on the 53rd Street, or better the material vehicles implementing this belief, can thus be seen as *extended* over his notebook; the supervenience base of Otto’s standing belief is not a brain process,

¹ Clark and Chalmers (1998, p. 17) tentatively mentioned also a fourth criterion, which holds that extended mental states must have received prior conscious endorsement, but this demand was later abandoned (see Clark 2010b). We shall not pursue this further here, but see Roberts (2011) for discussion.

but an extended system formed by Otto and his notebook. The presence of the notebook, and its readiness for deployment by the subject, contributes to a distinctive dispositional profile that can be attributed to the whole system: the profile that characterises standing belief.

Clark and Chalmers' defence of ExM appeals to the *parity principle*, which reiterates the point that there is nothing sacred about skin and skull, and that what matters for establishing whether something is part of a mental process is what this something does: "If, as we confront some task, a part of the world functions as a process which, *were it done in the head*, we would have no hesitation in recognizing as part of the cognitive process, then that part of the world *is* (so we claim) part of the cognitive process" (8; italics in original). The right way to understand this principle, in our view, is not as aiming to offer a definitive "mark of the mental" or "of the cognitive", by antecedently identifying the mind with some internal neural goings-on. Rather, this principle "is best seen as a heuristic (a rough-and-ready tool) for identifying some plausible cases of cognitive extension" (Clark 2011, p. 48); as such, it draws upon existing common-sense characterizations of paradigm psychological categories: if some hybrid organism-world system plays roughly the same role as something that we already call cognitive/mental, then we are justified in seeing this system as a cognitive/mental one (see also Clark 2007; Kiverstein and Clark 2009).² Material resources that reside outside of the body thus count as components of the realization base of a subject's dispositional mental states, according to the guiding principles of ExM, when they are incorporated by the subject in such a way that a relatively stable, enduring system can be identified, whose functional properties are, intuitively, recognizably mental in character.

The strategy for defending the extension of more transient, occurrent cognitive processes, such as the acts of calculating or preparing a presentation as they are taking place over some limited span of time, is rather different, but rests upon parallel considerations of parity. Here the reliance is not on the criteria of glue and trust (which, as we saw, are meant to be met by dispositional mental states), but on the notions of *coupling* and *self-stimulating loops* (see in particular Clark 2008, pp. 129–131; see also Shapiro 2011, pp. 175–177). The concept of coupling relevant here is one inherited from dynamical systems theory, where two or more systems are said to be coupled when they reciprocally influence and constrain one another's behaviour over time, such that they can be modelled as a single system. Various arguments for ExM suggest that in those cases where an organism is in an intimate relationship of ongoing give and take with an external item, then the two can be considered one single system.

Clark (2008, p. 131) acknowledges, however, that coupling alone is not sufficient for extension: "*sometimes*, all coupling does is provide a channel allowing externally originating inputs to drive cognitive processing along". In these cases, coupling may boost one's cognitive capacity, yet fail to instantiate an extended

² But see Wheeler (2011) for the different position that ExM requires a locationally uncommitted "scientifically informed, theory-loaded" (p. 419) mark of the cognitive. According to Wheeler, Clark's appeal to our rough sense of what counts as cognitive risks favouring an internalist view of cognition. See Clark (2011) for the response that any scientifically informed mark of the cognitive is, rather, more likely to favour the brain as the locus of cognition. In this paper we align ourselves with Clark.

cognitive system. What is also needed for extending cognition, Clark proposes, is a “self-stimulating loop”. To illustrate this idea, he introduces the example of the turbo-driven engine, which uses exhaust flow to boost its own power: emissions are recycled and sent to a turbine and then to a compressor, which forces air and fuel back into the engine at high speed and pressure; the engine can then produce more power than a standard engine with the same capacity. As Clark points out, in this case it is plausible to see the power-generating mechanism of the car as involving the engine plus the turbo-driven loop, with its various components. Clark’s view is that self-stimulatory loops of an analogous kind are at play during the process of, say, calculating with pen and paper, or working at an architectural plan while using compass, square rule, etc. In these cases, the organism distributes information out into the world (symbols, lines, sketches), which is then recycled by the organism as input, enabling it to boost its “naked” calculating and planning capacities. In these instances, we ought to talk of extended occurrent cognitive processes, implemented by material vehicles that span brain, body, and world: “These are the cases where we confront a recognizably cognitive process, running in some agent, that creates outputs (speech, gesture, expressive movements, written words) that, re-cycled as inputs, drive the cognitive process along. In such cases, any intuitive ban on counting *inputs* as parts of *mechanisms* seems wrong” (Clark 2008, p. 131, italics in original). The point, in other words, is that when we face a system that is in a close relationship of give and take with some environmental item, and that exploits this coupling to achieve some cognitive capacity, it seems intuitively wrong not to count those environmental items as parts of a cognitive system.

