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Temporal naturalism: reconciling the “4Ms” and points of view within a robust liberal naturalism¹

In the past generation, various philosophers have been concerned with the “placement problem” for naturalism. The problem has taken on the shorthand alliteration of the 4Ms, since Mind/Mentality, Meaning, Morality, and Modality/Mathematics are four important phenomena that are difficult to place within orthodox construals of naturalism, typified by physicalism and a methodological preference for ways of knowing associated with the natural sciences (Price 1997). Of course, it might be objected that looking for a precise physical location for the 4Ms is a clear case of a category mistake. Indeed, even if we were to succeed in this explanatory project, it would involve highly revisionary consequences for our standard ways of understanding these phenomena, perhaps such that we can no longer see the trees for the wood, *if* certain putative facts – whether mathematical, conceptual, ethical, modal – are explained away. Despite these kinds of concerns, however, some kind of placement within the scientific image is standardly thought to be required, short of a tacit commitment to non-naturalism with spooky properties, explanatory gaps, unexplained emergence, and the like. This work of “placement” generally involves efforts at reducing the 4Ms to properties or laws which are accepted within the

¹ Thanks to Pat Stokes and Cathy Legg for helping me to think about these issues, and to Talia Morag for organising a conference on Liberal Naturalism at Deakin University in 2017 where I got some terrific feedback on this paper, especially from Pat, Cathy, Talia, David Macarthur, Mario De Caro, and Dan Hutto. This essay has also benefitted from discussions with Ricky Sebold and Shaun Gallagher on related themes.

relevant sciences, and with inter-theoretic reduction between the sciences being the long-term aim. Whether or not all naturalistic explanations must be reductive in this way is contested, but views range from radical revisionary approaches that endorse something like an error theory about the 4Ms to more conservative approaches that seek to preserve their primacy².

In this paper I aim to improve on some of the middle-way options by highlighting the importance of temporality to this ostensibly forced choice between naturalism and the 4Ms, and then reframing the problem by advocating a temporal naturalism rather than the atemporal versions that remain the orthodoxy. In short, I argue in Section 1 that some of the major forms of scientific naturalism (e.g. physicalism) are standardly atemporal in outlook and in philosophical presuppositions. In Section 2, I establish that temporality is a fundamental condition for each of the 4Ms (drawing on insights from classical phenomenology), and thus we derive the intransigence of the dilemma, with the 4Ms a genuine stumbling block rather than merely a business-as-usual research agenda. It also helps to explain why any recourse to temporality will appear (to the scientific naturalist) as stipulatively instituting the difference between mind and world. Instead of accepting this construal, however, in Section 3 I outline a temporal naturalism that owes more to biology than to physics (and hence more to Peter Godfrey-Smith than Huw Price), where we also see temporally dependent “points of view” in incipient biological forms, and where the norms surrounding explanation are less nomological and reductive in orientation.

Section 1. Scientific naturalism and the placement problem

² We have been taught the efficacy (and reality) of the 4Ms since time immemorial, often with a religious heritage. I hope I am not committed to any substantive views about the necessity of how we ordinarily regard each of the 4Ms (which changes with time and culture), even while I aim to challenge eliminativism and reductionism about them.

Scientific naturalism standardly involves commitments to both ontological naturalism and methodological naturalism.

Ontological naturalism holds that the furniture of the world (or ‘reality’) is just those entities/processes/structures postulated by our best sciences, or principled extensions thereof. To quote a few exemplary remarks: “science is the measure of all things, of what is that it is, and of what is not that it is not” (Sellars 1963); “only *natural* objects, kinds, properties are real” (Schmitt 1995); “reality contains only the kinds of things that the hard sciences recognize” (Rosenberg 2014, 32). These formulations are not all strictly equivalent. There are differences between more theoretically oriented conceptions (i.e. physics) and more object-oriented versions of ontological naturalism. But once a philosopher defines what is meant by “natural objects”, such views are usually connected with objects posited by the natural sciences, with mathematical objects sometimes in and sometimes out, and fermions and bosons all the way down (Rosenberg 2014).

Methodological naturalism often accompanies the ontological claim. There are a variety of diverse positions available here, including the requirement of some kind of “results continuity” obtaining between science and philosophy, usually holding that where scientific and philosophical claims conflict it is the philosophical claims that give way to any mature science. Other methodological naturalists contend, more stridently, that our beliefs are ultimately only justifiable by the methods of science. As Michael Devitt puts it, “there is only one way of knowing, the empirical way that is the basis of science” (Devitt 1996, 2). Note that the “strong” versions of both ontological and methodological naturalism involve claims to exclusivity: *only* scientific theories approximate to the truth; the *only* entities that exist are those

posited or required by our best sciences. Whether or not naturalism requires exclusivity is debated, but any position that obviously flouts either of these commitments is liable to be said to be “spooky”, invoking entities or ways of knowing that are tacitly super-natural (for criticisms of this kind of naturalist “blackmail”, see Thompson 2007; De Caro and Macarthur 2010).

The conjunction of these ontological and methodological views, with some commitment to the exclusivity idea, is often called ‘scientific naturalism’³. For the scientific naturalist, the progress of science will eventually erode all ostensibly recalcitrant knowable phenomena, including the 4Ms, which are akin to coastal cities gradually being eroded by the ocean (Price 1997).

Note, however, that there is little about temporality in this picture. While phylogenetic and genealogical accounts will be offered for each of the 4Ms by the naturalist, physics poses particular challenges to any phenomenological or ordinary conception of time. And it is physics that sets the agenda for the naturalist, given the influence of physicalism, which conceives of physics as constituting the fundamentals of our world⁴. Partly due to the influence of special relativity, for much of the current naturalist orthodoxy there is no in principle difference between the past and the future, and the ‘now’ or living-present is deprived of any special significance, dependent on a conception of simultaneity undermined by Special and General Relativity. While relativity theory on its own makes time (objectively) a property of

³ These claims are usually taken together as a package deal to address worries concerning the “pessimistic meta-induction” about the history of science. The meta-induction rightly holds that the theories and entities posited by our best sciences have changed significantly over history and are very likely to continue to do so, so the addition of something about the reliability and truth-tracking credentials of the scientific method is needed to render plausible efforts at deriving an ontology from our best sciences.

