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Are You Social?

The Ontological and Developmental Emergence of the Person

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In what way does human sociality differ from that of ants or bees? The sociality of social insects is an emergent at the level of the nest or hive, an emergent of the organization of interactions among the *biological* organisms: Each individual insect remains as a biological being no matter how complex the social organization. There is a sense in which that is the case for humans, but human sociality also involves an additional social ontological emergence for each individual. This is the *developmental* emergence of the *social person*. Modeling how this occurs, and accounting for how it could possibly occur, will be the foci of this chapter.

Accounting for how ontological emergence is possible *at all* takes us into issues of philosophy and physics. Accounting for how the individual level social emergence of *persons* is possible in human beings, but not in insects, takes us into issues of mind and development. Modeling how this occurs in human beings takes us into issues of knowledge, values, and culture.

Ontological Emergence

Parmenides argued that change could not occur, because for A to change into B would require that A cease to exist and B emerge out of nothingness. Since nothingness cannot exist, this turning into nothingness and emerging out of nothingness cannot occur—therefore change cannot occur (Campbell, 1992; Gill, 1989; Guthrie, 1965; McKirahan, 1994; Reale, 1987).

Problems with "nothing" may sound slightly archaic to contemporary ears, a century or so after Frege showed how to render such notions as "some," "all," and "none" as quantifiers rather than as concepts, but modern thought has had and still has its own related serious problems with that which does not exist and that which is false. For example, how could a representation encode something that doesn't exist? Or have an encoding relationship with a false state of affairs—and just what would a false state of affairs be?

Russell, for example, struggled for years with these and related problems early in the 20th century, as did Wittgenstein and many others. The problems seem less pressing now because we tend to think of such representations of non-existents and falsehoods as constructed out of component representations, and to assume that it is the *structure* of the representation that makes it represent a nonexistent or makes it false. The component representations might themselves be composite, but ultimately there must be (in this view) some basic level of atomic representations out of which all others are constructed. Representation of nonexistents or falsehood is no more a solved problem for these base level representations than it was for Russell—or Parmenides.

In any case, the Greeks took these arguments quite seriously and devoted major effort to overcoming their counterintuitive consequences. In particular, Empedocles devised his system of the substances earth, air, fire, and water in response to Parmenides, and Democritus developed his notion of atoms in similar response. Earth, air, fire, and water did not change, thus satisfying the Parmenidean constraint, but manifest change in the world could nevertheless be accommodated as alterations in locations and mixtures of the basic substances. Similarly, atoms did not change, but apparent change could be accommodated as alterations in locations of the atoms.

Aristotle's versions of the earth, air, fire, and water metaphysics was much more sophisticated and subtle than that of Empedocles, but involved similar motivations to avoid the Parmenidean problems. Aristotle's metaphysical framework of substance and property (though not necessarily all of the

Aristotelian details and sophistications) became the dominant metaphysics throughout most of Western history. Its legacy is with us still today.

Substance Metaphysics

In particular, a substance metaphysics carries with it several deep, usually implicit, commitments. First, substances were introduced precisely in order to avoid real metaphysical change. They do not change; they are inert. Stasis, therefore, is the explanatory default, and any purported change requires explanation.

Second, substances were introduced in order to avoid emergence. New substances cannot emerge, and substances cannot change into one another.[1] The term and explicit notion of emergence is relatively modern (Stephan, 1992), but the metaphysical concept was precluded by the basic metaphysics inherited from the Greeks.

Third, substances or atoms were actual and factual. They outlined a world of substance or atoms, and their configurations and properties. In particular, they did not involve properties of normativity, intentionality, or modality. A substance or atom metaphysics, therefore, assumes a fundamental split between the actual, factual world and the realm or realms of normativity, intentionality, and modality. In particular, it assumes a fundamental split between the physical realm and the realm of mentality. Implicitly, mind was dirempted from the rest of the world.

Three Metaphysical Options

A substance metaphysics, then, commits to there being two possible realms: that of the substantive (or atomistic) and factual and that of the normative, intentional, modal mind. Within this framework, there are only three coherent options.

The first is to assume two realms, one of substance and one of what is not included in that substantive realm—a realm of concepts, intentionality, normativity, and so on. Aristotle had a two-realm framework, with substance and form characterizing the two. Descartes famously, or infamously, posited two kinds of substances. Kant proposed a noumenal realm and a transcendental realm. And, most recently, analytic philosophy assumes a factual, atomistic realm of the sciences, and a normative, modal realm of language and philosophy (Rouse, 2002; Sacks, 1998).

A second option would be to attempt to account for everything in terms of a single “mindlike” realm. This yields various forms of idealism, such as that of Hegel, Green, or Bradley. Contemporary versions tend to be linguistic idealisms (Bickhard, 1987, 1995, 1998a).

The third option is to attempt to account for everything strictly (or as close as you can get) in terms of the factual, “scientific,” physical realm. Hobbes and Hume (at least as he is most often interpreted) represent this approach. An important contemporary advocate is Quine. In eliminating the analytic philosophy distinction between the analytic (modal, normative) and the synthetic (factual), Quine rendered everything that he could in terms of the factual “scientific” realm, and this is the perspective that today dominates much philosophical thought and almost all work in psychology.[2]

What about Emergence?

It might seem, and has to some, that the mental and the nonmental realms could be integrated by some notion of emergence: perhaps normativity, intentionality, and so on are emergent phenomena, emergent within and from the natural, physical, biological, world. Such ideas have become somewhat more common over the last century or so, but it is not often realized that the basic metaphysical presuppositions within which we tend to think were historically introduced precisely to preclude such notions of emergence—and that they do a good job of precisely that. Emergence may be a tempting notion, but it is not possible to consistently develop it within a substance or atomistic metaphysical framework.

Aspects of (parts of) this point concerning the apparent impossibility of emergence have been realized and argued. I will address two of them, one logical and the other metaphysical. The logical challenge derives from Hume, and the metaphysical challenge from Jaegwon Kim.

