Noise, the Mess, and the Inexhaustible World

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Abstract

This chapter outlines an embodied conception of noise. From an enactive and ecological perspective noise is an inevitable complement to the richness of bodily sensitivities and complex actions. The world around us, the universe, is replete, full of inexhaustible texture available to be explored at every scale at which we are capable, or can become capable, of making distinctions. Drawing on work in ecological psychology I suggest that noise is our experience of that encompassing fullness, and can be encountered in a number of different ways depending on the organisation of our bodies and activities at different scales across a given period. While that fullness can be overwhelming, and create challenges for us to distinguish and coordinate effectively with the particular aspects of the world most relevant to our present concerns - noise can be intrusive and disruptive - I argue that there are significant positive aspects to the phenomenon. Noise is an inherent part of the rich messiness of the world as discussed in recent enactive work, which provides both robustness to developmental processes as well as opportunities for action that support adaptive agency. In a noisy, messy world there are always more options available to explore.

1. Introduction: The world beyond our grasp

The world is always greater, more detailed, more complex, than we can grasp. In this paper I will argue that noise, and related experiences, are our awareness of this immensity. Briefly put, noise is an inevitable result of a complementarity in the

structure of our perception and the world around us. The world is full – replete with texture across a wide range of scales. Our embodied sensitivities make us sensitive across a range of scales too, though as finite beings engaged in goal-directed activity we can never be engaged with the entirety of our surroundings simultaneously. This tension between the inexhaustibility of the world to which we can be sensitive, and the finitude of embodied action, creates a perceptual mass we call the background or ground. This immensity, this plenitude of the world is something that can be both enervating and overwhelming, but is also essential and deeply related to fundamental characteristics of experience and agency more generally.

In presenting this point of view, I will be engaging with the related theoretical approaches of enactive cognitive science (such as that derived from the work of Varela, Thompson, and Rosch 1991; Di Paolo, Cuffari, and De Jaegher 2018; Di Paolo, Buhrmann, and Barandiaran 2017 amongst others) and that of ecological psychology (as derived from the work of J. J. Gibson 1966; 1986; E. J. Gibson and Pick 2003; Shaw, Turvey, and Mace 1982, and others). While quite distinct in several ways, both of these theoretical approaches centre a mutuality between organism and environment, such that the world that is encountered is a world that is meaningful to an embodied agent. Given that, intuitively, a crucial characteristic of noise is that it is meaning*less*, there is work to be done in coming to an understanding of noise that can be effectively integrated into such mutualist accounts of actor and world.

In the following section I outline the central premise of mutuality between agent and world that is common to both ecological and enactive approaches. I focus in particular on the extent to which this implies an *emergent* concept of agency. I will use it to outline some of the apparent tensions that could be perceived between such accounts and the question of noise.

Then, drawing primarily on work from the Gibsons I will explore how the phenomenon of noise is something that can in fact be considered inherent in mutualist, or emergentist accounts of the relationship between agent and world. In particular, perception is a way of being in contact with the world through a process of orient-

ing ourselves to a figure within a ground, a complex domain that nevertheless has nested structure at various scales. Emergent agency is necessarily complex – it involves multiple processes interacting with one another, often in some kind of dynamic equilibrium. Human beings, for example, involve numerous processes that involve coordinations between bodies and their environments, as well as being tangled together in mutual interaction. Complex agents can thus be understood as involved in more than one action at a time (McGann, 2024). This multiplicity of action implies a multiplicity of sensitivities, which must ebb and flow as the agent maintains its coordination with the textured world around it. We cannot be doing everything, everywhere, all at once. Agents in the real world are therefore always capable of distinguishing more than they do during any particular action. A necessary result of this is that the world as experienced is always greater than the world that is engaged with (whether effectively or ineffectively) at any given moment. Noise is inherent to the experience of this immensity of the world.

