Extending Existential Feeling Through Sensory Substitution

Introduction

In current philosophy of mind, there is lively debate over whether emotions, moods, and other affects can extend to comprise elements beyond one's organismic boundaries (see, e.g., Colombetti & Roberts, 2015; Carter et al., 2016; Krueger & Szanto, 2016; Maiese, 2018; Stephan & Walter, 2020). At the same time, there has been growing interest in the nature and significance of so-called existential feelings, which, as the coinage suggests, are feelings of one's overall being in the world (Ratcliffe, 2008, 2015; see also, Fingerhut & Marienberg, 2012). In this article, I bring these two strands of investigation together to ask: Can the material underpinnings of existential feelings extend beyond one's skull and skin? My inquiry is motivated by Krueger and Szanto's (2016) call for a "complete defense" of extended affectivity, which in their view "requires not just a consideration of how paradigmatic emotional states like fear, anger, sadness, or joy might be extended, but also affective phenomena comprised of different components and temporal profiles: bodily affects, existential feelings, moods, temperaments, sentiments, character traits, dispositions, and the like" (pp. 865–866). Apart from existential feelings, all these phenomena have already been discussed in varying length and depth vis-à-vis extension – with emotions clearly attracting the most attention.

Thus, to push the investigation into uncharted territory and to bolster the overall case for extended affectivity, I home in on existential feelings. In essence, these feelings provide us with a sense of reality and belonging by pre-intentionally structuring how we experience, perceive, and think about the world. I introduce a particularly intriguing and potent candidate for the extension of existential feelings, namely, the bodily integration of sensory substitution devices (SSDs). Basically, SSDs make use of one sensory modality, i.e., the substituting modality, to gain access to a type of information normally delivered through another modality, i.e., the substituted modality. They include, famously, devices that convert visual information (obtained by a camera) into tactile stimuli (on one's abdomen or tongue), and in this way enable the individual to 'see' what is in front of them via the sense of touch (Bach-y-Rita, et al. 1969; Bach-y-Rita & Kercel, 2003). Blind or otherwise visually impaired persons can thus come to experience the world anew in a modality that is arguably irreducible to either vision or touch. This outcome raises a fundamental ontological question: Does the agent-plus-SSD system extend the supervenience base of the agent's sense of what is possible and real or, to put it even more broadly, what is 'there'? Is it, in other words, an instance of extended existential feeling?

To ground my investigation of the matter, in Part 1 I introduce and adopt a componential-systemic view of extended affectivity. In doing so, I specify the vehicle externalist criteria for extension employed in my analysis. In Part 2, I define what existential feelings are and pinpoint several key issues in their potential extension. I then identify the agent's body schematic sensorimotor 'know-how' as a possibly extending component of existential feeling and posit it as the fulcrum of my argument. In Part 3, I move on to consider the extension of existential

feeling via sensory substitution, especially through so-called Tactile Visual Sensory Substitution (TVSS) devices. Informed by both philosophical and empirical studies, I argue that, under certain conditions, (a) the agent's implicit sensorimotor processing and a TVSS device can become coupled into a new systemic whole, which in turn (b) reconfigures the material underpinnings of the agent's pre-intentional world-experience. This, I submit, counts as a cogent case for extended existential feeling. To conclude the article, I briefly consider the broader implications of my argument.

1. Extending affectivity

"Where does the mind stop and the rest of the world begin?" Since Clark and Chalmers (1998) posed this question in their landmark article, several waves of debate have swept over the topic (see Gallagher, 2018, for a recent review). The outstanding issue is whether the mind can, under certain circumstances, supervene on resources (or 'vehicles') external to the biologically bounded agent. This 'vehicle externalist' discussion has long focused on distinctively cognitive phenomena, such as standing beliefs and calculative processes, whereas affective phenomena have only recently begun to receive their share of the spotlight (see, e.g., Slaby, 2014; Krueger, 2014; Colombetti, 2015; Roberts, 2015; Léon et al., 2019). It is beyond the scope of this article to review, in even the broadest of strokes, the numerous arguments and theoretical developments central to the extended mind thesis. Instead, to establish a clearly defined framework for the present analysis, I introduce a *componential-systemic* approach to extended affectivity derived from prior theorization on the matter (see, especially, Palermos, 2014; Colombetti & Roberts 2015; Carter, et al., 2016; Krueger & Szanto, 2016).

The basic idea of prevailing componential arguments is simple enough: (a) If affective phenomenon Q comprises component states or processes $X_1, X_2, \ldots, X_n$, and (b) at least one of $X_1, X_2, \ldots, X_n$ extends, then (c) Q extends as well. For example, Krueger and Szanto (2016, p. 866) base their defense of extended emotions on a model that distinguishes between the neurophysiological, evaluative-cognitive, motivational, regulative, expressive-motor, and subjective-feeling components of an emotion (as per Scherer, 2005, and Gross, 2014). Consequently, they aim to explain how each of these components can integrate with different material and social resources to extend emotion. Colombetti and Roberts (2015, pp. 1256–1257) likewise distinguish between cognitive, bodily, and phenomenal components of emotional episodes and argue for their potential extension through various candidate cases. But whichever affective phenomena such componential explanations target, their cogency hinges on how 'extension' itself is defined. What criteria, then, can we employ to determine whether the supervenience base of any given affect has genuinely come to include extra-organismic vehicles?

Colombetti and Roberts (2015, p. 1246) suggest that the criteria for extension depend in part on whether the inspected phenomenon is *dispositional* or *occurrent*. In their view, arguments for extended affective dispositions – such as sentiments, temperaments, and emotional

dispositions – align more readily with so-called *glue and trust* criteria. Originally conceived by Clark and Chalmers (1998) to explicate the extension of standing beliefs, these criteria require (a) that the resource carrying the belief's informational content be "reliable and typically invoked", (b) that the relevant content be "easily accessible", and (c) that the content thus accessed be "more or less automatically endorsed" (Clark, 2008, p. 79). The paradigmatic case of glue-and-trust is of course Otto, the hypothetical Alzheimer's patient who writes down the addresses of important places in a notebook and then consults these memoranda trustingly, effortlessly, and automatically whenever he needs to find his way around town (Clark & Chalmers, 1998). Otto's case also illustrates what has come to be known as the *parity principle*, which (in its initial interpretation) underscores the functional equivalence between internal and external elements in (some) instances of extension (Clark & Chalmers, 1998). Hence, in habitually and fluently summoning up dependable beliefs about locations from his notebook, Otto not only satisfies the criteria of glue and trust but also entrusts his notebook with a role equivalent to biological memory. This, the argument goes, amounts to extended dispositional belief.

Following the path laid out by 'Otto', Colombetti and Roberts (2015) argue that written records can form part of the supervenience base of *emotional* dispositions as well. To support this claim, they present Eve, who documents her resentment toward her parents in a diary and, by re-reading these entries, unfailingly rekindles her otherwise dormant feelings of bitter indignation. Given that Eve's diary is "consistently and straightforwardly available", "accessible for fluent use", and deployed "with a trusting attitude", its use satisfies the criteria of glue and trust (p. 1253). Eve's interaction with her diary also manifests what Colombetti and Roberts call a "relatively liberal understanding" of the parity principle (p. 1249fn). Here the key precondition is not the functional equivalence between internal and external processes per se but between internal processes and *systems* comprised of *internal-plus-external* processes. On this approach, 'Eve-plus-diary' is a joint system that stores and induces her resentment and is therefore functionally equivalent to an internal disposition that could, under other circumstances, realize the very same resentment. Colombetti and Roberts thus conclude that, just like standing beliefs, emotional dispositions can extend to comprise external vehicles.

