Can Whitehead's Philosophy Provide an Adequate Theoretical Foundation for Today's Neuroscience?

David E. Roy

DAVID ROY wrote his doctoral dissertation under the directorship of John Cobb and has practiced as a psychotherapist for forty-five years. Email: <soulfulpsy@mac.com>.

ABSTRACT: This article compares research in neuroscience regarding the right and left hemispheres of the brain, particularly in the work of Iain McGilchrist and Robert Ornstein, with Whitehead's perception in the mode of causal efficacy and in the mode of presentational immediacy, respectively.

Introduction

The purpose of this article is to propose that Whitehead's process philosophy has the potential to serve as an adequate metatheory for today's rapidly expanding field of neuroscience. This will be demonstrated by the high degree of correlation between key categories in his theory of perception in both *Symbolism* and *Process and Reality* and a recent and highly regarded summary of the different styles of the two hemispheres of the human brain.

If process thought is to seep into and reshape the worldview of those who are unfamiliar with Whitehead's ideas, psychology can provide an excellent medium for this reshaping because it is of great interest to a large number of people, including that branch of psychology called neuroscience (see Jones and Mendell).

The growth of neuroscience has been accompanied by increased attention given by professionals to the relationship between the neurological systems and various applied areas of psychology, including clinical, developmental, learning, and cognitive psychology. As a result, neuroscience is actually serving as a common ground for these fields and potentially other areas of psychology.

A potential problem facing neuroscience is the lack of a metatheory¹ capable of bringing together the huge amount of psychobiological findings that have been generated. University of California, Los Angeles's Allan

Schore, a leading figure in neuroscience, gave a plenary address to the 2009 annual conference of the American Psychological Association where he lifted out the need for a comprehensive theory to work with the new perspectives and new research brought about by the “emergence of non-invasive brain imaging technologies” (“Paradigm Shift”). He said, in part,

[Today] the challenges are more conceptual than technical. We need an overarching theoretical model of development across the lifespan. . . . With the current flood of neuroscience data, only an interdisciplinary perspective can interpret that data effectively. That model will involve cross-collaboration between psychology and neuroscience, as well as researchers and clinicians. At this point, no theory can be purely psychological.

Schore touched on this topic a second time in the address. (Note a degree of vagueness in the later treatment of the topic.)

Psychology is more than the study of behavior, or cognition, or a disembodied mind. The field must create models that overcome Descartes' error. The fundamental unit is not mental but psychobiological. Not the mind but the human organism, mind/body. . . . No function of the mind studied by psychology (e.g., child psychology, personality theory, social psychology, abnormal psychology, physiological psychology, etc.) can be understood without considering not only the brain but the bodily systems that underlie the function.

Schore also made a presentation at the June 2015 “Seizing an Alternative” conference.² In the discussion that ensued following the presentation of an outline and summary of the correlation between Whitehead's theory of perception and the neuroscience account of the activities of the brain's hemispheres, he was asked for his opinion of this by a collaborative colleague, Darcia Narvaez. Schore affirmed that the correlation was promising.³

In addition to the capacity of a metatheory to bring together all the current pieces of a field, another important requirement to engage the field's researchers will be the capacity for the metatheory to generate research to test the assumptions as well as any changes in procedures that might be called for by the theory. If the metaphysics can be shown to be explanatory and capable of generating research questions, then, given the central status that neuroscience has with regard to other fields of psychology, this usefulness could aid its extension into other areas of psychology.

The discussion that follows will be organized as such: First, there will be a prologue with two parts to set the stage for later discussion. The

first part is a brief description of the nature and role of the dominant or presiding occasion, as this will be referred to in the discussion that follows. The second part is a list of eight dynamics that provide a basis for comparison between the two systems and the basis for understanding the dynamics as polarities. This is followed by the primary material of this section, the argument that Whitehead's metaphysics is capable of providing a metatheory for neuroscience. This will be based upon an examination and comparison of Whitehead's ideas with the findings and derived interpretations of our bicameral brain established by neuroscience.

The Nature and Role of the Dominant Occasion in the Human Mind and Body

Whitehead's full theory as developed in *Process and Reality* includes a description of the nature of the presiding or dominant occasion and the role it plays as it relates to the human psyche and body, including the brain. The dominant occasion is a specialized version of an actual occasion. As the dominant occasion, it is the recipient of the activity of the occasions that constitute the body, including the sensory organs, the peripheral and central nervous system, and, finally, the brain. In turn, it returns its influence, impacting the occasions that constitute the systems of the brain, the rest of the central nervous system, the peripheral nervous system, the sensory organs, and the body in general. As such, it is responsive to and responsible for the entire organism or "living person" (Cobb 43–45). Unlike most other actual occasions, it can have the subjective form of consciousness.

Some would call this our *mind*. The difficulties with this term concern the connotations that reflect the more rational, intellectual dimension of our experience and exclude the emotional, intuitive, and unconscious portions of our experience. This temporally ordered society of dominant occasions is better understood as the *psyche*, as this term refers to the entire mental and emotional history of a "living person."

A primary point in this article is that the dominant occasion is an interactive partner with a unique role in the whole, complex process of perception. Based upon the fundamental nature of all actual occasions, this dominant occasion creates a single, unified, whole event upon completion. All the constituent elements (prehensions) that are eventually included are harmonized into a single experience. This understanding of the nature and role of the dominant occasion in human psyche-soma

dynamics provides a missing link to bridge the “mind-body” gap that is evident in the quotations above from Schore.