I conclude by touching on some of the ways in which research in ecological and enactive cognitive science have touched on this experience of immensity, noting some of the challenges and opportunities that these accounts provide.

2. Mutualism and emergence

Both enactive and ecological approaches to understanding cognition explicitly endorse a mutuality between agent and world such that neither one can be defined or described without reference to the other. There are important differences between the approaches, and there remains disagreement as to whether some reconciliation or integration of the two can be achieved (Heft 2020; Fultot, Nie, and Carello 2016). While recognising difficulties, I am something of an optimist on this front, though I will not engage with the matter in much depth here (I provide a little more discussion in McGann 2020).

For my immediate purposes I can focus on two key points that theorists in both approaches agree upon: that agents are embodied, and that that embodiment must be taken into account in how we understand the agent, the world, and the emergent

relationship between them. These bring with them explicit accounts of meaning for the agent, but also a tension with the theme of our current volume, given that a certain reading of the mutuality claim can be taken as implying the impossibility of meaninglessness that we commonly associate with 'noise'.

Both enactive and ecological approaches to cognitive science begin in the bodily presence of a living agent coping with a complex environment. There are differences in accent here - the enactive approach emphasises the fact that bodily, specifically metabolic, being creates a dynamism of need that drives the agent's engagement with its world; ecological psychologists give more time to the necessary kinds of structure that exist in the interaction between the acting agent and its environment. I have argued elsewhere that these rather complementary emphases enable both approaches to support the other (McGann, 2020), but more important for our present purposes is the agreement that meaningful engagement with the environment is both driven and constrained, conditioned, by the particularities of agents' bodies. The reciprocal character of the relationship between agent and environment is crucial to the claim by researchers from both approaches about the meaningfulness of that relation. For ecological psychologists the environment is encountered in terms of what is possible for the embodied being, an organism or animal engaging with those aspects of the world that provide opportunities for a being with the particular bodily scale, sensitivities, and skills instantiated by that being. In theoretical terms, the world is thus encountered as an array of *affordances*. Affordances are most often described as opportunities to complete a particular action, but as they are what the world provides for the organism "for good or ill" (Gibson, 1966, p.285), they can be threats or dangers too. Most frequently studied as a vital component of our understanding of skilled activity, affordances can be encountered as pressures or invitations - depending, for instance, on whether, the object flying through the air toward us is something we want to catch or dodge.

Being defined in terms of possibility for action, and support for the coupled control of activity for an embodied agent, affordances are inherently meaningful for that agent (Heft 2014). The reciprocality of the agent-environment relationship for ecological thinking means that affordances necessarily incorporate both facets, though

a certain emphasis applies on the environmental aspects in both description and discussion within the ecological psychology literature.

Enactive researchers discuss things in a somewhat complementary vein, an account of meaningfulness that encompasses both, but with a certain accent on the bodily agency involved. Enactivists describe meaningful engagement with the world as 'sense-making'. A part of the living, embodied being of an agent is the constant process of taking up and incorporating the world into their activity in various ways. In the organic domain this is described as metabolism, by which material is continually brought into the body, maintaining the continuity of the processes that make up that body. The same logic applies in other domains discussed by enactivists (enumerated by Thompson and Varela 2001 as 'cycles' of embodiment, but by Di Paolo, Buhrmann, and Barandiaran, 2017, as 'dimensions' of embodiment). In the sensorimotor domain, rather than material organic bodies, the logic applies to bodies that are collections of habits and skills (Di Paolo et al., 2017), in the intersubjective domain the bodies can be linguistic (Di Paolo, Cuffari, and De Jaegher, 2018).

In all cases the same general principles apply - a self-producing system maintains its continuity through the judicious coordination with the world - materially, skillfully, intersubjectively. The kinds of encounter and kinds of activity possible in these varied domains (which are also inter-dependent with one another) depends on the body in question. Our organic bodies make us sensitive to, and capable of effectively ingesting some aspects of our chemical environment, but oblivious to others. Our skills make us sensitive to some goings on in the world, but others pass us by.