Hume Hume (1739–1740/1978) argued that norms could not be derived from facts: “no ‘ought’ from ‘is’”. His argument is not, in fact, very fully developed, but it is standardly interpreted as being based on a conception of what is involved in validly introducing any new term into a deduction. In particular, any new terms must be defined on the basis of those initial factual terms. So, if the premises of the reasoning

include only factual terms, then the conclusion can only (validly) contain factual terms. The central point is that any new terms in the conclusion could, in principle, always be eliminated in favor of the defining phrase or clause. Such back-translation through the definitions can continue until only the original terms in the premises remain, and, by assumption, those are strictly factual. Therefore, the conclusion(s), if valid, can be fully rendered in those original factual terms: the conclusions themselves can only be factual: No "ought" from "is."

The general form of this argument, however, is that you can only (validly) get rearrangements of whatever you begin with. The point, then, holds for any kind of novelty: a valid conclusion is restricted to arrangements of premise terms. There cannot be anything fundamentally new in the conclusion: there cannot be any metaphysical emergence.

In effect, Hume (partially) codified the split between fact and norm, substance and mind, and did so in a way that reached down to the level of the preclusion of emergence. Mixtures and rearrangements of substances and atoms are permitted, but nothing more.

If Hume's argument were sound, it would in itself preclude emergence, and, thus, preclude any emergent account of the normative. I will argue in a moment, however, that it is unsound. First, however, I turn to a metaphysical challenge to emergence from Kim.

Jaegwon Kim In a series of sophisticated arguments, Kim (1989, 1990, 1991, 1992a, 1992b, 1993a, 1993b, 1997) has shown that, given a few reasonable assumptions, such as that the physical world is causally closed, any emergent phenomena or entity will be causally epiphenomenal. The basic core of the arguments is that causality is a property of whatever the fundamental particles of physics turn out to be, and that all phenomena more complex than single particle interactions are resultants of those basic interactions. There are no new causal powers, only the working out of the causal dance of the basic particles in whatever configuration they are in.

So, there may well be "new" resultant causal manifestations given "new" configurations, but there is still nothing more than the particle interactions that are causal themselves. Configuration or organization is just the stage setting for genuine particle causality. All potentially or supposedly emergent phenomena, therefore, are causally epiphenomenal: all the genuine metaphysical causality is resident in the basic particles, whatever they may be (Bickhard, 2000a, 2003/2004b; Kim, 1991).[3]

I have rendered Kim's argument in a way that makes especially clear its reliance on a particle metaphysics of the general substance or atom form. I will argue that avoiding Kim's argument requires transcending that metaphysics, and, conversely, that moving to a process metaphysics instead of a substance or atomistic metaphysics does in fact avoid Kim's argument.

Contra Hume Hume's argument precludes all emergence, not just normative emergence. But the argument is unsound: it rests on a false assumption, namely that the only valid form of definition is explicit, abbreviatory definition—definition of the kind that permits back-translation of the defined term into the defining terms.

The alternative form of definition is implicit definition, contrasted with the explicit form of definition that Hume assumes. Hume did not know about implicit definition, but it was introduced in a forceful (and controversial) way by Hilbert in his axiomatization of geometry around the advent of the 20th century (Kneale & Kneale, 1986).[4] Within formal contexts, such as Hilbert's geometry, the axioms are taken to implicitly define the class of interpretations of the terms in those axioms that would satisfy them. So an axiom with a form something like "Two Xs determine a Y" could be interpreted as two points determine a line, or two lines determine a point (their intersection, so long as points at infinity are accepted). The more general form of implicit definition is that of the implicit definition of the class that satisfies a set of conditions or constraints (Hale & Wright, 2000).

For my purposes, the important point about implicit definition is that it exists, and that it cannot be back-translated through. The Humean argument against the possibility of introducing terms that cannot be back-translationally rendered in terms available in the premises, therefore, is blocked. Hume's argument is based on the false assumption that abbreviatory definition, that *can* be back-translated through, is the only

valid form of definition. His argument, therefore, is unsound, and the possibility is opened of new properties emerging that are more than just rearrangements of properties already available—and, perhaps, of *normative* properties emergent on the basis of nonnormative phenomena.[5]

Contra Kim Kim's arguments turn on a presupposition of a particle metaphysics—in particular, of some metaphysically basic level at which the bearers of causal power can participate in organization but that have no organization themselves. With this split between causal power and organization, the latter is delegitimated as a potential locus of causal power; thus, new causal power emergent in new organization is precluded.

The first point to make in rejoinder is that, if the world were constituted of only point particles, nothing would ever happen because the probability of two points ever striking each other would be zero. So, a pure point particle metaphysics is not possible.

The second point is that particles do not in fact exist. A particle metaphysics is false according to our best contemporary physics (Cao, 1999; Davies, 1984; Huggett, 2000; Saunders & Brown, 1991; Weinberg, 1977, 1995, 1996). What appear as particlelike phenomena are in fact wavelike processes, and the superficial particle character of the phenomena is a manifestation of the quantization of the processes. That is, the oscillatory processes are quantized in the sense of taking on only integer (or half integer) values. This is similar to the sense in which the number of wavelengths in a vibrating guitar string is quantized, and there are no more physical particles than there are guitar sound particles.

What does exist are quantum fields: processes with various quantization and conservation properties. For current purposes, the crucial property of quantum fields is that they are processes, and that processes inherently have organization. Furthermore, quantum field processes possess whatever causal powers they do possess in strong part *in virtue* of their organization. So quantum fields have both causal power and organization, unlike particles, and the organization cannot be delegitimated as a locus of causal power without eliminating all causality from the universe.

Everything, then, is process, and causality must be a property (or properties) of, among other things, organization of process on pain of eliminating causality altogether. The way is open, therefore, to the possibility that macroscale organizations of (quantum field) processes might ground novel, emergent causality. The way is open to the possibility of emergent, nonepiphenomenal, causal power.[6]

Emergence

Genuine ontological emergence, thus, is not precluded. A process metaphysics, which is forced by both metaphysical considerations ("nothing but point particles" cannot constitute a world) and contemporary physics. This undoes the substance and particle framework from Parmenides, Empedocles, Democritus, and so on, and legitimates at least the core intuition of Heraclitus.

