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Neuropragmatism and the Culture of Inquiry: Moving Beyond Creeping Cartesianism

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ABSTRACT. Recent work in psychology by Daniel Kahneman on system 1 and system 2, recent interest in revitalizing representationalism in cognitive science, and recent use of the concept of information in the science of consciousness all suffer from a creeping Cartesianism that blocks the road to inquiry. Neuropragmatism offers a way through this hurdle by emphasizing the contextual situation in which inquiry develops. The neuropragmatic sketch of experience, habit, mind, consciousness, and inquiry provided here is used as a framework to reconstruct the important data we consider from psychology, cognitive science, and the science of consciousness. The shortcomings of these empirical studies are overcome by system 3, which is the dual-process of enculturation that situates systems 1 and 2 and provides the means of their further transformation through the work of creative intellectuals, whose task it is to imagine and discover new possibilities for lived experience. The introduction of system 3 is a philosophical hypothesis intended to effect further philosophical discussion and scientific consideration.

Keywords: Systems 1 and 2, neuropragmatism, representationalism, information, consciousness, culture, inquiry, Cartesianism, Daniel Kahneman.

Résumé. Le neuropragmatisme et la culture de l'enquête : dépasser le cartésianisme rampant. Le travail récent en psychologie de Daniel Kahneman sur le système 1 et le système 2, l'intérêt récent pour une reconsidération du représentationnalisme en sciences cognitives, et l'usage récent du concept d'information dans les sciences de la conscience souffrent tous d'un cartésianisme rampant qui entrave la voie de la recherche. Le neuropragmatisme propose une manière de surmonter cet obstacle en insistant sur le contexte de développement de l'enquête. L'esquisse neuropragmatiste de l'expérience, de l'habitude, de l'esprit, de la conscience et de l'enquête que nous proposons ici sert de base théorique pour reconsidérer des données importantes obtenues en psychologie, en sciences cognitives, et dans les sciences de la conscience. Les défauts de ces études empiriques sont dépassés par le système3, c'est-à-dire par le double processus d'acculturation qui contextualise les systèmes 1 et 2 et qui fournit les ressources de leur transformation par le travail d'intellectuels créatifs, dont la tâche est d'imaginer et de découvrir de nouvelles possibilités pour l'expérience vécue. L'introduction du système 3 est une hypothèse philosophique ; elle vise à susciter d'autres discussions philosophiques et une prise en compte scientifique.

Mots-clés : Systèmes 1 et 2, neuropragmatisme, représentationnalisme, information, conscience, acculturation, cartésianisme, Daniel Kahneman.

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INTRODUCTION

Pragmatism is explicitly anti-representational, emphatically anti-Cartesian, and undeniably experimental. These characteristics and the history shared with early psychology, psychobiology, cognitive science and the cognitive, behavioral, and social neurosciences have led many to recognize pragmatism as the defining trait of contemporary mind science. For some, like Jerry Fodor, this is not only lamentable but (practically) suicidal for the future of cognitive science. For most, the pragmatism at work in the mainstream cognitive sciences is adequate. However, we contend that this embryonic pragmatism is at risk of becoming still-born, thereby risking the vitality of the sciences of mind. We neuropragmatists are the few who recognize the situation as such. For all the talk of pragmatism, much more of it needs to be worked explicitly through scientific research. As things stand, too many questions – and worse, time and resources – deal with the creeping Cartesianism underlying much of the cognitive science enterprise itself.

William James and John Dewey anticipated many of the current ideas about the mind put forth in connectionism, embodied, enactive, and extended mind theories, and ecological psychology (cf. Dalton, 2002; Freeman, 2005; Rockwell, 2005; Chemero, 2009; Johnson, 2007; Schulkin, 2009). We have taken the liberty of naming such thinkers *neuropragmatists* and have written on several core issues (Solymosi, 2011a, b; Shook & Solymosi, 2013). In this essay, we take a further step in articulating a philosophical – *viz.*, proto-scientific – hypothesis that results from what we believe is a neglect within cognitive science of the radical nature of pragmatism. Fodor may have well been correct when he expressed worry about the pragmatism in cognitive science; he was simply wrong to think it was too much: the problem is that there is not enough.

Our hypothesis is that once the Cartesianism underlying the psychological constructs of systems 1 and 2 (as recently popularized by Daniel Kahneman),[1] the debate over what to do about so-called "mental representations," and the import of the nebulous concept of information is eradicated, we contend that a reconstruction of the two systems, of representations, and of information yields a third system that resolves the difficulties faced by cognitive scientists suffering from creeping Cartesianism.

In other words, system 3 is chronologically the most recent of the systems, the most fragile, and the most important for understanding the mental life of the individual yet social human animal. The stereotypical Cartesian and Humean concerns over intentionality and the "external" world are shown to be more properly conceived as socio-cultural events and not strictly (neuro)biological "things" of individual brains (or minds). So conceived

[1] Kahneman has given a forceful presentation of these so-called systems of cognition in his recent work, *Thinking, Fast and Slow* (2011). System 1 is characterized as the automatic, quick response – habits, instincts, etc. – that humans have that allow them to act without deliberation in time-sensitive situations. System 2 is the slow, deliberative, and conscious attention humans sometimes engage in to override the impulsiveness of system 1. We elaborate these two systems in a later section.

system 3 is cultural insofar as it produces the means by which the first two systems are capable of doing their work in a *specific situation*.

Our approach is piecemeal but cumulatively constructive. We present critical summaries of systems 1 and 2, of recent discussion over the status of representationalism, especially with regard to dynamic systems theory (DST); and of the ubiquity of information, specifically its role in the three systems and in representationalism. Throughout each of these steps, we offer a pragmatist reconstruction so that much of the important experimental data is retained and available for further work. We conclude with the introduction of culture as system 3. We also begin with culture in some prefatory remarks about some key neuropragmatic terminology.

NEUROPRAGMATIC TOOLS FOR INQUIRY

Familiarity with the tools one has at hand always well serves the inquirer. Reminding oneself and one's fellow inquirers of the uses of familiar and integral tools not only expedites their regular use, it also affords the opportunity to more readily anticipate and create novel uses of these tools. Intelligence and innovation go hand-in-hand when such hands are well informed. Here we sketch a brief account of how the general pragmatist view of the culture and experience of inquiry occurs, with which we also introduce other terms taken from recent scientific literature. The classical terms we introduce here are: *experience*, *habit*, *mind*, *culture*, *consciousness*, and *inquiry*. The new terms are the symbol *Œ*, and the regulatory mechanisms, *homeostasis* and *allostasis*.