Sense-making is this continuous encountering, coordination with, and metabolising of the environment conditioned by the particularities of the organic, sensorimotor, and intersubjective bodies in question. From a sense-making perspective there is a deep and important continuity between, say, the organic processes of a cell taking up glucose and digesting it to produce energy, a martial artist's grappling, turning, and throwing an opponent, a parent's incorporation of their infant's babbling into an on-going proto-conversation, or you reading this paper as part of your professional activity.

For both enactive and ecological viewpoints, a crucial result of this interdependence between embodied agent and their world is that actions are not solely shaped or dictated by either one or the other. Given both active bodies and their environments are complex, dynamic things, meaningful behaviour, agency, is an emergent result of their interaction. This emergentist perspective, however, may seem to provide the prospect of *too much* meaning. That is, if agent and world arise together, it is not apparent how an agent can encounter a world of which it cannot make sense. It becomes a challenge to consider how *meaninglessness* might be broached and theorised within such thinking (Cappucio and Froese 2014).

If our perception of and interaction with the world around us is so finely tied to the specifics of bodily being and activity, both ecological and enactive approaches might seem at first blush to require that perception can *only* be meaningful. The shape, organisation, and sensitivities of bodies ensure that the world we encounter is the world that matters to us. The very concept of noise appears to be a challenge to such a point of view. Whether in its literal or figurative sense a defining characteristic of noise is precisely that it is meaning*less*. How is it that an embodied account of cognitive engagement with the world can acknowledge and theorise the nonsensical?

3. Noise, figure, and ground

The theoretical and empirical resources most useful for resolving this apparent tension come from the domain of ecological psychology. In a classic 1955 paper the Gibsons addressed the question of what is happening in the process of perceptual learning (J. J. Gibson and E.J. Gibson 1955). What are the mechanisms by which we come to a richer and more refined capacity for perception of the world around us? The principal competing hypotheses extant in the psychological research at the time were those of enrichment and discrimination. The more popular of the two approaches, enrichment, was premised on the idea that the perceptual system begins with a *given* of basic sensations, a limited raw material which must be augmented either by associating it with information stored in memory (such that the sensations are really just cues which can activate stored knowledge), or by reasoning (in which

the sensations are really the premises for a set of abductive inferences regarding what is out there in the world). In either case, as the Gibsons note, as perception becomes more fine-grained and effective over time the percepts must become decreasingly correspondent with the sensations that give rise to them. Rather, associations with memories become stronger or inferences more intricate given these impoverished initial sensory conditions.

The alternative account examined by the Gibsons was one of discrimination, by which, over time, a person becomes increasingly sensitive to differences between distinguishable objects and events. From this perspective, perceptual learning makes a person *more* sensitive to the specifics, the finer details, of the objects and events of the world with which they are engaged.

By presenting people with an array of abstract figures that differed in ways that were quite subtle, the Gibsons found clear evidence for the latter. Participants became capable of uniquely identifying items over time, and in doing so spontaneously produced new descriptions that made reference to various distinguishing features.

Eleanor Gibson (E.J. Gibson, 1988; E.J. Gibson and Pick, 2003) would go on to address how this same process of increasing sensitivity to discriminative aspects of objects and events characterised children's increasing perceptual ability over developmental time. Learning and development were both characterised by a process of finer grained sensitivity to the world arising from continuously motivated exploration of action possibilities. This is in contrast to, say, increasing capacity to link existing knowledge with a particular pattern of sensory stimulation.