The possibility of genuine emergence is rescued, but to this point this is only a possibility. Metaphysical assumptions that make *any* kind of emergence impossible have been cleared away, but the task of accounting for normative emergence, of accounting for the emergence of mental processes, phenomena, and properties more generally, remains.

Normative Emergence

Adopting a process metaphysical framework involves corollary shifts in all three of the consequences mentioned earlier of a substance metaphysics. In particular, the barrier to an integrated account of normativity and mental phenomena is removed, because the barrier to genuine emergence is removed. Addressing the positive task of developing a model of normative emergence, however, involves consideration of the first consequence of a substance framework. In particular, within a substance framework, stasis is the default and change requires explanation; within a process framework, change is the default and stability requires explanation. Understanding normative emergence begins with consideration of how processes can be stable at all.

There are two basic forms of stable process, and there is an asymmetry between them that, so I argue, underlies the asymmetries of normativity. The first stable kind is that of energy well stabilities. These are organizations of (quantum field) processes that are stable because to disrupt them requires more energy than is ambiently available. So long as the impinging energy is below some crucial threshold, the

organization of process will persist. An easy example is that of an atom: such an organization can be changed and disrupted, but to do so requires energy not available in, for example, normal terrestrial conditions. Such organizations can remain stable for cosmological lengths of time.

The second stable kind is that of organizations of processes that are far from thermodynamic equilibrium. Atoms, and energy well stabilities in general, can happily continue to exist in isolation and in thermodynamic equilibrium. Far from equilibrium systems, however, cannot be isolated because they must be maintained in their far from equilibrium conditions. If they are isolated, they go to equilibrium and cease to exist. An example would be a pan of water heated from below that has self-organized into Benard cells of boiling water. This example illustrates both that if the source of heat is removed, the system goes to equilibrium and ceases to exist—in particular, the Benard cells cease to exist—and it illustrates that far from equilibrium systems can manifest properties of self-organization, the cells in this case.

The asymmetry between energy-well stabilities that do not need to be maintained, and the stabilities of far from equilibrium systems, which must be maintained, is the basis for the emergence of normativity (Bickhard, 2003/2004b, in preparation). Note that far from equilibrium systems are necessarily open systems, exchanging and interacting with their environments; they cannot be isolated. If they were not in interaction with their environments, their far from equilibrium conditions could not be maintained and they would cease to exist.

Self-Maintenance and Recursive Self-Maintenance

The pan of water is dependent for its stability entirely on external sources of heat. It makes no contributions to its own stability. But some systems do make such contributions.

A candle flame, for example, helps to maintain several of the conditions for its own existence—it is in that sense *self-maintenant*. The flame maintains above combustion threshold temperature, it melts the wax so that it percolates up the wick, it vaporizes the wax so that it is available for burning, and, in standard circumstances, it induces convection which brings in fresh oxygen and gets rid of waste. The self-organized properties of the candle flame are essential to its own continued existence.

The candle flame does only one thing, it burns, with several crucial consequences. There are several ways in which it is self-maintenant, but they all follow from the burning. The flame cannot adopt differing activities in the service of self-maintenance in differing conditions, but some systems can.

Consider the bacterium that can swim and continue swimming if it is going up a sugar gradient, but will tumble if it finds itself going down a sugar gradient (D. T. Campbell, 1974, 1990). In this case, swimming contributes to self-maintenance under some conditions—for example, oriented toward higher sugar concentrations—but swimming is dysfunctional for self-maintenance under other conditions—for example, oriented toward lower sugar concentrations.[7] The bacterium can detect the difference in relevant conditions and trigger appropriate activity, swimming or tumbling, accordingly. The bacterium, then, can maintain its condition of being self-maintenant under varying conditions: it is *recursively self-maintenant*.

Representation

With recursive self-maintenance, we have the grounds for the emergence of primitive representation. I will outline this model of representational emergence with a focus first on the crucial normativity, truth value, then on what constitutes representational content in this model, and, finally, I will elaborate on some of the resources of the model for accounting for more complex forms of representation.

The Emergence of Representational Normativity: Truth Value The selection of particular interactions, such as swimming, will at some times be *successful*, in the sense of contributing to the self-maintenance of the system, and at other times not. In triggering or selecting an interaction, then, the system is implicitly predicating that this environment is one that is appropriate for swimming.

That predication may be *true* (e.g., if the orientation is toward higher sugar concentrations), or *false* (e.g., if the orientation is toward higher saccharin concentrations): the bacterium can be fooled just as we can. This is the primitive emergence of representational truth value out of normative pragmatic success or failure.

The Emergence of Representational Content The selection of particular interactions, for example, swimming, will contribute to the self-maintenance of the system only under certain conditions. In the case

of swimming, there is such a contribution if the orientation is toward higher sugar concentrations, but there is not such a contribution if the orientation is toward higher concentrations of saccharin.

The predication that the current environment is appropriate for swimming, then, presupposes that the environment has one or more of the properties that support the success of that interaction, that support that predication. This is normative functional presupposition: it is presupposed in the assumption of the appropriateness of the interaction.

The presupposed conditions, in turn, may be true, in which case the predication will be true and the interaction will contribute to self-maintenance, or they may be false, in which case the predication will be false and the interaction will fail to contribute to self-maintenance. The presupposed conditions constitute the *content* of the predication.

This content is implicit, presupposed, not explicit. The bacterium knows nothing that is explicit about sugar or gradients. For some purposes, this implicitness makes no special difference, though in others this difference from standard assumptions in which content, if there is any, is explicit can be of fundamental importance (e.g., Bickhard, 2001; Bickhard & Terveen, 1995).

Representation as predication of interactive appropriateness is a primitive form of representation. It captures the essential normativity of truth value and of content, but it is far from familiar kinds of representations, such as of objects, and raises the question of whether such an interactive model is adequate to more complex forms of representation.

Resources for More Complex Representation I argue that it is adequate to more complex representation, and will illustrate this point with a central example of the representation of small manipulable objects. First, however, I need to elaborate some on what resources are available in the interactive model for greater representational complexity.