In contrast to dispositional states, *occurrent affects* such as moods and episodic emotions are temporally unfolding dynamical phenomena and therefore involve somewhat different criteria for extension. To clarify how this is so, Colombetti and Roberts call attention to a similar divergence between arguments for extended *mental states* (like beliefs), on the one hand, and extended *cognitive processes* (like problem-solving), on the other (see also Palermos, 2014; Carter, et al., 2016, p. 201). As they see it, compared to dispositional mental states,

> [t]he 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*. (Colombetti & Roberts, 2015, p. 1246, italics in original.)

In essence, a *coupled system* emerges when the "human organism is linked with an external entity in a two-way interaction" (Clark & Chalmers, 1998, p. 8). Thusly connected, all the system's components play an active causal role in governing behavior, and if the external component is removed, the system's behavioral competence declines accordingly – just as it would if part of the brain were removed. Clark and Chalmers assert that "this sort of coupled process counts equally well as a cognitive process, whether or not it is wholly in the head", and thus accommodates the notion of environmental extension (p. 9). Clark later redefines the critical two-way interaction as *continuous reciprocal causation* (CRC), which "occurs when some system S is both continuously affecting and simultaneously being affected by activity in some other system O" (2008, p. 24). CRC can be found, for example, in small improvising jazz combos where each musician's playing concurrently influences and is being influenced by everyone else's (p. 24).

However, as Clark has suggested, coupling via CRC does not by itself ensure the extension of cognitive processing. What is required between the coupled systems is a *self-stimulating loop* akin to a turbo-driven engine whose exhaust output simultaneously serves as input that boosts the engine's own power. By way of analogy, Clark contends that cognitive processing can also create "outputs (speech, gesture, expressive movements, written words) that, recycled as inputs, drive the cognitive process along" (Clark, 2008, p. 131). Building on this idea, Colombetti and Roberts suggest that the *strength* of such couplings depends on the extent to which their feedback loops are specifically designed, or selected and maintained, for particular purposes over time. As they put it, this kind of "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" (2015, p. 1247, my italics).

In much the same way, Krueger and Szanto (2016) maintain that coupling plays a key role in explaining how agents incorporate material and social resources to realize otherwise unattainable affective functions. Specifically, they utilize Wilson's (2010) notion of *functionally integrated*, *gainful systems* (FIGs) to spell out the conditions and implications of extension. Altogether, the processes involved in FIGs are:

> (1) *coupled*, in that they are linked by reliable causal connections; (2) *integrated*, in that they are mutually-influencing and working together as one; and (3) *functionally gainful*, in that these processes together realize novel functions they can't realize separately. (Krueger & Szanto, 2016, pp. 7–8.)

Krueger and Szanto (2016, p. 867) cite music-making as a prime example of a FIG – and hence of an extended emotional episode. They describe how practicing an instrument entails an ongoing process of emotional self-stimulation that involves (at least) the expressive, regulatory, and bodily components of emotion. Playing the music simultaneously triggers and

regulates the musician's emotional experience, which in turn influences what they play next, and so on in a tightly coupled, self-stimulating loop of give-and-take. The ongoing process of active integration also seeds functional gain, enabling the musician "to realize emotional experiences with a particular intensity, depth, and diachronic character" (p. 867). This, Krueger and Szanto conclude, is possible only when the musician is part of the materially extended musical feedback loop.

At this point, one might object to the componential approach by noting that the extension of a single component underlying affective phenomenon *Q* does not suffice for the extension of *Q* itself. In this case, only the specified component extends, nothing more, nothing less. To counter this challenge, it is worth re-asking: What, essentially, does it mean for a mental state or process to extend? Extension occurs when the *supervenience base* of the given state or process – its material substrate – comes to include an extrabodily part of the world. And to explain precisely how this happens, it is necessary to anatomize in detail what that supervenience base consists of. Having done this, we can specify *how* and *through which* of its components the base has, *as a unified operational whole*, come to incorporate an external element. It is crucial to recognize here that the components of different types of affective phenomena can only be isolated for analytical and conceptual purposes. In reality, they form an integrated unity – a dynamical system – where a change in one component entails a change in the entire systemic structure, of which the said component is part (dynamical systems theory will be discussed in more detail in Part 3).

This kind of componential argumentative strategy, which foregrounds the *systemic unity* of the supervenience base, has not been fully developed in the extended affectivity literature. Instead, the explanatory emphasis has mainly been on the extension of *particular* components – without specifying how this works to extend the affect as a whole. Carter et al. (2016), for example, assert straightforwardly: "[I]f a necessary ingredient of emotion is extended, then so is the emotion itself" (p. 205). They identify as one such ingredient the cognitive process of appraisal and argue that, if this kind of processing can extend into the world, "some emotions will supervene on cognitions that are themselves extended beyond brain and body" (p. 205).[1] On their view, then, the extension of an emotion is fully explainable in terms of its supervenience on just one extended (cognitive) component (see Colombetti & Roberts, 2015; Krueger & Szanto, 2016, for similar strategies). However, I find it misleading to overplay the extension of isolated components of an affect when, in fact, it is the entire supervenience base of that affect that comes to include, in its unified and integrated makeup, an external element *via* one of its constitutive components. It is therefore more appropriate to state that the affect is realized by a *unitary extended system* rather than any solitary extended component. And when this happens, it is merely shorthand to declare that the affect itself has extended.

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[1] Carter et al. suggest that other components of emotion, like action tendencies, might also be potential candidates for extension, "though it would be incumbent on such proposals to provide argument for why these non-cognitive elements count as metaphysically extended in the sense that cognitive processes are claimed to extend" (2016, p. 213, fn. 26).

With these specifications in mind, the tenets of 'functionally gainful extension via coupling' can now be rearticulated in componential-systemic terms as follows:

> (1) When inner state or process X is coupled, through CRC and feedback looping, with some external vehicle Y, an extended system, Z, is jointly constituted.
> (2) If X is a constitutive component of affective phenomenon A, and X is coupled with Y to form extended system Z, then A extends in virtue of Z (not X).
> (3) Moreover, if extended system Z realizes novel functions unattainable by X or Y separately, it becomes functionally gainful.

As will shortly be fleshed out, I build my argument for extended existential feeling on the stated tenets of componential-systemic coupling. And, although the criteria of glue and trust will recede from my analysis, parity (in the liberal sense introduced above) will continue to serve as its overarching principle. Importantly, as Colombetti and Roberts (2015, p. 1250fn) point out, the liberal view of parity is consistent with approaches that foreground *integration* and *complementarity* – rather than functional sameness – between inner and outer components in extended systems (see also Menary, 2010). In their words, it is "precisely the distinctively different powers and capabilities contributed by non-neural components" that make them suitable for extension (2015, p. 1250fn). This, of course, echoes Clark, who has likewise asserted that the parity principle does not require any deep similarity between inner and outer processes. Rather, it is meant to highlight the "sameness of opportunity, such that bioexternal elements *might* turn out to be parts of the machinery of cognition *even if* their contributions are unlike (perhaps deeply complementary to) those of the biological brain" (2008, p. 115).