That perceptual learning is a process of discrimination reinforces perhaps one of the most basic characteristics of perceptual experience: its figure-ground structure (Rubin, 1915, cited in Pind, 2012). The focus of our perception is distinct from a general background of relatively undistinguished experience. At face value, perception would therefore seem to be a process of separation, taking the figure out of the ground. The definitions and etymologies of 'discriminate' and 'distinguish' both im-

ply such a separation (Oxford English Dictionary 2023). We should be careful, however, not to allow the ground to recede from our theorising too quickly. Our experience of the world around us, after all, is replete, full in every direction. While the figure of our perception is our focus, the ground is nevertheless present. We are immersed in the world, part of it, not above or separate from it.

3.1 On the relationship between ground and background

Before we go further, there is a issue of vocabulary that we should acknowledge, and that is with regard to *ground*, and *background*.

The phrasing of "figure-ground" denotes a relationship of a focus of perceptual attention on some distinguishable thing marked from a relatively undifferentiated background. In regular discourse we happily draw on the theatrical terminology, subsequently applied to analysis of visual artwork, in referring to the "background" of the image when we wish to discuss the 'ground' as that undifferentiated context against which the "figure" is discerned.

The term "background", though, also often bears a more technical payload in philosophy. At first glance it would seem that we should be very cautious in keeping quite separate the one from the other. Following Heidegger, and other subsequent writers, the background is an implicit meshwork of skills, habits, and sensitivities that enable the formation of particular kinds of distinction and engagement in particular kinds of action. This is something much more than the undifferentiated context of a particular perceptual distinction in the separation of figure from ground.

While these are distinguishable concepts, there is an important continuity between them. Dotov and Chemero (2014) discuss Merleau-Ponty's (1948/1964) claim that perception necessarily involves a figure-ground structure. In particular, they note that what is background is not passive, or neutral. Rather, it is sufficiently stable as to enable the figure to be distinguished from it. From the mutualist standpoint, by which the skills and other embodied sensitivities of the acting perceiver are fundamental to all aspects of perception, Dotov and Chemero note that the background is what is stably successful – what Dreyfus (2002) would refer to as everyday coping.

The figure-ground structure of perception is not contingently, but inherently related to the background of skilful coping in which an agent is engaged.

The concepts of perceptual ground and background are continuous with one another, and though for both to exist as they are they must necessarily not impinge markedly on perceptual experience (else they cease to be ground or background), they nevertheless constitute vital facets of experience, and have a complexity that it is important for us to be able to address and investigate. It is how to orient ourselves to be able to engage in that investigation is the focus of the present chapter.

3.2 Orientation within a background

The embodied perspective of both ecological and enactive approaches weave perception and action together into a single coherent process - most frequently described as a 'loop' of perception-and-action. Our perception of figure, therefore, is not so much a *separation from* a background but rather an *orientation within* one. In perceiving something we do not simply remark upon its existence, we bring ourselves into coordination with it, amidst a mass of potentially different experiences of the world. Ecological psychologists (J. J. Gibson 1986; Michaels and Carello 1981) describe perception as being in contact with the world, a means of an agent's aligning their activity with some particular aspect of the world that encompasses them. This contact is a vector, though - it is in motion, we are not simply in touch with the world, but involved with it. Being finite, we can only be directly engaged with a limited set of aspects or facets of what is going on around us, and are therefore selective regarding those aspects with which we tune our actions to fit. Phenomenologist Sara Ahmed (2006) has pointed out that orientation is therefore bivalent: in orienting *toward* a thing we necessarily orient ourselves *away* from other things.

In this recognition of a background from which we turn as we coordinate with the objects and events in the world that matter to us, we find the first aspect of noise - both in its auditory and more general sense. Noise is the undistinguished mass, the ground to perceptual figure. The figure is that to which we turn, as distinguished *in the aspect of its relationship to the ground*, from which we turn away. Figure-ground

structure reminds us that perception is not absolute, but relative. The figure cannot be perceived *except* through the possibility for us to distinguish it from the messy, noisy background in which we encounter it, a background which remains full of alternative figures to be discerned.