If we move from bacteria to more complex organisms, such as a frog, three resources for representational complexity can be illustrated. First, unlike the discussion of the bacterium in which swimming or tumbling is directly triggered, the frog may have multiple potential interactions available at a given time. It might be able to flick its tongue in one direction and thereby eat a fly, perhaps another direction and thereby eat a worm, and perhaps jump in the water in order to avoid the hawk whose shadow just passed overhead. Selecting an actual interaction to engage in, then, cannot be for the frog a simple triggering as it might be for the bacterium. There must be some way in which the frog can indicate what interactions are currently available so that it can then select among those available. The indications of interactive potentialities must be distinct from the selection of interaction.

The selection of interaction is central to motivation, which I will not address in this chapter (Bickhard, 2000b, 2003, in preparation); for current purposes the most relevant aspect of this example is the indication of interactive potentialities without necessarily engaging in those interactions. Crucially, such indications involve similar implicit predications and presuppositional contents as the direct triggering of the interactions: an indication of an interactive potentiality is an implicit predication that this environment is appropriate for that kind of interaction, and it presupposes that this environment satisfies the implicit content consisting of sufficient support for the interaction to make that interaction appropriate—that this environment possesses (a sufficiency of) the implicitly presupposed properties. Indicating interactive potentiality, then, itself constitutes representational emergence.

A second point illustrated by this example is that such indications can branch in multiple "directions." More than one interactive potentiality can exist at a given time, in particular circumstances.

A third point can be derived from consideration of the status of *potential indications* of interactive potentiality when initial conditions for those potentialities are not currently present. If certain visual processes *were* to occur, for example, then the frog would set up an indication that it could flick its tongue in some new direction with the consequence of eating a fly in that direction. This conditional *readiness* to set up a tongue-flicking and eating indication is available in the frog even when nothing is detected in the required direction. The setting up is conditional on proper prior visual detection, and the conditional as a whole is present even if it is not activated in particular conditions. These conditionals have roughly the form of "'condition satisfied' yields 'indication set-up'."

Such conditional interactive potentialities can, in principle, iterate in the sense that the engagement in one interaction may create the conditions for the potentiality of some further interaction. And that further

interaction might create the conditions for a still further interaction. In sufficiently complex organisms, such branching and iterating indications of interactive potentialities can form vast and complex webs of indications of interactive potentiality. Such webs constitute one of the primary resources of the interactive model for capturing complex representation.

Complex Representations Consider now a small manipulable object, such as a child's toy block. The block offers multiple possible interactions, such as manipulations and visual scans, and they are all interrelated with each other. In particular, any one of them indicates the potentiality for each of the others, in some cases with appropriate intermediate interactions. So, a particular visual scan of one side of the block indicates, among other things, the possibility of a visual scan of some other side of the block, so long as the proper manipulations are engaged in so as to bring that other side into view. In general, the possible interactions with the block form a subweb of the overall web of interaction potentialities in which every part of the subweb is reachable from every other part: it is internally completely reachable.

Furthermore, this internally reachable subweb is invariant under a large and important class of other interactions and other processes in the world. The child can drop the block, leave it on the floor and go somewhere else, put it in the toy box, and so on, and the entire subweb remains available so long as appropriate intermediate interactions occur to bring it back into manipulable range (e.g., walking back into the room). The subweb is not invariant under all possibilities, however: crushing or burning the block destroys that particular organization of interaction potentialities.

Such an internally reachable, translational and locomotor invariant subweb constitutes the child's representation of a small manipulable object. More generally, this illustrates how indications of interaction potentialities can address more complex representational phenomena, such as of objects.

Another challenge to the interactive model of representation would concern abstract representations, such as numbers. It may be that interactive representation can account for the physical world that is available for interaction, but what world is it that is available for interaction for representing abstractions? Such challenges (including that for objects) cannot be met by addressing every possible case because they are unbounded, but, again, I can illustrate how this model can address abstractions, and will do so with the case of number.

A system interacting with its environment might well have a servomechanism that can be called on during other interactions that would control engaging in some particular interaction and encountering failure three times before giving up on that interaction and switching to something else—a "try X three times before giving up on X" subroutine. If there were a second level system interacting with the first level, in generally the same sense in which the first level interacts with the environment, then the second level could represent various properties of organization and process in the first level. In particular, it could represent the property of "ordinal three" instantiated in the heuristic subroutine mentioned. In this sense, the overall system could represent abstractions.

More generally, a system interacting with—thereby *knowing*—its environment will instantiate properties that may be useful to interact with and represent from a second level of knowing, and the second level, in turn, may itself have properties that could be interacted with and represented from a third level, and so on. These potential levels constitute an extremely rich resource for addressing cognitions about and representations of abstractions. Again, the interactive model does not encounter perplexity in addressing more complex representation.

Representation, Piaget, and Pragmatism

The model of object representation outlined above is basically Piaget's model translated into the interactive framework (Piaget, 1954). The model of representing number is also similar to Piaget's model, though with more fundamental changes, especially regarding the nature of the levels of potential cognition and representation (Bickhard & R. L. Campbell, 1989; R. L. Campbell & Bickhard, 1986).

The interactive model can borrow from Piaget in this manner because both models are action based, both models are within the general pragmatist framework in which action serves as the foundation and framework for understanding mental phenomena (Joas, 1993). This is in strong contrast with standard approaches which attempt to model representation in terms of some sort of result of the processing of perceptual inputs.

Alternative Models of Representation

There are, in fact, multiple candidate models of representation in the contemporary literature, but the pragmatist nature of the interactive model alone suffices to distinguish it from most of them. A detailed comparison would require very lengthy discussion, but I can illustrate some of advantages of the interactive approach with just a few points.

Indications of interactive potentialities are *anticipative*. They anticipate the general flow of interaction should the indicated interaction be engaged in. It is such anticipations that can be true or false. Anticipations are modal (interaction *possibilities)*, normative *(true* or *false)*, and intentional (about interactions with *this* environment). They contrast in all these respects, and more, with standard approaches to representation.

Standard approaches to representation assume that representation is some form of special correspondence between the mental representation and what is to be represented that constitutes an *encoding* of what is being represented. They assume that representation is fundamentally a matter of encoding; thus I call such approaches to representation instances of *encodingism*. They are descendents and variants of the Aristotelian metaphor for perception of the signet ring pressing its form into wax—they have a very long history. In contrast, it has been only a little over a century since Peirce introduced pragmatism's core notions (Joas, 1993; Mounce, 1997; Rosenthal, 1983).