For pragmatism and science alike, experience is a prominent concept that carries considerable authority. Prima facie, the appeal to experience may not seem problematic in itself. However, when it comes to the science of the mind, experience is both that which is to be explained and the means by which an explanation gains some authority. This circularity is even more troubling when we consider that the conception of experience at hand is vague and often an equivocation between what the Germans refer to as *Erfahrung* and *Erlebnis*.[2] The latter refers to the sensationalistic empiricism of David Hume and, subsequently, the logical positivists and empiricists. On this conception of experience, there are mental or experiential *states*, each of which is easily discernible from another. The philosophical and the scientific literature abounds with talk of states of blue or red, cold or hot, etc. This classical view of experience is faced with the problem of *representing* the world external to the experiencing mind. This view relies on an ancient distinction between sensation and perception. Briefly, sensation consists in the bodily sense organs (*i.e.*, eyes, ears, nose, tongue, skin) sensing the external world and transmitting its data about the world to the mind, where it is then perceived. Dewey called this view the spectator theory of knowledge (LW4), and Daniel Dennett has christened it the Cartesian Theater (1991). The central epistemological and metaphysical issue here is that the mind *is* a thing that passively receives sense

[2] Here we follow the useful distinction made by neopragmatist Robert Brandom (2004). Despite the utility of the description of classical pragmatism in the first part of Brandom's article, the second part on semantics is extremely problematic, as Larry Hickman has critically addressed (2007).

data about the world and that this is how the mind *knows* about that world. Among the several problems with this conception of experience is what is known as the veil of ideas or appearances. This veil divides the world in two, into the mental and inner world and the physical and external world. Somehow these sense data of which the veil is made connect with the external world and thereby represent that world to the inner world. This indirectness of experience presents the problem of knowing *anything* with certainty about the world, which raises further questions about how scientific knowledge is reliable enough for human action to depend upon.[3]

In light of Darwinism, the classical pragmatists found good reasons for rejecting this duality between mind and world. Instead of conceiving of experience as *Erlebnis* (*i.e.*, sensationalistic), they promoted the conception of experience as *Erfahrung*. Experience of this variety is at play when someone asks if you have experience with a skill, like skiing. It is another way of asking if you have *familiarity*. And just as the etymology suggests, there is no real divide – mind and world are of the same source, just as siblings are of the same parents. This intimacy of experience also provides the means of knowing about the world. Instead of experience being a sequence of atomistic states, the pragmatists considered it a continual process of learning. Education occurs through a familiarization – an ongoing transaction between the learner and that which is learned. There are differences but not divides. Of the experiences had, *the differences that prove to make a difference* in future experience are particularly important. As James put it, consider the "cash value" of our claims in terms of differences that make a difference. Dewey echoed the sentiment in his emphasis on the consequences for lived experience.

For pragmatism, there is no underestimating the import of this conception of experience. For James, experience was the underlying metaphysical category – *a world of pure experience*. Dewey modified James's radical empiricism by first prioritizing the experiential *situation* – the contextual whole in and through which experience occurs. From this priority of the situation, the phase of experience we know as inquiry is able to make the *functional* distinction between organism and environment. This distinction between organism and environment – while often made at the skin – must be functional and not ontological because the two are inseparable: if there is an organism, then there is an environment; if an environment, then an organism. Consider the etymology of "environment": it is that which "environs," *surrounds*, something – in this case, the organism.[4] Recent work in

[3] Indeed, by the time of Kant, the problem of knowledge had become how knowledge was even possible in the first place.

[4] Some readers may contend that this co-defining of *organism* and *environment* is misleading because *organism* is a biological or natural category that presupposes the third-person perspective, whereas *environment* is a phenomalistic or "experiential" category that presupposes the first-person perspective. Our use of these two terms together is not idiosyncratic. For Darwin, adaptation was a matter of the relationship between an organism and its environment – a matter that remains influential today as Griffiths & Grey (2001) indicate. With regard to Dewey specifically, the very divide between the third-person perspective as biological or natural and the first-person perspective as phenomalistic or experiential is the very dualism of modern philosophy he sought to destroy from the evolutionary perspective taken in *Experience and Nature*. In short, the first-person perspective – the so-called

evolutionary biology and developmental systems bears this out. Griffiths and Grey (2001) have argued that this coupling of organism and environment is so tight that the proper unit for evolution is the single unit of *organism-environment*, or as Griffiths and Grey suggest, the symbol *Œ*. From here, Dewey's conception of experience as organism-environment transaction can be restated as Œ-transaction. This conception implies that experience is old: it has a long evolutionary history, most of which is a series of events that are simply had – experiences involved with knowledge are a much more recent affair.[5]

Experience as Œ-transaction implies that any attempt to localize experience in any part of the transaction is doomed to failure. Furthermore, experiencing and the products of experience are not exclusively found inside the organism. This transactionalism requires that experience modify both the organism and the environment. Dewey referred to this joint modification as *adjustment*. This is a *dual process* of the organism's *adapting* to the environment and the organism's *alteration* of the environment (Hickman, 2001, p. 21). Among the consequences of these adjustments is the development of *habits*, the dependable and regular behavioral dispositions to act without foresight or deliberation. Given the time pressures within Œ-transactions, the development of habits comes as no surprise. Some habits become so good at keeping life and limb together they become generic traits in a species. One such trait is plasticity, an individual organism's ability to learn new habits through its interaction with its environment.

Another habit is the active organization of one's environment so that one's habits are more effective. For Dewey, this ecological niche construction develops a niche filled not just with transient and fleeting gestures and sounds that communicate the here and now but also with signs and symbols that persist beyond the momentary use. This phase of experience Dewey conceived as mind*ing*. Instead of mind being some sort of individual ephemeral thing that somehow interacts with a physical body, the body *minds* its environment. Minding on this view is the dynamic organization of habits of the organism and of its environment that afford meaningful behavior. While dynamic, this

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privacy of mind – grows out of the public transactions of the third-person perspectives, just as experience grows out of nature. These claims will become clearer as this sketch develops.

[5] To be clear, this recognition does not imply that only cognitive experience is of value; rather, that there are far more varieties of experience than that which is known, that such experiences are often significant, and that without them there can be no cognitive experience in the first place. On this point, specifically within Dewey's thought, see Hickman, 2001, pp. 17-20.

A reader may further retort that putting experience in phylogenetic terms is unorthodox because it leaves no obvious space for the subject of experience: it seems odd if not absurd to place the subject in the species and not in its members. Yet this way of talking about experience, as though there must first be a subject who is capable of undergoing experience in the first place, prior to any experience whatsoever, is a non-starter. Pragmatists from James and Dewey to Rorty and Dennett reject this conception of experience as presupposing a subject. Rather, the individual subject or self develops out of experience as Œ-transaction. Integral to this achievement of being able to talk to oneself without others' hearing it is an ecological niche in which others talk to each other first and foremost. For more on this point, see Dewey, 1925/LW1, p. 135, and Dennett, 1991, p. 195. Lastly, it would behoove the reader to remember that for Cartesians consciousness, mind, self, and subject are conceived as one and the same thing. We deny such equivocation and consider each of these terms as specific phases within the process of experience.

scaffolding has far greater stability than does conscious activity, which occurs when the regular flow of habitual activity becomes disturbed and thereby uncertain.

