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Adrian J. T. Alsmith

EMBODYING BODILY EXPERIENCE

Embodiment means many things to many people. Two ways of thinking about the explaining the nature of mental phenomenon by appeal to its embodiment are in tension with one another. For some, a psychological phenomenon is embodied if one can only adequately explain that phenomenon by giving a distinctive explanatory role to the body itself. Call this strong embodiment. For others, a psychological phenomenon may be embodied without there being a distinctive explanatory role for the body in its explanation; it may be embodied only in so far as there is a distinctive explanatory role for representations of the body. Call this weak embodiment. I am interested in the sense in which bodily experience is embodied. I will argue that the fact that agents stand in a certain kind of affordance relation to their own bodies, a relation of structural affordance, allows us to conceive of a robust sense in which bodily experience is strongly embodied. Nevertheless, I will consider various ways in which the putative existence of mental representations of parts of the body might be consistent with and even complement a strongly embodied account of bodily experience.

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AFFORDANCE AFFORDS MEASUREMENT

When James Gibson (1979) introduced the concept of affordance, he remarked that “an affordance cannot be measured as we measure in physics” (p. 128). The reason is that affordances “have to be measured relative to the animal. They are unique for that animal. They are not just abstract physical properties. They have unity relative to the posture and behavior of the animal being considered” (pp. 127-128). The classic study in which affordances are measured is William Warren’s (1984) measurement of stair-climbing affordances. Warren measured these affordances relative to body-scale. By taking this article as exemplary of affordance measurement, this paper will show that an affordance can be measured “as we measure in physics”. Measurement of an affordance is a derived measurement of an intensive property, similar to the measurement of density. To show that the measurement of an affordance is derived measurement, I will pick two definitions, by Thomas Stoffregen (2003) and Anthony Chemero (2003), out of the variety of definitions that currently are debated – without wishing to take a position in this debate. The reason is that these two definitions are closest to the one implicitly used by Warren, and they allow me to arrive at a more general account of affordance measurement than Warren’s body-scale account. Warren referred to Robert Rosen’s (1978) “principle of dynamical similarity” to indicate the kind of measurement he was employing. Comparing this principle with Brian Ellis’s (1966) account of derived measurement, I will discuss the conditions for which a numerical evaluation of affordances can be considered to be a measurement. It will be shown that Warren’s numerical evaluations of stair-climbing affordances can rightly be called measurement.

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**GLASS CEILINGS AND GLASS FLOORS – ELEANOR GIBSON
AND THE VISUAL CLIFF**

Eleanor Jack Gibson came of age at a time when attitudes and administrative regulations prevented women from rising through (or even joining) the ranks of the American academy. Fortunately, her intellect was matched by her inventiveness and her perseverance. From serendipitous beginnings in the agriculture fields at Cornell University—in the only laboratory space the mere research associate was allowed to use—Jackie Gibson used the visual cliff paradigm to define and build the fields of perceptual learning and development (eventually garnering that regular academic appointment, albeit after she had already received several of our discipline's most prestigious awards). I survey work by Gibson, her colleagues, and her students that takes the visual cliff from its early role in examining depth perception to its current incarnation as a rich tool for exploring the mutuality between the perception of affordances and the perceiver's behavioral repertoire.

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AFFORDANCE AS A CONCEPTUAL BANDAGE

In my book *Tacit and Explicit Knowledge* I use the term affordance quite often. Those who do not know the book might think this means I understand the term. But I do not – I use the term as a bandage covering the bleeding wounds in my understanding. The hardest part of the book was to explain explicit knowledge but in the end I could not explain it; I could only explain why sometimes it was possible to transform a physical object – what I called a ‘string’ – from something that did not carry understanding into something that did (provided the recipient was suitably equipped to understand). But I could not explain how any string could convey any understanding in the first place. So I used the term ‘afford’ as in ‘this string [it might be the type of string which we call a photograph], readily affords Ludwig Wittgenstein whereas this string more readily affords Bertrand Russell’. With the bandage of affordance in my medicine chest I could then get on with my analysis and even use the term to describe how it was that certain physical objects could afford certain kinds of tacit knowledge whereas others could not: thus there is a distinction in the book between ‘somatic limit tacit knowledge’ and ‘somatic affordance tacit knowledge’ – eg we humans cannot process data as fast as computers (giving somatic limits) but we are very good at picking up fragile objects (somatic affordance).

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AFFORDANCE CHOREOGRAPHIES: WHAT DOES A MATERIAL WANT?

In this paper I will reconsider the idea of agency and affordance by engaging with current discourses on agency and my practice-based research on responsive materials. The materials I work with, often labeled “smart”, have been developed with the purpose of efficiency and functionality. My group has been inventing new processes of working with such materials, in order to take them outside of scientific laboratories. The goal is to enable new ideas and expressions of which these materials are capable of. By opening up alternative paths for matter, we let them flow and leak into the world, not knowing what they will be becoming. As Tim Ingold writes ‘things move and grow because they are alive, not because they have agency’. Indeed, responsive and transient materials reveal agency as temporally emergent and potentially useless if the idea of activity and life is introduced. Through hands-on experiments with materials, we follow what they afford instead of trying to impose ideas on matter by controlling their physical properties. In this process, we discover hidden affordances, and then choreograph them so to enable the flow of activity through them. This seems to also shift Gibson’s idea of affordance as static and pertaining to objects - in the creative process of following material; our own affordances begin to emerge. We are matter after all...