Within the encodingist framework, the central issue concerning representation is what the crucial correspondence relationship is that constitutes a representational relationship. It is variously proposed to consist of a causal correspondence, an informational correspondence, a lawful correspondence, a correspondence of structural iso- or homomorphism, or a correspondence with the right evolutionary history (Cummins, 1996; Dretske, 1988; Fodor, 1975, 1987, 1990a, 1990b, 1991, 1998; Millikan, 1984, 1993; Newell, 1980; Vera & Simon, 1993; cf. Bickhard, 2003/2004b; Bickhard & Terveen, 1995; Levine & Bickhard, 1999). There are multiple problems with such approaches: I will mention three.

First, consider a causal or informational correspondence between some mental activity and a table being visually perceived. Whatever that special correspondence is supposed to be, there is also such a correspondence with the light on the surface of the retina, with the quantum activities in the surface of the table, with the table a minute ago (note that the light reflected from the table in the past, however short a time into the past it may have been, but the continuity from the light to the table continues through the temporality of the table itself), the table a year ago, the manufacture of the table, the creation of the materials out of which the table is constructed, and so on to the Big Bang. Which of these instances of the "special" correspondence is the representational one, and how does the organism "know" which one it is?

Another problem arises from considering how representational error could be modeled. If the special encoding correspondence between representation and represented exists, then the representation exists, and it is correct. If the special correspondence does not exist, then the representation does not exist. These are the only two possibilities, but there is a third possibility that must be modeled: the representation exists and is incorrect. There have been major efforts in the last decades to account for the possibility of representational error, but without success.

An even stronger criterion is not even addressed in the standard literature: how can *system* or *organism detectable* representational error be accounted for? Attempts to model representational error do so (however unsuccessfully) from the perspective of an external observer of the organism and its environment: the property of error is assessed, if at all, only from this external perspective. How the organism could detect its own error is not addressed.

But if the organism cannot, however fallibly, detect its own error, then error guided behavior and error guided learning are not possible. It is clear that error guided behavior and error guided learning do occur, so any model that makes this impossible or cannot account for it is thereby refuted.

The anticipations of the interactive model, in contrast, account for representational error very simply; the actual interaction, should it be engaged, may or may not proceed as anticipated. If it does not, then the anticipation is in error, and the organism is in a position to functionally detect that error and respond accordingly. Neither error per se, nor system detectable error, are problematic in principle for the interactive approach.

Developmental Emergences

An action or interaction based approach to representation yields several further consequences. In particular, it forces a constructivism of learning and development—and, thereby, sets the stage for the possibility of developmental emergences, constructive emergences, within individual organisms.

Implications for Learning and Development

If the world presses itself into a passive mind, as does the signet ring into wax, or, in more modern terminology, in sensory transduction (press into wax at a moment in time) or induction (scratch into wax over some duration or number of instances), then we are led to passive models of both perception and learning. There is little for development to do within such a framework.

If, however, representation is emergent in systems for action and interaction, there is no temptation to assume that competent interactive systems can be pressed into a passive mind by the world. Instead, interaction systems must be constructed. A pragmatist orientation forces a constructivism. Furthermore, absent prescience, these constructions must be tried out and rejected or modified if they are not successful: A pragmatist orientation forces a variation and selection constructivism, an evolutionary epistemology (D. T. Campbell, 1974).[8]

Recursive and Metacursive Constructionism

In simple organisms, it is likely that all learning is construction from the same base. In more complex organisms, however, constructions are in the context of prior constructions, and make use of prior constructions both as components and as loci for further variations. In this case, construction is *recursive:* prior constructions constitute a primary resource for later construction.

In still more complex organisms, including human beings, the processes of construction are themselves constructed, and these processes are also recursive: a kind of *metarecursivity*. It is worth noting that Piaget's model is recursive—prior constructions are very much used as resources in later constructions—but it is not metarecursive—equilibration remains the central constructive process throughout development. It is also worth noting that, although it is clear that metarecursivity is common in humans, it is almost universally overlooked in developmental models.

One consequence of recursive constructivism is that it introduces a kind of *historicity* into constructive trajectories over time. Earlier constructions can make certain later constructions easier, or make them possible at all. Learning can get easier in a domain in which significant prior learning (construction) has occurred (R. L. Campbell & Bickhard, 1992a). Of course, in some cases, such prior construction can make later learning more *difficult*, if the recursive constructive resources are in some sense inappropriate for a later task.

Learning and Development Within such a constructivism, the study of learning is the study of how such constructions occur and how they are influenced by experience (Bickhard, 1992a, 2003). The study of development focuses on the historicities of construction involved, the constraints and possibilities of constructive trajectories, lattices, and weaves (Bickhard, 1980).

Constraints on Development

Development is a class of phenomena that emerge in constructive learning. Prior constructions can have strong effects on later constructions—making some constructions much more likely and, perhaps, others less likely, than before—and the historicities introduced are of crucial importance.

There are important constraints on constructive development that are not of a standard causal nature. The historicities of prior constructions is one example: prior constructions make a difference for later constructions, but they do not *cause* that difference (certainly not in any sense of efficient cause). Instead, they enable various other constructive processes to do what would otherwise be difficult or impossible.

Another source of developmental constraint derives from the constructive processes themselves. Constructions that might be complex and difficult with some constructive processes might be much simpler with some other constructive processes. Processes of construction impose a topology of nearness and farness on the space of potential constructions: roughly, more constructive steps means more complex, which means "farther" in that constructive topology. Note that a *meta*recursive developmental constructivism, by introducing new constructive processes, can drastically alter the topology of developmental space. It can make some things "near" and easy that were previously extremely complex

and distant. This is one view on the advantages of constructive, learning heuristics (Bickhard & R. L. Campbell, 1996; Bickhard & D. T. Campbell, 2003).