⁴ As a reviewer has pointed out, some scientific naturalists are not reductionist ‘within’ the natural sciences, instead claiming that it is the natural sciences as a whole, rather than physics specifically, that defines our ontology and methodology. Although positions like these are not always especially liberal on the surface, I think that once this move is made away from an atemporal naturalism indebted to physicalism, the position is liable to be less dismissive regarding the 4Ms and more able to countenance a biologically-inspired position like the one I outline in Section 3.

frames of reference, hence standpoints, and therefore might seem to challenge any idea of objective or absolute time, Einstein's theory has been complemented by developments in quantum mechanics and by Minkowski's conception of a single space-time block. This has led to the idea (accepted by most analytic philosophers of science and theoretical physicists) that rather than time and space being separable we need to think of a single space-time continuum (or block) with four dimensions, of which time is a one-dimensional subspace. The basic laws concerning quantum mechanics (e.g. field theory and general relativity) are held to be fundamentally time symmetric, thereby raising the question whether the so-called arrow of time is real (see Price 1996; Callender 2017), along with the sorts of asymmetries regarding the past and the future that might appear basic. As a consequence, philosophical views like eternalism gives us the block-universe and space-time with four dimensions, with no indexicals required, and the rival growing universe theory is also meant to be able to be analyzed in non-temporal terms, referring to an objective sequence of events, before and after, but with no reference to past, present, and future (and they are thus aligned with J. M. McTaggart's "B series").⁵ On both of these views, the possible configurations of a system do not evolve but simply are, and on this mathematized rendering time is inessential to the laws of physics. While these views are occasionally contested (Smolin 2013), and sometimes due to recent findings with regard to quantum gravity and the persistence of *some* temporal asymmetries in physics (e.g. in thermodynamics), they exert a significant normative force on potential research programs in philosophy that are naturalist in orientation. Indeed, while Sir

⁵ Despite his criticisms of metaphysical realism and the God's Eye view, Putnam's earlier work presents as a paradigmatic case of scientific naturalism: "the problem of the reality and determinateness of future events is now solved. Moreover, it is solved by physics and not philosophy... Indeed, I do not believe that there are any longer any philosophical problems about Time; there is only the physical problem of determining the exact physical geometry of the four-dimensional continuum that we inhabit" (Putnam 1967, quoted in Smolin 2013, 63). Putnam did, however, become a liberal naturalist later in his career (see, e.g. 2016).

Arthur Eddington's two tables evocatively presents a stark contrast between the manifest understanding of tables and a scientific one, the gap between these images is arguably nowhere as pronounced as in regard to time⁶.

While considerations to do with the 4Ms are rarely quite as blithe about the manifest view of temporality as the philo-physicist might be, the naturalist still aims to reduce the first-person perspective, intentionality, normativity, etc., to ways of knowing, and the theories/entities/processes, that are required by our best sciences. Can this be done? Without offering any strictly a priori rejection of what is at least partly an empirical question, as conceived the 4Ms are a *very* hard problem (or set of problems), to borrow from David Chalmers' claims regarding consciousness and qualia. If I am right in linking each of the 4Ms to temporality in the next section, and in ascribing to strong naturalism a default atemporality, then these fundamentally temporal aspects of experience will need to be understood (for the orthodox naturalist) via a non-temporal metaphysics and reduction to properties that are not intrinsically temporal, yet efforts to do this are generally promissory (e.g. Paul 2010).⁷

But this does not vindicate non-naturalism. To argue convincingly that the 4Ms are somehow placed in nature differently, it is not sufficient to have recourse to ordinary language, or to just declare that this is so and thereby assume that philosophy and science are radically different in kind. Rather, we need an argument about why it is plausible to think the 4Ms are different or special, without begging the question and assuming non-naturalism, and this means we will inevitably not just describe but also

⁶ Our phenomenological experiences of time are rather more complex than our engagement with a table. After all, no object is directly presented or given to consciousness in the case of time: although we can attend to features of temporal experience, it is more often an enabling condition for other experiences (e.g. boredom when reading a philosophy paper, retaining prior melodic sounds and structures when listening to music). It is hence "transcendental" in a sense to be explored.

⁷ Despite other work that notes the importance of the indexical (e.g. her book, *Transformative Experiences*), for Paul these temporal features of our experience are real "for us", but not ontologically real (e.g. her argument draws on physics and considerations from theoretical virtues like parsimony). For her, they are more like our perception of movement when dots on a computer screen oscillate but nothing actually moves (Paul 2010).

explain. In what follows, I argue that temporality is pivotal to developing this middle-way in robust fashion, complicating some of the precepts of strong scientific naturalism and yet also enabling a weak naturalizing of some ostensibly non-naturalist positions deriving from phenomenology⁸.

Section 2. The 4Ms and Temporality

Phenomenological philosophers like Husserl, Heidegger and Merleau-Ponty have long associated temporality with core features of human experience, including mind/mentality, meaning, morality, and even with modality. In this section, my focus will be on what Merleau-Ponty calls the ‘taximeter’ time of the body, which Shaun Gallagher explicates as: “a temporal structure that is not captured by objective time. It is not enough to say that action takes time; there is a time in action, an intrinsic temporality or a temporal structure in action” (Gallagher 2012, 112). What Gallagher refers to as objective time may be clock-time or the physicist’s conception of a single space-time or “block” universe. It refers to any conception of time wherein the variability that is built into the relationship between a particular organism and their milieu is rendered metaphysically and epistemically irrelevant (i.e. as merely subjective, psychological, etc.). To understand this claim about intrinsic time and its alleged irreducibility to objective time, a palaeontologist might need to invoke objective temporal considerations pertaining to a rock, but they are external to the rock, and do not feed into a set of plans, habits, and actions wherein the duration and interaction with the environment is internally significant for the organism in question

⁸ Some versions of classical phenomenology did have temporality as instituting differences in kind between mind and world, between human and animal, etc., even if Francisco Varela, Shaun Gallagher and Evan Thompson have complicated this picture, while keeping the centrality of temporality for humans, organisms and beyond.

and required to understand their behavior. Whether this kind of dynamic temporal structure involved in our embodied point of view, and in agency and action, applies to animals and others biological precursors will be considered in section 3. For now my aim is to show that all of the 4Ms presuppose both this “intrinsic time” of agency and a past-future asymmetry, and to suggest that without these temporal dimensions we appear to lose the 4Ms: in other words, the ostensible reduction really becomes an elimination. Many of those entertaining reductionist programs about time within a naturalist perspective, and deferring to orthodox contemporary physics, appear to admit this, but are willing to embrace the consequent (for example, see Paul 2010, 334; Baron and Miller 2015).