Eight Key Dynamics

The eight dynamics listed below will help illustrate the correlation between Whitehead's theory of perception and the current neuroscience understanding of the differing dynamics of the hemispheres of the human brain. The more specific details for each mode and hemisphere will be summarized later in this article. It should be noted that this list is not exhaustive and hopefully will need to be expanded as new features are explored, adding to the richness of understanding that is possible when using process metaphysics as a searchlight.

Several of these dynamics function as polarities. On one side of the polarity are causal efficacy and the right hemisphere; on the other end of the polarity are presentational immediacy and the left hemisphere.

1. Contact with the world (direct or indirect)
2. Breadth of attention (broad or narrow)
3. Nature of responsiveness to the world (conformal or detached)
4. Degree of clarity of perception of the world (low or high)
5. Primary for meaning or symbol
6. Strength of emotionality and attachment (strong or weak)
7. Possessing power and control over the subject (power versus powerlessness)
8. Nature of awareness (unconscious or conscious)

Comparing and Correlating Whitehead's Theory of Perception with the Functions of the Right and Left Hemispheres

Given the compact style of Whitehead's presentation, the summaries of the two direct modes of perception explicitly include most of the key dynamics, often in a few words and sometimes with more than one dynamic in the same paragraph. Because of the richness of detail in Iain McGilchrist's analysis of the hemispheres, I will use his thought as found in *The Master and His Emissary: The Divided Brain and the Making of the Western World* to help explicate the above-mentioned dynamics. I will also rely on the work of the psychologist Robert Ornstein.

The metaphysics will be drawn from Whitehead's *Symbolism*. These ideas were taken up in *Process and Reality*, but they are presented in *Symbolism sans* the complex context found in *Process and Reality*. As the

correspondence between Whitehead's theory of perception and his theory of concrescence has been developed previously, the present article implicitly provides a connection to the full theory of perception (see Roy).

McGilchrist's observations about the general nature of how the two hemispheres differ are in line with descriptions made by other key figures in the field (in addition to Ornstein), including Schore, who is highly regarded as a leading expert in developmental neuroscience for the attachment period, from birth until three years of age. Schore's attention to empirical detail is extraordinary, having published a large number of scholarly articles and several books developing his theory of self-regulation, the positive outcome of attachment. There is also strong support for McGilchrist's book from a number of other scholars in the field. Rupert Read notes that "the book has been appreciated by leading figures in neuroscience: such as Ramachandran, Panksepp,⁴ Hellige, Kesseling, Schore, Bynum, Zeman, Feinberg, Trimble, and Lishman."

What makes this book especially valuable for purposes of comparison is the way McGilchrist describes quite clearly what actually is taking place with these major areas of the brain. At points, he can sound remarkably similar to Whitehead. Although Whitehead played only a minor role in McGilchrist's book, limited to the second half where McGilchrist discusses distortions and what is missing in Western civilization because of the disproportionate role the left hemisphere has played, his bibliography does include two works by Whitehead, *The Concept of Nature* and *Science and the Modern World*.

Whitehead's Three Modes of Perception

In *Symbolism*, delivered as lectures at the University of Virginia in 1927, Whitehead laid out his ideas about perception and the theory that ties them together. The three modes are causal efficacy (CE), presentational immediacy (PI), and symbolic reference (SR). The first two modes involve direct perception of the external world (S 30). As forms of direct experience, they are "infallible," not subject to error (S 6). The third mode is the result of the two primary modes and, as it does not involve a direct experience of the world, it is subject to error. In this article, the two direct modes will be brought into play. SR requires dealing with the issues involving consciousness, no small topic in neuroscience today, and would require a separate treatment.

Causal Efficacy is the becoming subject's experience of the impress of the world, initially unmediated and conformal. This is the experience

of things happening to us, the sense of being “done to” by something or someone else: “The perception of conformation to realities in the environment is the primitive element in our external experience. We conform to our bodily organs and to the vague world which lies beyond them” (S 43).

One key feature of CE that is important for the correlation with neuroscience that may not be clear in the description of it thus far is the initial totality of experience. While this is implicit in the nature of CE, it is made explicit in *Process and Reality* with Whitehead's analysis of physical feelings, which correlate closely with CE (see Roy 138). Initially, what is included in the experience could be called “the big picture” because nothing is excluded at that point.

It is experience of “contact with the things gone by, which lay their grip” upon us, of “characters mysteriously moulding our own natures” (S 44), of “controlling presences” (S 56–57). This portion of our perception is felt as “a heavy, primitive experience” (S 44), one that is “more prominent both in apparent behavior and in consciousness, when the organism is low grade” (S 41–42). For higher grade organisms, such as human beings, the experience does not usually dominate. When it does, it is by means of a reversion (S 44). (A reversion introduces novelty.)

This primitive experience is *vague*. What is perceived is vaguely perceived. The experience of conformation itself is perceived “vaguely” (S 43) and so is the sense of relationship of “oneself” and ‘another’ in the undiscriminated background” (S 43). The “exact discrimination of thing from thing, and of position from position, is extremely vague, almost negligible” (55). “There is no adequate definition of localization” (S 55). Though things perceived in this mode are “unmanageable, vague, and ill-defined” (S 57), they are our usual source of meaning: “But for all their vagueness, for all their lack of definition, these controlling presences, these sources of power, these things with an inner life, with their own richness of content, these beings with the destiny of the world hidden in their natures, are what we want to know about” (S 57).