Another constraint on constructive development arises from the levels of potential representation, of potential "knowing," where knowing is modeled in terms of capabilities for interaction with that which is known.[9] In particular, it is not possible to construct an interactive system at some level N+1 if there is nothing already constructed at level N to be interacted with. Again, this is not a causal constraint. In fact, it is much stronger than a causal constraint—it is a metaphysical necessity: if the space of potential constructions has such a simply ordered structure, then it is logically impossible to skip a level in construction because there would be nothing at the skipped level to be interacted with. Psychology is not accustomed to considering such ontological or metaphysical constraints (R. L. Campbell & Bickhard, 1986, 1992; Bickhard & D. T. Campbell, 2003).

Developmental Emergences

In the standard form of computer models of the mind, "development" consists of storing lots of information. Development is in scare quotes here because, in such models, there is, as mentioned before, little for development to do. For such a computer, it is of no particular consequence what the information is about—in particular, whether it is about interactions with the physical world, some abstract world, or the social world. There is no meaningful construction, just more chunks, and therefore no basis for emergence.

If mind is an interactive system, however, then constructive development does occur, with all of its recursions, historicities, constraints, levels, trajectories, and so on. In this case, development constructs particular kinds of interactive systems, perhaps more than one kind in a particular individual. This yields the possibility that there might be important *emergent* kind(s) of interactive system constructed. I will argue that this is in fact the case, with a central ontological focus on the emergence of the social person.

The Emergence of Social Ontology

There is a complex dialectic involved in the emergence of the social person. Social levels of process and organization—social realities—are themselves emergent, and social persons are developmentally emergent as participants in, and as constituting the emergence base for, that social level of ontology. Social reality and the reality of social persons are in a continuous generational dance upon which each are centrally dependent for their existence, and even for the very possibility of their existence. Social reality and social persons are in an ontological interdependence.

There is a third aspect of this evolutionary developmental emergence, and that is language, which is simultaneously a social institution for creating and transforming social realities and also a central aspect of the ontology of that social reality—and, therefore, of the social persons who coparticipatively constitute it. Language enables the unfolding of the full complexities of society and culture—and persons. Sociality, social persons, and language are three aspects of one evolutionary, developmental, social dynamic (kind of) process that involves emergences at multiple levels and with respect to multiple aspects.

Situation Conventions

Social reality emerges out of an epistemological perplexity that agents pose to one another. In particular, when interacting with stones and toy blocks, the interactive potentialities available are determinable to a large degree just on the basis of the initial perceptual encounter, but when *agents* are dealing with each other, the interactive potentialities that each affords to the other are largely hidden from perceptual access. Much of the interactive potentiality afforded by an agent is constituted or determined by internal representational and motivational processes that are not directly accessible and that can change over relatively short time spans.

Even worse (epistemologically speaking), the interactive potentialities afforded by an agent depend in part on that agent's interactive characterizations of other agents in the situation, but their interactive affordances, in turn, depend in part on their characterizations of the first agent—and this problematic is reciprocal amongst all participants in the situation. No agent can interactively characterize the situation containing other agents without at least partly characterizing properties of those other agents' characterizations of him- or herself.[10] Interactive construal of the situation depends on construal of others, which depends on others' construal of you.

This kind of situation poses what Schelling called a coordination problem (Schelling, 1963): There are in general multiple joint construals of the situation that social situation participants might be satisfied to have. The problem is to arrive at a mutual framework of interactive construals among the participants that is in fact "joint," that are mutually consistent. The problem is to arrive at a coordinated organization of mutual construals. Modified from Lewis (1969), I call any solution to this coordination problem a *situation convention:* a social convention about how to interactively construe the social situation.

Situation conventions constitute the basic emergence of social reality. They are, if they exist at all, an inherently social organization with novel properties that cannot be modeled in any simple aggregative manner from the participants in a social situation (Wimsatt, 1986, 1997).

A lecture situation, for example, is so because of the mutual assumptions among its participants that it is so. If the same people were involved, but they all were mutually to assume that the situation was a birthday party, then it would be a birthday party. Social realities are constituted in the commonalities of presumptions concerning those social realities. Furthermore, social realities are real in a very basic sense—violations of conventions can have consequences: realities can resist and surprise.

Nonrecurrent Situation Conventions and Institutionalized Conventions There are two basic kinds of situation conventions that need to be distinguished here: those that can occur but likely never recur, and those that do, or at least can, recur over times, situations, and people.

Nonrecurrent situation conventions are illustrated by the commonality of readiness to interpret a pronoun in a conversation in the same way amongst all the participants to that conversation: the particulars of that situation constitute a coordination problem—the participants would like to arrive at the same interpretation—so the fact of a common interpretation, and the condition of being ready to so interpret, constitute a situation convention that is not likely to recur simply because the particulars of the conversation are not likely to recur.

Institutionalized conventions are those, such as driving on the right side of the road, which are capable of multiple reinvocations across times and people. Institutionalized conventions derive from conventionalized means by which they are invoked. Meeting another vehicle on a road automatically invokes the "driving on the right side" convention across multiple societies and cultures. Lectures similarly involve complex conventions across large numbers of people. Institutionalized conventions need not be institutionalized across entire societies: personal relationships are constituted by intricate conventions, some of which may be of wider scope, but many of which may be specific to this pair or group of people. Roles emerge as conventionally typified kinds of participation in conventionalized kinds of organizations of social interactions (Berger & Luckmann, 1966; Bickhard, 1980, in preparation).

It might seem to be a puzzle how nonrecurrent situation conventions can occur other than by chance. How could such a convention ever come into existence if there were no past history for it to be based on? The key to this puzzle is to recognize that conventionalized means of invoking conventions, characteristic of institutionalized conventions, such as insignia of rank or the bang of a gavel, are not simply triggers, but, instead, are context sensitive transformations of prior conventional understandings into new or more specific conventions. Someone banging a gavel has very different conventional consequences depending on the prior situation and the status of other participants: it is context sensitive in its consequences. In general, this constitutes a limited example of a broader phenomenon of conventionalized *transformations* of conventions—in this case, a transformation of the existence or lack of existence of a formal institutional mode of interaction.