Further passages suggest that, for Clark, the intuition that occurrent cognitive processes extend over self-stimulatory loops is strongest in those cases where the self-stimulatory activity has been designed, or selected and maintained, for a certain purpose over time. This point comes through in Clark’s (2008, p. 130) following comparison. Consider first the momentary facilitation of one’s flow of thoughts due to the sound of rain hitting the window. Here, Clark claims, the rain is not part of cognitive processing because it is not “part ... of any system selected or maintained for the support of better cognizing. It is indeed *mere* (but as it happens helpful) backdrop”. However, in the case of a robot *designed* to use the sound of rain to perform operations essential to some kind of problem solving, “it is not clear, at least to me, that the whole drop-based timing mechanism is not usefully considered as one of the robot’s cognitive routines” (p. 130). The intuition that relevant loops of self-stimulated activity can become part of cognitive routines is even stronger, Clark believes, in the case of a robot that *evolved* to spit stored water onto a plate to generate sounds used to time certain operations key to problem solving. Here, the appeal to the diachronic properties of a material resource—its proper function, or its history of recruitment, selection and maintenance—can be read as a further condition on its being counted as a true part of a coupled system, thus guarding against the problem of “cognitive bloat” by restricting the class of agent/world interactions that fall within HEC.³

³ See Rowlands (2009) for further defence of the historical condition on cognitive extension, and Allen-Hermanson (2013) for discussion.

In sum, then, the argument for the extension of occurrent cognitive states, as reconstructed here, is that when a system is coupled to an environmental item through which the system loops some kind of self-stimulating activity, and this self-stimulating activity in particular has been set in place and maintained over time to achieve a certain cognitive feat, then the system is intuitively best regarded as an extended (i.e., world-involving) cognitive system.⁴

Having clarified this, in the rest of this paper we will argue that there are scenarios in which the material underpinnings of *affective* phenomena extend beyond biological boundaries, and that the hypothesis of extended affectivity (HEA) applies to both standing and occurrent states and episodes in this domain. There are situations, that is, in which it is legitimate to speak of affective dispositions as having a physical basis which is distributed across both organism and environment, or in which recognizably occurrent affective processes are driven, and boosted, by a subject's self-stimulating loops of interaction with worldly materials, such that any intuitive disqualification of the extra-neural components from the proper parts of the system seems to be grounded in internalist bio-prejudice. We thus intend to advance a stronger proposal than the more familiar hypothesis of *embodied* affectivity, which, in a variety of forms, has already received support both in the history of philosophy (see Colombetti and Thompson 2008) and in the light of empirical findings (for overviews, see e.g. Prinz 2004, Esp. Chap. 3; Gibbs 2006, Chap. 8; Niedenthal 2007; Krueger 2012). Emotional episodes, it is now commonly recognized in affective science, include a range of bodily components including facial and vocal expressions, autonomic nervous system activity, and distinctive behavioural stances (see Davidson et al. 2003; two main sections of this work are dedicated to “autonomic psychophysiology” and “expression”). Moreover, there is evidence indicating that impairments in facial or autonomic feedback dampen emotion experience (e.g., Cole 1999; Mack et al. 2005; Davis et al. 2010; Krueger 2012). We thus treat the view that the vehicles of affectivity span both neural and non-neural, but still biological, underpinnings as having a rich pedigree, and as providing as compelling a case as any within the literature on embodied cognition more generally. Our focus will be on the more controversial thesis, according to which affective phenomena extend not simply beyond the skull, but beyond the skin as well.

Before examining the cases that we take to motivate HEA, we shall disambiguate the various categories of phenomena that lie within the affective domain, the better to see the conditions under which they might be accommodated by ExM. In doing so, we will appeal to distinctions commonly drawn in the philosophy of emotion, which we think also correspond to our intuitions or “rough sense” of what belongs

⁴ This argument is not uncontroversial, even among supporters of ExM. Wheeler (2013, pp. 284–293) for example does not think it succeeds in securing HEC; Shapiro (2011, p. 178), on the other hand, thinks that it does provide a reason for endorsing HEC that critics need to rebut. We shall not engage with this debate here. As mentioned earlier, our aim in this paper is to discuss whether and how already existing arguments for HEC (as developed primarily in Clark's work) apply to the realm of affectivity. If one does not accept those arguments, then one is not likely to accept HEA either, at least in the way we articulate it here.

to the realm of the affective. In other words, we do not aim to provide a theory-loaded, scientifically grounded “mark of the affective” (vs. Wheeler 2011), but an accessible, folk-psychological characterization of various affective phenomena which ought to come across as relatively uncontroversial.

3 The realm of the affective

In Clark and Chalmers’ original discussion, Otto’s (standing) belief that the MoMA is on 53rd St. is extended. However, Otto’s desire to go and see the exhibition, like Inga’s, appears to remain inside him (see Clark and Chalmers 1998, p. 13). In addition, Otto’s enjoyment of the exhibition, once he finally gets to the MoMA, presumably need not involve his notebook either. It is certainly implausible to imagine that when Otto sees a painting by, say, Kandinsky, he looks up his notebook, reads that Kandinsky is his favourite painter, and only then looks back to the painting in awe and admiration. As Sterelny (2010, pp. 471–472) writes, in a quick passage on the possibility of extending desires and emotions, “it is hard to credibly imagine Otto keeping his preferences in his notebook, representing the information that he is gay, or that he likes blonds. ... The notebook might be an external belief store, but not an external store of lusts, longings, hopes and preferences”. The reason why Sterelny thinks that desires and emotions cannot be extended is that these are typically experiential and bodily phenomena: “The notebook might of course be an external cue, a prompt that allows Otto better access to his internal, embodied wants and desires. But it cannot substitute for those internal states, for these have a phenomenological, embodied component” (p. 472). Sterelny in particular blames the parity principle for the impossibility of extending desires and emotions: “parity supported cases do not plausibly generalize to other intentional or cognitive states, in particular those with an affective or motivational elements. The more one thinks cognition is embodied, the less one will accept functional equivalence between inner and outer” (p. 471).