2a) Mind, mentality, and “mineness”

“Mind” is one of the vaguest and most contested of philosophical ideas. It is often broken down into cognition on the one hand, and qualia or phenomenal consciousness on the other, the latter of which is taken to have a unity about it (Bayne 2010), at least for humans if not necessarily for octopi, given their multiple (largely) autonomous nervous systems and the difference that would be likely to make for their sentient experience (Carls-Diamante 2017). Indeed, it is arguable that both cognition and phenomenal consciousness presuppose the basic capacity to have an experience that is recognisable as one’s own, sometimes referred to as the “ownership” or “mineness” of experience, and some temporal structure appears important for this. This is because there needs to be real-time feedback from the environment an agent or organism is mobile within, as well as proprioceptive attunement (for vertebrates and some invertebrates) that enables pre-reflective awareness of where our limbs are situated in

the world at any given ‘now’. All of this depends on what Gallagher calls “intrinsic time” and it is also connected to the sense of agency that is often part of our conscious lives, whether in deliberative decision-making or in non-forced habitual activities wherein the agency is implicit.

This intrinsic time is difficult to directly characterise, but at the phenomenological level it does not appear to involve the experience of discrete instants. While any given “now” passes, it does not do so abruptly. Rather, it involves some retention of the past and anticipation of the future, whether or not we reflectively attend to this. We will consider Husserl’s account of this shortly, but even those individuals without explicit episodic memory retain the past through procedural memory, habits, and the like. There are various empirical ways of accounting for such experiences through neurological explanations that include proprioception and accounts of what it is that facilitates “integration” or “binding” in the brain, and hence the unity of much conscious experience. Such views, however, generally agree with the phenomenological claim that to apprehend an experience as mine requires some minimal unity and coherence of temporal experience to even be identifiable as an experience at all (cf. Clark 1997, Menary 2010).

This connection between temporality and mind/mentality has also been emphasised by all of the authors in the phenomenological tradition. Sometimes they have asserted their ostensible equivalence⁹, and temporal structures have often been argued to be a necessary condition for mind/mentality. Merleau-Ponty puts it perhaps most strongly when he argues in *Phenomenology of Perception* that: “it is through temporality that there can be ... ipseity, significance and reason” (2008, 426/487).

Without trying to explicate each of these claims yet, which bear on all of the 4Ms and

⁹ In early 1920s lectures Heidegger declared that “Dasein is time; time is Dasein”. There are related formulations in Merleau-Ponty’s *Phenomenology of Perception* concerning time and subjectivity.

will take some time to elaborate, let us begin with Husserl. In “Phenomenology of Internal Time-consciousness”, Husserl famously maintained that the experience of listening to a melody is at least somewhat integrated, no matter the genre of music and no matter whether we have heard this particular music before, and perhaps even whether we have heard music simpliciter (to entertain an auditory thought experiment a bit like Frank Jackson’s Mary and her visual experience of the colour red). Without being able to consider empiricist proposals in which this capacity to hear a melody as structured (rather than as just unrelated punctal notes) is built up through a series of genetic encounters¹⁰, it is helpful to consider Shaun Gallagher and Dan Zahavi’s summary of this phenomenological treatment of consciousness. As they put it:

Consciousness is not simply a passive reception of the present; it enacts the present, constituting its meaning in the shadow of what has just been experienced and in the light of what it anticipates... Nothing is an affordance for my enactive engagement if it is presented to me passively in a knife-edge present; that is, nothing would be afforded if there were only primal impressions, one after the other, without protentional anticipation, since I cannot enactively engage with the world if the world is not experienced as a set of possibilities, which, by definition, involves the not-yet. (Gallagher and Zahavi 2014, 95)

We will return to this idea of a world that is teeming with possibilities (the not-yet, the future) and affordances in the next section. For now, let us just note that Gallagher and Zahavi’s description of consciousness is alleged to be applicable in broad terms to all experiences. Our point of view or perspective is indexed to a ‘here’ and ‘now’, but

¹⁰ Husserl says they would presuppose the very same temporal structures rather than explaining them in non-temporal terms.

it is not a static now or instant: it opens onto a future, and in perception we also anticipate moving and making use of object we are perceiving. It pertains to any sort of basic experience and action, but it is also applicable at the level of more fully-fledged action, which involves a “for the sake of” and an “in order to” structure that is built into our behaviour, as Heidegger shows at length in *Being and Time*.

But this basic temporality is important even in the absence of any explicit reflection and any explicit temporal narratives (plans, memories, etc.). Consider, for example, some of the famous scenarios from analytic philosophy regarding the so-called “essential indexical”, whether involving the amnesiac, Rudolf Lingens, lost in the Stanford library (Perry 1979), or the shift involved in moving from a third to first-person perspective in which one transitions from seeing an unkempt person in a bus window in non-ideal lighting conditions to subsequently recognising (perhaps to one’s dismay) that they are that unkempt person (Baker 2012). As Baker puts it, in these examples there appears to be a “non-reducible distinction between “thinking of oneself as oneself* in the first-person and thinking of someone who happens to be oneself” (Baker 2012, 64). The asterix here denotes the ability to conceive of oneself as oneself, a conceptual ability which in her view is different in kind from animal agency. But what Baker, Perry and others do not adequately recognise is that experiences of this sort constitutively depend on a more basic temporality – that is, a ‘now’ that involves the retention of the past experience in the present, a temporal reflexivity, without which there could be no shame, pride, doubt, etc. This is the sort of basic structure that Gallagher and Zahavi have pointed to. Temporality has a

plausible claim to being a feature basic to anything to which we ascribe mind and mentality.¹¹

2b) Meaning and modality

It has been protested that strong forms of naturalism (i.e. scientific naturalism) evacuate the world of meaning. The concern is that in taking a God's eye view, or in attempting to explain the 4Ms without presupposing them, we lose the phenomenological dimension in which we are "thrown" into a socio-historical situation as Heidegger holds, or "condemned to meaning" as Merleau-Ponty puts a related point. By contrast, Heidegger and Merleau-Ponty contend that we are beings-in-the-world and emphasise a tight holistic structure between agent and meaningful environment. If we separate them out and untie the Gordian knot, we will have great difficulty putting it together again. In particular, they argue that we will fall short of explaining the phenomena in question if we proffer a strictly reductive or causal explanation that is non-temporal, or we will circularly presuppose this holistic temporal structure (and the 4Ms) to do so. Without emphasising time, this is also why more liberal naturalists like John McDowell disparage "disenchanted" or "bald" naturalism and describe it as nihilistic (2004), evacuating the world of meaning only to then endeavour to reconstruct it, as if they were not themselves of that world.¹²

¹¹ A more detailed account would show that specific kinds of experience have differing temporal structures, whether we have in mind emotions, beliefs, desires, hopes, regrets, nostalgia, etc., and it is the interplay between them that is important to reasoning, cognition, etc. Minimally put, we might just note the apparent indispensability of beliefs and desires to our lives (and to folk psychology), and note that they are temporally differentiated, with different directions of fit, and with desires in particular involving an "intrinsic temporal vector" (Altshuler 2009).