Presentational Immediacy is the becoming subject's experience of the world as it is immediately presented to the subject. It is the experience of things out there, around us, at the present moment, but not the whole world all at once. (Most often, only select portions of the present world are perceived in any given instance.)

Perception in this mode is “what is usually termed ‘sense-perception’” (S 21). In this mode, instead of conformation, there is *independence* (S 25).

These events in the immediate present do not influence us, though they are relevant: “[PI] expresses how contemporary events are relevant to each other, and yet preserve a mutual independence. This relevance amid independence is the peculiar character of contemporaneousness” (S 16).

The relevance is expressed in the awareness that these independent, contemporary events appear as elements “constitutive of our own experience” (S 21). That is, though “external” and separate, they are “*objectively* in our experience” (S 25). “[Perception in this mode is] to a large extent controllable at will. I mean that one moment of experience can predetermine to a considerable extent, by inhibitions, or by intensifications, or by other modifications, the characteristics of the presentational immediacy in succeeding moments of experience” (S 23–24).

In contrast with the vagueness of CE, this mode of perception is vivid and distinct and is the source of our ability to make definite discriminations: “The definite discrimination, which in fact we do make, arises almost wholly by reason of symbolic reference from presentational immediacy”⁵ (S 55). “For human beings, this type of experience is vivid and is especially distinct in its exhibition of the spatial regions and relationships within the contemporary world” (S 14).

The appearance of the solidarity of actual things, perceived in this mode, is derived from the distinctness of the perception of spatial regions and relationships. Our experience of solidarity is due to our experience of “participation in an impartial system of spatial extension” (S 23).

Whitehead discusses the process of localization as a projection (not to be confused with the psychological category of projection⁶). Whitehead says that we perceive the contemporary world “by means of our projection of our immediate sensations” (S 13), adding: “There are no bare sensations which are first experienced and then ‘projected’ into our feet as their feelings, or onto the opposite wall as its colour. The projection is an integral part of the situation, quite as original as the sense-data” (S 14).

Keep in mind that this mode of perception is our way of knowing the spatial extensiveness of contemporary regions and that these regions and objects are seen as external to us. Thus, *projection in this sense means that we know via this mode of perception where a sensation comes from with clarity, vividness, definiteness*. The sensation of blueness arises from our perception of that blue wall (spatial region) “over there.” The wall is defined by its spatial extensiveness, the fact that it is a spatial region out there; its quality (sense-datum) of blueness is what is both in our experience and in the wall.

In contrast with CE, this mode is not normally the source of meaning, typically serving as the symbol instead. "The reason why the projected sense-data are in general used as symbol, is that they are handy, definite, and manageable. . . . There are limits to this handiness of the sense-data: but they are emphatically the manageable elements in our perceptions of the world" (S 56).

Knowledge provided by the sense-data in this perceptual mode is "barren" (S 23) of meaning and history. That which is perceived in this mode is therefore not as "freighted" or laden with extensive meanings. The result is that what is perceived in this manner is more easily shifted from one context to another. PI "is the superficial product of complexity, of subtlety; it halts at the present, and indulges in a manageable self-enjoyment derived from the immediacy of the show of things" (S 44).

Symbolic Reference is the perceptual experience of the integration of the two direct modes and is characterized by consciousness as its subjective form. Consciousness for Whitehead is also termed the affirmation-negation contrast. (A contrast is Whitehead's term for the "holding together" in a single instance of experience elements that may be difficult to bring together. In this case, the contrast involves what is as well as what it might be, even if only slightly different, but is not yet.)

The issues involving consciousness are numerous and complicated. Though they are definitely related to the topic at hand, an exposition of consciousness, exploring current neuroscience views and process thought, would be complex and needs to be dealt with separately.

The summaries of the functional qualities of the two direct modes of perception, including key dynamics, will be presented in a later section along with the summaries of the functional qualities and key dynamics associated with the two brain hemispheres.

The Neuroscience of the Left and Right Hemispheres

In many ways, the modern history of today's intensive neuroscientific study of our brain's two hemispheres begins with the pioneering work of the late Roger Sperry (1913–94). He joined the faculty of the California Institute of Technology in 1954 and began to study the hemispheres in mammalian brains by severing the corpus callosum, the primary neural body that connects the two sides. This led to work with human subjects who had their brain surgically divided as a last resort to prevent life-threatening seizures.⁷ He was awarded the Nobel Prize for this work in 1981.⁸ Sperry's groundbreaking work set the stage for additional research

and serious speculations about what all the findings were revealing (Ornstein 2).

In 1974 and 1975, Sperry entered into discussions involving neuroscience and process thought with John Cobb and several graduate students.⁹ In 1975, *Process Studies* published an article by Sperry, “Mental Phenomena as Causal Determinants in Brain Functions.” He remained interested in the exchange with process thinkers but was forced to stop participating in these conversations due to health concerns.

Robert Ornstein was one of the initial professionals to approach these new findings and analyze their implications for psychology. However, in response to the embarrassment that arose when the popular market’s imagination was excited by the seemingly magical qualities of the right hemisphere, Ornstein was one of the researchers who moved on to other topics. The topic even become fodder for advertising, e.g., both Saab and United Airlines used this concept in advertising campaigns (see Ornstein 1–5).