In considering perception as orientation, then, what is perception of background noise? We can make sense of this in terms of Ahmed's 'turning away'. While a perceptual figure provides us with a clear focus, a means of finely tuning our actions toward some aspect of the situation in which we find ourselves, the background is a noise of undistinguished meaning which offers only the coarse guidance of 'not this'. From an ecological perspective we can see the very limited (but not absent) value of the noisy ground - it provides a potentially coarse, very basic form of orientation. In situations where we are trying to get something particular done, it can perhaps constrain the domain in which we search for meaning, but itself offers only a vague push in a general direction, rather than a clear guide toward achievement of an intended action.

We will return to the orienting value of noise in a later section. For now, I wish to consider, critically, the idea of the background as undistinguished mass, and the limits of the figure-ground structure of perceptual experience.

The figure-ground distinction is important and easy to identify on introspection, a phenomenon of experience that any theory of perception should at the very least address. It seems equally obvious, however, that perception is also more complicated than that. The basic figure-ground idea is unitary, a single dimension of experience. But while a figure is distinct and may be complex, we also experience the immensely textured and inexhaustibly detailed world around us as still available for inspection and engagement (Noë, 2004, explores this point in some detail). The noisiness of the background is therefore not something that is experienced as entirely unstructured. While, in orienting to the figure or focus of our attention we turn away from and become substantially insensitive to other potential distinctions available to us, there is always some general shape to things ignored, and we must ask how to conceive of that shape.

There are at least two dimensions to this complexity of the background. The first is the embodiment of the agent. By embodiment I mean not just the details of the sensory surfaces and organisation of joints and limbs, but the action and perceptual systems (involving both physiological and behavioural components - skills and habits as much as cochlea and retinae), that enable us to reliably make distinctions, to discriminate objects and events in the world around us. The buzzing blooming confusion of the ground to which I am not paying attention buzzes and blooms in colours, sounds, textures, and motions to which I can become attuned. It is full of potential distinctions. But it is not empty of those aspects of the world to which I cannot be sensitive – there is no experience of their absence because the world remains full and there is nothing in my experience that suggests something is missing. This goes for things that are too small (typically, for instance, germs), too big (tectonic plates), or too unfamiliar (for me, tactics on a soccer pitch), such that they are simply unavailable - things to which I cannot orient without technical mediations, or scaffolded training.

The second dimension of structure to the background is the complexity of our actions during any given interval of experience. We are always doing more than one thing. We are always, therefore, oriented not in a simplistic way, but in a complex one, and the figure and ground of perception will therefore have a concomitant structure.

Let us take an example of a situation used by Ahmed (2006) to illustrate the complexly enfolded character of typical circumstances: sitting around a table at a family dinner. Taking a bite of food in such circumstances will involve me using fine motor skills involved in cutlery use, postural orientation toward the plate and table, but also possibly accented by the comfort or discomfort of my relationship with others present, and the conversation in which we are involved. As Ahmed considers, in families with particularly strong or constraining value systems simply being at the table may require at least an acquiescence to broad, deep cultural norms such as heteronormative social orientations during the course of the meal. The moment of tasting the food may be additionally contextualised by a requirement for fine management of emotional expression for the sake of politeness. We are always do-

ing more than one thing – or perhaps more accurately, every single thing we do has multiply interacting aspects at different scales of activity.

The complexity of the simultaneous coarse-grained and fine-grained activities in which we are involved at a given time means that the ground of any given perceptual discrimination may be an aspect of a figure of another in which we are involved during the same period, though occurring at a slower tempo. Activities unfold at different timescales, with tensions or conflicts between them waxing and waning over periods. My continuing to eat might conflict with my involvement in a conversation at different points during the dinner, while being perfectly resonant with it at others. The conversation may therefore affect the ebb and flow of affordances for eating politely (e.g. eating with my mouth closed, not speaking) and manage the pace of my eating just as much as my appetite does.