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AFFORDING ILLUSIONS? NATURAL INFORMATION AND THE PROBLEM OF MISPERCEPTION

One of the most remarkable tenets of J.J. Gibson's ecological theory of visual perception was that the information provided by the environment to a perceiving organism is an entirely objective affair, and hence is sufficient for structuring perception. In this paper, I will address two related questions raised by this assumption.

Firstly, what notion of natural information is at work in the ecological theory? Gibson himself only gives a few hints, mostly in terms of what information, besides being objective and natural, is not. Most notably, it is claimed to be entirely unlike anything the mathematical theory of communication has treated as information. It bears more resemblance to natural information as conceived by Fred Dretske, and is likely to share some of its problems, most of all the difficulties in accommodating the possibility of getting things wrong.

Hence, secondly, what status accrues to misperception and illusion? How can we get things wrong when our perception consists in picking up information that objectively and reliably specifies the environment and the qualities of the objects we perceive? Gibson acknowledges this problem but does not conclusively answer it. Moreover, he only discusses certain kinds of illusions, namely pictures that are purposefully made to create the appearance of objects that are not present in the environment and devices that are purposefully placed in the environment to create discontinuities in perception. His prime example of the latter are planes of solid glass that extend over visual cliffs and thus provide support while maintaining the visually based affordance of falling off the cliff. There is no mention of naturally occurring misperceptions, nor of those illusions which are an innocuous part of perceptual routines in everyday environments.

I will maintain that, under a well-reconstructed ecological perspective, misperception, as the misperception of affordances, should be kept clearly distinct from perceptual illusions. This distinction shall be carved out with some help from the "Empirical Strategy" in the psychology of perception (Purves et al.). Only misperceptions of affordances are actually misperceptions, in terms of getting things wrong in a relevant sense, and in many cases, the blame for getting things wrong does not lie with inaccuracies or dysfunctions on the side of the perceiving organism, but with the dynamics of informational relations in his environment. Two of Gibson's intuitions shall thus be preserved: the objectivity of informational relations and the empowerment of the perceiving organism as an active perceiver who makes use of those objective relations.

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THE RELATION OF AFFORDANCES TO MERELOGICAL PRINCIPLES AND THE FALLACIES TO WHICH THEY ARE SUBJECT

1. Reminder of origins and the shifts in meaning towards a field of family resemblances.
2. Analysing Bohrian complementarity in terms of affordances give explicit recognition to the unity of apparatus/world as target of attributions of affordances and corresponding dispositions and powers.
3. Thus empirical concepts are meaningful only relative to known apparatus and relatively unknown world – in the last instance bridged by models – e.g., molecular structure of ice that affords walking to a wolf but not to an elk. Ultimate grounding is indeterminate.
4. Developments:
 - a. One class of mereological fallacies as failures to take account of affordances.
 - b. Extension to psychology: Cultural relativity of psychology as affordances.

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REFLECTIONS ON THE ORIGINS OF AFFORDANCES

James Gibson formulated the concept of affordance in the context of his ecological approach to perception. He was insistent that his contributions not ossify, but rather that they be developed and modified with advances in our understanding. However, extensions and applications of affordances do run the risk of substantively altering the distinctive character of the concept, as we have witnessed in recent years. In advancing the concept we must avoid letting slip back into our thinking some of the very conceptual difficulties that the affordance concept was intended to displace. This presentation is an attempt to clarify some of the distinctive theoretical commitments of affordances by grounding the concept historically. Affordances will be viewed in relation to a selective examination of four of its antecedents: William James' radical empiricism, Kurt Lewin's field theory, Maurice Merleau-Ponty's treatment of the body, and the concept of an ecosystem.

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VARIETIES OF OBJECTS – ON ARTEFACTS, AGENCY AND MEDIATION

Digital artefacts are pervasive and standardized means through which social practice is currently articulated and carried out. Granted the object-like nature of technology, I construe digital artefacts as *objects* and seek to understand the ways they are involved in expert practice. This is a admittedly a broad and challenging task yet one it may have purchase, if digital objects can be shown to be associated with distinctive sets of attributes or affordances. Conceiving digital artefacts as objects constitutes a sort of conceptual heuristic (Abbott 2004) that seeks or hopes to transgress the agency predilection of much of social research on these matters at the same time as it creates a stimulating contrast between the solid status of objects and the evasive tangibility of digital artefacts. I subsume under the label digital objects records, documents, displays and other digital outputs of this kind as well as some of the digital resources (systems and applications) by which they are assembled and sustained as items of cultural interaction.