Roughly twenty years later, in 1997, Ornstein returned to the field to see what findings research had produced. He was “bowled . . . over” by what he discovered, namely forty-five thousand articles and books on this topic published since the late 1970s. He also was forced to set aside his original ideas that the hemispheres were not that different. Reading the research, he concluded that “the division of the mind is profound” (Ornstein 3–4).

In *The Right Mind*, Ornstein provides a clear, sufficiently detailed, and largely nontechnical update on two decades of research on the brain’s hemispheres. One of the key findings is how people who, due to damage or surgery, cannot access their right hemisphere are typically unable to discern the *meaning* of what they are experiencing. He illustrates this by sharing the verbatim comments by eight different patients who were asked what was going on in a painting by Norman Rockwell, *The Waiting Room*. The painting shows a young man with his head bandaged and a young boy sitting together on one end of a bench, looking up and leaning forward. On the other side of the bench is a man smoking a cigarette with an ashtray filled with cigarette butts. He is facing somewhat away from the other two. On the wall is a sign with all but the first letters of the words “SILENCE PLEASE.”

Ornstein shares that one of the eight patients suggested they might be at a Boy Scout meeting, while others said the subjects in the painting were

at a baseball game, at the movies, watching TV, and so on. One person listed perfectly every detail in the picture but drew no conclusions about the meaning.

These results are in keeping with the findings and conclusions that McGilchrist provides. As will be further explained, one of the primary functions of the right hemisphere is to provide us with the big picture, a sense of the whole, from which we derive meaning. The left hemisphere, by contrast, provides us with the equivalent of a close-up picture of parts of the whole conveyed by the right hemisphere. As a result, the meaning can be trivialized or lost.

Iain McGilchrist began an academic career teaching literature at Oxford. After a time, however, he reacted negatively to the abstract nature of literary criticism, something that he found deadened the spirit of the art. He left the field and chose to train as a psychiatrist (see "Interview"). His background in literature is apparent in *The Master and His Emissary*, which looks at the impact of the brain's hemispheres on society. It is well written and extensively documented. The first half of the book is devoted to a comprehensive explanation of the different natures of our brain's hemispheres. The second half is an in-depth overview of cultural history that aims at supporting his thesis that we are unwittingly damaging ourselves and much that is good in the world by over extensive reliance on our brain's left hemisphere.

The book's premise is implied by its title. McGilchrist tells a story to exemplify the struggles between the left and right hemispheres of the brain. My hunch is that he made this story up; several have looked for it, including myself, and have found nothing close—he's vague about it. The story goes as follows: The master has been kind and generous to the citizens of his realm. As a result, the realm has grown too large for him to visit all parts of it. To deal with the growing realm, the master adds an emissary to help carry out his work. Eventually, however, the emissary concludes that *he* is really the one in charge and so disposes of the master. In the end, the emissary drives the realm into ruin because of his greedy and insensitive manner.

For McGilchrist, the master is the right hemisphere and his emissary is the left hemisphere. In order to provide a background of sufficient depth to be able to grasp how the disproportionate influence of the left hemisphere's process has damaged our world, McGilchrist covers an enormous amount of neuroscience. He provides a thorough exposition of the current understanding of the unique and distinctive natures of the right and left

hemispheres, how they organize information about the world, and how they interact with each other.

It is in the details of the description of how the differing hemispheres function that the close kinship with Whitehead's two pure modes of perception becomes apparent.

The Defining Characteristics of the Hemispheres¹⁰

Embodying all the genetic changes over millions of years of evolutionary development, the modern human's hemispheres of the brain have become larger and more complexly organized in comparison with other primates, let alone most other vertebrates. As parts of a system, their normal functioning requires significant coordination (McGilchrist 216), and most of this coordination involves the corpus callosum, the body of nerve fibers that provide the lion's share of interhemispheric connection. As previously discussed, a huge amount of the research on the hemispheres over the past sixty-plus years is the result of the extensive testing of human subjects who have had their hemispheres surgically separated as a life-saving last resort measure when plagued by potentially deadly uncontrollable seizures.

An initial overview highlights the fact that *the right hemisphere provides the big picture*, the holistic or "*Gestalt*" of the situation (McGilchrist 46). By contrast, *the left hemisphere sees "part-objects"* (47). Normally, these would be parts of what the right hemisphere sees as a whole. McGilchrist suggests this division of modalities had its origin in enhancing survival. Birds, for example, split their attention as follows: with the right eye, which connects to the bird's left hemisphere, the bird is scanning the ground for bits of food, and with the left eye, connected to the right hemisphere, the bird is keeping a broad lookout for danger (26).

On the face of it, this division of labor would ensure a creature's survival better than creatures who lack this second mode of perception. This in turn suggests that the development of the second mode is the result of an evolutionary step. Birds are described as having a split screen, so to speak, a constant background surveillance of the territory for signs of danger combined with a foreground focus on finding tiny bits of food on the ground. Clearly this division of labor was taken to a far more complex level as this trait proceeded to be enhanced in primate evolution, reaching the human brain only 200,000 years ago with the origin of modern humans. McGilchrist's book is rich with detail of a number of dynamics that the development of our hemispheres has made possible.¹¹

Some ninety years ago, Whitehead himself implicitly advanced the idea that evolution led to the development of the second mode of perception when, in 1927, he said, "sense-perception is mainly a characteristic of more advanced organisms, whereas all organisms have the experience of causal efficacy" (S 5).