Note, though, that the parity principle does not require functional equivalence between internal and external processes. What it requires is functional equivalence between internal processes (which we already intuitively regard as cognitive or as mental more generally), and extended systems composed of internal-plus-external processes—in other words, it requires *functional integration* between inner and outer, such that the resulting system does something that we are inclined to identify as cognitive or mental (see Wilson and Clark 2010). An extended cognitive process, then, is not one where the outer plays the same functional role as the inner. As Wilson and Clark admit, some passages in Clark and Chalmers (1998) do suggest that the outer must by itself be functionally equivalent to the inner for it to be part of an extended mind (e.g., see the passage, quoted earlier, that the information in Otto’s notebook plays the same role as Inga’s memory). The right interpretation, it has now been clarified, is that it is the joint system Otto-plus-notebook that is functionally equivalent to (plays the same role as) Inga’s internal memory system. It follows that, in order to extend affective states, one need not find outer processes that have themselves an embodied or phenomenological character. Rather, it is

enough to point to integrated extended systems whose states and processes play a role that we intuitively regard as distinctively affective.⁵ As we are about to show, we believe that there are indeed extended affective systems of this kind.

Importantly, when asking whether affectivity can be extended, one should not forget that the realm of the affective, as conceptualized in mainstream philosophy of emotion and by our folk judgements concerning emotional categories, includes a variety of both occurrent and dispositional phenomena. Our aim is to argue that all of these can be extended, by applying the arguments already provided so far for ExM and presented in the previous section. To do so we need first to illustrate the various phenomena that are traditionally, and intuitively, seen as making up the realm of the affective.

The emotions (fear, anger, sadness, hope, shame, joy, contempt, and so on) are paradigmatic affective states. The term “emotion”, however, is ambiguous: it, alongside the labels for individual emotion types, can indicate both an occurrent and a dispositional state (see also Goldie 2000, p. 104). If we hear that Mary is angry at John, we can understand this in two ways. We can infer that Mary is at present experiencing an episode of anger at John, and is also perhaps in some way expressing her anger at John, and/or undergoing some physiological change, such as a change in heart rate; or, we can infer that Mary has a longstanding angry disposition toward John, such that she may experience and also express her anger when she is in John’s presence.

To avoid this ambiguity, we distinguish between *emotional dispositions*, and *emotional episodes* (see also Deonna and Teroni 2012), where the latter are occurrent states with an event-like or temporal structure. Occurrent emotions (emotional episodes) are the component of the affective domain that has received the greatest philosophical attention, and of which there is the greatest diversity of competing theoretical analyses. For the sake of providing the broadest possible treatment of the issue, rather than entering the debate over which of these accounts is correct, we adopt here a “componential” approach, according to which emotional episodes are complex occurrences involving cognitive evaluations or “appraisals”, bodily (autonomic and expressive) changes, and feelings. This approach reflects not only, we think, our common-sense understanding of the emotions, but also a dominant trend in affective science (e.g., Russell 2003; Scherer 2009). We return to the question of whether any or all of these elements can be extended in Sect. 5 below.

Other common occurrent affective states are *moods*, such as having the blues, feeling elated, being grumpy, feeling anxious, or feeling upbeat. They are usually characterized in the philosophy of emotion as diffuse affective colorations that influence one’s experience of the world, and that make some emotional episodes more likely than others (someone in a grumpy mood, for example, is more likely to

⁵ This relatively liberal understanding of the parity principle is consistent, furthermore, with those approaches to ExM that have emphasized the *integration* and *complementarity* of inner and outer resources (e.g. Menary 2010; Sutton 2010), and argued that it is precisely the distinctively different powers and capabilities contributed by non-neural components that make them suitable candidates for cognitive extension.

burst out at someone else in anger; someone in an anxious mood is more likely to be preoccupied with things that would otherwise not worry her). Moods are primarily feeling states, but are also associated with characteristic bodily postures and gestures, and expressive-behavioural attitudes. Moods are typically distinguished from emotional episodes by reference to duration and intentional character. Moods generally last longer than emotional episodes—one can feel grumpy for hours or even days. Moreover, moods, unlike emotional episodes such as anger, sadness, fear, pride, and so on, are not directed at specific objects (things, people, events); one does not usually have the blues, or feel up, about anything in particular. How exactly to characterize the intentionality of moods is a matter of debate. Some philosophers think that moods are not intentional states altogether (e.g., de Sousa 1987), whereas others think that they are rather about general or indeterminate objects (Broad 1954; Goldie 2000; Solomon 2007; Ben-Ze'ev 2010). Here we take moods to be pervasive affective states with an unclear intentionality, such that they are not about anything in particular, but remain nevertheless “open” to the world, in the sense that they present the world as affectively toned, in one way or another. Moods, too, are naturally conceived of as event-like, i.e., as unfolding over a span of time, during which they can change and evolve. Think, for instance, of a bad temper caused by a difficult day at the office taking on a particular coloration as one deals with, say, people, traffic, and weather during the journey home.