Seen as objects, digital artefacts lack what it may seem to be the most compelling attribute of object-ness, that is, *plenitude*. This may appear to be the inevitable outcome of them being just data or information entities. But paper documents in which data and symbol tokens are arranged can still claim some sort of plenitude and stability. The elusive status of digital objects, such as webpages or documents, is most critically related to the fact that as items of cultural interaction they remain fugitive accomplishments, assembled out of digital resources distributed over technical, geographical and institutional boundaries. They last as long as users ponder them only to dissolve as soon as they are ‘closed’ into the databases and digital structures out of which they have been composed. Retrieval and recomposition often result in dissimilar displays, as digital objects are constantly updatable and *version-able*. Updatability is intrinsic to most digital objects. In all these qualities, they lack plenitude, stability and, ultimately, identity. In some fundamental way, digital objects are just assemblies of operations and therefore objects only euphemistically (Ekbia 2009; Kallinikos et al. 2013).

An appreciation of the distinct forms of agency and life entities of this sort summon emerges against the background of practices in which objects *qua* physical things have been traditionally involved. I distinguish objects *qua* physical things from both *subjects* and *events*. While not exhaustive of all possible distinctions,¹ this dual contrast, I suggest, offers a fruitful path for understanding some of the most compelling qualities of objects and the ways they are involved in social practice. I then use that distinction as the springboard for approaching standardized, abstract

¹ Common distinctions of objects entail those of portable and stationary, physical and mental, concrete and abstract, small and big, enduring and perishable, attached and detached, found and manufactured.

and collective entities such as routines, programs, measurement systems, social protocols etc. I refer to these as *social objects* to indicate their standardized nature and non-subjective mode of being. Social objects provide, I claim, the basic stuff of social practice and one of the most conspicuous candidates of technological mediation by computational means. It is via such a rather unconventional route that I arrive at digital objects and the exploration of the ways they are involved in human affairs. Digital objects, I claim, are fundamentally *disembodied embodiments* of standardized social processes and patterns that reintroduce a temporal dimension into the making of social practice withheld by objects *qua* things.

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**FROM INTRAPSYCHIC TO INTERPSYCHIC PROCESSES –
SHIFTING FROM AN “ARCHEOLOGICAL” TO AN
“ECOLOGICAL” MODEL?**

Contemporary psychoanalysis has moved away from intrapsychic, one person models in pursuit of objective, historical truth. This transition, which has been called the relational turn, is related to the development of psychoanalytic Field Theory. Field Theory offers both a theoretical psychoanalytic model and a clinical model. It represents psychoanalytic process as an interpersonal process and this is what affords the potential for something new to emerge. This bi-personal model emphasizes a focus on interaction in the present and on the forms that the interpersonal exchange take. The moment to moment use to which the analytical process is put by the participants becomes itself a subject of the exchange. Contrary to the "archeological model" in which an individual's history and truth are posited to be uncovered and discovered, in the "ecological model" the focus is on the interactive nature of human experience, the social and perceptive affordance of the environment, which is relationally based. This is not only of consequence for exploring therapeutic process but also for the conception of psychoanalysis affording eventually a groundwork for general interdisciplinary dialogue about human experience.

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AFFORDANCE OF HYDROLOGICAL INFRASTRUCTURE FOR PUBLIC SPACE AND ENVIRONMENTAL IMAGINATION

The second half of the 20th century has seen an unprecedented rise of cities connecting their urban identity to their rivers. From L.A. to Seoul, Brisbane to Sao Paolo, cities are planning major urban renewal projects around their waterways. I describe this relatively new urban planning phenomenon as a transition from a 19th-20th century utilitarian river paradigm to a 21st century integrated paradigm, in which rivers function as a hydrological-ecological-cultural-economic-political nexus. After a brief overview I will zoom in on the Trinity River in North Texas, give a short intro of the grand plans to re-connect the Dallas and Ft Worth populations to ‘their’ river, which was consciously pushed out of the cultural imagination for almost a century. I will zoom in on the infrastructural features affording these moves in order to arrive at much less impressive but omnipresent infrastructural storm water features.

I will show how these most common places, one can find in every American town, can become places of affordance and engagement, situations in of encounters. In my presentation I explore how these everyday infrastructural features can be designed as technologies of environmental engagement. Not only designated parks or nature areas foster an environmental imagination, but also infrastructure can afford such experiences. In fact, the experiential boundaries between hydrological infrastructure and natural landscape features can become porous and lead to a green and grey hybrid infrastructure *and* a public space, and thus afford a place of encounter, fostering a bio-cultural nexus.

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IN SEARCH OF ARCHITECTURAL AFFORDANCES

For a notion so old and attractive to conventional design approaches (“we just know how it is” is the permanent defence of intuitive design approaches), affordances have attracted relatively little attention in architectural research. There are few studies that mostly deal with the applicability of affordances to architecture and outline prototypical applications to design problems. Reviewing these studies returns three main observations:

1. Affordances are usually considered from a use perspective
2. Affordances usually focus on single objects
3. There is a search for the right formalisms for representing affordances

The first is hardly surprising: the actionable properties of an object normally refer to the viewpoint of its users, who should be able to know directly what to do and how. The gap between intention and use is a primary argument for applying affordances in design, as it facilitates evaluation and feedback, and promises transformation of feedback into feedforward (design guidance). Although affordances increase complexity, they improve transparency in the connection between design and use, and can so inform designers on the consequences of their actions.