A minding organism goes about its environment with expectations of how this transaction will go. For this reason, pragmatists conceive of belief as a *habit of action* – not a representation or reflection of how the world is independently of human activity, *viz.*, of a reality behind the veil of appearances. When an organism's habits are conducive to activity that maintains life and limb, there is no need for adjustment of the organism nor its environment. However, when this dynamic equilibrium of Œ-transaction is disrupted, some adjustment is necessary. One common means of adjustment – and the one that receives a significant amount of attention by neuroscientists – is *homeostasis*. This is the regulatory mechanism that *reacts* to the disruption by modifying the organism until the dynamic equilibrium is *re*-attained. A simple example is the body's either sweating or shivering to return to a specific internal temperature. Another means of adjustment is the lesser discussed *allostasis*. This regulatory mechanism is anticipatory of a likely disruption to the Œ equilibrium. This anticipation, to be clear, is not conscious nor cognitive (*i.e.* not having to do with knowing, though it may very well have to do with the brain). It is anticipatory in that it is a preparatory habit aimed at modifying the body to ready for further disruptions of equilibrium and to bring it to a new dynamic equilibrium. An example is the release of cortisol and/or testosterone prior to sex or battle. After a provocative discussion of regulatory mechanisms, Dewey evoked his 1896 characterization of Œ-transition as an organic circuit that is a system of tensions, concluding that "This *wariness* [characterized by anticipatory modification] is the organic prefiguring of the tension that constitutes *awareness* in the case of human beings" (2012, p. 212) – a noteworthy observation that plays a recurring theme in our argument.

Jay Schulkin has noted that this pattern of allostasis – of stress and relief – follows Dewey's rhythm of life, of anticipation and consummation (2003, p. 38).[6] Furthermore, the regulatory dynamic between equilibrium, homeostasis, and allostasis shares a parallel with Dewey's and Peirce's basic pattern of belief, doubt, and inquiry. So strong is this parallel, these regulatory mechanisms should be seen as precursors to and continuous with the fixation of belief. The pragmatist process of inquiry only gets going when our actions and the beliefs that guide them fail to cohere with our expectations and interactions with the environment, thus bringing about a felt difficulty. This feeling may be very brief, such as when you are asked to order at a restaurant without yet having decided. As Peirce noted, there are four general ways of resolving this difficulty, the methods of tenacity, authority, a priority, and science (1877). These first three seem to resist any sense of fallibilism or an openness to change according to the circumstances. The power of tradition in each is indicative of homeostasis – do what it takes to regain stability as it has always been. Change is to be resisted. Like allostasis, the method of science seeks to modify the situation such that it is new, having grown, however, from

[6] Schulkin has written extensively about homeostasis and allostasis along pragmatist lines. See Schulkin, 2003, 2011a, and 2011b.

the old. A new equilibrium is reached when a new set of beliefs is fixed as a result of inquiry. Dewey's emphasis on the importance of cultivating an experimental attitude in life is key. The flexibility of mind determines the ability of the organism – and its community – to deal with problems in an ever more intelligent fashion. The better a group of organisms can anticipate problems likely to arise, the better chance it has in preparing for such problems.

This anticipation, however, differs from allostasis in that it requires conscious deliberation on the part of the community members. It is one thing for a felt difficulty to be had and resolved without one's recognizing it. It is quite another to name the difficulty, to name the exigency, and to put effort forth to resolve it, or even evade it in the first place. This style of anticipation requires consciousness – or, in an effort to overcome or resist the unfortunate hypostatization of adverbs as committed by Cartesianism, *conscious activity*.

Where minding is the relatively stable scaffolding that makes Œ-transaction meaningful, it is insufficient for deliberate, and especially scientific, inquiry. Minding is a necessary condition for consciousness, but the two are not identical. Dewey recognized that the basis of conscious attention is in the *wariness* an organism faces when the Œ equilibrium is sufficiently disrupted that the beliefs, habits of mind and action, and other bodily regulatory mechanisms are inadequate for the task of resolution (2012). So a culture of inquiry evolves to provide the symbolic significance, cultural instrumentation, and worldly – *viz.*, inquisitive, if not yet experimental, though distinctly technical – orientation that is necessary for the conscious attention and deliberate intervention into the situation in order to create from the resources at hand[7] a new situation that is no longer problematic but consummatory and ameliorative.

Dewey, late in life, regretted his use of the term *experience* because so many of his fellow philosophers confused his *Erfahrung* with the Humean *Erlebnis*. For instance, Dewey wrote that he should have titled *Experience and Nature* as *Culture and Nature*. In light of recent advances in our understanding of non-human animal life, especially in its continuity with human life, we reserve experience as a larger category than culture. Experience as Œ-transaction is deep, going back millions of years. Culture refers to the idiosyncratic Œ-transactions that define symbolic and sapient – *viz.*, human – life. Some species are communicative and have just those sorts of experiences, but they do not know it. Others communicate through symbols and signs and not just gestures and sounds; but they are not aware of their semiotics, nor can they inquire into them. Culture grows out of such populations when its instrumentation becomes deliberatively innovative and thus consciously selective.

Recall that adjustment is a dual process that modifies organism and environment alike. This general phase of Œ-transaction develops into a powerful process with the evolution of culture. The introduction of cultural artifacts affords humans the means of deliberate innovation, specifically in using them to discover new strategies for getting about the natural and cultural

[7] *Viz.*, the raw materials, intermediate stock parts, and skill and tool sets (Hickman, 2001).

environment *and* for transmitting the successful strategies to the rest of the culture, thereby reforming it. This process of discovery is undertaken by a small number of inquirers. These researchers have a greater disposition toward fallibilism and stronger attention spans. They have developed a set of habits that are conducive to performing cutting-edge inquiry. The projects taken up by artists and scientists alike – the creative intellectuals – demand an openness and willingness to be self-critical, not only to develop new solutions to problems but to reconsider both the solutions proposed and the articulation of the problems addressed. This degree of critical reflection not only requires above average conscious attention to the complex situation but also a community that encourages and effects this highly sophisticated sort of inquiry.[8]

Over time, however, this imbalance between experimentalists and those who just benefit from experimentation has changed. Our culture has slowly but surely become more experimental. From the days of *Homo erectus*, when hominins spent millions of years using the same process to manufacture the same tools, hominins today are regularly if not constantly developing new tools, skills, and strategies, *and* passing these developments to the rest of the population. Culture is a dual-process system that actively promotes discovery via experimentation and deliberately modifies the cultural environment in light of these discoveries.[9]

From this pragmatic sketch, a reconstruction of these key concepts or themes in contemporary cognitive science is possible. Our reconstructive sketch situates Kahneman's systems 1 and 2 within the just described view of habits, conscious mind, and culture. This provides the framework for addressing concerns about representationalism, and consequently clarifying uses of the term information. Through this our hypothesis for the postulation of system 3 and the call for further inquiry into it becomes clearer.

SITUATING SYSTEMS 1 & 2

Kahneman's recent book (2011) elaborates a dual-process theory of human cognition. He takes up the nomenclature of Stanovich & West that distinguishes between a fast response, system 1, and a slow one, system 2 (Kahneman & Frederick, 2005; Stanovich & West, 2002). Even though Kahneman is careful to note that systems 1 and 2 are umbrella terms covering several different subsystems, he nevertheless sets them in nearly perfect dichotomous opposition. Where 1 is fast, automatic, effortless, and always operating, 2 is slow, lazy, and rarely operating. Plus, system 1 is metabolically efficient, whereas system 2 drains energy. The metabolic contrast is well illustrated by the commonsensical descriptions of each system. System 1 is the set of habits or intuitions or instincts that quickly respond to immediate problems a person may face. Usually, the system does a good enough job at

[8] To appreciate the disproportionality, consider that all humans are familiar with the problem of thirst and its easy resolution. But most humans lack the unique traits required for experimental inquiry performed by a research team in a laboratory.