Noise, in this aspect, is not a constant background buzz or bloom, but an ebb and flow of conflict and resonance between different activities and action systems. Noise has structure at different scales, and those different scales provide for interdependent forms of orientation. Just what scales there are, and how we should understand the dynamics of their interactions in different contexts, will depend on the particularities of individual, acting bodies. The mutualist theses of enactive and ecological perspectives imply that a core principle of what it is to be a living body is the entanglement of different processes in the world, making phenomena at different scales, or in different locations, matter to one another though the messy knot of metabolic, skilful, and intersubjective dynamics that is a body (McGann, 2024). But there is another significant aspect to noise, which is always present, but most notably so in those periods of disorientation, when ecological psychologists would indicate that we switch between performing, to exploring.

4. Exploring the excess

Gibson (1966) introduced a distinction between two different kinds of action, which has been made much of in some of the subsequent work (see in particular E.J. Gibson, 1988; E.J. Gibson and Pick, 2003; Reed 1996). These two kinds of action are

the performative – when we are focused on a task, just getting on with things – and exploration – when we are in the process of settling on what to do next, searching for available ecological information.

The vast majority of ecological psychology research has been conducted on performative actions, where the focus is on understanding the ecological information available to the actor and the manner in which working bodies can be coupled to the environment such that the information guides actions.

Exploratory actions involve a *search for* ecological information (which is defined as structures in the ambient arrays of energy – such as light – or chemicals, that specify affordances for action). By the logic of ecological psychology exploratory actions are meta-actions, the search for what actions are possible, or available (E.J. Gibson, 1988). Having distinguished what is possible, we can engage in a task and get performative. Being actions, however, explorations are themselves not without some guidance. We can see both on immediate reflection and through observations of laboratory activity that when the next appropriate action is not apparent, people's behaviour changes. But in such times of uncertainty or instability of focus, while behaviour changes, it does not break down entirely, hinting at the nested structure of our perception, actions, figures and grounds. What I will argue below, drawing on insights provided by the laboratory work of Dotov and Chemero (2014), is that exploratory activity makes this inter-dependence of scales more apparent, and that even when we consider noise as something defined by the way in which we orient negatively, away from it, it can be incorporated into, and guide effective kinds of action.

Dotov and Chemero (2014) describe an experiment in which participants play a computer game akin, in dynamics, to herding sheep. Using a mouse, participants move a pointer on the monitor in order to shepherd one or more moving circles (abstract notional 'sheep') inside a bordered area. (There are a number of very clever ways in which the equations underlying the movements of player and 'sheep' relate to the task of balancing a pole on the end of your finger, but we don't need to go into that level of detail for our purposes here.) The game is intuitive, and reasonably

enjoyable, and enabled Dotov and Chemero to evaluate people's responses to noise in the relationship between movements of the mouse and on-screen pointer. Their primary topic of interest is the experience of the relationship between body, tool, and action, and an analysis of Heidegger's notions of ready-to-hand and present-at-hand. The discussion encompasses aspects of the structure of perception more generally, though, that are directly relevant to our present concerns.

In their discussion of the figure-ground structure of perception (building, as noted above, on Merleau-Ponty), Dotov and Chemero adopt quite a common tendency, which is to address how the background is most notably characterised by its absence from our awareness. The background also then recedes from explicit discussion, relegated to reliable banality, a process of automatic, or unconscious processes. The background is the typical, unmarked form of absorbed, habitual coping common to much of our everyday existence; a normal just-getting-on-with-things. Though this does allow for a complexity of structure for the background, it does not particularly invite articulation of the nested character of that structure, nor the interdependencies between different activities that are involved in that non-focal, habitual coping.