Architecture is arguably an interesting application area for affordances because it involves a wide scale of abstraction levels, from single components like a door handle to more complex configurations such as an entrance (door plus its immediate environment) to spatial entities like a bedroom and to spatial configurations such as the exhibition halls of a museum (the whole building arguably does not count; claiming it affords sheltering a museum simply describes general goals and overall use; any study of an architectural type like a museum reveals a variety too great to be summarized into an affordance for a whole building). Affordances at these levels may differ significantly: at the highest level of specificity, the affordances of a door handle tend to be precise and well-known, while the affordances of a room require more abstract thinking (e.g. activity zones) and often extensive tolerances.

Many of the studies on affordances in architecture and buildings focus on representation: on how we could describe affordances and link them to existing design representations. This search for the right formalism suggests that existing representations are not suitable, a.o. by being too static. Deriving from orthographic and perspective projections and geared towards construction, they tend to offer the overview necessary for recognizing affordances in a design but little to explicitly link use and affordances to a building component, element or space. Augmenting such representations with computer-related formalisms appears to offer means for registering affordance-related information, albeit in a rather static manner that may fail to match the dynamic, flexible and adaptable character of both affordances and architectural design. There seem to be a few fundamental challenges that remain to be attacked in a comprehensive and coherent manner. The first of them is *how we recognize architectural affordances*. In cognitive psychology there is a long tradition of abstract, elegant examples that may illustrate a point quite well but are often

removed from everyday experience. This seems to influence many investigations, so we tend to talk too much about rather simple applications, e.g. the affordances of a door or even just a door handle. A door can be critical in a building (it can limit the possibilities of even spacious rooms) but usually both designers and users tend to deal mostly with larger configurations, typically involving tens of such objects and their relationships, usually at several levels of abstraction simultaneously. We appear to be quite efficient and effective in recognizing affordances at all these levels. The question is how: does it simply involve massive constraint propagation from the readily perceivable affordances of components or do we map affordances onto objects at several levels (e.g. employing something like a hierarchical modular representation)?

The traditional emphasis on use affordances obscures another aspect of recognition: the possible difference between *use and design affordances*: do architects perceive affordances differently or recognize different affordances? We generally assume that education, training and experience play a significant role in the transition from user to novice to expert in architecture. There is also evidence that learning and development influence recognition as well as utilization of affordances. However, there may be more to that: a designer is not just an experienced and well-informed user. Designing involves different actions and other aspects as well as abstraction levels. These actions actually result into use affordances by interacting with opportunities in the environment or simply imposing alien structures on it. Recognizing the design affordances of a given situation is usually the domain of the trained professional, although users may also perceive them and act accordingly but usually following some established design precedent.

A third challenge concerns *abstraction*: design and design representations rely heavily on variable abstraction. Even though the role of abstraction has yet to receive the attention it deserves in architectural research, it seems inconceivable to try and apply affordances to architectural subjects without involving the multiple and often simultaneous levels that e.g. allow us to open a door and navigate through an unknown room without the slightest hesitation or allow an architect to consider together the design of an entrance and of a whole museum wing (or even to make mistakes by choosing incompatible solutions for the two). Explaining abstraction in terms of affordances between components works for bilateral relationships (e.g. a floor affords support for a wall) but not necessarily with respect to the multilateral relationships that characterize spatial entities and configurations. Such abstraction also relates to typology: what are the affordances of a generic or specific office space? Can we reduce them to the affordances of types and of their instances?

Such challenges form a network of interrelated research questions that is apparently typical of affordance research: opportunistic applications and initial explorations reveal a substantial potential that is only limited by the lack of a valid fundamental methodical and operational framework that guides comprehensive application and feeds back to theory meaningfully and purposefully.

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AFFORDANCES AND TECHNICAL ARTEFACTS

The basic problem of Gibson's theory of affordances is how it is possible for an animal to *directly* perceive what its environment 'has in store' for it or affords it. According to Gibson's theory, what the environment affords an animal is an objective feature of the environment. He also claims, however, that when an animal directly perceives the affordances of the environment, it perceives *meanings* and *values*. This would seem to commit the theory of affordances to the ontologically very controversial claim that values and meanings are objective features of the world. Gibson tries to avoid this by stating that an affordance is neither a property of the environment nor of the perceiving animal, but a property of the environment in relation to the perceiving animal. Affordances may be perceived directly, but because affordances are relational in nature, they are not simply objective features of the environment. Gibson maintains that there is only one world which is neither objective nor subjective. Additionally he seems to deny any difference with regard to the affordances of natural and artificial objects since he considers it a mistake to distinguish the artificial environment from the natural environment.