The affective realm also includes a variety of dispositional states. We have already encountered the emotional dispositions, which are dispositions to undergo a certain kind of (occurrent) emotion. When we say that Mark is envious of the rich, for example, we mean that Mark is prone to experience and/or manifest envy for a rich person whenever he meets one or hears about her and her possessions. Being angry, being jealous, being scared, and being proud are all examples of expressions that can refer not just to occurrent emotional episodes but also to emotional dispositions (e.g., Ryle 1949, Chap. 4). Emotional dispositions can last very long, up to one's whole life.

Emotional dispositions are distinguished from the *sentiments*. Emotional dispositions can be characterised as “single-track”, namely, as tendencies to exhibit *one* specific emotion (e.g., anger, envy, jealousy, fear, pride; see Deonna and Teroni 2012). Some affective dispositions however are “multi-track”, i.e., they are tendencies to feel a variety of different emotions. When we say that Mary loves John, for example, we imply that Mary is likely to undergo an intelligible pattern of different emotions towards John and in relation to him, such as erotic desire and warm affection, but also worry, pride, or jealousy. Similarly for hatred. These multi-track affective dispositions are traditionally characterized as the sentiments (see also Broad 1954; Ben Ze'ev 2000, Chap. 4).

A further category of affective dispositions are the *temperaments*. A temperament is generally viewed as the tendency to have certain moods. Often-cited examples of temperaments are being cheerful, being phlegmatic, being irritable, being gloomy, being melancholic, being lascivious, and being nervous (Deonna and Teroni 2012, Chap. 9). Someone with an irritable temperament, for instance, is disposed to enter a grumpy mood more often than someone with a cheerful or phlegmatic temperament.

Finally, temperaments are distinguished from *character traits*, which are dispositions to evaluate and affectively respond to events in a certain way. Paradigmatic examples are “being optimistic, kind, courteous, opportunist, meticulous, modest, loyal, frivolous, cruel, but also negligent, insensitive, unfriendly as well as the standard virtues and vices” (Deonna and Teroni 2012, p. 106; Goldie 2004). Character traits differ primarily from sentiments in that the latter are considered attachments to specific things (objects, but also people and institutions), whereas the former are attachments to values (such as justice, modesty, loyalty, and so on). Recent literature has raised a sceptical challenge to the treatment of character traits as context-independent, enduring, and stable features of moral agents (e.g., Harman 2000), motivated by results from situationist social psychology (see, e.g., Kunda 1999 for discussion), which have been taken to indicate that individuals tend *not* to exhibit uniform traits—e.g., kindness, charity, or honesty—across different contexts and situations. One response (e.g., Upton 2005) is to hold that features of character should be understood in “local” terms, as dispositions to respond evaluatively only within a circumscribed context—to attribute to an agent the property, for example, of being “honest-at-work”, or “compassionate-towards-the-sick”. We will not take a stand upon the question of which account of character traits, global or local, is correct, but hold that each is consistent with HEA as we will develop it.

Occurrent emotional episodes and moods, and dispositional emotions, sentiments, temperaments, and character traits differ in their temporal span. Emotional episodes typically last a few seconds or minutes, whereas moods can last for hours, days, or even weeks. The various dispositional affective states are usually long-lasting and relatively stable: one can be angry at one’s parents for the whole of one’s life; likewise for a sentiment of love, a gloomy temperament, and a frivolous character trait. Arguably, not all affective dispositions fall neatly within one category only. Being irascible, for example, can be seen as a single-track emotional disposition (e.g., Goldie 2004), but also as a temperament, and even as a character trait (if one exhibits a pattern of preferential attachments to one’s own interests at the expense of others’, say). For our purposes, what matters is that it is possible, and indeed customary, to identify a variety of occurrent as well as dispositional affective phenomena. Moreover, we can do so in the absence of a definitive, theory-driven “mark of the affective”: our appeal is to well-established and, we think, relatively uncontroversial categorizations of affective phenomena.

4 Extending affective dispositions

We shall argue that all of these phenomena can be extended, on the basis of the arguments already provided for ExM, as detailed in Sect. 2.

Consider the affective dispositions first (emotional dispositions, temperaments, sentiments, character traits). Otto’s example, recall, was intended to make the point that the material vehicles realizing his belief that the MoMA is on 53rd St. include his notebook. The belief in question is standing or dispositional, and has a specific content. Of the various affective dispositions listed earlier, the emotional

dispositions are most similarly standing and intentionally directed states. Can we find a case of an extended emotional disposition, along the lines of Otto's case? We think so. Take for instance Eve's dispositional resentment at her parents. Imagine that Eve occasionally records in her diary the things that her parents do that make her angry, such as "my father does not care about my feelings", "my mother always criticizes me and does not appreciate my achievements", and so on. Eve does not always consciously exhibit resentment, but when she reads these statements, she does. Sometimes she re-reads the previously recorded entries in her diary, which also elicits her resentment; in fact, her record of past episodes contributes to fuel her resentment, even during periods of her life when she does not interact much with her parents, and is otherwise quite satisfied with her professional and marital life. Without the diary, we can imagine, she would not rekindle her resentment that often, in fact she may even be able to forget her negative relationship with her parents, and cultivate more positive memories and feelings toward them. Without the diary, that is, she is not (or need not be) so disposed to manifest parent-directed resentment.