To continue the analysis of the functions of the hemispheres, the following discussion provides a more detailed description of the eight key dynamics previously listed for the right and left hemispheres.

Further Right Hemisphere Characteristics

1. Direct Contact with the World

"But it is only, as I have tried to suggest in earlier chapters, the right hemisphere that is in direct contact with the embodied lived world" (McGilchrist 199). In contrasting the right hemisphere with the left, for the most part McGilchrist describes the left as being only in touch with an inner reality that it has created. This conclusion will be discussed further in the following section on left hemisphere characteristics.

2. Breadth of Attention

As previously stated, the right hemisphere is oriented toward the big picture. This also determines the *type* of attention given by this hemisphere. Of the five types of attention that have been studied, three are the function of this hemisphere: vigilance, sustained attention, and alertness, all called the *intensity axis*. (McGilchrist 39). The other two (focused and divided attention) form the *selectivity axis* and are managed by the left hemisphere (39–40). The right hemisphere sees and experiences the world as whole, everything in context with everything else.

3. Response to the World Is Conformal

Looking more closely at the right hemisphere, it is evident that getting the big picture goes well beyond scanning the field for predators. Not only does this hemisphere get the whole picture, but it receives it in a manner that is fully responsive to the uniqueness of what it is experiencing. The right hemisphere is said to "allow things to be present to us in all their embodied particularity" (McGilchrist 93). This includes "their interconnectedness as a part of the whole . . . [and] we, too, feel connected to what we experience, part of that whole" (93).

This description indicates that this is a fully receptive and conformal process. Saying that the right hemisphere is *allowing* this to happen

indicates this to be a passive, i.e., receptive, position. This means that “things” are experienced “in all their embodied particularity.” This implies that the “Other”¹² is being felt by the perceiver as a feeler in its own right (which is the basis for internal relations). All of these dynamics are associated with CE and physical feelings. That is, for things to be present to us this way requires the experiencing subject to be *unconditionally receptive* and this in turn evokes a *fully conformal response*.

4. The World Is Perceived Vaguely

Despite this deep sense of connection with the Other, and anything else that is perceived by the right hemisphere, what is known is “in the nature of things never fully graspable, always imperfectly known” (McGilchrist 174). Again, we cannot help but think of CE as both luring yet vague.

5. The Right Hemisphere Is the Source of Meaning

As McGilchrist discusses the ways of the right brain, it becomes clear that meaning, including the deepest of meanings, is the province of this hemisphere. For a clear example, notice the enthusiastic language of dynamic 3 above and how that language conveys the tremendously important meaning of what is being described in that section: we know we are part of the whole, we are intimately aware of the world, including the Other. The sharp contrast with the left hemisphere that focuses on things that are “disembodied” and “ultimately lifeless” (McGilchrist 174) underscores the opposite quality for the right hemisphere, paralleling Whitehead’s description of PI as “barren,” “the superficial product of complexity” (S 44).

6. Emotions and Emotional Attachment Are Strong

McGilchrist describes passionately how the right hemisphere is central to our strong emotional need and desire for connection: “[T]he right hemisphere pays attention to the Other. . . . It is deeply attracted to, and given life by, the relationship . . . with this Other” (93). McGilchrist leaves no doubt that the right hemisphere is the hemisphere where emotions are at home:

The right hemisphere has by far the preponderance of emotional understanding. It is the mediator of social behaviour. . . . Patients with right frontal deficits, but not left frontal deficits, suffer a change of personality whereby they become incapable of empathy. . . .

It is the right hemisphere that identifies emotional expression: it is faster and more accurate than the left hemisphere in discriminating facial expression of emotion. . . . The right hemisphere is the locus of interpretation [of emotion], not only of facial expression, but of prosody (vocal intonation) and gesture. . . . [And, reading the] subtle information that comes from the eyes. (McGilchrist 58–59)

The attachment period in human development coincides with the period in a child's life when the right hemisphere is dominant, from birth (if not before) until age three when the left hemisphere moves to the fore with language development (Schore, "Effects" 10). This key dynamic intersects with key areas in neuroscience, developmental psychology, and psychotherapy.

7. *Being Controlled*

If the subject, the perceiver, is open to the world in a conformal manner, conforming to the specific nature of the influx of energy, then this also means that, in this mode, the subject's experience is influenced by the energy received and in that sense will be controlled by that energy of the world. This is how one will know in the deepest way possible what the Other feels, needs, and wants. As CE is basically identical to the concept of physical feelings as developed in *Process and Reality* (see Roy 136–46), during the process of concrescence the subject's relationship with the initial blast of energy can change to the degree that there no longer is the sense of total control by the other.

Again, there is the sharp contrast between the subject's experience shaped by the right hemisphere, where the subject feels controlled by the causal influx, and the subject's experience imparted by the left hemisphere of the ease of controlling part objects.

8. *Nature of Awareness Is Unconscious*

Over the course of the first half of the book, McGilchrist associates the right hemisphere with unconsciousness (and the left hemisphere with consciousness): "the right hemisphere is more intimately connected with the unconscious and automatic systems" (69). During a more definitive discussion of the relationship between the hemispheres and consciousness versus unconsciousness, McGilchrist says, "The attentional system that detects stimuli outside the focus of conscious processing [a characteristic of the right hemisphere], is strongly lateralized to the right hemisphere. Equally, conscious processing tends to go on in the left hemisphere" (187, also 186–88).