¹² "Meaning" as one of the 4Ms is also a placeholder referring to a narrower linguistic dimension of meaning regarding the intelligibility of noises and scribbles on the page: to invoke Quine, what establishes that the verbal utterance "gavagai" refers to rabbits, or undetached rabbit parts/stages, without the answer invoking any non-naturalist commitments? I cannot address this question here.

This challenge presents something akin to a forced dilemma, indeed one that effectively reverses the “blackmail” presented by atemporal naturalism (in Section 1). We will seek to mitigate both dilemmas in Section 3, where phenomenological claims about holism are complemented by some biological studies, but what else can we learn from phenomenological treatments of meaning? Without doing justice to this tradition here, phenomenological treatments of meaning emphasise the importance of embodiment and “mineness” to giving us a world with possibilities and affordances for our action. They also suggest that the temporal structures outlined above (e.g. in section 2a) are also pivotal. It appears plausible, for example, to claim that it is relative to the phenomenological ‘now’ that we have a past and a future, and that it is due to this temporal structure that our projects in the world have or lack meaning (in a manner that is usually negatively marked rather than involving any strict indifference). I cannot elaborate on the temporal dimensions of Kierkegaardian anxiety (*angest*) or Heideggerian *Angst* here¹³, but without the temporal structure outlined above (intrinsic time associated with “mineness”, a present that passes due to retention and protention, an orientation to the ‘not yet’ and possibility), agency and action appear to lose their point. With any “knife-edge present”, or a series of primal impressions alone, “meaning itself would dissipate” (Gallagher and Zahavi 2014, 95), or at least it would be very different in kind. This is because meaning derives at least partly from *both* agency and ownership of experiences, as necessary conditions. While the former is more obviously temporal (involving plans, memories, narratives)

¹³ For Heidegger, Dasein’s existence presupposes this temporal structure, but in the background, and we generally dwell in an inauthentic way. It is the experience of being-towards-death, defined as the awareness of our finitude in *Angst* that is important to shedding light on this structure which is usually only implicit. We can also push this analysis in the direction of psycho-pathology. For many of those suffering schizophrenia, severe depression, post-traumatic stress, the structure of temporal experience is itself subtly altered and comprehended by the sufferers as such (see Ratcliffe 2013; Zahavi and Parnas 2005).

it is the latter that grants us a temporally extended ‘now’ from which we can not only make plans but orient ourselves spatially and temporally at all.

From a phenomenological perspective, then, our basic sense of reality depends on modal distinctions like possibility that are temporally inflected and oriented to the “not yet” (Ratcliffe 2013). For Ratcliffe, our ability to distinguish between “is” and “is not” (which is basic to belief and to science) presupposes an understanding of the world as a richly structured cognitive and affective possibility space, the sort of holistic structure that Heidegger describes in his account of being-in-the-world. If this is correct, confronting a “world” has a few important conditions. Again, it depends on a dynamic “now” rather than a series of self-contained and concatenated instants. Drawing on Husserl, Ratcliffe argues it also depends on a tacit and pre-reflective awareness of a horizon of possibilities (which are practical rather than logical ones), which includes a perhaps inchoate apprehension of the temporal and modal distinctions pertaining to perceiving a cat, imagining a cat, remembering a cat, and anticipating being with one’s cat (Ratcliffe 2013). Some of this is quite sophisticated, of course, and able to be articulated only through language, but Ratcliffe’s claim is not that we must all be able to reflectively pick out such distinctions. Rather, they are operative in our experience, pre-reflectively, enabling that experience to have the features that it does. Without these features our experience (e.g. of meaning, and indeed of the very practice of science) could not be as it is (Ratcliffe 2013).

Again, this is a form of transcendental argument, although it is not strictly deductive and its plausibility depends on a range of theoretical assumptions and empirical findings (cf. Chase and Reynolds 2010). In particular, it seems to need to consider research in developmental psychology, taking care not to project sophisticated adult structures upon early neonate experience (see Gallagher 2005).

Ratcliffe himself appears to concede this, since the remainder of his paper (2013) focuses on studies of psychopathology. In the end, his argument appears to be that this phenomenological sense of reality, wherein the perception of possibilities in the mode of the “not yet” is understood as an intrinsic part of the structure of perception, is inferred to be the best framework for understanding both the phenomenological changes involved in psycho-pathology and the details of the relevant empirical studies. And whether or not this is a strictly phenomenological move, this seems appropriate. While there is a *prima facie* sense in which phenomenology stipulatively defines experience as meaningful, thus side-stepping the hard problem from a physicalist perspective, it also makes available a new explanatory agenda, which will be prosecuted in section 3 and does not start from a physicalist construal and bare atemporal nature. If the phenomenological solution affirms the primacy of our perceptual relation to the world in regard to linguistic meaning and propositional structures, arguments will need to be given for this, as well as claims like the following from Merleau-Ponty: “There is an autochthonous significance of the world which is constituted in the dealings which our incarnate existence has with it, and which provides the ground of every deliberate *Sinngebung*” (Merleau-Ponty 2008, 512). On this view, language is not basic to all meaning, nor rules and representations that might be algorithmically or linguistically encoded. But findings from biology and developmental psychology are relevant to such a view (potentially supporting or placing it under pressure), especially in the dialogic context of giving and asking for reasons, since the body is the basic source of meaning on this kind of view and just assuming it is tantamount to non-naturalism or vitalism. Note that it is not any physical object, however, but a body that instantiates a point of view, and has something like “intrinsic time” in regard to its coupling with its environment, unlike

say an object that does not interact with its environment dynamically and symbiotically (e.g. my pen) and is temporally aware to some minimal extent, even if unable to thematically attend to this¹⁴. Temporality is the difference maker here, but we will see that it is more a matter of degrees rather than in kind and thus not necessarily naturalistically suspect (pace Kornblith 2011).