But before moving on to existential feelings specifically, I want to briefly address one more point of concern for 'extended affectivity' in general. At bottom, the most pressing issues surrounding extended emotions, moods, and other affects stem from criticisms that have already featured in prior debate on extended mind and cognition. Particularly, in both the cognitive and affective domains, arguments for extension via coupling have been accused of committing the *coupling-constitution fallacy* – an alleged failure in reasoning that runs as follows:

> The fallacious pattern is to draw attention to cases, real or imagined, in which some object or process is coupled in some fashion to some cognitive agent. From this, one slides to the conclusion that the object or process constitutes part of the agent's cognitive apparatus or cognitive processing. (Adams & Aizawa, 2010, p. 68.)

This move is deemed erroneous because coupling relations are distinct from constitutive relations, or, as Adams and Aizawa encapsulate it, "the fact that object or process *X* is coupled to object or process *Y* does not entail that *X* is part of *Y*" (Adams & Aizawa, 2010, p. 68). What's more, committing the coupling-constitution fallacy arguably leads to an untenable situation where, ontologically speaking, our minds leak out into the world much too promiscuously.

Stephan and Walter (2020) suggest that proponents of extended affectivity are guilty of these very same mistakes (see also Stephan, Walter & Wilutzky, 2014). They identify Eve's diary-extended resentment as a prime example of the coupling-constitution fallacy and worry that seriously entertaining similar candidates for extension will only lead to "affective inflation, viz., to seeing (the partial constituents of) affective episodes virtually everywhere" (2020, p. 304). They also surmise that these problems arise from lack of genuinely cogent criteria for either cognitive or affective extension. That being so, Stephan and Walter recommend an ontologically more conservative view where affects often causally depend on – and become tightly coupled with – external resources but cannot be said to be constituted by them.

While I appreciate the concerns voiced by Stephan and Walter, I do think we have at our disposal sufficiently stringent criteria to repel the stated charges. The introduction of feedback loops, in particular, significantly tightens the criteria for extension and, by that token, serves to fend off accusations of the coupling-constitution fallacy and its unwelcome concomitant, affective inflation. Stephan and Walter, however, do not fully acknowledge the role of feedback loops in coupling and thus base their criticism on a somewhat deficient view of extension. (I return to this issue in Part 3, where I employ a more detailed account of CRC and non-linear feedback loops to argue for the extension of existential feelings.) Moreover, it appears that Stephan and Walter consider it a more or less foregone conclusion that satisfactory criteria for extension simply cannot be found, and that we should therefore focus our energies on more tractable questions regarding mind, cognition, and affectivity (2020, pp. 304–305). Contrary to this, I believe that diligent philosophical effort can and should still be exerted on the issue of extension. Continued investigation can open up new conceptual space and push the argumentation in unanticipated and productive directions, regardless of where one stands on the topic in advance.

2. Existential feelings

In what follows, I base my discussion of extended existential feelings solely on Matthew Ratcliffe's work on the topic, for the following reasons. First, having coined and extensively disseminated the term 'existential feeling', his is undeniably the standard view of the subject. Second, his account provides the most rigorous contemporary conceptualization of the phenomenon designated by that term – the outcome of over fifteen years of systematic development. To be sure, Ratcliffe's theory has also received criticism (see, e.g., Fernandez, 2014; Saarinen, 2018). My present aim is not, however, to critique Ratcliffe's account but rather to investigate whether existential feelings can extend *if* his view is adopted as the starting point.

In Ratcliffe's definition, "existential feelings are variants of a non-localized, felt sense of reality and belonging, something that all intentionally directed experiences and thoughts presuppose" (Ratcliffe, 2020, p. 251). Unlike emotions, existential feelings are not about specific objects in the world, nor are they directed towards one's surroundings more generally, as is arguably the case in moods. Instead, existential feelings provide an experiential backdrop against which

intentional attitudes become possible and intelligible in the first place. As Ratcliffe puts it, "when I have an emotional experience of *p*, perceive *q*, or think about *r*, I already *find myself in a world*, situated in a realm where it is possible to direct oneself towards entities, events, and situations in these and other ways" (p. 251). Another way of saying this is that "the feeling amounts to a kind of 'style' that is manifested in one's experiences, thoughts, and activities (or lack of activities), rather than a singular psychological entity that reveals itself in one or another way" (Ratcliffe, 2020, p. 218). In short, existential feelings are distinguishable from other affective phenomena in virtue of their *pre*-intentional, world-disclosing nature.

To elaborate, Ratcliffe suggests that existential feelings open up and shut down kinds of possibility and, by doing so, constitute varying *possibility spaces* (Ratcliffe, 2015, pp. 33–58).[2] On this construal, possibilities do not manifest as static abstractions or propositions for conscious reflection. Rather, to inhabit a possibility space is to be "immersed in an all-encompassing pattern of anticipation and fulfilment" where "access to kinds of possibility is itself integral to experience" (Ratcliffe, 2020, p. 257; 2015, p. 51). This means that 'possibility' is something that is continuously *felt* rather than "a non-phenomenological disposition" to have one or the other intentional attitude (Ratcliffe, 2015, p. 51). Through existential feeling, a sense of the possible is inextricably woven into ongoing experience, and, accordingly, "changes in the overall style of experience, in existential feeling, are shifts in the kinds of possibilities one is receptive to" (p. 51). This intertwinement becomes all the more clear when existential feelings undergo significant transformations, for instance in psychopathology or religious conversion. Extreme changes may even eliminate the possibility for certain *kinds* of states altogether. A profound depressive loss of hope, for example, does not cancel out however many previously held intentional hopes, it dissolves the possibility for hoping itself (p. 130).

Ratcliffe also argues that existential feelings are entirely bodily and non-conceptual (2015, pp. 59–64; 2020). The fact that existential feelings are *bodily* implies both (a) that they are constituted by corporeal states and processes and (b) that they have a distinct bodily phenomenology. To clarify the latter, Ratcliffe introduces a Husserl-derived distinction between *noematic* and *noetic* bodily feelings (2015, pp. 83–84). Noematic feelings are *of* the body or parts of the body, such as awareness of one's rapidly beating heart, and thus have the body as their intentional object. In noetic feelings, the body is in turn felt as *that through which* objects and states of affairs in the world are experienced. For example, deciphering a demanding philosophical treatise while fatigued can make the text feel infuriatingly impenetrable. Here, the *feeling body* is intentionally directed towards the world and discloses its objects in a certain evaluative light. However, as Ratcliffe repeatedly emphasizes, existential feeling is neither noematic nor noetic in character; it is not about the body or anything beyond its boundaries. Instead, it establishes a bodily backdrop for the two specified feelings, an "overall context in which we have intentional states with noetic and noematic aspects"

[2] This notion hinges on a distinction between *instances* of possibility and *kinds* of possibility (Ratcliffe, 2015, p. 51). For example, 'I fear that *q*' or 'I am afraid of *p*' are instances of a presupposed possibility of 'being threatened'. If one were incapable of experiencing things as threatening, one would not be able to experience this particular *q* or that given *p* as frightening.