Further Left Hemisphere Characteristics

1. The Nature of the Left Hemisphere's Contact with the World

McGilchrist emphasizes that the left hemisphere is not in direct contact with the world but merely in contact with its own construct of the world (174–75). He feels that, as a result, this hemisphere is limited in how it approaches events and is distorted in its judgments (93, 175). This is in direct opposition to Whitehead's theory that says both modes of perception have direct contact with the actual world.

There are some potential problems with McGilchrist's assessment. First, there is a possible empirical challenge to this conclusion. Both hemispheres receive direct sensory input. This suggests that, in the rawest sense, the left hemisphere is in direct contact with the world as much as the right hemisphere.

McGilchrist himself actually opens the possibility of a more flexible view when he implicitly acknowledges that, regardless of where things end, even the left hemisphere has to start with direct contact with the world. Even so, he believes that this hemisphere ends up turning only toward itself after much repetitive experience:

Without experiencing whatever it is, we would have nothing on which to ground our knowledge, so we have to experience it at some stage; but in order to know it, we have to "process" experience. We have to be able to recognize ("re-cognize") what we experience. . . . This processing eventually becomes so automatic that we do not so much experience the world as experience our representation of the world. The world is no longer "present" to us, but "re-presented," a virtual world, a copy that exists in conceptual form in the mind. (38)

I agree with his analysis up until the point when he equates the process having become automatic with the advent of a purely self-created virtual copy of the world. Because something has become simplified or has dropped out of awareness does not mean that the outside world is no longer involved. We perceive and are influenced by many things we either do not consciously recognize or recognize in the most vague, dim way possible.¹³ Someone who is an expert only has to see (feel, hear, smell, taste) a tiny piece of something and, because of extensive experience residing in the unconscious background, will know in an instant what others might not recognize for a long time.

From a process perspective, one could argue that memory ("remembering") of anything likely would include the re-creation of at least

some elements passed along via the chain of physical feelings that start from the initial contact. Moreover, even though McGilchrist believes the left hemisphere is mostly out of touch with the actual world, it is noteworthy that so many of the dynamics unique to this hemisphere correlate well with PI.

Finally, it seems possible that his concerns here may reflect the larger problems that he feels are caused by the left hemisphere. If so, it is reasonable to conclude that his interpretation that maintains the left hemisphere is out of touch with the actual world may be not accurate, at least not to the extreme that he suggests.

2. Breadth of Attention

As explained earlier, the left hemisphere is focused on “part-objects.” These can be small or large, but the difference from the right hemisphere is that the part-object is no longer in context, no longer seen or felt in relationship with everything else. This makes this hemisphere excellent for things that have been grouped into categories that are by definition routine.

3. Response to the World Is Detached and Independent

As the counterpoint to the right hemisphere's immersion in full, rich actuality, the left hemisphere focuses on parts of the whole. Whereas the right hemisphere process at the initial phase of contact has to be fully saturated with the details of the world being perceived, the left hemisphere, with the same source material, is disengaged and detached because it has stepped “outside the flow of [causal] experience. . . . From this [whole, actual] world we feel detached, but in relation to it we are powerful” (McGilchrist 93). The power derives from the ability one possesses by means of this mode to analyze parts of the field and to modify or rearrange them for other aims.

4. The World Is Perceived Clearly

In addition, the world is re-created in such a way that there is clarity in this mode, though there is a price, according to McGilchrist: “the world [is presented] in a form that is less truthful, but apparently clearer” (93). Accusing the left hemisphere of lying amounts to what can be called *entification*, making an entity out of something that is not, something that, in this case, is a functional component or system belonging to our very complicated brain.

5. The Source of Symbols

While there can be little question that the right hemisphere is strongly associated with meaning, thus correlating with the properties that are found in CE, there is no direct, explicit match to correlate the left hemisphere's dynamics with Whitehead's idea that symbols are usually the function of PI. However, in an analysis of the different ways the hemispheres function in relationship with language, McGilchrist describes the left hemisphere's important, unique role: "the superiority for language [by the left hemisphere] stems from its nature as the hemisphere of *representation*, in which signs are substituted for experience" (70).

While a technical difference can be made between a sign and a symbol, knowing that the left hemisphere's specialty is using a representation of some sort to substitute for experience makes the dynamics of the two very close, if not identical, to the way a symbol can be used to point to something that is meaningful. This amounts to using something to point toward meaningful experience.

6. Emotionally Low-Key

For this mode, the stance is emotionally low-key: "This world [experienced in this manner] is explicit, abstracted, compartmentalized, fragmented, static . . . essentially lifeless" (McGilchrist 93).

7. Locus of Power and Control

McGilchrist assigns the power to control to the left hemisphere: "The world of the left hemisphere, dependent on denotative language and abstraction, yields clarity and power to manipulate things that are known, fixed, static, isolated, decontextualised, explicit, disembodied, general in nature, but ultimately lifeless" (174).

"From this world we feel detached, but in relation to it we are powerful" (McGilchrist 93). The power derives from the ability one possesses by means of the left hemisphere's process to be detached, independent from the control experienced by the other hemisphere. If one is entirely receptive and conformal, there is no freedom or novelty; when detached, unmoved by the surroundings, then it is possible to analyze parts of the field and to modify or rearrange them for other aims.