2c) Morality and Time

Morality (or social normativity) is often cited as one of the most significant obstacles for naturalism. Scientific naturalists who adhere to strong formulations of ontological and methodological naturalism seek to explain morality via non-moral terms, usually via a genetic and evolutionary story that (allegedly) does not assume morality and normativity from the outset. These naturalist commitments render morality very difficult to place (and perhaps even as illusory), given the distinction between facts and values, the 'is' and the 'ought'. It is for this reason that Putnam says naturalism has a horror of the normative (2004, 70). And yet there is surely also something importantly right about this trajectory. Social norms and morality do not appear to be some basic fact of an unchanging human nature, divined from God like manna from heaven; or, if they were so given, they were bound up with a very complex developmental story, evidenced by anthropology as much as biology, and with significant cultural variability. *If* any religious (or transcendental) story about

¹⁴ Indeed, this connection between embodiment and temporality also sheds new light upon Hubert Dreyfus' famous critique of the ambitions of classical artificial intelligence (1972), which in essence is about the frame problem and the prospect of a machine encountering a non-meaningful (i.e. context free) environment and being able to flexibly navigate it in real-time. This problem has not been solved by computationalist approaches and advances in robotics. The body and its intrinsic time appear to present the central stumbling block here, preventing an infinite regress, grounding a 'now' and establishing a practical orientation within an environment that is able to sort relevant from non-relevant considerations.

necessary and universal features of morality contradicts this picture it should arguably be treated with some suspicion, notwithstanding that any simple debunking account will also confront the danger of the naturalistic fallacy and the Kantian separation of the *quid juris/quid facti* questions. In this section of the paper, however, I aim to show the indispensable role of temporality to morality, and in the subsequent section I consider how this might work biologically and developmentally, without morality being rendered somehow occult and inexplicable.

What then is the connection between temporality and morality? First, key features of moral experience such as egocentric concern, fearful anticipation (e.g. dread or anxiety), as well as emotions like regret, depend upon an irreducible ‘nowness’ of experience (see Stokes 2015). In related vein, Richard Moran contends that there is a “temporal dimension to the moral meaning of various attitudes that is difficult, perhaps impossible, to capture in the terms of criticism developed for the evaluation of beliefs as true or false, justified or unjustified” (Moran 2005, 180). But it is not just specific moral emotions and attitudes that are temporally saturated, as it were. It is also various value judgments that we make, *en masse*, which appear to be *intrinsically* temporally indexical. Almost all of us, for example, care more about pain *tomorrow* than about pain – even *more* pain – that occurred *yesterday*, to invoke Parfit’s famous scenarios from *Reasons and Persons* (cf. also Stokes 2017). This time-asymmetry appears central to many basic judgments we make. It is not merely prudential, but also pertains to our judgments about other people we care about. We also generally want to get better as people (and philosophers) over time, rather than worse. We praise and blame others on the expectation that they could have done otherwise, that there is the possibility of personal change, atonement, responsibility. Without being able to think about the problem of free-will in any detail here, these

sorts of judgment are broadly aligned with Gallagher's claims concerning intrinsic temporality at the pre-judicative and embodied level, in that there is a temporal asymmetry in both cases.

These two sorts of "intrinsic time" can be in tension with one another. We might, for example, be depressed, or suffering schizophrenia, in which case this rich temporal possibility space will be attenuated, often involving a foreshortening or constriction of the future, say, or a repetition of the past (but cf. Ratcliffe 2013; Ratcliffe 2015; Parnas and Zahavi 2005). Much more pervasively, however, it is the relationship *between* the intrinsic time of the minimal self (e.g. the now) and the temporal judgments that we might make at the level of the narrative self, which is central to moral experience yet inexplicable from a view from nowhere (and nowhen). Indeed, this is also roughly the objection that Marya Schechtman and Patrick Stokes (amongst others) raise against Galen Strawson's picture of a time-slice 'me', which denies the metaphysical existence of any narratively extended self. In short, they argue that Strawson's individual could not have the kind of morally-rich experience they purport to have, without experiencing themselves as temporally-extended (Stokes 2010; Schechtman 2007). Their view is analogous to the claims about meaning that we saw above, but specifically in regard to moral experience or moral meaning. Again, it has something like the form of a transcendental argument. We have this or that experience (of our moral lives in which we are both persons who endure over time within a social narrative and selves who are not reducible to such narratives), and these experiences are alleged to be impossible on certain views (Strawson's) of consciousness and personal identity.

In this respect, it is also worth briefly considering utilitarianism and other atemporal and "objective" views of value. These views have a long-acknowledged

problem about how we integrate our investment in the “now”, and our asymmetrical investment in the future rather than the past, with any aggregative account of value or the good. It is because of this “split” that these moral theories are sometimes charged with being “self-effacing” or even “schizophrenic” (Stocker 1998), with naturalistic meta-ethics treating this as a problem to be overcome. But even if we do not invoke an atemporal and objective account of ‘the good’, and then seek to explain or reduce our subjective preferences to that objective value, the contrast between *selves* who are attached to a “now” and *persons* that persist over time appears a constitutive feature of morality. Without these dual temporal perspectives, morality as we know and experience it, especially when we are indeed “split” concerning what is the right action and needing guidance, appears impossible. For the creature only concerned with aggregative good rather than the ‘now’, we either encounter the problem of motivation and Stockerian “schizophrenia” or they seem somehow more or less than human, perhaps akin to Parfit’s imagined “Timeless” protagonist, unbiased and without asymmetrical temporal preferences. For the creature with only a moral orientation in regard to the “now”, punishment and vengeance may enable some basic or proto-normativity, but it would be constrained by a fairly immediate stimulus and direct response, perhaps based on sympathy, anger, and other relatively simple emotions.

Of course, the scientific naturalist about morality may well be an error theorist (like J. L. Mackie or Richard Joyce) and protest that insofar as we have such an irremediably normative perspective, that perspective is in error: nothing in the world, understood from a view from nowhen, or thought of as a totality of facts, corresponds to what Mackie calls the “queer” objects of morality. We might seek to challenge this

metaphysics directly¹⁵, but for now we can remain on the conceptual terrain: if a moral theory is meant to be prescriptive or have any revisionist consequences for how we decide to conduct our lives, it would also seem to need to be temporally placed. It does not necessarily need to prioritise this over any attempt to consider objective or total good (or over a narrative interest in the totality of our lives), but it cannot ignore this relational aspect of morality on pain of changing the subject.

Section 3. Illiberal and Liberal Naturalisms: From Huw Price to Peter Godfrey-Smith

In what follows I will briefly consider the work of two philosophers who are closely associated with both liberal naturalism and pragmatism, Price and Godfrey-Smith. The aim will be to better understand how the foregoing account of temporality and the 4Ms can be naturalistically grounded within a robust liberal naturalism, but without temporality being occluded, as is the case for versions of scientific naturalism where theoretical physics has a primacy and motivates considerations concerning inter-theoretic reduction.