This scenario strikes us as plausible, and one in which, if one endorses ExM, one also ought to say that Eve's diary is part of the supervenience base of the system that realizes her standing, dispositional resentment toward her parents. The parity principle applies smoothly in this case: if Eve were disposed to rehearse those statements ("my mother always criticizes me", etc.), and hence to undergo bouts of occurrent resentment, "only" in virtue of her internal condition, we would have no hesitation to consider her in a state of dispositional resentment toward her parents. Eve's interaction with her diary meets the criteria of glue and trust: the object is consistently and straightforwardly available; it is accessible for fluent use in the course of Eve's day to day activities; and she does not submit its contents to reflective scrutiny, but deploys them with a trusting attitude (i.e., when she reads the entries, she is convinced by what they say).⁶

It is also possible, we think, to extend temperaments. Thus consider Reinier, a person with a melancholic temperament, who is generally prone to self-doubt, tends to view his daily circumstances in a negative light, worries about trivial matters, and dwells upon past failures. Reinier, let us suppose, decides at some point to change his affective outlook and, perhaps under the advice of a therapist, begins to compile a notebook of inspirational quotations, cheerful sayings, and positive accounts of his own achievements and successes, which he consults whenever he detects or predicts that his mood is on a downward turn. If, after a suitable period of training and adjustment, the use of this external resource enables Reinier to undergo more frequent occurrences of positive mood, then, it seems to us, if one endorses ExM

⁶ In contrast, imagine that Eve consults an entry but initially fails to grasp its significance, or doesn't fully interpret some negative written remark about her parents appropriately. Although the episode may eventually effect an episode of resentment, once she comes to appreciate the content fully, her consultation of the diary in this case lacks the trusting attitude required by the Clark and Chalmers' criterion on extension. In the latter case, it is not appropriate to ascribe to Eve the state of dispositional resentment, because she is not suitably poised to manifest the resentful attitude, but only reaches it after some mental effort.

one also ought to say that the notebook is part of the supervenience base of Reinier's cheerful temperament (a temperament, recall, can be seen as the disposition to have certain moods). Reinier's notebook, in this scenario, comes to satisfy the glue-and-trust conditions in virtue of its skilful and uncritical deployment, and its steady availability. The parity principle also applies in this example: if the re-evaluation of events as positive were carried out entirely in Reinier's head and he achieved a more positive mood as a consequence, we would have no hesitation to see the process as an illustration of Reinier's cheerful temperament.

Similar considerations, we contend, also apply to the sentiments (such as love and hatred). Think this time, for example, of the use that people make of objects to rekindle specific feelings of attachment towards someone or something. Widows often add the wedding ring of their spouse to their ring finger, as a way to maintain a sense of connectedness with the deceased person; more generally it is not uncommon to wear the jewels or clothes of a deceased loved one to cultivate their memory and a sense of proximity to them. If sentiments are dispositions to be attached to certain objects, including people, then the deceased spouse's ring in this example ought to be seen as a proper part of the vehicles that instantiate the sentiment of love towards a specific person. Or consider that religious faith is often supported by favoured and oft-consulted devotional texts, as well as material objects and practices. If a person were to sustain her practices of religious observance entirely in her head, without the recourse to any text, object and rituals, we would have no hesitation to call her faithful. From the perspective of ExM, relying on a text and manipulating objects (such as a rosary) to enable occurrent experiences of devotion ought to count as a proper part of (the vehicles of) a faithful disposition or sentiment.

The case of character traits does not strike us as different in principle. Just as Reinier can rely on his notebook to alter his temperament, he may also rely on it to change, and to maintain, his character traits. For example we can imagine that Reinier, thanks to his notebook, becomes a meticulous person. Before he started to add to-do-lists and appointments to the volume he was scattered and disorganized, but by continually structuring his behaviour through coordinated interaction with the notebook's entries (and, let us say, a timer and alarm-clock), he gains a punctual and efficient aspect to his character. Or one may decide to become more courteous and gentlemanly (perhaps as a consequence of cultural and social pressures, but not necessarily) by acquiring a manual of good manners, carrying it and following its advice systematically and appropriately. If the manual is smoothly integrated within the person's behaviour, implicitly trusted and regularly employed, such that we would have no hesitation to call the person "courteous" were he to act as he does without any reliance on the manual, then we ought to see the manual as part of the material vehicles that enable the character trait of being courteous. Here, it is not only a mere behavioural disposition that is governed by the manual, but a pattern of attention and motivation: without the guidebook, we can imagine, the individual struggles to maintain focus on the aspiration of improved manners, even though he may entertain it as an inchoate or abstract goal. In the presence of the manual, though, and in virtue of its prominent influence in directing attention and guiding behaviour during his negotiation of social interactions, he is able to recognise and

make effective the value he places upon etiquette and its enhancement of interpersonal relationships.

Think also of a case of extended unfriendliness or introversion, where one blocks oneself off from worldly stimuli by using headphones all the time, and more generally structuring one's appearance and environment so as to discourage interactions with other people and to change the space of ways in which they show up for one (as, for instance, potential conversation participants, friends, sympathisers, annoyances, and so forth). This example, especially, can be applied neatly within a framework that construes character traits as local: "unfriendliness-on-the-bus", a context sensitive trait, is here partially subserved by the subject's being plugged into her technology. If we understand traits in this way, then the fact that some extra-neural artefacts are deployed for their transformative effects only within a certain domain—workplace, home, public transport—is no barrier to their being true extensions of a person's character. Moreover, environmental components may lend a degree of stability to a person's dispositions, enabling her to exhibit responses with a greater degree of uniformity across different social contexts than would otherwise be possible.