[9] This feedback serves to modify the upbringing of the next generation of creative intellectuals, for the problems and the resources available for inquiry will have been modified and expanded as well.

reacting, but mistakes are made regularly enough that a fail safe is beneficial. System 2 evolved to be what Kahneman describes as the conscious self that is, on occasion, capable of pushing back against habit or instinct. This tension is perhaps better assuaged when a person is not in a situation that demands immediate response. That is, system 2 is capable of modifying system 1 through the deliberate intervention into one's lived experience that is intended to change a person's habits. Take, for example, an overweight person who wants to lose weight. His system 1 readily accepts offers of food or simply directs him to get food that is delicious, calorie-rich, and readily accessible. Because of such habits (and other cultural factors to be discussed later) such an individual does not realize that he has eaten more than he needs until it is too late for maintaining the goal of not gaining weight. System 2 intervenes by making it more difficult for system 1 to react to temptation. Such tricks to aid intervention might include keeping junk food out of the house, shopping for food on a full stomach, changing one's daily route to work to avoid fast food, or even seeking therapeutic help to address any possible issues underlying one's relationship with food. But such long-term tricks do a person no good if he is incapable of resisting temptation when directly faced with it. System 2 takes the most effort to be successful under such conditions. If the direct temptation is too strong for too long, system 2 fails, and system 1 takes over. A successful dieter must take great pains to cultivate a new set of habits to resist temptation. As some recent research suggests, it could be as many as three years of diligence before system 2's efforts to adjust system 1 take hold, rendering moot the need of the conscious self to intervene (Dreifus, 2012).

Two more examples of how systems 1 and 2 work and interact are in order. Unlike the dieter, these examples are Kahneman's and illustrate the need for system 3. The first is a word puzzle involving simple arithmetic. Before introducing the puzzle, Kahneman instructs his readers to "not try to solve it but listen to your intuition:

- A bat and ball cost $1.10.
- The bat costs one dollar more than the ball.
- How much does the ball cost?" (2011, p. 44).

He contends most people would answer that the ball costs 10¢. But that intuitive answer is simply incorrect. A dollar more than 10¢ is $1.10 for the bat, making the ball and bat together $1.20. It takes only a moment's reflection to realize that the ball must be 5¢, making the bat $1.05 and the sum identical to the first premise of the puzzle. What Kahneman believes is going on here is an illustration of the laziness of system 2 in its monitoring of system 1. If system 2 was not so lazy, it would have done its job and intervened in system 1, keeping it from blurting out what seemed to be the right answer.

A similarly apparent and similar faux pas occurs with the second example. Kahneman shares the popular story told in the book *The Invisible Gorilla* by Christopher Chabris & Daniel Simons (2010). Kahneman describes the experiment as follows:

> "[Chabris & Simons] constructed a short film of two teams passing basketballs, one team wearing white shirts, the other wearing black. The viewers of the film are instructed to count

> the number of passes made by the white team, ignoring the black players. This task is difficult and completely absorbing. Halfway through the video, a woman wearing a gorilla suit appears, crosses the court, thumps her chest, and moves on. The gorilla is in view for 9 seconds. Many thousands of people have seen the video, and about half of them do not notice anything unusual. It is the counting task – and especially the instruction to ignore one of the teams – that causes the blindness. No one who watches the video without that task would miss the gorilla. Seeing and orienting[10] are automatic functions of system 1, but they depend on the allocation of some attention to the relevant stimulus. The authors note that the most remarkable observation of their study is that people find its results surprising." (2011, pp. 23-24)

Kahneman concludes that this "study illustrates two important facts about our minds: we can be blind to the obvious, and we are also blind to our blindness" (*ibid*., p. 24).

What both of these examples illustrate to us is not so much the laziness or the blindness of the so-called mind (recall the pragmatist framework introduced in the previous section), but the need to recognize the artificial situations in which such results occur. Consider the following questions: How often are people in a store faced with doing the sort of arithmetic Kahneman describes? Moreover, would people be so careless – so lazy – if they were actually spending their own money? Besides the cost of sporting equipment is not so cheap these days; five cents is simply not much to most Westerners. Yet if the formality of the puzzle was retained but the *cultural* context was altered to reflect a major financial transaction, we contend that most people would simply ignore Kahneman's imperative not to solve the puzzle. This disparity is not accounted for by systems 1 and 2 alone. In similar fashion, Kahneman seems oblivious to the fact that people are quite good at following instructions, like "Count the number of times the white team passes the basketball." So good we are at following instructions that we are not interested in and therefore not likely to observe the cultural and biological anomaly of a dancing gorilla's making an unannounced and unanticipated appearance.

To relate these two systems (and our general criticism) to the neuropragmatic sketch of Œ-transactional inquiry, let us state first the obvious, and second an evolutionary perspective that draws on DST. The obvious connection is that system 1 is informed by the pragmatists' emphasis on habits and their role in fixing beliefs about how to interact with the world. System 2, as the reluctant monitor and control system, roughly corresponds to the conscious phase of inquiry. However, Kahneman's characterization of it as lazy is somewhat disingenuous. Our discussion of system 3 in the final section of this essay will expand our concern; here it suffices to say that this sense of

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[10] To be clear, our claim that system 3 is responsible for *orientation* is not the same claim here. In fact, what we see with this example is the recognition that something gets systems 1 and 2 going. In this case, like the ball and bat example, it is the instruction given by the experimenter. What we propose is that system 3 as culture accounts for and relates this important part of the situation. Ideals or goals (or what the next section will call, at times, *representations*) are cultural guidance parameters that orient systems 1 and 2 toward specific variables or sub-routines, like the one described here.

laziness is both endemic to a culture and not applicable to all persons to the same degree – or in the same situation. For now, consider the stereotypes of the unathletic scholar and the book-dumb athlete. One is at home in the library or the laboratory, but utterly disinterested in what goes on on the football field; the other just the contrary. Arousing conscious interest takes greater effort depending on the situation at hand.[11]

From meager beginnings, Œ-transaction has taken a form (one of a vast plethora) in organisms with nervous systems with neocortexes in environments rich with cultural symbols and signs that are continuous with and often amplifications of the non-human ecological affordances of the ancestral past. Recent work in DST has gained significant attention from neuropragmatists, drawing insights from both connectionism (Rockwell 2005) and ecological psychology (Chemero, 2009). Central to these views has been Dewey's criticism of James's stimulus-response mechanism for learning (see James, 1890; Dewey, 1896; Solymosi, 2011b). With regard to systems 1 and 2, we emphasize this dynamic pattern as an ongoing one within the pattern of Œ-transaction. As such a pattern, the dynamics of Œ-transaction accounts for the tension between the systems, and, especially, their resolutions through the guiding parameters of a dynamic system. To appreciate just what we mean by guiding parameters, we turn to an ongoing debate over *representations* in a cognitive system.