As well as introducing the very idea of the 4Ms, Price also criticizes the material orientation to many existing efforts at solving these placement problems. He labels such metaphysical work “object naturalism”, for which “the object of each kind of talk is an aspect of the world-as-studied-by-science, or else nothing at all” (Price 2011, 186). He instead proposes a “subject naturalism” in which, as he puts it, “science tells us that we humans are *natural creatures*, and if the claims and

¹⁵ Perhaps this might be done through an enactivist construal: after all we also cannot precisely locate affordances but on some construals such relational entities are explanatorily vital. In this vein, there is a cognitive science and process biological rejoinder to the metaphysics of the 4Ms, involving as they tacitly do, a timeless naturalism (cf. Smolin 2016, 361).

ambitions of philosophy conflict with this view, then philosophy needs to give way” (Price 2004, 73). We will come back to the issue of “natural creatures”, but Price’s “subject naturalism” endorses a version of methodological naturalism in which the sciences retain an epistemic priority in terms of both their practices and their results (experimental, mathematical, or otherwise), but the ontological construal of naturalism is considered to be problematic for resting on semantic assumptions about the relationship between human language use and the world (i.e. representationalism). For him, by contrast, the 4Ms and the placement problem in general should be understood as one governing human language use, hence allowing him to endorse a kind of deflationary naturalism (Price 2004, 76). While the challenge to any default representationalism is well made, reasonable doubts might be raised against any programmatic linguistic resolution of philosophical problems in this way (cf. Jackson 1997), and it is arguable that any “subject naturalism” worthy of the name will need to refer to the “given” and experience, rather than treat both in the manner of Quine’s semantic ascent¹⁶. That argument needs to be developed in future work, but it involves understanding pragmatism as first and foremost about coping with a world, with the use and significance of concepts and symbols understood in that light (Westphal 2003; Legg 2005; see also Rosenthal 1996).

Despite his own avowed liberal naturalism, Price is not always so liberal, as might be guessed from his background in philosophy of physics¹⁷. There is an animating view from “nowhen”, announced in the title of chapter 1 of *Time’s Arrow and Archimedes’ Point*, in which Price aims to free us from the subjective and anthropocentric distortions induced by temporality. To see this, consider the

¹⁶ Of course, in invoking the “given” here I acknowledge that an engagement with Sellars and his critique of this “myth” is also required. Carl Sachs’ work provides a useful starting place for thinking this through (2014).

¹⁷ David Macarthur (2010) makes this point in regard to Price’s treatment of the social sciences.

following remark from an unpublished paper where Price offers an “argument from variability” that sits uneasily with the “natural creatures” dimension of his subject naturalism that we considered above:

Variability – the fact that *physics seems to allow that there could be creatures elsewhere with the opposite temporal orientation* (and to provide no sense in which their viewpoint is any worse than ours). The reason the hypothesis *seems* surprising is that the features of our temporal outlook it treats as merely perspectival are very deeply ingrained. We don’t find it easy to think of them as anything less than fully objective, and it isn’t obvious where else the contagion will spread, when we attempt to do so – and what else will get caught in the indexical net (my italics, Price 2007, 6).

Price acknowledges that time has a special role in the indexical net, including both ordinary modal and causal thinking as we concluded in the previous section and as he develops in *Time’s Arrow*. He does not explicitly connect the 4Ms and time but might agree with the connection we have established, while taking it to be akin to a user-illusion. On the question of the perspectival and variability of temporal experience we also largely agree. There is clearly socio-cultural variability in humans as well as variability between species. This is to be expected if we are to take seriously what Merleau-Ponty calls the taximeter time of embodiment, and if there is something about these anticipatory temporal engagements with our environment that cannot be captured by any strictly external or objective time, as Gallagher holds (2012)¹⁸. But the question is just how radical might this variability be, and what sciences should we

¹⁸ There is even, perhaps, sufficient diversity and variability to agree with Jakob von Uexküll, who maintained that: “Every animal is surrounded by different things, the dog is surrounded by dog things and the dragonfly is surrounded by dragonfly things. Every *Umwelt* has its own spatio- and temporal dimensions” (von Uexkull 1937, 117). An environment like this has meaning and value for the organism in question: animals too are “thrown” to invoke Heidegger, and they do not occupy brute physicality. Rather, “living beings shape the world into meaningful domains of interaction and thereby bring forth their own environments of significance and valence” (Thompson 2007, 154).

consider to justify this claim? Price does not consider in detail relevant empirical sciences such as anthropology, comparative psychology, cognitive neuroscience, and evolutionary theory (Sachs, forthcoming). Perhaps because of that, he is able to countenance a variability of such radicality that it includes creatures with reverse temporal orientation, without the asymmetry of agency, and without a past-future asymmetry in which the past affects the future but the future does not affect the past. It is hard to think, however, how this might be selected for. Are these *non-natural creatures*, contra Price's own subject naturalist motto? Indeed, whatever we might think about downward causation and other considerations from theoretical physics, this is a strong conclusion to draw and one in which the gap between "object naturalism" and naturalism regarding our best scientific *theories*, briefly averted to in section 1, is apparent. Price criticises the former, but in endorsing the primacy of theoretical physics he ultimately arrives at a rupture between the scientific and the manifest images that is akin to the scientific rather than the liberal naturalist.

Arguably, however, we also need to think about the second law of thermodynamics and entropy. A glass of water will move towards temperature equilibrium within its environment. A pebble in a pond causes ripples that spread outwards, both of which apparently exhibit time asymmetry. Price and others suggest that subjective biases condition our apprehension of such phenomena, but given that time asymmetry is still to be found in physics on Price's own view, that a more radical temporal turn in physics is a live option (Smolin 2013), and that temporality is pervasive in biological considerations as well as human level ones, it is not clear that we should be quite so quick to accept the user-illusion view of temporal experience. Evolution itself is a temporal process, and we can meaningfully ask about the evolution of the laws of nature and physics themselves (Smolin 2016). Likewise, is it

a coincidence that animals and organisms that have evolved in time will have basic processes wherein there is an asymmetry between past and future, for example? Might we really entertain Price's radical temporal reversal, because it is allegedly possible within the framework of some of our best theories of physics? Perhaps, but this appears to be an argument from conceivability dressed up in respectable form via physics.

Against this picture, it is useful to consider the philosophy of biology of Godfrey-Smith and some enactivist treatments of "mind in life" (e.g. Thompson 2007). Godfrey-Smith's developmental story about the biological individual motivates the idea that (almost) all living forms have a basic temporality to them that preserves at least some of the asymmetries in question. Firstly, metabolism is a form of dynamic renewal that is basic to almost all living forms, including cellular life (but not viral life), and required to establish developmental continuity of an individual through material change within a thermodynamically open system (Thompson 2007, 152). Indeed, cells need to extract resources from their environment and expel material. If they do not, or if they are static, they die. There is a basic time asymmetry that is presupposed here in the way in which organisms change their self-organisation in response to the environment. Indeed, with animals that have sensorimotor coordination, and a nervous system which links perception and action along with proprioceptive sense, there would appear to be structures closely akin to the "intrinsic time" that Gallagher discussed as facilitating our pre-reflective perception and action in the world. Things may be very different for an octopus, but there appears to be no organism or creature that lives by Price's argument from variability in its extreme form (e.g. temporal reversal). Again, this is probably not surprising. Adaptation implies responses to a changing environment, and although adaptation is not

something we are conscious of (taking thousands of years), and functions through selection more than through evolutionary feel, this adaptation and evolution is not just an external process that comes from outside upon the organism, but involves evolutionary niches, scaffolds, and, for the individual animals, it involves affordances for action, especially in regard to the so-called 4Fs: fighting, fleeing, feeding and fornicating. Here is the asymmetry of agency writ large. It remains open to the scientific naturalist to contend that this is the merely perspectival temporal net all the way down, but it appears to be less a user-illusion peculiar to humans than a key aspect of all living things in the only world we inhabit.