(Ratcliffe 2012, p. 39; 2015, pp. 83–85). As it plays this phenomenological role, existential feeling is not typically felt *as* bodily or, for that matter, thematized in conscious awareness at all – it usually just "*is* the way in which one finds oneself in the world" (Ratcliffe, 2008, p. 129).

The *non-conceptuality* of existential feelings in turn indicates either (a) that they lack conceptual content but still incorporate non-conceptual content or (b) that they are devoid of content altogether. Ratcliffe hints at the latter when he says that an "existential feeling is a space of possibilities within which we experience, think, and act, as opposed to being an *experience* or *thought content*" (2010, p. 368, my italics). However, since it is clear enough that existential feelings (at the very least) exclude from their ontology "judgments or appraisals of *any* kind", I will stick with the more moderate premise of 'mere' conceptual absence (p. 368).[3]

Overall, Ratcliffe's characterization of existential feelings considerably constrains how we might go about arguing for their extension. The premise of non-conceptuality in particular rules out designating beliefs, judgments, and other propositional attitudes as components through which the supervenience base of existential feelings could extend. This is no trivial restriction considering the prominence of such cognitive-componential strategies in arguments for extended affectivity, especially emotions. For example, Colombetti and Roberts (2015) maintain that, along with bodily and phenomenal components, emotions typically comprise temporally structured cognitive appraisals of how one is faring in the world. Returning to the case of Eve, they argue that the occurrent act of writing down her resentment in a diary qualifies as an extended emotional episode because it simultaneously clarifies and constrains her emotion-specific judgment and also feeds back into her overall evaluative perspective (p. 1257). Whether or not this is a convincing case of extension is moot; the point is that argumentative strategies appealing to propositional cognitive components cannot be applied to existential feelings due to their fundamental non-conceptuality.

In effect, the categorization of existential feelings as non-conceptual bodily feelings compels us to adopt an exclusively body-oriented strategy. But this yields yet another challenge. Compared to his fine-grained analysis of the bodily *phenomenology* of existential feelings, Ratcliffe's discussion of their corporeal substrate – their *physiology* – is notably sketchier. To put this in componential terms, we have plenty of information about the phenomenal structure of existential feelings but very little about their underlying material components. In general, Ratcliffe suspects "that the body states involved in (…) existential feelings will be many and diverse" (2005, p. 50). Or, to put it slightly differently, "existential feelings are likely to have various different ingredients, which interact in all sorts of ways" to produce a unitary "body sense" (Ratcliffe, 2008, pp. 123–4; 2015, p. 61). Ratcliffe thus alludes to various corporeal

[3] Alternatively, we could opt for an account that *does* permit conceptuality, e.g., that of Slaby and Stephan (2012), which differentiates between levels of existential feeling based on their "conceptual impregnation". However, I will stick with Ratcliffe's account for the previously stated reasons.

processes, states, and dispositions that coalesce to realize existential feelings without giving any definitive description of what these physiological components are or how they operate together.

At first blush, the given approach might seem too vague to get an empirically viable investigation of extended existential feelings off the ground. To be sure, a *comprehensive* account of the ways in which external vehicles potentially integrate with the physiological ingredients of existential feelings would indeed require a much more detailed grasp of all the key ingredients and their mutual interactions. However, to argue *in principle* for the extension of existential feeling is a different prospect since it only requires (a) sufficiently precise identification of just *one* of its corporeal components and (b) a demonstrative case for *that* component's coupling with a part of the external world. This strategy is effective because, in the espoused componential-systemic view, target phenomenon Q extends if any component X_1, X_2, …, X_n comprising its supervenience base is properly integrated with an external vehicle (as per the previously specified criteria). In this scenario, the given component X serves as that through which the overall supervenience base of phenomenon Q comes to include an extrabodily part of the world, hence extending Q.

So, is there a corporeal component of existential feeling that can do the necessary 'extensive' work? I submit that there is – namely, the *sensorimotor know-how* embedded in body schematic processing. To break down what this means, a two-step clarification of the key concepts is in order. First, I refer to 'body schema' specifically as a "non-conscious system of processes that constantly regulate posture and movement – a system of motor-sensory capacities that function below the threshold of awareness, and without the necessity of perceptual monitoring" (Gallagher, 2005, p. 234). Physiologically, body schemata depend on proprioceptive, kinesthetic, vestibular, visual, and other afferent processes that register in centrally organized neural matrixes and issue in efferent motor control commands (p. 239). Moreover, body schematic processes do not occur independently from one's surroundings; rather, they "are what they are because moving bodies move through environments" (p. 239). Recently, Rucińska and Gallagher (2021) have suggested that body schematic processes not only "constrain perception by defining possible actions in specific environments" but also "influence judgment and decision making" and "inform 'image-schemas' that underlie metaphor use and abstract conceptual thought" (p. 8153). On this account, body schemata operate dynamically and sub-personally to organize not only our motor-kinesthetic sensibilities but our perceptions and thoughts as well. This is strikingly similar to the role existential feelings play in preconfiguring our overall 'standing' in the world.

Importantly for our ends, Ratcliffe also acknowledges this similarity – or "degree of correspondence" – between Gallagher's 'body schema' and his 'existential feeling' (2015, p. 62). He suggests that the main difference between the two is that, unlike body schemata, existential feelings are accessible to disciplined phenomenological reflection, even if we are usually oblivious to their experience-structuring role. This difference, Ratcliffe thinks, may ultimately be one of emphasis, since (on his view) Gallagher does not conclusively assert that

body schematic processes are "*irrevocably* out of phenomenological reach" (p. 62). In any case, Ratcliffe considers 'body schema' to harmonize with his theory of existential feelings:

> Gallagher's account of the body schema – which draws on a substantial body of empirical evidence for the inseparability of bodily orientation, bodily capacities and perceptual experience – can be construed as complementing and supporting my claim that a structured framework of bodily dispositions is *inseparable* from a sense of what the world has to offer. (2015, p. 62, my italics.)

I maintain that the confirmed connection between 'existential feeling' and 'body schema' can pave the way for an empirically informed scrutiny of extended existential feeling. That said, recognizing conceptual overlap doesn't quite suffice. Since the two are not the *same thing*, what we need is a clearer picture of their ontological relations. I therefore submit that there is a part-whole relation between body schema and existential feeling, where the former constitutes a core physiological component of the latter. The body schema is thus one of perhaps several (unspecified) components in the overall "structured framework of bodily dispositions" which, Ratcliffe tells us, is "inseparable from a sense of what the world has to offer", i.e., from existential feeling. This construal also fits in seamlessly with Ratcliffe's parallel observation that "our experience of the possible is *at least partly constituted* by kinaesthetic dispositions" (2015, p. 59, my italics).