Before moving on to occurrent affective phenomena, we wish to address the possible worry that our scenarios do not illustrate instances of extended dispositional affective states, but simply reduce to further instances of (extended) dispositional belief.⁷ According to this objection, if, for example, the instigation of Eve's occurrent resentment, or the improvement of Reinier's mood, can only occur via their treating certain externally encoded contents as true, then it may be reasonable to regard those external encodings as part of the dispositional basis of belief, while retaining an internalist analysis of the relevant affective phenomena. Similarly, perhaps, with our example of extended religious faith—if one takes religious faith to reduce to a set of dispositional beliefs.

Note first that this worry does not apply to *all* of our examples. In the scenarios illustrating the extended sentiment of love, and extended meticulous, courteous, and unfriendly character traits, the environmental items over which these affective phenomena are said to extend are not repositories of any propositional content; it is thus not clear to what kind of extended dispositional belief these affective phenomena could reduce. Even in the examples of Eve and Reinier, we contend, the objection does not succeed in excluding the possibility of HEA. Note that there are two readings of the doxastic alternative. On the first, the affective phenomena in question are a component of the dispositional profile of evaluative belief; for instance, part of what it is to believe that one's parents treated one badly just is to be disposed to exhibit resentment towards them. On this view, the occurrent resentment, or changes in mood, involved in the scenarios of Eve and Reinier respectively, are internally realized manifestations of an extended standing belief (other manifestations of the doxastic state would include treating the relevant content as true in thought, word, and deed). On the second reading, the subjects' standing doxastic states involves their being disposed to entertain certain occurrent

⁷ Thanks to an anonymous referee for raising this concern.

beliefs, which causally mediate their affective responses. Again, although the standing beliefs may have partially extended vehicles, the occurrent mental phenomena—cognitive and affective—would remain internal.

Although we do not deny here that there may be instances in which an individual's dispositional mental states operate in these ways (note that it may not always be possible neatly to categorize what a subject believes and what her standing affective attitudes are, or whether or not her occurrent emotions are mediated by belief), we do not accept that every standing affective state can be analyzed in doxastic terms. Conceding this point would amount to effectively denying that there are dispositional affective states at all.⁸ In addition, some straightforward amendments can be applied to our cases in order to show that there can be distinctively affective dispositional states, and that the onset of an occurrent emotion, or of a change of mood, need not be mediated by occurrent beliefs. For example, we can imagine that the contents of Reinier's notebook possess an imperative form ("keep it up!"; "go for it!", "find a place inside where there is joy"); or that Eve's book contains evocative images rather than written text. These changes diminish the temptation to construe the cases as involving the endorsement of a particular content as true—again, because there is no candidate propositional content—and so the dispositional profiles in question are more obviously affective, rather than doxastic. Moreover, it is possible to construct scenarios in which the relevant disposition is subserved by non-representational artefacts altogether, as when an otherwise anxious Reinier uses, say, a stress ball to regulate his mood with such regularity and proficiency that it becomes reasonable to see it as part of the basis for his now calmer temperament. In these scenarios, it appears illegitimate to ascribe to the subject a standing belief from which the affective changes issue, either as manifestations of that belief or as causal products of an intermediate thought—because there is no proposition that he or she takes to be true.

5 The case of occurrent affective states

What about occurrent affective states, namely emotional episodes and moods? Can they also be extended? Given the diversity of existing accounts of occurrent emotions, there is no single or authoritative solution to the question whether emotional episodes can have extended material underpinnings; one's openness to this possibility will rest, ultimately, upon one's ontology of these phenomena. As mentioned in Sect. 3, for the sake of providing the broadest possible treatment, we adopt here a componential approach, according to which emotional episodes typically comprise cognitive, bodily (autonomic and expressive), and phenomenal

⁸ This denial faces the problem of recalcitrant emotional dispositions, i.e., emotions that we have in spite of what we believe. For example, one may be disposed to undergo bouts of fear whenever one is on a plane, in spite of one's standing belief that flying is not dangerous. Here, we cannot explain the occurrence of fear by appealing to a standing belief that flying is dangerous, for the person does not believe so. The solution is to allow that there are dispositional emotions that cannot be accounted for in dispositional doxastic terms.

features. From this perspective, to extend occurrent emotions, some or all of these components would have to be extended. In this section we examine each of these components in turn. If one endorses a theory that treats a particular component as forming the essential core of occurrent emotion, then one can accept that this element's extension suffices for emotional extension simpliciter. Otherwise, one might adopt a partial, or componential, view.