8. Nature of Awareness Is Conscious

The left hemisphere poses another challenge to its correlation with consciousness. There are many references in the first half of McGilchrist's

book that link consciousness with left hemisphere processes, unlike the right hemisphere. One of the phrases he uses is “the conscious left hemisphere” (e.g., McGilchrist 108, 163, 171, 191). Or, “Conscious knowledge, the knowledge that characterizes left-hemisphere understanding” (164). In addition, there are at least an additional ten references in the first half that imply a close connection between the left hemisphere and consciousness.¹⁴

Whitehead's theory supports a different perspective, namely that there is a nominally separate entity, the psyche, that presides over the brain and the rest of the body and that this entity is capable of consciousness as a result of *its own integration* of CE (constituting the physical pole of the occasion) and PI (a dynamic of the mental pole).

Entification and Its Implications for Neuroscience

Before proceeding to a final conclusion, there is one topic left to address briefly, the problem of entification. As mentioned earlier, entification is when a part of a system, even one as highly responsive as the central nervous system, is lifted out as capable of willfully making independent decisions that can impact the rest of the system. This is not to ignore the complexity of the interactions within the central nervous system, such as the inhibitory nature of the corpus callosum in relation to the two hemispheres. It is a reasonable assumption, however, that the hemispheres are coordinated (on-off, off-on, on-on, etc.), that this is for a larger purpose of coordinating a response to something. The use of an oppositional interplay to accomplish something is true with other bodily systems. For example, to straighten our arm requires one set of muscles (the triceps) to contract and another set (the biceps) to relax and lengthen at the same time.

McGilchrist himself emphasizes the fact that “the brain is a dynamic system” in the first chapter (32–33). Despite this introduction, however, many of his descriptions of the left hemisphere frame it as disruptive, untrustworthy, entirely self-focused, power hungry, and aiming to dominate the right hemisphere, ending up destroying the culture as a result.

This perspective does point toward a real solution. If we accept the idea that the left hemisphere is a vital subsystem that is part of a bigger system, the brain, then we need to look for what agency is actually in charge, namely the person or the psyche. People, individually and as a part of a group, are making these choices that bend the world's problems toward solutions offered by the left hemisphere to such an extreme that any perspective offered by the right hemisphere is dismissed or not recognized at all.

In psychotherapy, as in many other fields (law, most religions, education, and more), the individual is seen as the locus of decision making. This is said in full recognition that the sometimes powerful, even overwhelming, influence from other people and the environment can make a real and profound difference in whatever is decided. But it is still the individual who is responsible for the decisions made.

In-depth study will be necessary to better understand the reasons why the left hemisphere's way of organizing the world has become so dominant. In the most general sense, however, this outcome seems likely to be due to the fact that this dominance is strongly rewarding. For example, when one discovers a cure for a disease, makes a powerful weapon, plots a strategy to get to Mars, controls an entire industry, or comes out on top of a power struggle, the person benefits from the approach that is guided by the left hemisphere. Competition, the urge to be the best, dominates much of human society and this belongs to the strategies that are planned via left hemisphere dynamics.

Whitehead's process philosophy offers an alternative perspective on the nature of how we are constituted. This perspective offers the potential to eliminate the need for calling out the left hemisphere as responsible for a great number of problems that face humanity. As outlined earlier, this perspective includes a dominant or presiding entity that is ontologically identical to everything that constitutes the body yet is also at least nominally separate and distinct from all the other actual occasions that make up the body. The temporal thread of dominant occasions form the psyche, each one subject for an interval and then object for the rest of the person's existence.

This separate, distinctive psyche receives the energy directly from the brain and the rest of the body and makes decisions, passing its directions back into the brain and body. As a highly developed actual occasion (dominant over the brain and the rest of the body), it has the capacity on its own to integrate the two perceptual polarities, regardless of the input received from the hemispheres. The hemispheres provide refined, specialized information, each in its own style, and this is what makes for full, rich experience. If a hemisphere is incapacitated, the evidence McGilchrist and others have provided shows that the overall experience remains conscious, but it can be markedly diminished. For example, without a functioning right hemisphere, people cannot grasp the meaning of their experience.

The following chart summarizes the correlations between each of the perceptual modes and their hemispheric counterparts:

TABLE 1: Correlation between Whitehead's Theory of Perception and the Brain's Hemispheres

<i>Key Dynamics</i>		<i>Hemispheres (Right Hemisphere [RH])</i>	
<i>General for CE + RH</i>	<i>Perception</i>	<i>Summary of Characteristics of CE</i>	<i>Summary of Characteristics of RH</i>
Contact with the world: direct or indirect	Direct contact of the external world	Direct contact with the world	Direct contact with the world
Breadth of attention (broad or narrow)	Big picture; akin to the first phase of concrescence	Big picture	Big picture
Nature of responsiveness to the world	Conformal, receptive	Allow things to be present to us in all their embodied particularity; changeability and impermanence	Allow things to be present to us in all their embodied particularity; changeability and impermanence
Degree of clarity of perception (high or low)	Discrimination and localization poor; vague	In the nature of things never fully graspable, always imperfectly known, vague	In the nature of things never fully graspable, always imperfectly known, vague
Primary for meaning or symbol	Usual source of meaning; what we want to know but elusive	To this world it exists in a relationship of care (that is, meaningful relationships)	To this world it exists in a relationship of care (that is, meaningful relationships)
Strength of emotionality and attachment	Heavy, intense, primitive, emotionality present	Interconnectedness, as part of a whole that is forever in flux	Interconnectedness, as part of a whole that is forever in flux
Locus of power and control	Subject feels "controlling presences"	In this world we, too, feel connected to what we experience, part of that whole	In this world we, too, feel connected to what we experience, part of that whole
Nature of awareness (unconscious or conscious)	Unconscious; by definition, only when CE and PI are combined is there consciousness.	Unconscious	Unconscious