Before we do, we reiterate that there is a need for system 3 to orient the processes of not just the two systems but of the Œ-transaction as well. System 1 operates often in tension with system 2; the immediate and habitual responses often conflict with the interests of the conscious self. Yet Kahneman's account finds this self to be lazy and often blind to what is really going on, making mistakes of its own. His illustrations of this laziness and blindness are not defaults of system 2 but products of its conflict with another system, the cultural situation. In these experimental illustrations of laziness and

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[11] The import of our use of the concept of situation cannot be underestimated. To appreciate this, consider the evolution, in broad strokes, of Œ-transaction. Drawing from proteonomics and genomics, Ryan and Grant (2008) have provided a sketch of the origins of the *protosynapse* and *ursynapse*. Discovering similarities across three different species – yeast, choanoflagellates, and sponges – all of which lack neurons, they found the components of animal nervous systems. These components are significantly involved in the response to the environment. Other components were found to be involved in the plasticity of cells – an important aspect for neural activity, without which adjustment and learning would be impossible. The continuities across species, from yeast to humans, illustrates not only the similarities but the differences as well. For what changed to effect more specific uses of these components was the situation – the contextual whole – in and through which Œ-transaction operates.

The evolutionary developmental (evo-devo) perspective further adds to the import of continuity between species, their evolution, and development, and to the significance of the situation in the understanding of such continuity. As Rakic argues, the human neocortex evolved to maintain neural patterns that have been most conducive to keeping not only life and limb together but also the regular-enough achievement of goals (2009). This addition illustrates the significant *continuity* between habits of reacting to the environment (what would become system 1 in humans) and the pattern of deliberate adjustment of habits (system 2). This continuity is vital for appreciating the contextual whole of a situation because these systems' working – sometimes together, sometimes in tension – cannot be isolated to the organism (or one of its parts, like a brain) without losing the integral role of the environment (which itself, we emphasize, is dynamic and evolving).

blindness, however, the culture is artificially constructed for the purpose of effecting what Kahneman finds to be absurd responses. Yet if the cultural situation changes, the results are likely to be different; the absurdity, in other words, is not a result of system 2 but of system 3 in tension with system 2 (especially when we consider that the particular test subjects' system 2 developed within a different system 3 than the artificially constructed one of the experimental model). The parameters of system 3 shape the nature of the Œ-transaction. This shaping of the trajectory helps elucidate how Œ-dynamic systems anticipate without relying on representations within the brain/mind, as the *Erlebnis* conception of experience requires.

RECONSIDERING REPRESENTATIONS

Kahneman admits that he focuses more on system 1 than on system 2. What is lacking more so is how system 2 can anticipate the future. Indeed it is unclear whether such a task is in the purview of system 2. Though it seems reasonable enough, at least to our commonsensical view, the conscious self is capable of anticipation. Many cognitive scientists take it as a matter of commonsense that our mental activity is representational and that if there is any doubt about this, the clear fact that we anticipate future events requires that we presently represent that future. This intuitive claim is shared by so many that Giovanni Pezzulo (2008) believes it is worth saving the concept of representation as part of a cognitive science of anticipation. What is most striking about his argument is that his use of the word *representation* appears to shift throughout his argument – moving between *Erlebnis* and *Erfahrung*.[12] Regardless of the charge of equivocation, we argue that the pragmatist rejection of representationalism as a theory of mind (and therefore of meaning and of truth) does not imply a rejection of conscious activity (*i.e.*, intentionality, traditionally, the mark of consciousness) as proposed by eliminativists,[13] and that there are better because safer words for several of his uses of representation.[14]

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[12] Here is a review of Pezzulo's uses of *representation*: "an internal representation of the world" is produced "to select and guide" the conduct of an organism toward a goal (p. 179); as Gibsonian affordances "as *ways for setting up indications of further interactive potentialities*" (p. 181); as pragmatist ideals or Deweyan ends-in-view, "representation originates from anticipatory mechanisms for the sake of action control…" (p. 183); as information states (pp. 194-195); as beyond information states in their capacity to be detached from the present but be about the future (p. 195); as the basis of an organism's inner life, "an internalization of external representation-making can be the basis of an 'inner life' for an agent, including inner dialogs and mental imaging" (p. 202); as situated and embodied symbolic and/or bodily schematic structures (p. 203); as cultural artifacts (*i.e.* signs and symbols) that are internalized (p. 204 and 210); as an instrument that "is *for* and *usable by* the embodied agent" (204); as means toward a goal – but distinct from the goal, "A cue for understanding *what representations are for?* is the notion of a *goal*" (p. 208 and 210); and as models in the sense of maps or blueprints about how to produce novelty (p. 214). There is a theme across these varieties of representation, namely that representations are internal "things" for anticipating ways the world could be. The difficulty we see is that there is no need to continue the internal/external distinction on which this view of representations continues from the older conception of simply presenting the world to an inner spectator. In other words, Pezzulo's uses of *representation* conflate *Erlebnis* with *Erfahrung*.

[13] At least, as Pezzulo sees ontological eliminativism (p. 198) as proposed by Paul and Patricia Churchland. What is puzzling by his view here is that the American Pragmatists are eliminativists of

Pezzulo's argument, if not provocative, does provide the service of setting representationalism within the plurality of theories and perspectives within cognitive science. He nicely summarizes the main failures of the representationalist theory of mind and concisely illustrates why approaches like DST make representationalism unnecessary. He nevertheless contends that due to the inability so far of DST to produce a plausible model of anticipation without representation, the only remaining and viable option is to return to representationalism. But these representations are not the atomistic states of modern sensationalistic empiricism (*viz.*, full-blown *Erlebnis*) as found in a Fodorian language of thought. Despite Pezzulo's attempt to resurrect representationalism, all he succeeds in doing is saving the word as a synonym for words like *imaginings, musements, ideals,* or, perhaps best for our present purposes, *ends-in-view* – words which have a rich pragmatist heritage.

Pezzulo is inadvertently correct to request a role for ends-in-view in cognitive science. Of course, he does not intend to do so, as a careful reading of a few key selections of his article indicate. First, his appeal to James (1890) and Dewey (1896) misses the main criticism Dewey made of James on the reflex arc concept (Pezzulo 2008, p. 182). Moreover, Pezzulo's description of James more aptly fits Dewey's criticism (*ibid*., p. 185 and 209). Regardless of these exegetical matters, Pezzulo makes two subtle but nevertheless important conceptual claims. First, he recapitulates the ancient – indeed atavistic – divide between knowledge and action – *episteme* over *techne*, *theoria* over *praxis* – when he writes, "anticipatory representations… permit to *coordinate with the future* and to act goal-directed [sic.]. Note also that our emphasis on goals and goal-directedness indicates that 'representation' has not (always) been intended as a synonym of 'knowledge' but it is deeply related to (potential or actual) action" (*ibid*., p. 202, emphasis in original). The shift from knowledge to action, some may argue, is a move toward pragmatism, given its emphasis on praxis. However, all Pezzulo has done is invert the old opposition with regard to representations. Representations no longer have anything to do with

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this variety but are emphatic that lived experience is very much real. Simply rejecting the role of representations in one's ontology does not necessarily imply that one must rid oneself of ways of speaking about mental – *viz.*, meaningful – life. Such a view about eliminativism, however, is the consequence of conceiving of science as representing True Reality and not as the best way humans have of getting about with the world. Paul Churchland, despite pragmatist overtones, rejects this view of science and truth (see, Rockwell 2011 and Churchland, 2012; also see Solymosi, 2011a on the consequences of Œ-transactionalism for understanding scientific activity).