3a. Proto-cognition and points of view

If we have begun to appreciate the pervasiveness of incipient points of view and their asymmetrical temporal interaction with their environment, we have also begun to place in question atemporal naturalism. Thus far, however, we have said relatively little about the 4Ms proper, and it is precisely the inexplicability of them that the non-naturalist will hang their hat on, with nothing much yet to cause them to worry about any potential encroachment from science. After all, one would be hard-pressed ascribing morality or mentality to cells. Here I favour an incrementalist picture wherein there are “proto” versions of each of the 4Ms in various organisms, but especially animals of a certain sophistication, and in what follows we will consider cognition (e.g. mind/mentality) and morality as two key cases.

Without arguing that cognition can be found in bacteria (but cf. van Duijn, Keijzer, and Franken, 2006), or entertaining a version of panpsychism, there is good reason to reject the idea that cognition and consciousness are all or nothing,

something we have that other animals do not, or something that all animals have but which other organisms do not. Godfrey-Smith suggests we reserve the name “proto-cognitive” for organisms that are able to sense and respond to external events to keep themselves alive. Without presenting the full details of his account that examines various key evolutionary moments (encompassing cells, bodies, nervous systems, proprioception and beyond), even simple organisms have a sense of a point of view, moreso than a digital camera (Godfrey-Smith 2016, 491). As we saw earlier in Gallagher’s account of intrinsic time, they are not some sort of mechanism wherein environmental constraints might be conceived of as strictly external to the system (like say the camera or a rock), but they have focal points within their environment¹⁹ and are able to rebuild themselves and maintain themselves in existence in a stronger sense than is characteristic of lifeless physical objects. As Godfrey-Smith puts it, they are “bounded and self-maintaining systems, engaged in traffic with their environment, and sensing and responding to events in adaptive ways” (2016). Many organisms have ‘reafferent’ capacities that register the effects of their own actions on their senses, differentiated from movements of their body that have been caused externally. An internal perspective of some nascent sort is involved here, and as Godfrey-Smith puts it: “these mechanisms are subjectivity-relevant because they give the organism the beginning of an internal registration of the self/other divide” (2016, 792). There also appears to be some minimal temporal orientation in registering the effects of the organism’s own action and serving as the basis for future action.

For animals, cognition also involves sensorimotor coordination, which depends on some rudimentary temporal attunement. Particular skills or capacities are acquired in direct interaction with an environment, both for any given organism and

¹⁹ Like the birds that do not, in fact, migrate “as the crow flies”, in direct geometrical fashion. Rather, they too are oriented by key landmarks, whether roads, mountains or trees (Mann et al 2014).

over time through evolution. In both senses, there is continuous reciprocal causation (Clark 1997), with feed-back and feed-forward loops. Of course, the kind of minimal cognition that accompanies interaction with an environment is not self-consciousness or reflective consciousness. Whether or not we should speak of perception, memory and action across the animal kingdom is also debatable (cf. van Duijin et al). Perhaps it is mere behavior, rather than action, which on most understandings involves a sense of one's own contribution. It is arguable, however, that a sense of "mineness" or ownership is implicit in studies in animals that show the importance of self-initiated movement rather than simply movement per se for the visual perception of depth and basic paw-eye coordination for kittens (Held and Hein 1963; Noë 2004, 3). In short, the kittens appear to register the difference between movements they initiated and those they did not, with a resultant effect on how they perceive their world. As such, an opposition between the strict causality of animal behavior and our own free actions seems exaggerated. They suffer pain and they perceive (no doubt differently from us, especially with the octopus or the bat), but this is enough to place pressure on the idea that cognition and consciousness are all or nothing, and instead seek to develop a continuity rendering of such phenomena. Making this argument, however, as many naturalists will want to do, requires taking temporality seriously and in a way that complicates the human-animal dichotomy.

At the outset of this paper I suggested that temporality and the 4Ms were a really hard problem for scientific naturalism. But the difficulty of that problem partly derived from the attempt to fit together atemporal naturalism, with its methodological and ontological commitments, and a certain view of both perspectives (qualia) and of nature (bare nature, mechanisms, miniscule bosons). The hard problem of consciousness pertains to the severity of the gap between bare physical matter

(involving structure and dynamics) and qualia or points of view. And non-naturalists invoke this picture as much as scientific naturalists do. Thomas Nagel, for example, argues that “physical properties characterise the world as it is extended in space and time, not how things appear from any particular point of view”. But as Mark Rowlands has observed (2010, 168), Nagel moves from a recognition of the importance of subjective phenomena being connected to a single point of view to the claim that they are only accessible from one point of view and thus will be a mystery untouchable by any account of the physical operation of that organism (Nagel 1979, 172)²⁰. David Chalmers makes a related claim when he sets out the problem as follows:

First: physical descriptions of the world characterize the world in terms of structure and dynamics. Secondly: from truths about structure and dynamics, one can deduce only further truths about structure and dynamics. And thirdly: truths about consciousness are not truths about structure and dynamics (Chalmers 2003, 120).

But it appears that biology (more than physics) provides a more complex picture of both nature and the physical than this, and truths that might not be deduced in law-like fashion. From a biological perspective, certainly, the physical is not just “bare bones”, or bare mathematical dynamics and structure. And as Godfrey-Smith puts it, the problem with Chalmers and Nagel’s arguments is that they:

look for a bridging capacity and finds it absent at level of physics itself. But that is not where you should expect to find it. To make sense of consciousness

²⁰ Some phenomenologists endorse versions of this view too, of course, and there is a complex Cartesianism in some phenomenology, with versions of *res extensa* and *res cogitans* which I think is a mistake. I think Romano (2015) shows why those sorts of phenomenology should not be endorsed. Also see Reynolds 2018.

you should look for features like point of view and agenda as features of a biological system, in relation to its milieu (Godfrey-Smith 2017).