In the previous section I noted that the noisiness of the background would wax and wan with resonances and conflicts between the nested orientations of activities at different scales. Noise was negatively valenced, the aspects of the world from which we turned away to orient ourselves more fully to the relevant figure in the focus of our actions. But in both Dotov and Chemero's description of the background as encompassing the habitual foundations of everyday activity, as well as the fullness of the background given our embodied sensitivities discussed above, we can see that the undistinguished mass of the ground is more than just a negative pole. There is a richness to noise that reminds us that the world has more going on than we can currently, coherently incorporate into what we are doing. When this occurs across a range of scales of our activities, it is disorienting and overwhelming, but when constrained, it can be inviting, or even demanding.

Nonaka (2020) examines the implications of the inexhaustible richness of the texture of the world. There is always more detail available than we capable of exploring right now. This inexhaustible texture contrasts with the necessary finitude of embodied being.

It is possible to examine a single person's actions as either always multiple or singular. Because of the nested complexity of beings with multiple, sometimes conflicting, values, we are always doing more than one thing. To return to Ahmed's (2006) example, eating at the family dinner table involves posture control, tool manipulation, digestion, and social skills. But it can also be argued that at any given time a finite body can only be doing one complex thing. That is, a body being a set of multiple entangled processes is defined as being a unity, but is always a complex one in precarious tension (Di Paolo, 2018; McGann, 2024).

In either case, a body as tangle of processes necessarily involves dynamics of proximity and distance, and orientation with respect to the values of that living body (McGann, 2024). Bodies are in part *defined* by their finitude, by their distinguishing between themselves and their environments (Maturana and Varela, 1980; Stapleton and Thompson, 2009; Weber and Varela, 2002). By definition then, a body cannot be everything, everywhere, all at once, but must be oriented and selective, a process that results in the necessary figure-ground structure of perception, and therefore the unavoidability of a noisy excess to experience. What is noise and what is signal, however, is as dynamic and structured as the skills and sensitivities of the experiencing agent.

Dotov and Chemero explore noise by breaking down the relationship between a person's actions and their effects in the world. In this case, they introduce a certain amount of randomness into the previously reliable relationship between hand and mouse movements and the movements of the shepherding pointer on the monitor in use for the game. The degradation of this relationship increased to the point that the pointer froze, and no movements of the mouse had any effect. When this happened, Dotov and Chemero report a change in people's behaviours. Their actions

became larger, and more varied - hand motions were exaggerated, bigger and faster than during the task under its previous, more reliable, operation.

Dotov and Chemero describe this change in behaviour as the participants searching, varying their behaviour more widely in a manner that would allow them to pick up what the new operating regimen of the situation might be - the old way stopped working, what might be the new movements that would get the job done? There are two important facets to their description that I would like to highlight.

Firstly, their description of participant's response to the changing situation is not one of catastrophic breakdown. While we must trust that the authors would have noted rather than suppressed examples of such behaviour, I suspect that it is reasonably safe to believe that participants didn't break down in tears, launch into frustrated song, kick over the testing table, or flop around on the ground like fish taken roughly from water. That is, participants' behaviour largely remained organised and oriented toward the task in broad terms - what failed was not the general mode of activity, but more fine-grained coordination. This maintained coordination both reinforces the multiple scales at which activities are organised, but also, crucially, enables the second key point about people's actions in these changed circumstances.

Dotov and Chemero's description of the change in participants' actions as one of search, or exploration of the situation in order to discover its new parameters. This tells us something important about noise (in this case, noise as increasing unreliability in the previously consistent relation between hand movements and screen activity). Participants experience noise as a breakdown in the activity, but also, *as something that can be explored.*

A key aspect of noise is as a scalar phenomenon - as texture in a situation that does not provide guidance or control of actions at a scale appropriate to the action. The experience of it as such, though, integrates with our understanding of embodied action. It is frequently the case that my bodily sensitivities (the sensorimotor ones, which will involve my skills and habits as much as my sensory physiology) are often excessive to the task at hand. In walking to the end of my gravel driveway, for in-

stance, it is possible but not necessary for my locomotion that I can resolve individual pebbles. As such, the messy texture of the driveway in my visual experience remains just that - a messy texture. I experience the world as having detail that would reward further exploration, but make no other distinction on the basis of that texture while involved in a task that just requires me to orient to the reasonably flat, solid, stable surface I'm walking on.