[14] One might respond (perhaps adamantly) that "My experience is *representational*, that is, insofar as what I think, imagine, and know, it is all *about* the world that exists independently of me and my experiences." Indeed, many of us do have such experiences. Our point, however, is that *Erlebnis* is itself a cultural product. Westerners' system 2 operates this way because our system 3 has promoted it. The sense that science "maps" the world has been the outcome of a specific cultural matrix in which scientists were brought up *and* it has been the model encouraged since the rise of modern science because of its success in the physical sciences. We contend that in light of Darwinism and what we are learning about human cognition, from neuroscience to anthropology, the very conception and use of science as a map-making activity becomes beneficially modified. Specifically, the representing that goes on with map using is a cultural activity in the dual sense of system 3 described above; and, as such, *Erfahrung* is the superior conception of experience to underlie this view and to ameliorate human life generally.

knowledge *because* they are involved in action: the divide between knowledge and action is maintained – and that is the divide pragmatism adamantly rejects. The second claim is indirectly related to the first. When describing the extended mind conception held by DST advocates, Pezzulo writes, "As argued in the literature about dynamical systems, *mind, body and environment* form an unique coupled system" (*ibid*, p. 205, emphasis ours). While we grant the possibility that this is an overlooked typo, it nevertheless exemplifies the creeping Cartesianism that regularly goes unnoticed in cognitive science. Though it is true that much of the literature in DST speaks in terms of coupling, the standard motif is not a unit of mind, body, and environment but of *brain, body, and world*. Indeed that *nexus* is what neuropragmatists conceive as minding.[15]

Pezzulo's ignorance of pragmatism comes in at least the three following forms. First, there is the simple negligence of the means-end dynamic of Dewey's instrumentalism (as suggested by Pezzulo's lack of discerning between James and Dewey). Second is the (plausible, but surely convenient for our larger point) misconception of the DST unit as a coupling of mind, body, and environment, when the nexus that constitutes the process of mentation is between brain, body, and world. To be fair, a corollary of this misconception that is not unique to Pezzulo is the term *coupling*; but this is better addressed momentarily. Finally, Pezzulo perpetuates the atavistic divide between knowledge and action.

The divides between means and ends, between mind/brain, body, and environment/world, and between knowledge and action are all anathema to pragmatism. As the opening sketch of the pragmatist conception of experience and inquiry states, any distinction between organism and environment is functional and not ontological, thereby rendering moot any need for coupling.[16] Furthermore, knowing is an active phase of Œ-transactions for the sake of action – to use Robert Brandom's slogan for describing the classical pragmatists' conception of experience, "No experience without experiment" (2004, 14).[17] The means-end dynamic is not one in which the operations of Œ-transactions are divorced from their goals, that is, to paraphrase Brandom, *No experiment without knowledge, no knowing without experimenting* – in other words, the means *inform* the ends as much as the end *informs* the means. What is attainable is determined by the resources at hand (*i.e.* the supplies, skills, tools, etc.); and what is aimed at will shape the selection, organization, and implementation of the means available.

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[15] There is an important affinity between Œ-transaction and the nexus of brain, body, and world. Specifically, the analogy is between organism as brain and body, and environment as world. The anti-Cartesianism of enactivists who endorse the nexus are not concerned with questions of internal or external worlds, such as which would construe *organism* as part of the external world (or having to do with the third-person perspective) and *environment* as internal (or having to do with the first-person perspective), as discussed in a previous note. More important is the difference between Œ-transaction and brain, body, world nexus: namely the role of *coupling* to be discussed momentarily.

[16] See Rockwell, 2010 on the fallacy of the so-called coupling-constitution fallacy.

[17] As stated in note 1 above, Brandom provides a concise and useful paraphrase of classical pragmatism's main themes, but he misunderstands much of the consequences of these themes, as the second part of his essay illustrates.

To connect our criticisms of Pezzulo's failures with regard to pragmatism to his uses of representation, let us consider briefly the role of intentionality. Pezzulo begins his argument by discussing the classical notion of a mental representation in terms of its intentionality. When a person thinks, she thinks *about* something. If she is thinking about something that is presently in her world or environment, then she already has access to that thing and need not represent it "in her mind," so to speak. But if she is thinking about the future (*i.e.*, anticipating), then she clearly does not have immediately present access to those future events – as they are, by definition, not here and now. Pezzulo believes that only representations can account for this phenomena. But in his several definitions of the term, we get nothing like the classical notion, but we do get varieties on a pragmatist theme. Yet Pezzulo's ignorance of pragmatism and the creeping Cartesianism in his ontology and epistemology prevent him from seeing how his concern for "coordinating with the future" is handled from a pragmatist perspective.

From the DST perspective, the dynamic pattern is the Œ-transaction that moves through a state space following a trajectory from attractor basin to attractor basin. When the equilibrium of a state space in an attractor basin becomes too uncertain, too chaotic, then a new trajectory of adjustment to the Œ unit occurs until a new basin is attained in which a new equilibrium is set. Whenever a trajectory is taken, the Œ unit is entering a conscious phase of inquiry. System 2, so to speak, becomes operative. This conscious activity is not so much interested in *mirroring* the world as it is interested in modifying it through interacting with it. Intentionality is not so much concerned with the world as it is in a specific state, because it is the process of taking aim toward a new way the world could be. This conception of intentionality not only fits well with the pragmatist conception of experience as Œ-transaction, it also harkens back to the word's etymology in Aquinas. As neuropragmatist Walter J. Freeman has reminded us (2005, 2008),[18] there is a similarity between taking aim at a target and thinking about something. When an archer takes aim with a bow and arrow, her sight is aimed at the target, just in the way that when she thinks about winning the archery competition, her thoughts are "aimed" at what victory would be like.

If we are to continue to use the word *representation* with regard to *Erfahrung*, it makes little sense to talk about representational states qua *Erlebnis*. For this conception of experience (as *Erfahrung*) is not one in which states have a role. The best way of using this word then, is as a *re-presentation* of the world, in that the present world is presented anew for the precise purpose of effecting such a world out of the present world – a taking aim at a new world. In order to anticipate, an organism needs information about the world's regularities, patterns of change, etc., so that appropriate action may be taken to bring about the *re-presented* – or, better still, *imagined* – world.