If there were a conventionalized *system* for constructing conventional *transformations* of social *situation conventions*, such a system could well create situation conventions that had never occurred before and likely never would again, simply by deploying (constructed) transformations that might themselves be novel in situations that might well be novel, so that the situation convention as (momentary) outcome of the invoked transformation will also be novel and nonrecurrent. Such a conventionalized tool for interacting with situation conventions would also be extremely useful: situation conventions can be powerful and important, and resources for interacting with them correspondingly valuable.

Language If such a social resource is *productive* in the sense of being capable of producing an unbounded number and range of possible situation convention transformations, it is called a *language* (Bickhard,

1980, 1998b).[11] This, as for the rest of the model, is a model of the nature of language as an interaction system, a social institution for interacting with social realities. It has kinships with, though also fundamental differences from, Wittgenstein's toolbox (Bickhard, 1987), J. L. Austin's speech acts (Bickhard, 1980), functional and categorial grammars (Bickhard & R. L. Campbell, 1992), and so on. It is drastically different from common assumptions about language as an encoding of mental contents for transmission to be decoded in someone else's mind (Bickhard, 1980; Bickhard & Campbell, 1992). I cannot focus on language here—it is among the more complex phenomena to attempt to model—but this basic approach to language as a social interactive system will suffice for the basic discussion that follows. Note that language is not only a tool for interacting *with* social realities, the potentialities for further language interactions constitute a major portion of the ontology *of* those social realities.

Social and Cultural Persons

The developing child will be constructing the abilities to interact with his or her environments. These will be massively social, ranging from family, to other children, to school, to the wider society and culture. The interactive agent that is constructed in this developmental process, therefore, will be an agent that can coparticipatively constitute the society(ies) in which he or she has grown up.

This social participative and social constituting agent will be quite different in kind from the more basic biological infant, however much it is the case that the particular infant is inherently open to such social development. Here, biological ontogenesis supports sociopsychological ontogenesis, and something new is emergently constructed: a social person, an interactive agent that is significantly social in its own ontology.

Furthermore, because societies and cultures are themselves historistic, the kind of social person developed in one culture may be deeply different from that developed in another (e.g., Geertz, 1973, 1983). The social person is not only an emergent agent, he or she is also an ontological heir to the historicity of the society and culture in which and out of which that emergence occurs.

There are at least two senses in which this constructive emergence takes place. The first is the more intuitive, and is simply the basic organization of what the person knows how to do as a social participant. The second is at first puzzling: cultures generate persons with fundamentally different values concerning multiple domains and scales of importance, and including values concerning what is important and worthwhile in life. It is such values that make social persons from different cultures most fundamentally different as persons. The difference is not just in skills, but in what can and will be taken to be meaningful, what can even be seriously considered as an option. It could not be a serious option, for example, for me to consider becoming a mendicant Buddhist monk: the value organization and presuppositions about the world and life are simply too different.

But how can such value differences be constructed? They are not instrumental skills that can be practiced and adopted for appropriate instrumental tasks; they are more fundamental to the person than that. They cannot be construed as being pressed into an otherwise passive mind: that approach to modeling is ruled out for all learning and development. What cultures provide is not values that can be pressed into children, but, rather, values as options that the child can construct to organize his or her life, or values as presuppositions of ways of being that the child can construct (Bickhard, 2004a). These are options both in the sense that the society will provide models for what it is like to live those values—guides to what to construct—and in the sense (usually) that the society provides ways for persons in that society to actually live those values, locations, or positions, or statuses that relate to persons in those positions in ways that make living those values possible. It is difficult, for example, to be a mendicant monk if there is no institution in the society of supporting such monks with food and other resources.

Hermeneutic Ontology Social persons are significantly social in their ontology, not just in their instrumental skills. Sociality, in turn, is significantly linguistic in its ontology: much of social reality is constituted in organizations of potential further language activity. Social persons, then, are also significantly linguistic in their ontology: much of who and what we are is constituted in language potentialities, including language about ourselves as social and linguistic beings.

In this way, the interactive model of social persons partially converges with the hermeneutic model of human ontology (Gadamer, 1975, 1976). Human beings are constituted in important ways by their language-framed self-interpretations.

But this is an emergent ontology, emergent within and with the support of the biological base. The ontology of persons is not *only* social and linguistic, not only cultural and historical. Furthermore, being biological human beings as well as social persons, the possibility is open that there are shared intrinsic interests and constraints that cross societies and cultures. I will not pursue this possibility here, but mention it because it potentially avoids the apparent cultural relativism of a fully hermeneutic human ontology: if we are completely constituted in our culture and its history, then there is no possibility of warranted judgment, moral judgment, for example, from within one culture about issues in another (Bickhard, in preparation; R. L. Campbell & Bickhard, 1986). In this view, there is no warranted judgment from Western culture, for example, that Aztec human sacrifice involves any moral violation. In contrast, the universal possibility of violating intrinsic, thus universal, interests and constraints provides a framework, however fallible and difficult to explore, for warranted judgments of cross-cultural scope.

Persons and Culture Persons, then, are developmental emergents; they are social developmental emergents. Because the ontology of social reality is largely constituted in language potentialities, persons have a social, cultural, linguistic ontology. They are constituted in and of a social/cultural emergent level of reality. Human society and persons coconstitute each other, both developmentally and occurrently.

Culture is the historistic aspect of social realities. It is the historical sedimentation of past social evolution and social constructions. Among the most important aspects of social and cultural processes is that culture induces the developmental emergent "production" of persons who can and do coconstitute that culture. In this manner, culture creates its own emergence base by guiding the developmental emergence of its constituent persons.

Culture, then, is a realm of evolution with its own historicities, an ontology that is partially independent of the biological base. It is a kind of emergent historistic process that creates its own emergence base ongoingly through its historical development. In this respect, culture is a unique realm of evolution: there are partial parallels elsewhere in evolution, but nowhere that the emergence base for an evolutionary process is created ongoingly by that very evolutionary process.

And persons are ontologically part of that process.