With respect to the many questions that Gibson's theory of affordances raises about the relational nature of affordances and his rejection of the subjective-objective distinction, we first argue, in line with views brought forward by Scanlon, Dancy and Parfit, that values should not be conceived as objects of perception at all. What we perceive are never other than objective features of the environment. To claim that these features are valuable, normatively significant, is to claim that they are reason-giving. Even if one denies that such reasons are inferred or constructed but instead holds that they are 'immediate', still this does not require the inclusion of reasons or values as objects of perception in the world. Secondly, we argue that the position that our perception is of objective features of the world is in line with how we propose to dispell, in so far as we are dealing with affordances of technical artefacts issues about the subjective-objective distinction, by considering affordances to be *ontologically* subjective features of the world but *epistemologically* objective (Searle, 1995). By doing so, a new interpretation of the relational nature of affordance comes into sight. Usually, the perceiver of an affordance is taken to be one of the relata that grounds the relational nature of affordances; Chemero's (2003) interpretation may be taken to be paradigmatic in this respect. However, we will argue that for technical artefacts his interpretation of the relational nature of affordances shows serious shortcomings. We therefore present an outline of an alternative interpretation of affordances of technical artefacts. With Gibson we will assume that affordances of technical artefacts may be perceived directly ("I see a hammer", that is "I see something with the affordance to hit other objects"). In contrast to Gibson, however, we will argue that the affordances of technical artefacts are not relational to the individual who happens to perceive them. The affordances are properties of just the technical artefacts. Nevertheless, these properties are not ontologically objective

features of the environment. The ontology of technical artefacts is relational; ontologically they are subjective features of the world, that is, they are objects with both physical and intentional properties. The relational nature of an affordance of a technical artefact is therefore not due to the involvement of the perceiver of that affordance, but due to the relational nature of the object of which the affordance is a property. This interpretation of the affordances of technical artefacts cannot be transposed to the affordances of natural objects and therefore challenges Gibson's claim that there is just one kind of environment. In closing we will briefly argue why, in our opinion, it is prudent to distinguish between the affordances of natural and artificial objects.

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AFFORDANCES AND THE MUSICALLY EXTENDED MIND

One of the main reasons we listen to music is to elicit powerful feelings. And by eliciting powerful feelings, music often functions as a tool for motivating and organizing individual and collective actions. Considerations such as these led Christopher Small to coin the term “musicking” to stress the dynamic character of our musical engagements. I will similarly use “musicking” to encompass the different ways that we actively engage with—and indeed use—music to animate behaviour, cultivate and refine affective experiences, and actively orient ourselves to others and the world more generally.

I argue that music often grants access to novel emotions by scaffolding and enhancing the functional complexity of our own endogenous resources, thus granting phenomenal access to experiences that we would be otherwise unable to access. First, I discuss the idea of “musical affordances” and specify both what musical affordances are and how they invite different forms of musical engagement. Next, I argue that musical affordances—at least when we act on them—enhance the functional complexity of various endogenous, emotion-granting regulative processes, drawing novel experiences out of us with an expanded complexity and phenomenal character. I appeal to different streams of empirical work to develop this idea. In so doing, I suggest that, since music is an essential external resource needed to access these experiences, it is therefore warranted to speak of the musically extended mind.

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ON THE AFFORDANCES OF TECHNOLOGICAL OBJECTS

Over the last two decades the concept of ‘affordances’ has enjoyed increasing popularity in work carried out in sociology and in related (sub)fields of inquiry such as organization studies or the social study of science and technology. Taking this work as a starting point we suggest, somewhat against the grain, that the ‘affordances’ of technological artefacts should be treated as themselves topics of analysis rather than as bottom-line explanations. Such ‘affordances’, we might say, name the ongoing exchanges of attributes between human bodies and the world of made objects. Understood in this manner ‘affordances’ cannot be seen as (merely) bundles of properties *possessed* by material artefacts (as in for instance in Hutchby’s [2001] influential formulation) - which in turn may, or may not, be perceived or activated by corresponding ‘effectivities’ on the part of the subject. It is rather the manner in which such attributions of ‘simple location’ (Whitehead, 1970) are made by actors in particular social settings that should be the object of sociological study. In short we are proposing that ‘action possibilities’ are better understood and described via a vocabulary of processes rather than one of end-states (Cooper and Law, 1995). In line with this understanding we must therefore ask not only what a given set of ‘affordances’ *is*, but also *when*.