Conscious intervention in the habits of Œ-transaction is integral to this sort of anticipatory adjustment of body and world. However, we still lack an account of how or why representations as ideals (or ends-in-view) could help guide system 2's operations. Neither Kahneman nor Pezzulo recognize (at least

[18] See also Dennett, 1996.

in print) the need for this. We believe this is due to the creeping Cartesianism at play, in at least two ways here. First, Pezzulo's concern about the inability of DST to model anticipation without drawing on representations presumes that representations are to be found strictly internally to the organism or mind; whereas the pragmatist emphasis on the dynamic transaction of organism and environment does not consider representations qua ideals (or ends-in-view) as being neither internal nor external but transactional. This transactional conception of experience implies that all inquiry must take place within a situation, within a cultural context. Thus we see the second way in which Cartesianism creeps its way in. The Cartesian ideal of pure inquiry outside of a cultural context is not only impossible to attain, it also blocks the road to inquiry – a cardinal sin, if there ever was one, for pragmatism.[19] This blockage can be overcome by recognizing the need for system 3 as that which provides symbolic affordances, shared aims in action and in inquiry, and, in short, the creative means for anticipating novel ways of living. The final step is now upon us. Before we elaborate a full hypothesis of system 3 as culture, we need to show that information works not only in a person's systems 1 and 2 but also in the cultural situation in and through which Pezzulo's representations as ideals (or ends-in-view) affect and effect.

PRAGMATISM AND INFORMATION

As James Gleick's recent tome (2011) tells us, information has a long and complex history. Noting the important theoretical relations between evolution, thermodynamics and information, Gleick writes, "Evolution itself embodies an ongoing exchange of information between organism and environment" (2011, p. 9). Despite this nod towards informational-Œ-transaction, Gleick does not mention the early contributions Charles Sanders Peirce made to what would become information theory. Nor does he mention the influence of pragmatism on cybernetics as Harold Sackman saw at the birth of cybernetics and information theory (1967).[20] One can speculate about the reasons for Gleick's neglect of pragmatism. What we are interested in is a view of information that is richer than the one provided by the hero of Gleick's story, Claude Shannon. Recent work in ecological psychology has drawn on J. J. Gibson's work on visual perception and the conception of affordances it presents (1979; see Chemero 2009 for details over the debate within ecological psychology). Our hope is that further work on pragmatism and information augments, if not significantly transforms, Gleick's story.

The basic conception of information put forth by Gibson is that it is ubiquitous throughout the situation. It only affords itself, however, through the relationship between organism and environment. Affordances, so conceived, are opportunities for behavior or action. For example, a set of stairs presents itself to an average human as an easy means of moving up or down, but, to an ant, that same set of stairs is a difficult climb – perhaps even an obstacle better

[19] See Peirce (1898).

[20] More recent work on information that draws on pragmatism is scarce, however, see Weinberger, 2002, and Goldkuhl, 2004. Much more work needs to be done on the history, philosophy, and future of pragmatism and information.

evaded. Information is a relational concept through which a pattern of activity may be discerned by that which is to be informed, *i.e.* the Œ dynamic pattern. That our characterization thus far of information sounds so pragmatist is due in part to our larger purpose, but it is also the result of Gibson's being influenced by James's radical empiricism.

The Jamesian influence carries through to our elaboration of information now considered. Despite the ubiquity of use of the term *information* throughout much scientific literature, it is rarely explicitly defined. We find this lack of definition problematic because it lends itself to abuses of creeping Cartesianism. For instance, information is often said to be *represented* by a specific thing or event, like a brain state or pattern. On such a view, it is all too easy to fall back into the sensationalistic empiricism in which the mind/brain somehow represents the external world. Such a move explains why Pezzulo can refer to the body and image schemes of Lakoff and Johnson as representations, despite Lakoff and Johnson's being pragmatists and anti-representationalists (Pezzulo 2008, p. 203).

The need for a pragmatist conception of information is even clearer when we consider that system 1 is an information processor that works at a fast speed, and that system 2 must not only process that information but other information in order to monitor, control, and intervene in the first place. Since information is mutually entailed with evolution and thermodynamics, the opening pragmatist sketch of the evolution and regulation of Œ-transaction is notably informational. Finally, our hypothesis of system 3 requires such an explicit conception of information as a means of effecting a confluence of the several themes of this essay.

In his provocative, though ultimately flawed, work on consciousness, *PHI* (2012, see also 2008), Giovanni Tononi offers a definition of information as "a difference that makes a difference" (2012, p. 172). Here he is following Gregory Bateson, but he is not exactly accurate. For Bateson, information is that which is measured in bits, where a bit is the difference that makes a difference (1987, p. 200 and 229). Recall that James saw the pragmatic method as a basic call for the cash value for experience, *viz.*, for the difference that makes a difference in Œ-transaction. Furthermore, James argued, via Papini's pragmatist motel, that this method worked regardless of subject-matter. This neutrality extends to information: There is no such thing as information qua information; it is not distinct from or separable from the situation in which it is said to be ubiquitous.[21]

On our view, information is the difference that makes a difference in action. The effect of information is transformative of Œ-transaction. For the Œ unit is a dynamic pattern of organized differences – rhythms – of information. The process of inquiry – as the very pattern of experience affords – is the *cultivating* of differences that make a difference. But, as anyone who has attempted to cultivate can attest, the process is not guaranteed to succeed. Progress is not promised; information can be deleterious as much as it can be ameliorative. The key is to orient experience toward a larger goal, via guiding

[21] A noteworthy consequence is that if there is no such independent entity that is information, the notion that information can be represented is non-sensical *outside of a cultural context*.

parameters that affect and are effected by the system variables such that consummation of the resolution of the problematic and uncertain situation is attainable. This call for orientation is especially important for thinking about information in pragmatist terms. As Tononi, Bateson, and Gleick all agree, the mutual entailment of information with evolution and entropy means that a chaotic situation is one in which *uncertainty* has increased, and that the only way to reduce uncertainty is through the increase of information via adaptation and learning. This increase of differences that make a difference is produced by the phase of Œ-transaction that is *inquiry*. Through that trajectory, the Œ pattern moves, through adjustments, from a chaotic attractor to a basin of attraction that affords equilibrium.

The reduction of uncertainty through the cultivation of information is what conscious activity (system 2) strives towards. System 1 lacks the information required for resolving new problems that arise in unorthodox situations. The means by which information is cultivated is not a strictly or exclusively individual act as the Cartesian conceives it. The cultivation of information – what Dewey called *education* – is a social activity that aims at the production of healthy inquirers. The overproduction of information, as alluded to above, does not guarantee success; too much information overwhelms. It stresses the inquirer; too much stress does irreparable harm. To put it in the terms of allostasis, described in our pragmatist framework, Œ-transaction can reach an *allostatic overload*[22] when the situation is too informative. There is no clear trajectory out of the uncertainty, for there are too many options from which to choose. System 2, on its own accord, cannot resolve the problematic situation. Guidance is required and is provided by the larger system 3, the cultural landscape that provides the values and ideals that orient an individual to the world such that one's interactions with one's environment can be more meaningful than the experiences that have come before – experiences that are not simply unique to the individual but experiences shared through tradition and education as well.[23, 24]

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[22] On allostatic overload, see Schulkin, 2003, 2011a, and 2011b.