The second clarificatory step is to establish, as per Rucińska & Gallagher (2021), that body schematic processes include *sensorimotor contingencies*. In general, the sensorimotor view "refers to facts about the body and the way the body is, such as the structure of our visual systems, which in turn define our possible perceptions and movements" (p. 8153). The notion of contingency in turn underscores the fact that our motor actions produce sensory changes in a rule-governed way (see O'Regan and Noë, 2001; Hurley & Noë, 2003; Noë, 2004). Since the different sensory modalities (vision, touch, etc.) depend on differing physical apparatuses, they are also "governed by different, rich and systematic patterns of dynamic interdependence between sensory stimulation and active movement" (Hurley & Noë, 2003, p. 146). For example,

> [w]hat characterizes the visual mode of sampling object properties are such facts as that the retinal image of an object only provides a view of the front of an object, and that when we move around it, parts appear and disappear from view; and that we can only apprehend an object from a definite distance, so that its retinal projection has a certain size that depends on distance. (O'Regan and Noë, 2001, p. 942.)

In sum, as part and parcel of body schemata, our implicit knowledge of contingencies amounts to a "kind of sensorimotor know-how" that not only defines our possible movements and perceptions but also regulates our experiential states (Rucińska and Gallagher, 2021, p. 8153; O'Regan & Noë, p. 1013).

I argue that this bodily know-how and the way in which it organizes perceptual and motor experience is *integral* to existential feeling. This view finds support in Ratcliffe, who, to reiterate, asserts that "when I perceive *q* (…) I already *find myself in a world* (…) where it is possible to direct oneself towards entities, events, and situations in these and other ways" (2020, p. 251). To illuminate the perceptual implications of existential feeling, Ratcliffe asks us to consider, for example, a "world in which everything appeared bereft of its usual tangibility" and notes how this would amount to "a world where everything appeared distant, 'not quite there'" (p. 253). Moreover, to specify further the various types of possibility constituted by existential feeling, he distinguishes between "a sense of *being able to do something* and a sense of its mattering" (p. 253, my italics). This highlights the fact that, besides establishing a space of perceptual possibility, the sensorimotor know-how inherent in existential feeling also outlines a space of *potential action*. Overall, then, existential feelings can be regarded as pre-intentionally structuring not only feeling and thinking but also – via one's bodily grasp of sensorimotor contingencies – perception and movement.[4] Going forward, I emphasize the latter two aspects of the possibility space disclosed by existential feeling, especially as they manifest in sensory substitution.

However, before moving on to these matters, there is a potential worry about the prospect of extending existential feeling that needs to be dispelled. Given that the feeling is presented as a world-involving phenomenon to begin with, is it not conceptually redundant to ask whether it can then extend into the world? In other words, the concern is that Ratcliffe's account may, in its very essence, be unamenable to analysis in terms of extension. At bottom, I believe this question arises from a broader debate about naturalized phenomenology, which suggests "that the phenomena it studies are part of nature and (…) therefore also open to empirical investigation" (Gallagher & Zahavi, 2008, p. 30). Although I cannot delve deeper into this contentious issue here, it should be clear that I consider a naturalized account of existential feeling to be both justifiable and pursuit worthy. I also believe that this approach can, in the following manner, help to dissolve the worry about conceptual redundancy.

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[4] A reviewer suggests that changes in sensorimotor know-how do not always amount to changes in existential feeling, for instance when one adjusts to weakening short-range vision by holding texts further from one's eyes. To be clear, if sensorimotor processing is, as I have argued, a core component of existential feeling, then any change in that component will *necessarily* be a change in the overall material substrate of the ongoing existential feeling. Whether or not – and the extent to which – this change is reflected in experience is a separate issue. Even so, one could argue that diminishing vision and the accompanying changes in sensorimotor know-how are subtle experiential transformations in existential feeling too, particularly in the visual-perceptual and motor possibilities disclosed to the agent ("objects/texts held at a certain distance are categorically no longer clear or legible to me", "if I move such objects/texts away from myself they will become clear or legible"). Related to this, we could – as the reviewer points out – pursue a more detailed 'type-token' account of the possibilities established by existential feeling, but this is beyond the scope of the present study.

From a naturalizing perspective, it is critical to differentiate between phenomenological (or personal/experiential) and ontological (or sub-personal/material) levels of description. In this respect, Ratcliffe's account is unambiguous: his main aim is to analyze the experiential structure of existential feelings rather than their material underpinnings. This is evident, for example, in his monograph on depression, where the proposed "account of existential feeling is based solely on phenomenological considerations" and thus "does not imply any commitment regarding [its] neural correlates" (2015, p. 62fn).[5] Essentially, then, the claim that existential feelings are 'world-involving' should be understood as a *phenomenological* one: they show up experientially, to the extent that they do, as feelings that encompass self, other, and world. The fact that existential feelings 'involve the world' is *not*, in this context, a claim about their material substrate or inherent extendedness.

Even so, Ratcliffe leaves the door wide open to empirical investigation into the nature of existential feeling. For instance, he refers approvingly to a study by Gerrans and Scherer (2013) that discusses the compatibility of 'existential feeling' with 'multicomponential appraisal theories of emotion' and, in doing so, contemplates whether "dispositions to appraise in certain ways (where appraisal is understood in affective, non-propositional terms) are the non-phenomenological correlates of existential feelings" (2015, p. 62fn). Even more tellingly, he concludes that bringing together a "phenomenological-level account of existential feeling" with "interdisciplinary literature on the neurobiological bases of affective appraisal" points to a "fruitful interaction between the phenomenology and the science" (2015, p. 62fn). Hence, while Ratcliffe remains non-committal about the substrate of existential feelings, there is nothing in his overall account that conceptually precludes investigating their material make-up or potential extendedness. On the contrary, there appears to be an open invitation to do so. I thus pick up on this unresolved issue to further theorization on both existential feeling and extended affectivity. At first, I rely on Ratcliffe's phenomenological description of existential feelings and his scant speculation about their bodily ingredients, but from there I take the liberty to advance into new directions.

So, to recap, existential feelings are bodily feelings that establish a constant yet changeable background sense of possibility and reality and, as such, are neither unfelt dispositional states nor transient affective episodes. The premise of pre-intentionality entails that the emotional, cognitive, and indeed perceptual aspects of intentional experience are necessarily grounded in existential feeling. And, although existential feelings cannot be broken down into components as readily as, say, emotions can, they arguably comprise (at least) corporeal elements. If there is non-conceptual appraisal involved in existential feelings, it is also fundamentally bodily and should thus be identified as a corporeal component as well. In short, existential feelings comprise various interacting bodily processes and dispositions – or components – that can be

[5] Interestingly, though, in one of his earliest investigations into feelings of being, and prior to coining these as existential feelings, Ratcliffe (2002) attempts to bring together Heidegger's notion of world-disclosing moods (*Stimmung*) with Antonio Damasio's somatic marker hypothesis. He does not, however, pursue this empirical line of exploration in his later work on the topic.

scrutinized on different levels of physiological specificity. I have singled out body schematic sensorimotor know-how as one such component and suggested that its extension entails the extension of the supervenience base of existential feeling. In the next part, I demonstrate how this can happen through sensory substitution.