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INVESTIGATING THE CONCEPT OF AFFORDANCES FROM CHEMISTRY

This lecture starts from the exploration of current chemical practices in order to investigate the meaning and the role of the concept of affordances in current philosophy of sciences. Following a historicized and ‘distributed’ kind of epistemology, we will highlight: (1) the mutual dependence of the levels of organization in most chemical activities; (2) the codefinition of relations and *relata*; and (3) the constitutive role of the modes of intervention in the definition - always open, operative, and provisory - of chemical ‘individuals’. The individuality of a chemical body does not only depend on its composition and its structure but can also dwell upon its size, the environment, and the chemical device, according to the context of practices at stake. Chemical body can thus be considered to be ‘ex-stances’ instead of ‘sub-stances’ to refer to Bachelard’s turn of phrase. ‘Ex-stances’ are the first formulation of ‘affordances’ developed in relationship with chemistry. From Bachelard to Rom Harré, we will point out that, beyond its *heuristic power*, the concept of affordances enables philosopher to overcome metaphysical drawbacks by developing a *metachemical approach* which faces the new ontological and mereological questions raised by technosciences. In this respect, we will stress that the concept of affordances takes its *consistency* and its *differentiating power* at a particular crossroads of problems which includes other concepts such as emergence, process, and particulars. In doing so, we will explain in which manner the concept of affordances paves the way for a reconceptualization of the concept of emergence which addresses the consequences of chemical transformations on humans and non-humans by integrating the pragmatic, socio-political, technological, and institutional conditions of chemical activities into the philosophical debate.

Keywords: Ex-stance, mereology, nanochemistry, affordances, individuals, emergence, metachemistry, *ceteris paribus* clause, operative knowledge, bundles of habits, distributed particulars.

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**CREATING CHANCES THROUGH COGNITIVE NICHE
CONSTRUCTION –THE ROLE OF AFFORDANCES AND
ABDUCTION**

Human beings continuously delegate and distribute cognitive functions to the environment to lessen their limits. They build models, representations, and other various mediating structures, that are considered to aid thought. In doing these, humans are engaged in a process of cognitive niche construction. I contend that a *cognitive niche* emerges from a network of continuous interplays between individuals and the environment, in which people alter and modify the environment by mimetically externalizing fleeting thoughts, private ideas, etc., into external supports. For cognitive niche construction may also contribute to make available a great portion of knowledge that otherwise would remain simply unexpressed or unreachable. This can turn to be useful especially for all those situations that require to transmit and share knowledge, information, and, more generally, cognitive resources. In dealing with the exploitation of cognitive resources embedded in the environment, the notion of *affordance*, originally proposed by Gibson to illustrate the hybrid character of visual perception, is extremely important. In order to solve various controversies on the concept of affordance and on the status of the *Brunswikian* proximal/distal dichotomy, I will take advantage of some useful insights that come from the study on *abduction*. Abduction may also fruitfully describe all those human and animal hypothetical inferences that are operated through actions which consist in smart manipulations to both detect new affordances and to create manufactured external objects that offer new affordances/cues.

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Paul Micklethwaite

SUSTAINABLE DESIGN, DEMATERIALISATION AND AFFORDANCE

“An affordance is a quality of an object, or an environment, which allows an individual to perform an action. For example, a knob affords twisting, and perhaps pushing, while a cord affords pulling.”

<http://en.wikipedia.org/wiki/Affordance>

“affordances – a relational property that becomes salient only in respect to human purposes and material agencies”

Nordmann (2011:1)

Based in a design school focused on material making, I am most familiar with use of the term ‘affordance’ in industrial design, particularly via the influential writing of Donald Norman (see references below). Understanding affordances in relation to human interaction with physical and technological objects – do I push or pull this lever? - allows us to design products which are more intuitive and easier to use. Though they never use the word, the concept of affordance predominates in Apple’s new product promotions.

Affordances are seen in terms of objects, products and things. They are the codes and cues by which we know how to interact with the material world. They are psychological and cultural triggers of meaning and behaviour. In this paper I consider the notion of affordance in relation to the common emphases on re- and dematerialisation in the field of Design for Sustainability. In doing so I am responding to the prompting question:

What are the cultural practices involved in ‘design for sustainable change’ and how do they change objects and techniques, the very making of a thing.

I want to examine the shift from ‘ecodesign’ to ‘sustainable design’ in terms of the notion of affordances. Ecodesign, with its primary focus on the product lifecycle, is centrally concerned with materiality – the ‘stuffness’ of stuff. Ecodesign seeks to rematerialise – to replace materials with environmentally-preferable alternatives. Sustainable design, a later construct, is less interested in materiality *per se* than with what we do with our stuff – not just how we make what we make (and unmake), but why we make what we make, and what we do with it. Sustainable design is interested primarily in people – their values, beliefs, behaviours and actions - rather than products. As such its outcomes tend to be more systemic and behavioural than product-based. For the sustainable designer, products are props that afford more- (or less-) preferable behaviours. Sustainable design focuses on our interactions with the material world, rather than our production of that world. In fact, it is possible to be a

‘sustainable designer’ and not engage in physical making at all. On this view, a design response that seeks to create more – albeit better stuff – is misguided. We should rather focus on optimising, integrating and humanising our products and technologies, rather than seek to make yet more. Sustainable design is therefore often about dematerialising, and not-making.

In a less-stuff-more-people world, we still need systems, platforms, and services that enable people to interact more effectively and enjoyably. These platforms and infrastructures will require some technology and a lot of design. Some services will help us share the load of everyday activities: washing clothes on the roof of apartment blocks, looking after children, communal kitchens and gardens, communal workshops for maintenance activities, tool and equipment sharing, networks and clubs for health care and prevention.