[23] This guidance occurs both in the process of discovery (namely through the paradigm and specific research program), and in the process of transmission and reformation (in the forms of educational practices and institutions).

[24] Some may wonder how different our use of *cultivation of information* is from Tononi's provocative view that *consciousness is integrated information*, as presented in his so-called *Integrated Information Theory*. Prima facie, there is a similarity insofar as the relating of differences that make a difference to other differences that make a difference that thereby increase the amount of information in the system such that novel information is created (*i.e.*, this "relating" is the means by which information emerges in the whole system though the sum of the information of the system's parts is less than the information of the whole). But the similarity stops there. Tononi's choice of word, "integrat*ed*", is indicative of the pre-Darwinian desire for finality and fixity in nature – a view that is further corroborated in Tononi's explicitly Galilean-Cartesian philosophy of science. The pragmatist counter to "integrated" is to reconstruct the "thing" (*i.e.* consciousness or information) into a process, so a better approach would be to say that conscious activity is the integrat*ing* of information. But to evade any confusion between *integrated* and *integrating*, we choose *cultivation*, especially since it shares its etymology with *culture*, to tend or to grow. This view of consciousness as nothing more than a functional process is rejected by Tononi who clearly hypostatizes the integrat*ion* into a thing unto itself when he sees a friendly voice in

Pezzulo's concern that DST cannot model anticipation without representation seems to be based on the view that information is not ubiquitous and only within the organism (or perhaps only the brain – or the neocortex). Kahneman's examples, such as the invisible gorilla, seem to illustrate something absurd to him about human perception and cognition for the same reason: that the only information that matters is the immediate (in the brain). Indeed, on his view, humans simply miss the readily available information that there is suddenly a dancing gorilla. What both these views suffer from is the need for a pragmatist conception of experience in which information is both ubiquitous and situated.

Pezzulo (and perhaps DST researchers as well, given their thinking in terms of coupling instead of holism) believes representations can convey the information necessary for anticipation. But he provides no reason to believe that representation or information need to be limited to the brain. Kahneman fails to see that his examples situate or frame the inquiries he asks of his subjects in such a way that they are simply not ready for doing awkward financial arithmetic nor ready for anticipating something absurd to happen while focusing on a very specific task. Change the conditions, and the experience will change. How then are we to understand the role of information with regard to systems 1 and 2, and representations and intentionality? We propose that a third system, culture, is the best way to orient ourselves.

INTRODUCING SYSTEM 3, A HYPOTHESIS

Our focus has thus far been on cognitive systems and dynamic systems with the occasional mention of the cultural. We have argued that Kahneman's conclusions that specific human acts are absurd is the result of his failing to see how the specific cultural situation orients the test subjects in such a way that their behavior is not all that absurd. In other words, the creeping Cartesianism (itself a form of culture) that drives scientists to see reality as devoid of context or perspective leads to absurdity. But a Darwinian and pragmatist view easily anticipates and accounts for these purported absurdities. Furthermore, what we see here between the Cartesian (*Erlebnis*) and the pragmatist (*Erfahrung*) are different orientations that guide the monitoring and controlling performed by system 2. As neither Kahneman nor the Cartesian can account for this guidance, and yet the fact that there is such guidance is hard to deny, there appears to be a third system at work.

This third system is the situational context through which a dynamic system, such as a conscious human, can anticipate by using previously learned skills, previously learned data (from facts to tropes), and previously learned methods of inquiry, to create novel ways of living and doing. These ways, of course, do not appear ex nihilo. They grow out of and are thus continuous with the previous ways. Such ways, however, are not so clearly available to a researcher who seeks to strip away culture and context.

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the James of *the Principles of Psychology* (1890) but dismisses the James of "Does Consciousness Exist?" (1904), see Tononi, 2012, pp. 157-172.

Kim Sterelny has done valuable work in the philosophy of nature[25] that argues that humans are unique among primates because we have evolved to be learners, specifically apprentices to each other (2012). Our socio-cultural organizations, our scientific and religious institutions – even neonate curiosity – reflect this uniquely human feature. Sterelny has much to say from the perspectives of evolutionary biology and anthropology, specifically about our development of tool use and innovation. But where his account is lacking is in the neural means of apprenticeship (to be clear, this is not the only means either). Bill Bywater has started this work, from an explicitly neuropragmatist standpoint (2012). He situates recent work on mirror neuron systems with Sterelny's conception of apprenticeship. Take this view with similar work by neurosociologist David Franks (2010) (who is working from the pragmatist perspective of George Herbert Mead), and we have the basic tools and methods for bridging the work of Kahneman and DST with anthropology in order to overcome or evade the concern of Pezzulo regarding representationalism.

With the pragmatist sketch of information introduced here, we hypothesize that system 3 is the means by which human experience qua Œ-transaction becomes oriented to the world and thereby appropriates information in a plurality of ways. From the general traits of systems 1 and 2 as components of the human dynamic system of Œ-transaction, we believe further research along these lines can help elucidate questions about how different cultures learn, how information is selected and passed down through various traditions, and how to resolve tensions between the three systems. Just as system 1 can conflict with system 2 – remember our example of the dieter, whose system 1 wants pie but whose system 2 says spinach is better – system 3 conflicts with system 2. In the case of the dieter, the culture may be one in which delicious but calorie-laden food is everywhere to be had, making the goal of spinach eating quite difficult, if not impossible. But system 3 could also be one in which spinach is easily available, but the cultural ideals – the guiding parameters – emphasize an extremely thin body type that is biologically and psychologically unhealthy.

Our hope is that by investigating the import of culture in this fashion, we not only resolve or evade theoretical difficulties in the cognitive sciences, but that we also offer a way for utilizing the results of these sciences, along with other inquiries, especially the arts, to address practical concerns for achieving

[25] Sterelny draws on Peter Godfrey-Smith's "helpful distinction between philosophy of science and philosophy of nature. The intellectual target of philosophy of science is science itself… The intellectual target of philosophy of nature is nature itself; the world in which we live (which, of course, includes humans and their practices, including science)" (2012, xi). Godfrey-Smith writes, "When we export a picture of the world from the immediate context of science into a broader discussion, the features of scientific description that have their origin in these practicalities become potentially misleading… Work of this sort will also often aim at synthesizing the results of a number of different scientific fields, working out how they fit together – or fail to fit – into a coherent package," before concluding "So philosophy of nature refines, clarifies, and makes explicit the picture that science is giving us of the natural world and our place in it. Calling it 'philosophy' does not mean that only philosophers can do it. Many scientists… undertake this kind of work. But it is a different kind of activity from science itself." (2009, 3). He also notes that the philosophy of nature is "an old term" – indeed, it was just what pragmatists like Dewey were doing (Dewey's influence here on Godfrey-Smith should not be underestimated as many of the latter's writings make use of the former's ideas).

the ever tenuous democratic culture, so well imagined by James, Dewey, and Rorty. What such a democratic orientation looks like in a neuroscientific age, however, is another story.

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