3. Sensory substitution, sensorimotor know-how, and extended existential feelings

The purpose of sensory substitution devices (SSDs) is to replace one sensory modality with another, for instance by converting into auditory stimuli the information usually delivered by visual perception. To argue for the extension of existential feelings, I will focus on SSDs that aim to replace vision with touch, i.e., Tactile Visual Sensory Substitution (TVSS) devices. Since their introduction in the late 1960s, the usability and efficacy of TVSS systems has improved immensely. In the prototype created by Paul Bach-y-Rita and his colleagues, a video camera mounted onto a dentist's chair delivered black-and-white imagery that was then converted into vibrations on a grid of pins attached to the chair's backrest. The blind or blindfolded subject sitting in the chair could thus feel the transduced visual information as a patterned sensation on their skin. (Bach-y-Rita, et al. 1969.) In a newer model called the BrainPort, the video camera is worn on the forehead and the grid of pins has been replaced by a 'lollipop' placed in the mouth (see, e.g., Bach-y-Rita & Kercel, 2003; Bach-y-Rita et al., 2005). More specifically, the device employs a tongue display unit (TDU) that transduces the camera's digital information into a pattern of low-voltage pulse trains, each of which corresponds to a pixel, and then conveys this information to the tongue through a flexible array of electrodes (Bach-y-Rita & Kercel, 2003, pp. 542–543). As the catchphrase goes, the BrainPort thus makes it possible to 'see with the tongue' (see, e.g., Twilley, 2017; Wicab, Inc. website).

Indeed, for many users, adapting to a TVSS device entails a peculiar shift in perceptual experience. Instead of experiencing the tactile stimuli as sensations on the back or the tongue, subjects begin to perceive them as features of the environment (for further discussion, see, e.g., Bach-y-Rita & Kercel, 2003; Hurley & Noë, 2003; Deroy & Auvray, 2015; Noordhof, 2018). As Bach-y-Rita reports:

> The subjective localization of the information obtained through the television camera is not on the skin; it is accurately located in the three-dimensional space in front of the camera, whether the skin stimulation matrix is placed on the back, on the abdomen, on the thigh, or changes from one of these body locations to another. (Bach-y-Rita, 1987, p. 69.)

When there is "no perception of stimulation at the site of the HMI [Human-Machine Interface]" (Bach-y-Rita et al., 2003, p. 542), it becomes *experientially transparent* and, as such, serves as *that through which* the subject is directed towards the world. In this situation, it is no longer necessary to consciously infer the contents of the transduced visual information from the sensations on one's skin. What instead becomes thematized in consciousness are the objects,

movements, and spatial relations conveyed by the camera. Simply put, subjects come to 'see' what is 'out there' through the sense of touch.

But *how* and *what* do subjects actually learn to perceive through TVSS devices? Training typically proceeds from simple to more demanding exercises, beginning, for example, with the identification of two-dimensional shapes and high-contrast symbols, then moving on to three-dimensional tasks involving scene topography and functional reach, and finally finishing with ambulation and advanced navigation (see Nau, et al., 2015). Proficiency in the latter is no mean feat considering it requires successful detection of optical flow (i.e., the motion pattern of objects, surfaces, and edges caused by both agentic and external movements). Overall, then, TVSS training aims to ensure that subjects can recognize objects and make perceptual judgments conforming to the principles of perspective, parallax, occlusion, and the like. At a more advanced level, subjects can also learn to coordinate their actions as if they were relying on visually obtained information about distance, movement, and depth (Bach-y-Rita & Kercel, 2003, p. 543; see also Macpherson, 2018, p. 7; Ptito et al., 2018, pp. 136–140). For instance, blind subjects using a TVSS device were able "to bat a ball as it rolled off a table at a point that had to be predicted" (Bach-y-Rita and Kercel, 2003, p. 543). This required identifying the rolling ball, estimating the time it would take for it to reach the edge of the table, and correctly timing one's movement to strike the ball.

The fact that TVSS enables goal-driven motor coordination in one's (changing) environment already hints at an integral connection between TVSS devices and body schematic sensorimotor contingencies, and hence between TVSS devices and existential feelings. To make this link fully explicit, two further explanatory steps need to be taken. The first step is to argue, along with Hurley and Noë (2003), that adapting to a TVSS device effects *significant changes* in one's sensorimotor know-how. Prior to TVSS, blind subjects do not possess practical knowledge about the ways in which motor actions intertwine with vision. They cannot, for example, appreciate how moving around an object brings its hidden parts into view or how moving closer will increase its tactile-visual size (Hurley & Noë, 2003, p. 144). However, after sufficient training, blind subjects can come to grasp at least *some* vision-specific sensorimotor contingencies. Based on this, Hurley and Noë suggest that:

> (S)eeing and TVSS-perception are similar *ways of exploring the environment*: they are governed by similar sensorimotor constraints, draw on similar sensorimotor skills, and are directed toward similar visual properties, including perspectivally available occlusion properties, such as apparent size and shape. These similarities go beyond just providing spatial information; they extend to the distinctively visual way in which dynamic sensorimotor interactions with the environment provide information to the TVSS-perceiver. (Hurley & Noë, 2003, pp. 144–145.)

Thus, despite falling short of normal sight, TVSS-perception seems to be vision-like in several key respects – a form of 'quasi-vision', as it were.[6] That said, there is no agreement in the research literature whether TVSS-perception is in fact closer to the substituted modality (vision) or the substituting modality (touch), or something else entirely (a new modality) (see Macpherson, 2018, for an overview). Indeed, some authors prefer to avoid terms like 'quasi-vision' and 'pseudo-vision' altogether. All things considered, I am sympathetic to Auvray and Myin's (2009) view that "experience after sensory substitution is a transformation, extension, or augmentation of our perceptual capacities, rather than being something equivalent or reducible to an already existing sensory modality" (p. 1038). Conceptualizing TVSS-perception as a transformed mode of perception does not, however, exclude the possibility that it also involves a grasp of *some* visual sensorimotor contingencies. Whatever the case, the crucial point here is that the newly acquired capacity to perceive via TVSS reorganizes the subject's bodily orientation to reality and opens up hitherto unavailable opportunities for skillful environmental interaction. As Kiverstein and Farina put it, "[w]hen the user has mastered the sensorimotor contingencies generated by the device, his sense of what he can do in the world is transformed" (2012, p. 39). Borrowing from Ratcliffe's terminology, we may thus conclude that an altogether novel space of perceptual and motor possibilities is disclosed to the TVSS-perceiver.

This brings us to the second step in linking TVSS devices and body schematic sensorimotor contingencies to existential feelings. Since sensorimotor know-how is a core component of existential feeling, the changes caused by TVSS in the former are also changes in the latter. That is, adaptation to a TVSS device brings about a shift in existential feeling, and this experiential transformation is explainable in terms of the device's effects on one's body schematic grasp of sensorimotor contingencies. However, as has become clear, this kind of causal linkage does not by itself entail that the TVSS device has become a genuine part of the existential feeling's supervenience base. What needs to be shown is that the device and the agent (in his or her body schematic sensorimotor capacity) form a functionally gainful system via continuous reciprocal causation (CRC) and self-stimulating feedback loops, as per the tenets of componential-systemic coupling introduced in Part 1. With that goal in mind, I will introduce a few further specifications to the concepts of coupling, loops, and CRC. In doing so, I rely on Palermos' (2014) dynamical systems account of cognitive extension. This account is especially useful in that it (a) provides stringent criteria for extension and thus tackles head-on the previously voiced concerns over coupling vs. constitution and cognitive/affective inflation, and (b) instructively discusses TVSS as a proper case of cognitive extension.