Thackara (2005:6)

The emerging modes of design practice ‘social design’ and ‘design for social innovation’ take just this approach. These modes of designing may not generate any physical, tangible outcomes. They aim at behaviour change, awareness raising, communal participation – and may not require any new hardware. What of affordances in these cases?

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**MODELLING UMWELTEN – AN APPLICATION OF
ECOLOGICAL PSYCHOLOGY TO GEOGRAPHIC
INFORMATION SCIENCE**

As a theory of environmental information, the theory of affordance is naturally attractive for geographic information science, a science whose foremost topic is the information about geographic reality. Consequently, the theory of affordances and the concomitant understanding of agent-environment systems have been taken up in geographic information science and related disciplines. Most notably, geographic information science has seen many applications of affordances to agent-based simulations, which allow the study of more complex systems of multiple agents behaving in complex environments. The present paper takes a look at the theory of *Umwelten* by von Uexküll. The theory of *Umwelten* predates the affordances theory, but bears interesting similarities in its holistic understanding of agent-environment system. The theory of *Umwelten* is used to structure spaces of human activities according to the activities they afford, and to connect these spaces with geographic information. The nested structure of environments allows for establishing a meronomy of environments determined by a hierarchical decomposition of the activities they afford. The mereological theory is implemented as information science ontology and exploited in an agent-based simulation.

The agent-based simulation illustrates at hand of a practical application how human observations of affordances can be augmented with context-dependent technical sensor observations to support decision-making in every-day activities. A test case deals with the event of icy roads derived from current weather conditions.

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PHENOMENOTECHNIQUE: AN ASSESSMENT

In my contribution, I will try to give an account of the notion of “phénoménotechnique” as it was developed in the epistemological writings of Gaston Bachelard. The organizers asked me to compare this concept with that of “affordance.” I will thus address this question at the end of my presentation. In short: Phenomenotechnique is a relational concept that relates particular research technologies to possible natural phenomena which they help to bring to manifestation. Affordance appears to be a relational concept that relates living beings and particular living conditions in an intentional way of being-at-hand. The question thus arises whether there are not more differences than commonalities between the two concepts.

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ENHANCING KNOWLEDGE, AFFORDING IGNORANCE

The present work distinguishes between two epistemic functions that scientific procedures are typically expected to fulfill. I call these functions *knowledge enhancement* and *ignorance affordance*. While enhancing knowledge is an uncontested goal of many scientific endeavours, I argue that affording ignorance – allowing an epistemic agent to justifiably ‘get by without knowing’ – is an equally important and independently valuable virtue of scientific procedures, whether theoretical or experimental. Idealizations, abstractions, mathematical approximations, robustness tests and randomized trials are only a few of the tools that scientists employ to convince themselves that they can ignore certain elements in a problem while retaining warranted trust in the solution. Despite this, philosophers of science have thus far overlooked the importance of ignorance affordance, focusing almost exclusively on ways in which scientific procedures enhance knowledge.

The talk has three parts. The first part is dedicated to an explication of the notion of ignorance affordance. Procedure P affords ignorance to epistemic agent E with respect to a piece of (declarative or procedural) knowledge K if and only if to have warranted trust in the results of procedure P , epistemic agent E does not need to possess knowledge K . The second part of the talk argues that affordances of ignorance are widespread and valuable to scientific inquiry. In particular, such affordances underlie the modularity and generalizability of scientific results. This is exemplified through an analysis of the methods used to calibrate measuring instruments at national standardization bureaus such as the US National Institute of Standards and Technology (NIST). The third and final part locates ignorance affordance on the conceptual terrain of science studies by considering its relationship with Latour’s notion of black-boxing and the Gibson-Harré concept of affordance.

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AFFORDANCES: TOWARD AN ONTOLOGY FOR ALL ORGANISMS

I will highlight the argument that the requisite theory of perception-action should apply to all organisms, the 96 phyla that comprise the Five Kingdoms—Bacteria, Protoctista, Fungi, Plantae, and Animalia. The major barrier to implementing such a theory is the traditional putative incommensurability of psychology, biology, and physics. The incommensurability encourages taking “loans of intelligence” to explain perception-action, invites a division of living things along the lines of human versus nonhuman, and deters seeking explanation from first principles. A science founded on commensurability is required. I will discuss some of its challenges. Primary among them is the conception of affordance. Two allied proposals will be made: (1) affordances are expressions of the inseparability of organism and environment in evolution, and (2) affordances are objective, real, and physical in the senses of impredicative (defined in reference to the totalities to which they belong) and quantum compatible (indefinite until a particular spatial-temporal relation is effected).

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Emre Ugur and Erol Şahin

AFFORDANCE: THE ELEPHANT IN THE ROOM

The notion of affordances, conceived by J.J. Gibson to clarify his ideas in Psychology, turned out to be one of the most elusive notions that influenced studies in a wide range of fields. The notion, from its very conception, has been a hazy one. Despite the existence of a large body of literature on the notion, one encounters different façades of the term, sometimes contradictory, rather like the description of an elephant by the six blind men in the famous Indian tale.