As remarked in Sect. 3, occurrent emotions, in contrast to the dispositional phenomena examined earlier, are not static but event-like; they take place over a certain temporal interval, during which they evolve. In seeking to determine whether the material basis for some core component of an occurrent emotion can be extended, then, we must understand each component as having a duration, during which it may transform. Let us consider first the cognitive component, often also termed "appraisal". To extend this, we must make reference to intentional events in possession of the relevant diachronic properties. Thinking of appraisals as *judgements* lets us do this, by allowing us to treat occurrent emotional episodes as content-involving performances in which a subject actively partakes over time.⁹ The judgements in question pertain to how we are faring in the world, broadly construed, and to the ways in which external states of affairs impinge upon a web of personal interests, values and concerns. An episode of occurrent anger incorporates the judgement that we have been wronged or offended, for instance, while sadness includes the judgement that we have suffered a loss. For present purposes, a crucial component of this account is that it allows episodes of judging to be not only instantaneous endorsements of some content as true, but "upheavals of thought", to use Nussbaum's (2001) phrase—namely, cognitive episodes through which the agent can move quickly or slowly, coming to recognize, conceptualize, and acknowledge the impact that salient factors (wins and losses, failures and achievements) have upon her interests, and to reorganize her evaluative perspective accordingly. These temporally structured acts of judging, we believe, are of an appropriate format to be carried out in close collaboration with material things, and so present a promising candidate for extending the cognitive element of occurrent emotions. Consider again Eve, the person whose emotional disposition of resentment towards her parents, we proposed earlier, can be seen as extending over her diary in virtue of the role that this resource plays in her life. What about the (occurrent) act of writing the diary, however? Is it just a case of "jotting out", on paper, contents that are already well-formed and "complete" in Eve's head or organism? In our view, writing about one's emotion episodes is rarely (if ever) a mere description of one's evaluative position. More often, the act of writing, *as it takes place*, contributes to clarifying and articulating one's thoughts, to demarcating them more clearly from others, and thus to constraining the judging process as it is

⁹ See Solomon (1993) and Nussbaum (2001) for theoretical analyses of emotions that treat them as essentially judgement-like. We offer the judgement view as one promising approach to the cognitive component of emotions that fits with the tenets of HEA, but there may be others.

performed by the emoting subject.¹⁰ The case of Eve, as we imagine it, is one where, as she writes that her parents do not listen to her, do not appreciate her, and so on, she is engaged in unfolding and articulating a specific evaluative judgement, which the act of writing down helps to clarify and structure. This act also feeds back into Eve, influencing her overall evaluative perspective as she continues to be engaged in the activity. In the act of writing, the external item contributes to an affective process with intentional directedness, such that we can talk here, we submit, of an extended appraisal component.

What about the bodily components of emotion? If the autonomic components can be functionalized, then they are, in principle, also apt for inclusion in HEA. Any artificial device coupled to the organic body to support a specific function (regulating the heart rate, or the release of some hormone) would count as an “autonomic extension” (see also Stephan et al. 2014). Similarly, the expressive (facial, gestural) component of an emotion can be extended by a hybrid system with expressive functions. Indeed, we already often naturally attribute expressive manifestations to hybrid systems (and to artefacts themselves); think for example of the act of smashing a vase on the floor in anger, or of using a handkerchief to cover one’s face in sadness.

Finally, the prospects for extending the material underpinnings of the qualitative character of an emotional episode are more difficult to assess, because there is no well-articulated and accepted metaphysical account of the relation between phenomenal and physical properties, and so it is hard to see what it would take for an extended system to instantiate the supervenience basis of the felt quality of fear, anger, or jealousy, for example. If one thinks, for instance, that consciousness depends on a particular distribution of neurophysiological activity, then it is not easy to imagine how equivalent properties can be implemented within a hybrid, and thus partially non-neural, system. According to Clark (2009, 2012), for example, consciousness cannot extend because only the brain appears able to access and integrate information at the adequate temporal scale and bandwidth. Although recent work disputes Clark’s point and advances a novel extended view of perceptual consciousness (Ward 2012), it is not obvious whether and how this view applies to emotional consciousness. As an elaboration of this point is beyond the scope of this paper, we will not pursue this issue here. We would like to highlight, however, that external resources may be capable of performing at least a deep, and *explanatorily ineliminable*, role in determining the overall dynamics and tone of the qualitative component of an emotional episode as it unfolds. Consider a jazz saxophonist, grieving at the loss of her best friend, whose playing sets up a mutually constraining cycle of affective responding and expression: the qualities of the music performed, and of the actions and gestures initiated, feed back into the character of the musician’s emotional experience, which in turn governs what she plays next.

¹⁰ Psychologists have indeed pointed out that writing about one’s feelings has positive therapeutic effects (e.g., Pennebaker 1997). Why this is the case is not yet clear. One possibility is that writing about one’s feelings enhances awareness of one’s emotional state, and that this heightened awareness in turn contributes to increased emotion differentiation or “granularity”, which is positively associated with the capacity to regulate one’s emotions (Barrett et al. 2001).