The dynamical systems account of extension can be condensed as follows (see Palermos, 2014, for full details). First of all, *dynamical systems* are "sets of interdependent elements, objects, entities, or items standing in interrelations on the basis of specific processes they take part in and give rise to, thereby forming a unified whole" (p. 29). Every dynamical system is distinguished by a set of *state variables*, i.e., the values of the changing aspects of the system,

[6] TVSS-perception does not, for example, deliver characteristically visual sensations like color or feelings of empty space, presence, or familiarity (see Deroy & Auvray, 2015; Dokic, 2018).

and a *dynamical law* that regulates the change of those variables across time. If the dynamical law of a system depends only on the values of the state variables and some set of *fixed* parameters across time, the system is *autonomous.* If, in turn, its dynamical law depends on the values of the state variables and the values of some set of *changing* parameters, the system is *nonautonomous*. A *coupled system* arises when two nonautonomous systems engage in *mutual interaction* (or CRC) so that, in technical terms, "the changing *parameters* of each system function as some of the *state variables* of the other, and vice versa" (p. 31).

In descriptions of *causally linear* relationships between two dynamic systems, the term *input* designates "the effects of the affecting system on the affected system", whereas *output* refers to "the affected system's reaction (…) to its *input*, but which (…) has no substantial direct effects on the affecting system's dynamics" (Palermos, 2014, p. 32). In linear relationships, then, the behavior of each system can be clearly distinguished from the other according to its inputs and outputs. The behavior of mutually coupled systems is, by contrast, essentially *non-linear*: they operate via *feedback loops* whose reciprocal causation is *simultaneous*. To paraphrase Palermos (p. 32fn), if systems S and O are mutually coupled, there is no 'linear story' to be told where, at time t_0, S is in state x_{S0}, which then makes O, at time t_1, enter state x_{O1}, which in turn, at time t_2, causes S to enter state x_{S2}, and so on. Instead, when "two *nonautonomous* systems mutually interact on the basis of feedback loops, there is an ongoing *causal amalgam* between the two units that disallows their decomposition into two separate systems on the basis of distinct *inputs* and *outputs*" (p. 33).

Systems coupled in this non-linear way can realize functional gain or, to put it in Palermos' terms, "give rise to behavior that goes beyond the sum of the behaviors the individual subsystems can produce on their own" (2014, p. 32). In this case, the functions, properties, or processes arising from mutual interaction are not attributable to either contributing system alone, but rather to the newly unified autonomous system *as a whole*. Importantly, on this account the individuation of systems does not depend on any previously fixed physical boundaries but rather "on the processes (and their properties) one is interested in, and which emerge out of component interactions" (p. 32). There is thus no reason to assume that systems cannot extend beyond skull and skin. Based on these considerations, Palermos concludes that ongoing mutual interdependence (or CRC) via simultaneous feedback looping is both a sufficient *and* necessary criterion for the constitution of extended cognitive systems.[7]

We are now in a better position to consider the extension of existential feelings in terms of coupled systems. Our concern here is with two specific systems, namely, body schematic sensorimotor know-how and sensory substitution devices. Therefore, let 'system A' designate

[7] It is not entirely clear whether Clark considers CRC and looping as merely sufficient (and not necessary) criteria for cognitive extension. In maintaining that they are both sufficient *and* necessary, Palermos significantly tightens the criteria for extension. Moreover, in his view, 'glue' and 'trust' are only *conducive practical conditions* for extension rather than necessary or sufficient criteria (2014, p. 34).

the agent in the specified body schematic capacity and 'system TVSS' the employed device. When the temporally changing parameters of A and TVSS come to function, through CRC, as some of the state variables of the other (and vice versa) in ongoing fashion, a coupled system is formed. Palermos rearticulates this mutual interaction in functional terms

> as a function *E* from the substitution system's *state variables* to the agent's *changing parameters* – such that it captures all the ways in which the substitution system can affect the agent – and a function *I* from the agent's *state variables* to the substitution system's *changing parameters* – such that it includes all the possible ways in which the agent may have an effect on his epistemic artifact. (Palermos, 2014, p. 31.)

In the loop that binds together A and TVSS, the agent's body schematic regulation of perception and movement affects the visual substitution system through *I*, which in turn simultaneously affects sensorimotor processing through the feedback received from the device, i.e., via *E*. Likewise, the visual substitution device's effects on the agent's sensorimotor processing via *E* are fed back through *I* to influence its own operation. As stated above, these mutual interdependencies cannot be broken down into inputs and outputs where, according to the 'linear story', system A being in state x_{A0} at time t_0 causes TVSS at time t_1 to enter state x_{TVSS1}, which in turn at time t_2 causes A to enter state x_{A2}, and so on. As Palermos emphasizes, "the differential equations (…) describing continuous time dynamical systems refer to infinitesimal differences (…) in time, and so, theoretically, $t_0=t_1$" (p. 32fn). Thus, it is more accurate to maintain that "system A's subsequent state x_{A2} depends both on TVSS's state x_{TVSS1} and its own state x_{A0} (which affects TVSS's state x_{TVSS1}) at time $t_0=t_1$, and so on" (p. 32fn).

Finally, it is evident that the coupled agent-plus-device system, ATVSS, can realize significant functional gain. The most notable systemic property to emerge is the capacity for 'quasi-vision', as described above. ATVSS does not merely affect *how* one perceives, it makes it *possible* for one to perceive in a hitherto unavailable way, namely, 'to see'. In terms of sensorimotor know-how, the key functional gain is instantiated in the agent's reconfigured bodily orientation and capacity for action, which, as the discussion of sensorimotor contingencies has shown, are inseparable from perception. Consider the following report from a blind subject who uses the BrainPort device when mountain climbing: "I can see the hold, I reach up, and I'm, like, 'Pow!' It's in space [indicating perception], and I just grabbed it in space [indicating action]. It sounds so simple when you have eyes, but that's a really cool feeling." (Twilley, 2017, my parenthetic additions.) The climber's sensorimotor possibility space has thus been transformed in a way that enables altogether novel ways of perceiving and interacting with the environment. Crucially, such emergent capacities cannot be attributed to A or TVSS alone, but only to the newly established system, ATVSS.

The argument for extended existential feeling through sensory substitution can now be spelled out in its entirety as follows:

Premise 1. Existential feeling extends if any of its component states or processes is coupled, through CRC and non-linear feedback looping, with an external vehicle, such that its supervenience base comes to include that vehicle as an integrated part (Part 1).

Premise 2. Body schematic know-how is a core component of existential feeling (Part 2).

Premise 3. Body schematic know-how can become coupled, through CRC and non-linear feedback looping, with a TVSS device (Part 3).

Conclusion. Existential feeling extends when the agent is coupled, through CRC and non-linear feedback looping, with a TVSS device.

Functional outcome. The coupled system ATVSS engenders perceptual, experiential, and interactional possibilities that are unrealizable by the agent's biologically constituted existential feeling alone.