Theoretical Commitments

The model outlined here is dependent for its coherence on strong theoretical assumptions. The possibility of any kind of ontologically real emergence requires a process metaphysics. Otherwise all causality remains with the fundamental particles, whatever physics ultimately tells us they are.[12] The possibility of human developmental emergence presupposes the interactive nature of what emerges. Otherwise, the world can just impress itself into a passive mind and there is no significant constructive development. And the possibility of the emergence of persons requires the coconstituting emergence of social reality, language, and person, all with their cultural historicities. Otherwise, social knowledge is just a set of skills and data encoded in the databanks of biological computers, no different in kind from nonsocial knowledge and data. Recognizing the social emergent nature of persons is forced by these underlying theoretical commitments, but it is also not coherently possible without them.

Philosophy of Science Commitments

Exploring ontologies is not a common or familiar practice in contemporary psychology. We are still burdened by the naïve inductivism of the neo-Macheanism inherited from behaviorism, and issues of ontology and metaphysics are not, within this framework, considered to be scientific. But there are very good reasons to reject this heritage: the empiricist epistemology is bankrupt (e.g., operational definitions were proven to be inadequate in the 1930s); the inductivism is false and misleading (e.g., not even logical positivism maintained the naïve inductivism that psychology still works with); the positivistic rejection of metaphysical issues is ungrounded and self-contradictory (empiricist positivism is itself a metaphysical commitment, just one that insulates itself from examination by its rejection of "metaphysics"). In sum, psychology is burdened with a deeply wrong conception of what science is, and, therefore, of how good science should be pursued. By the standards of contemporary psychology, contemporary physics, for example, is very bad science (Bickhard, 1992b).

The metaphysical explorations in this chapter, then, not only involve theoretical commitments, they also

involve commitments in the philosophy of science in general, and the philosophy of psychology in particular. Within an empiricist inductivism, these explorations have no place. But, then, within such a view of science, exploring the nature of quantum fields and gravity has no legitimate place either.

Conclusion

The ontology of persons is an issue which *should* have a central place in psychology. Pursuing it here presupposes a number of theoretical and philosophical commitments that are not yet common in the field. This exploration has looked at issues regarding emergence in general and especially normative emergence, constructive developmental emergence still more specifically, and the developmental emergence of social persons as constitutive participants in society and culture in particular. The conclusion?—

Whether or not you are social in the sense of sociable, you *are* social onto-logically (at least in a major way).

Notes

1. Aristotle's substances could change—into each other—but he had a still more fundamental level that did not change, that did satisfy the Parmenidean constraints (Gill, 1989). The assumption of "no change" has dominated thought since then.
2. A few years ago I heard a major psychologist respond to a question about the normativity of representation with the response: "I'm not interested in that mystical stuff." From within a purely factual perspective on the world, normativity is outside of the ken: it is mystical, not scientific, not part of the world to be scientifically accounted for.
3. Kim's more recent work makes increasing room for emergent phenomena (1998, 2005), but does so by making room for configuration, or organization, as a legitimate locus of causal power—and this is precisely what I argue is required for legitimate models of emergence. It is not clear, however, how Kim's legitimation of organization is justified by Kim's arguments.
4. Hilbert was not the first to recognize implicit definition (Hilbert, 1971; Kneale & Kneale, 1986), but he put the notion in play in a major way among early analytic philosophy. Schlick, for example, attempted to make use of implicit definition in his early work (Coffa, 1991; Schlick, 1925/1985).
5. Mention should be made at this point of Beth's theorem, which has frequently been used as an excuse for ignoring implicit definition (Doyle, 1985). Beth's theorem proves that, under certain conditions, implicit and explicit definition are of equal power. Why pay attention to implicit definition then? This conclusion is in error in at least three ways: (1) even if implicit and explicit definition were in fact equal in all other ways, it remains the case that implicit definition cannot be back-translated through, and, thus, that Hume's argument is unsound; (2) the equivalence of power proven in Beth's theorem is an extensional equivalence only, and has no bearing on issues of meaning; and (3) Beth's theorem is proven in first order predicate logic with infinite models (Chang & Keisler, 1990), and, in all other combinations of logics and models (e.g., infinitary logics, fixed point logics, finite models, etc.), implicit definition has been found to be either equally as powerful as explicit definition or *more* powerful than explicit definition (Dawar, Hella, Kolaitis, 1995; Hella, Kolaitis, Luosto, 1994; Kolaitis, 1990). In no case is it less powerful: implicit definition can not be ignored.
6. The standard more naïve conception of contemporary physics is that of particles that interact with each other via various fields: gravitational, electrical, and so on. This view fits poorly with contemporary physics, but it nevertheless has already conceded the basic point above: if fields are countenanced, then organization is legitimated as a potential locus of causal power because fields are causal and are so necessarily in part in virtue of their organization.
7. I will skip over and not address here the simplest form of normative emergence, that of biological normative function. The grounding intuition, however, is itself simple: contributions to the maintenance of a far from equilibrium system are functional for the continued existence of that system (Bickhard, 1993, 2000c, 2003, in preparation; Christensen & Bickhard, 2002).
8. Consistent with this point, Piaget's model is a constructivist model. Piaget, however, though he acknowledged "random" variation and selection, thought that such a process was too weak to account for all aspects of development, and posited an inherent "groping" as the central process. I argue that Piaget was in error in this reasoning (Bickhard, 1992c).
9. This is very much a psychological notion of knowing, and knowledge. Its relationships with the philosophical criteria of justified, true, belief are not simple (Bick hard, in preparation). But the philosophical notion is a "success" notion: it is not ascertainable with certainty by an organism, including a human, whether or not some

potential knowledge is in fact knowledge in this philosophical sense.

10. This introduces interesting and at times important levels of epistemological and ontological reflexivities to social situations (Bickhard, 1980). I will not address these here.
11. In at least one sense, it can be misleading to characterize utterances as *transformations* of social situations: this usage is consistent with a notion that utterances some-how *encode* transformations similar to the sense in which a mathematical formula might encode a function. There are strong arguments, however, that language not only is not an encoding phenomenon, but that it cannot be (Bickhard, 1980, 1992a, in preparation; Bickhard & R. L. Campbell, 1992). A more careful rendering might be to say that an utterance evokes a transformation of the social situation in the course of the (ap)perception of the utterance (Bickhard, in preparation; Bickhard & R. L. Campbell, 1992), but this would require considerable further discussion to elaborate.
12. But, of course, physics has already gone beyond this.

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