In addition, there is an important difference concerning the role of laws for the physicist and the biologist respectively. Godfrey-Smith argues that there are theories rather than strict laws in biology, contrasting quite starkly with physics and associated theses regarding the unity of science that lead the scientific naturalist to look for reduction to laws/theories (notwithstanding that biology often makes use of laws in physics or chemistry). John McDowell also claims that it is this commitment to laws (and inter-theoretic reduction) which is what liberal naturalism must contest (2004, 95). However, with Godfrey-Smith's biological work on points of view, and the temporal dimension I have emphasized in them, we have begun to see how the liberal naturalist can readily draw on naturalistically plausible explanatory resources that are nonetheless non-reductive in character. This is important. While liberal naturalism is prepared to admit a much broader range of entities than the scientific naturalist, we still need an explanation (if not criteria) about this. Without it, the liberal pluralism risks letting everything in, and therefore being unable to distinguish itself from non-naturalism or super-naturalism in both an explanatory and ontological sense²¹.

3b. Time and Morality redux

It is often said that morality and normativity are the hardest cases for naturalism.

While that may be so, it depends on whether the explanation proffered is intended to reduce the moral to the non-moral, and the temporal to the non-temporal. Couched in those terms it presents as a really hard problem, but recent debates in philosophy of

²¹ If this is so, the putative contrast between the liberal and the non or supernatural appears lost. After all, the super-natural is indeed part of many life-worlds. This is Sean Bowden's question for liberal naturalists, one that I believe this essay helps to provide an answer to.

biology about the origins of social norms are in fact useful for the kind of gradualist and incrementalist picture I am advocating and not necessarily tethered to a reductive view of explanation. In short, we will consider some of the historical and temporal conditions for morality and normativity (e.g. the 4Ms proper), but also show that there is a more restricted temporal experience at stake in basic norms and morals that are plausibly part of animal life.

It is hard to dispute that animals have some normativity, even if not rational normativity or fully-fledged moral normativity. They suffer, of course, and can apprehend their environmental conditions being suboptimal, and they will inevitably seek to improve them – i.e. to end their suffering or to alleviate danger or risk, or to provide food, or protect their young, etc. Norms like this are not morals, of course. But we also have immediate mutual relations in animals that appear proto-moral in character. Macaques, for example, exhibit “pay-back” behavior in which those who take more food are punished, and other animals are liable to quite vehemently protest if their neighbour gets more (or more attractive) food than them (de Waal 2017), ostensibly indicating something like a concern for fairness. Admittedly this concern with fairness goes one way, only, in that the animal with the desired food will not give up their booty under internal moral pressure, but that behaviour, while certainly possible in humans is perhaps not so typical: witness increasing inequity in the world today, both within so-called Western countries and between developed and undeveloped countries. We also have consolation behaviour in animals that appear to evince the capacity for empathy, even if primarily (but not exclusively) oriented towards kinship groups. All of this seems to involve implicit norms, and perhaps implicit morality, although it is primarily prudential and associated with fairly direct

feedback and response, and it does not appear to involve complex episodic foresight or planning in regard to the future (Suddendorf 2013).

Without invoking any state of nature, this is arguably not significantly different from what we can glean from the archaeological records of very early social interactions of primates. The evolution of norms is dated by many authors at different periods, with Tomasello, Sterelny, and others, emphasising different periods, with high-stakes cooperation between dyads, forager cooperation, or even increased cooperation stresses in the late Pleistocene period being said to be pivotal to the evolution of norms. On the last of these stories (Sterelny 2012), as trade, markets, and the like increase and generate social complexity and competition, the need for better ways of ensuring trust arises, along with the importance of memory and ties of social and familial obligation that persist. Others emphasise reason and developing cognitive capacities to explain the way in which humans come to differentiate themselves from other primates (Tomasello 2014), as well as the sophisticated social mechanisms we develop for keeping each other in check over both time and distance, with the development of capacities for both joint and collective intentionality being likely important (see Satne 2015). I cannot resolve those debates here, but it is enough for my purposes to see that there is evidence of differences between these various forms of social organisation and the kinds of norms involved in them. In particular, there appears a transition *from* the basic norms characteristic of group hunting (i.e. if someone takes too much food they will be punished, direct empathy in regard to members of the group in distress), with immediate rewards and punishment sanctioned by group, perhaps deriving from basic normative ideas like jealousy and resentment, *to* more complex social norms involving debts over time, and the need to trust when friends are absent and when there is no direct perceptual encounter that

might evoke empathy or an immediate threat of punishment. Without suggesting this (very abridged) evolutionary story exhausts morality, or enables us to dispense with the Kantian *quid juris* question, what is at stake in such transitions (whenever they are dated to have occurred) is gradual transformations in the structure of temporal and moral experience, in interaction with the social and external environment. Of course, in terms of the laws of the universe, *qua* physics and a view from nowhere and nowhen, nothing changes. But, from the perspective of the particular human organism, and its physical and cultural milieu, much does. Certain kinds of moral behavior depend on a more sophisticated temporal structure, involving memory and transformed capacities for cognition that include planning for the future (Suddendorf 2013). In this respect, both the asymmetry of agency and the past-future asymmetry appear important parts of understanding the evolution of norms and of cognition. Indeed, they are as important to the relevant sciences (both as explananda and also as explanans) as they are to human folk psychology.

Conclusion

At various points in this paper we have seen a Scylla and Charybdis emerge regarding the relationship between time and naturalism. Many philosophers have adopted ontological and methodological positions that appear to force us to choose sides: between a view in which temporality is inessential and the temporal asymmetries ensconced in folk-psychology and the manifest image must be reductively explained away; and one wherein time is essential but we seem to thereby also give up on naturalism, a cost that will be too high a price to pay for many. But I have sketched here the outlines of a temporal naturalism that promises a viable

middle-way. It holds that various temporal asymmetries should be considered real, rather than merely subjective projections. This view has the advantage of allowing us to situate the 4Ms, with their temporal dependence, in a manner that is both philosophically and scientifically plausible, rather than explain them away, as is required for any timeless naturalism. This proposal is both programmatic and promissory, with more detailed consideration required of the relationship between the temporal symmetry at the basis of much physics and the asymmetries of biological processes (without aiming for any global inter-theoretic reduction). Nonetheless, the considerations drawn on here have been philosophical as well as within the terms of the sciences themselves. We have drawn on a variety of arguments, some ostensibly transcendental in character, but with the putative insights into necessity tested with and against the engine of difference that is evolution. I believe this is work that liberal naturalists need to continue to do in order to outline a non-reductive solution to the 4Ms that avoids the Scylla and Charybdis of scientific naturalism and non-naturalism.

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