This talk will consist of three parts. In the first part, we will briefly describe the historical context in which the notion was conceived to clarify Gibson's stance against other contemporary paradigms of his time. Then, the use of affordances in different fields, ranging from human–computer interaction to autonomous robotics, will be reviewed in order to outline the confusion around the notion. We will identify the existence of different perspectives to view affordances, as a major source of the confusion and will argue that there are three, not one, perspective(s) to view affordances.

In the second part, we will propose a formalization of affordances for the learning, perception and use of affordances in robot control, and show how the formalization enables a mobile robot to learn, perceive and use affordances such as traversability. We will argue that three of the main attributes that are commonly associated with affordances, that is, affordances being relative to the environment, providing perceptual economy, and providing general information, are simply consequences of learning from the interactions of the robot with the environment.

In the third part, we will share the criticisms that we were subjected to over the use of this highly debated term (and how others working on similar ideas avoided to be drawn into such heated debates by using a different terminology), and will argue that the debate over affordances should be based on experimental results (along with philosophical arguments) in the future.

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Cees van Leeuwen

“INTO THIS WORLD WE'RE THROWN” – A PREQUEL TO FUNCTION

Gestalt and ecological realism agree that the world is there for the taking: "the bread says: eat me" (Koffka). In Gibsonian ecological realism, this notion is specified in the concept of affordance which offer body-scaled information to the acting organism. This concept is cashed out in the complementarity of affordances and effectivities, where the latter specify a repertorium of action capacities. The complementarity is spelled out in highly-organized dynamics of an actor, whose behavior evolves in direct coordination with higher-order dynamical properties of the environment.

This description assumes an emergent(order parameter) dynamics at a highly abstract level without, however, specifying the emergence from the microscale dynamics of its substrate.

How to characterize the substrate, from which these functions emerge? Traditional answers from neuroscience have characterized the visual system as hierarchical and segregated. More recently, neuroscience has focused on recurrent activity, but has retained two notions: first, the division of labor between lower and higher-levels of neural signal processing and representation; second, the notion of the brain function as inference to the best explanation of external signals. Thus, even though the function of brain activity is seen as essentially anticipating the state of affairs in the world, this view remains essentially passive, as the primary goal is to reach an equilibrium state, in which the external world is optimally reflected internally. I will argue that the available evidence does not support either notion. As an alternative to hierarchy, I will offer a notion of intrinsic holism, in which brain states are geared to produce organized patterns of activity. As an alternative to a system geared towards stable equilibria, I will present my view of the brain as restlessly wandering and propose this activity as a substrate for actively exploring the world and what it affords.

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Catharine Ward Thompson

WHAT GREEN SPACES AFFORD – LINKING LANDSCAPE AND HEALTH

This paper takes an environmental designer's view of relevant and effective research and research approaches that can provide evidence for policy and practice (Ward Thompson, 2013). I will explore recent research undertaken in OPENSspace research centre that demonstrates the links between the quality and accessibility of local open space and people's health and quality of life. The research has contributed to recent understandings on the importance of the outdoor environment for wellbeing, from childhood to old age, including development of Scottish Government policy for the future.

I will initially consider the relationships between attributes of outdoor environments and responses in populations using those environments, with a particular focus on theories, past and present, for the role of the landscape as a salutogenic context – one that engenders good health (Ward Thompson, 2011). I will then describe work that has investigated patterns of woodlands and green space visits for different kinds and levels of activity, relating these to perceptions, experience and barriers to use by different groups across a range of UK contexts (Ward Thompson & Aspinall, 2011). Segments of the population targeted include deprived urban communities, black and minority ethnic groups within such communities, and older adults across different regions of Britain. The findings show certain consistent patterns in active use of natural environments, and in attractors and barriers to use. They suggest that natural open space offers opportunities for peace, relaxation and social activities and, for many, physical activity is a secondary benefit, rather than a primary purpose in visits. Nonetheless, recent longitudinal work points to a causal relationship between improvements to the quality and accessibility of natural environments and levels of active use (Ward Thompson, Roe & Aspinall, 2013).

Recent, innovative work in this area was supported by the Scottish Government and undertaken in collaboration with the James Hutton Institute and the Universities of Heriot-Watt, Glasgow and Westminster. It investigated whether there is a link between GIS-based measures of the amount of green space in the residential environment and both biological and self-report measures of health and wellbeing. It was undertaken with residents of deprived urban communities in Scotland. We found a significant association between higher levels of green space and lower levels of physiological stress, as indicated by diurnal salivary cortisol patterns in a sample of unemployed men and women. This is important in demonstrating a method using biomarkers for measuring the salutogenic effects of environmental settings such as green space and provides evidence of environment-body interactions within a real-world context of people's everyday lives (Ward Thompson et al., 2012; Roe et al, 2013)

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