To fully apprehend what the proposed extension entails, it is worth recalling that existential feelings establish a pre-intentional space of possibilities, or a background 'sense of what the world has to offer'. Arguing that existential feelings extend is therefore *not* equivalent to suggesting that any particular *intentional* states extend, be they cognitive, affective, or perceptual. What is claimed to extend is the bodily substrate that makes such intentional states possible and intelligible to begin with. In other words, when the coupled system ATVSS extends existential feeling, the sensory substitution device operates as part of the corporeal 'machinery' that pre-configures all intentional experience. Accordingly, the functional gains realized by ATVSS should be understood as gainful transformations in the agent's possibility space or, as Ratcliffe alternatively puts it, in one's "overall style of experience" (2015, p. 51). In sum, by restructuring and enhancing the agent's pre-intentional bodily capacities, ATVSS discloses a world where it is possible to experience and interact with the environment in previously unavailable ways.

As yet, TVSS devices do not allow prolonged use and therefore cannot be integrated as permanent fixtures of existential feeling. Thus, while existential feeling itself provides a constant backdrop to experience, its extension via TVSS and the resulting functional gains can only be episodic. Moreover, these temporary shifts are likely to vary in their *profundity* (see Ratcliffe, 2015, pp. 129–135) – that is, in the extent to which the possibility space disclosed by the ATVSS-extended existential feeling differs from that of the previous, non-extended one.[8]

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[8] Related to this, one reviewer brings up the possibility of extra-bodily elements becoming constitutive parts of one's sensorimotor know-how – and hence of one's existential feeling – without producing any notable shifts in said feeling. Undoubtedly, there is bound to be case-to-case variation in the extent to which ontological extension gives rise to changes on the phenomenological level. It is precisely the fact that system ATVSS tends to engender such

And even in relatively profound experiential shifts, there are likely to be individual differences in how satisfying the novel perceptual capacity is felt to be. Seeing as there are numerous other such personal factors and variations involved in sensory substitution (see, e.g., Arnold, et al., 2017), we should be careful not to overgeneralize from individual subjective reports of SSD use. Nevertheless, it is safe to say that when the ATVSS system is decoupled, the visually impaired subject returns to a world that presents distinctly different kinds of possibilities.

In closing, I want to land on a somewhat speculative note. The notion that SSDs can extend the mind is certainly not a novel one. While some have suggested that SSDs extend the agent's cognitive, bodily, and/or perceptual capacities (see, e.g., Clark, 2008; Gallagher & Zahavi, 2008; Auvray and Myin, 2009; Palermos, 2014; Favela et al., 2021), others have gone further to argue that, in such circumstances, *phenomenal consciousness* extends as well (see, e.g., Noë, 2009; Kiverstein & Farina, 2012; Telakivi, 2020; for a critique, see Wheeler, 2015a). In essence, the latter presupposes "the (sometimes) extended character of the physical machinery that enables us to be conscious – in a phenomenal-quality-endowed way – of worldly objects or states of affairs" (Wheeler, 2015a, p. 133). We may therefore ask: Does the extension of existential feeling via sensory substitution also entail the extension of affective consciousness? Seeing as the theoretical grounds for extended consciousness are less than solid and settled (see, e.g., Ward, 2012; Wheeler, 2015b), no simple or conclusive answer can be given here. I will thus comment on the matter briefly, and solely, from the componential-systemic perspective applied in my study.

As one might expect, in prevailing componential accounts the go-to strategy for discussing the possible extension of affective consciousness has been to isolate for closer inspection the affect's "phenomenal" (or "experiential", or "subjective feeling", or "qualitative") component, and to then consider whether this component can extend (see, e.g., Colombetti & Roberts, 2015, p. 1257; Krueger & Szanto, 2016, p. 866). Besides the risk of placing undue explanatory load on an isolated component (as discussed in Part 1), there is another potential concern lurking here. The worry is that, once we have established the supervenience base of affective *consciousness* as the target of our analysis, the notion of a phenomenal component may turn out to have little explanatory value. Why so?

Arguably, when terms like 'phenomenal', 'experiential', and the like are used in this context, they do not serve to delineate a state or process – i.e., a component – upon which affective consciousness conceivably *supervenes*, but simply state what is already presumed and in need of explanation, namely that the affect has a felt, qualitative character. In other words, to say that an affect includes a phenomenal component is just to say that that affect is consciously felt. If so, it is circular to argue that the consciously felt character of an affect supervenes on a phenomenal component which, in effect, stands in for the fact that the affect has a consciously felt character. Caution should therefore be exercised when using the notion of a phenomenal

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noteworthy experiential transformations that makes it an especially striking and interesting case of extended existential feeling.

component to investigate the extension of affective consciousness. If applied, it should clearly designate that part of an affect's supervenience base which presumedly *enables* its consciously felt character. Only on this conceptualization can an affect's phenomenal component serve the same realizing function as, e.g., its cognitive-evaluative and expressive-motor components do.

As things stand, however, the essence of any such component is a mystery. From a naturalistic perspective, we simply do not know which elements or processes realize phenomenal consciousness. This makes it extremely challenging to establish what the extension of affective consciousness actually entails. As Colombetti and Roberts put it, 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" (2015, p. 1258). That being 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" (p. 1258). The same uncertainty applies of course to existential feeling. Nevertheless, if we *do* presume that the unified supervenience base of existential feeling necessarily includes an (as yet) undetermined component *X* that enables the feeling to be consciously felt, it follows that, when the base extends (via, e.g., another component), then *X*, as a constitutive part of that whole, extends along with it. Simply put, if we adhere to the componential-systemic criteria of extension set forth in this study, we must be ready to grant that affective consciousness may extend, too.

Conclusion

In this article, I have argued on the sub-personal level of dynamical systems theory that a non-consciously operating bodily component of existential feeling can become mutually coupled with a sensory substitution device. When this happens, the unified supervenience base of the existential feeling comes to include an external part of the world. And that, in essence, is what it means for the feeling itself to extend. The benefits of my effort are threefold. First, in adding to existing arguments for extended emotions, moods, etc., the case for extended existential feelings has made the defense of extended affectivity more complete. Moreover, by endorsing stringent criteria for extension, my study has not only specified how and when existential feelings can extend but also alleviated the more general worry of 'seeing the partial constituents of affective episodes virtually everywhere' (Stephan and Walter, 2020). If the suggested criteria are applied scrupulously, I believe arguments for extended affectivity can successfully repel charges of committing the coupling-constitution fallacy and promoting affective inflation.

The second benefit of my study is that it further illuminates the material substrate of existential feelings. In this respect, it is not just an exercise in figuring out whether or not existential feelings can extend; it is also an investigation into their bodily ontology. This is an area of the theory that has been underexplored, owing perhaps to its primary usefulness and obvious success in analyzing the *phenomenological* structure of different kinds of experience. By

focusing on body schemata and sensorimotor contingencies, this study has shed a bit more light on the supervenience base of existential feelings.

Finally, the study encourages us to recognize and articulate more fully the existential import of sensory substitution systems. Over the past decades, research has revealed how SSDs can augment and arguably extend various bodily-perceptual capacities. For instance, the impact of TVSS devices on object recognition, movement detection, and coordinated action has been extensively examined and documented. However, considerably less has been said about the impact of SSDs on subjects' underlying sense of what is possible and real. I believe that further analyses of the 'world-disclosing' effects of SSDs can thus enrich our overall understanding of what sensory substitution amounts to and how it potentially influences subjects' overall sense of being 'here'.[9]

[9] I would sincerely like to thank the three reviewers of this article for their critical and valuable feedback. I would also like to thank the Experiential Demarcation Research Project and the Academy of Finland for their financial support.

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