The rate, rhythm, tone, and volume of the music (for instance) affect, and are affected by, the ebb and flow of the saxophonist's feelings of sadness, their intensity, poignancy, and so forth. A self-stimulating, coupled relationship is instantiated between musician and instrument, that is quite unlike the unidirectional causal link that holds between an environmental happening and a feeling response in ordinary cases. The self-stimulatory character of this loop is arguably most apparent in the case of the musical improviser, who does not plan what she is going to play before she plays it. In this case her feelings are shaped, moment by moment, by the novel musical form she and her instrument are bringing forth (see Cochrane 2008 for a discussion of solo jazz improvisation and the extended-mind view). If we endorse the intuition that couplings like this one, selected and maintained for the function they perform, ought to be treated as unified wholes, then we can view the activity of the whole loop as responsible for the episode's overall phenomenal character. The continuous interaction with the musical instrument enables the achievement of a specific feeling, with a particular temporal structure, that would not be possible without the manipulation of the external artefact. In its strongest form, this counterfactual can be taken to support an extended-vehicle account of the qualitative character of emotion, wherein this character supervenes upon activity that belongs to the entire coupled system. But even if this proposal fails to comply with one's favoured metaphysical picture of consciousness, it is possible to identify an essential explanatory role for the interaction between agent and environment in such cases. One can concede that, at any moment, the minimal supervenience base for emotional feelings is, strictly speaking, confined to the neural, while also adopting the lesson that a complete account of the diachronic character of such a qualitative episode must make essential reference to the coupled system as a whole.

Lastly, let us consider moods, such as having the blues, being grumpy, being downcast, feeling up or down. Moods can also be seen as involving autonomic, expressive, and phenomenal components, and therefore the possibility of extending them relies, as for occurrent emotions, on the possibility of extending those features. The major difference here is that moods do not have any clear intentional or cognitive element; but otherwise, the considerations developed above for the other components of emotion apply just as well in the case of mood. Again, playing a musical instrument provides perhaps the clearest example. The coupled system constituted by the instrumentalist-plus-her-saxophone, where the musician self-stimulates her activity by looping her performance through the instrument, extends at least the expressive component of mood (e.g., a nostalgic mood, or a euphoric one). The saxophone's "voice" expands the subject's expressive range beyond those of her unadorned vocal capacities, and empowers novel communicative abilities. In addition, the coupling with the instrument influences the way the world appears to the musician (the way the world is "coloured", so to speak), including the kind of actions she is more inclined to undertake in it, and the kind of emotional episodes she is more likely to go through. For example, while playing the musician may become more likely to endure occurrent emotions of sadness or happiness. This increased likelihood is a property of the closely coupled hybrid system musician-plus-instrument. Another example would be one in which what is extended is the autonomic aspect of mood, thanks to the integration of an artificial device within the

person's physiological functionality (as in the earlier example of a device that regulates heart rate). In this case, again, it is this integrated system that is inclined to undergo some occurrent emotions rather than others, undertake some actions rather than others, and to which the world appears "coloured" in some ways rather than others. Although one may still want to maintain here that the phenomenal aspects of mood are realized by a process inside the organism (in the brain, perhaps, or in some part of it), it appears, again, that other core aspects of these occurrent affective phenomena are apt for inclusion within HEA.

6 Conclusion

We have suggested that the resources of ExM need not be restricted to a narrow class of cognitive states and processes, nor that external materials, devices, and artefacts are implicated in this view only when they are put to use in the service of "intelligent problem solving". The domain of the affective, too, can extend beyond the skin. In drawing out the various categories of phenomena that constitute this domain, we can see that the arguments deployed to motivate an extended treatment of belief, memory, planning, and calculation can be applied to cases of mood, sentiment, temperament, character, and emotion. Affective states may be characterized dispositionally, as more or less enduring tendencies to act and feel in systematic ways, and if a functionally specifiable system composed of both biological and non-biological resources instantiates some dispositional phenomenon which we would have no hesitation to call affective if we were to appeal to intuitive, folk-psychological thinking, then excluding the inorganic elements from an account of the phenomenon's material underpinnings appears to be mere internalist prejudice. In this way, we can see that stable subject-artefact coalitions may come to exhibit the dispositional properties that are essential to a temperament such as cheerfulness; an emotional disposition like resentment; or longer-term sentiments such as loving concern for another. Character traits, too, where their core features are dispositionally defined, may be realized by systems whose physical vehicles extend across biological boundaries, whether through an agent's self-conscious organisation of her environment, or just in virtue of the materials (text, clothing, technology) with which she adorns herself.

Elsewhere, it is the dynamic and self-stimulating nature of a subject-environment coupling, again in conjunction with the deliverances of a heuristic parity principle, that grounds its being understood as an instance of extended affectivity. Occurrent moods and emotional episodes, unfolding over time, can be realized and structured through acts of musical or written expression, for example, in such a way that it does not make sense to single out the neural constituents as the privileged locus of the episode in question. The agent's capacities for emotional feeling are enhanced in such an encounter; emotional experiences of hitherto-unattainable forms, depths, and clarity are made possible by an individual's world-engaging performances.

For proponents of the ExM approach to cognition, we submit, this should not be an entirely unexpected result. If, as authors working under this banner have suggested, we must construe cognitive capacities as densely and inextricably

embedded within a wider cultural, technological, and social context in which thinkers deploy environmental opportunities to shape and expand their powers for thinking, then it is natural to anticipate that the same may hold true for affective phenomena. Only if one were to endorse a very strict conceptual separation between cognition and emotion, would the claim that one but not the other might be realized within an extended system be a sustainable theoretical position. If we are correct in our analysis, proponents of ExM ought to accept that—just as in the case of cognition—an exhaustive description of the nature of human affectivity, philosophical or empirical, cannot be achieved unless attention is directed outward from the merely neural, and indeed beyond the spatial limits of the living organism.

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