This description of noise as excess appears contradictory to my basic claim that noise is something from which we are negatively oriented. How can we be both engaged in search, exploring the noise, while simultaneously trying to avoid it? There are two ways in which we can make sense of this. The first is in the terms of ecological psychology that I have leaned on most heavily to this point. Ecological psychologists (e.g. E.J. Gibson, 1988) describe exploratory action as the search for ecological information specifying affordances. We have already noted that actions are nested, and that organisation at one scale can constrain otherwise less organised activity at another. Dotov and Chemero's participants didn't wet their pants, lose their balance, and begin wailing in vowel sounds when their mouse stopped working. Continuing constraints at the level of the experimental setting and beyond remained in place, which provided quite a bit of structure to the exploratory process in which they could engage. The experience of noise becomes a necessary background against which we can make distinctions, essentially, affording continued search, while providing a contrast against which relevant structure can distinguish itself, for us to know when we have found something. By these lights, we experience randomness as noise when it masks or otherwise impedes upon on our capacity to engage with the world in a manner relevant to whatever it is we are doing, or when we can find no relevant organisation in the world with which to act at all - if all there is is such randomness, which cannot be made sensible by encompassing it in a new context (say, a dynamical systems analysis, where noise signatures are being evaluated).

Noise, therefore, manifests a rather interesting holism and duality. Overall, it is an experience of a fullness of the world that will always overspill our present concerns and purposeful orientations. On the one hand that means that there will always be ways in which the complexities of our actions can articulate, shifting between con-

sonance and conflict. On the other hand, it means that the world will always have opportunities for differently oriented actions – there will always be something to do, some way in which we can seek new, coherent coordinations.

In recent enactive work the potential value for this noisy fullness for adaptive resilience has begun to be recognised. Di Paolo, Cuffari, and De Jaegher (2018) describe now the *messiness* of everyday life, in which there is always more than one thing going on, and actions are frequently interrupted, disrupted, and revised mid-flow, can in fact help support rather than impede the maturation of social and linguistic practices. The inevitable diversity of experiences and circumstances in which different skills are enacted, and the way the plethora of different social and material resources in the world provide for innumerable different ways in which a particular action can be successfully completed in varying contexts, help support robust linguistic development. In other recent work (McGann, 2024) I have noted how the unavoidably messy character of the real-world underpins agency, in providing a multitude of possible actions and outcomes as actions, skills, and life continuously unfold within complex, nested contexts.

Noisiness and messiness, so frequently negative terms, can be understood from an ecological and enactively informed perspective, to be an ever-shifting, metastable ground supporting the constant dynamism required for living. These more positive aspects invite a certain theoretical, philosophical grunge, a revelling in the noise and the mess.

5. Conclusion

In this chapter I have attempted to outline an embodied conception of noise. From an enactive and ecological perspective, noise is an inevitable, indeed necessary complement to the richness of bodily sensitivities and complex actions. The world around us, the universe, is replete, full of inexhaustible texture (Nonaka, 2020) and detail available to be explored at every scale at we are capable, or can become capable, of making distinctions. I have suggested here that noise is our experience of that encompassing fullness, and can be encountered in a number of different ways

depending on the organisation of our bodies and activities at different scales across a given period.

While that fullness can be overwhelming, and create challenges for us to distinguish and coordinate effectively with the particular aspects of the world most relevant to our present concerns - noise can be intrusive and disruptive - I argue that there are significant positive aspects to the phenomenon. Noise is an inherent part of the rich *messiness* (Di Paolo, Cuffari, and De Jaegher, 2018; McGann, 2024) of the world, which provides both resilience to developmental processes as well as opportunities for action that support adaptive agency. In a noisy, messy world there are always more options available to explore.

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