(continues on next page)

TABLE 1 (continued)

<i>Key Dynamics</i> <i>General for PI + LH</i>	<i>Perception</i> <i>Summary of Characteristics of PI</i>	<i>Hemispheres (Left Hemisphere [LH])</i> <i>Summary of Characteristics of LH</i>
Contact with the world: direct or indirect	Direct contact with the world (via sense organs)	No direct contact (counter argument offered)
Breadth of attention (broad or narrow)	Selects portions of surrounding here-and-now world	Focus on “part objects”
Nature of responsiveness to the world	Independent	Detached, independent
Degree of clarity of perception (high or low)	Discrimination and localization excellent; clear	Perceives clearly (less truthful) (counter argument offered)
Primary for meaning or symbol	Usual source of symbol in perception	Substitutes a sign or a symbol for experience
Strength of emotionality and attachment	Low-key; focused, detached, emotionless	World experienced as static, lifeless, detached
Locus of power and control	World is highly manageable; power over the world	In relation to the world, we are powerful
Nature of awareness (unconscious or conscious)	Unconscious	Conscious (counter argument offered)

Conclusion

The preceding analysis supports the proposition that there is indeed a high degree of correlation between Whitehead's theory of perception (a part of his overall theory) and the differing ways in which the hemispheres in the human brain function. There are some exceptions, as noted and discussed, but even these differences do not appear to have a substantial impact on the overall correlation.

I find that the details that make up the complex picture neuroscience has painstakingly created bring the process concepts unexpectedly and delightfully alive. The effect of the two streams being joined together is to provide unparalleled insight into the process that constitutes our fundamental nature.

As this information is shared within neuroscience, my hope is that there are those in that field who will come to recognize the capacity of Whitehead's process philosophy to provide an illuminating and heuristic metatheory for this field of science that is becoming central to much in psychology and beyond.

ENDNOTES

1. I know from my education and training in experimental psychology that practitioners of a hard science generally consider themselves to be exceptionally cautious when it comes to theory, preferring to decide upon the basis of empirically derived facts to tell what little story can be told. Those who go too far beyond the data are subject to scorn.
2. The track was "The Impact of Civilization on the Human Psyche" at the conference "Seizing an Alternative: Toward an Ecological Society," June 4–7, 2015, <http://www.ctr4process.org/whitehead2015/section-3-track-4/>.
3. Confirmed in an email received from Darcia Narvaez on September 22, 2016.
4. Panksepp is notable for providing the details of the emotional circuitry for all mammals, implicitly supporting the idea that other creatures besides ourselves have a rich emotional life that is experienced subjectively.
5. The power of PI's clarity shines through symbolic reference. This can only be true if PI outweighs CE in some fashion. The counterbalance would be those moments when CE is more dominant.
6. Psychological projection refers to someone assigning one's negative traits to someone else, i.e., projecting what is unacceptable onto someone else.
7. See https://www.nobelprize.org/nobel_prizes/medicine/laureates/1981/sperry-bio.html.

8. See http://www.nobelprize.org/nobel_prizes/medicine/laureates/1981/.
9. See the Editor's Note to an article by Sperry at <http://www.religion-online.org/showarticle.asp?title=2403>. I was one of the student participants. See <http://www.ctr4process.org/bibliobase/subjective-form-and-ecg-rhythms-question-dr-sperry>.
10. Occasionally in this section, I will point out a correlation between neuroscience material and Whitehead's ideas. The more complete, formal correlation will be summarized later.
11. This is not to discount the complexity that most likely existed in previous hominid species; without an actual brain to study, there is no factually sound way to determine the organization of those species' brains. The only measure that has been used is the size of the brain cavity. Unfortunately, this approach could easily miss a species that had a relatively small brain cavity but had a wiring package that was superior.
12. Though he does not explain what he means by this, McGilchrist uses the term "Other" at several points when describing the close, intimate relationship that exists between the experience of the right hemisphere and the world. It has the implication of someone or something sacred, like Buber's I-Thou relationship.
13. In college, I read a number of studies done with a tachistoscope, which can flash an image, word, or a blank spot of light that subjects cannot identify. Despite this, the words or images shaped their responses subsequent to exposure. See McCleary, who deals with our emotional attitudes being broadcast by means of facial expressions, gestures, and body position. While words can be used to attempt to hide, our physical expressions inevitably tell the truth.
14. See McGilchrist 44, 62, 71, 90, 127, 148, 175, 198, 223, 224, 228.

WORKS CITED

- Cobb, John B. *Whitehead Word Book*. Claremont, Process Century P, 2008.
- "Interview with Iain McGilchrist." *Frontier Psychiatrist*, 4 Feb. 2010, <http://frontierpsychiatrist.co.uk/interview-with-iain-mcgilchrist/>.
- James, William. *A Pluralistic Universe*. New York, Longmans, Green, 1909.
- Jones, Edward G., and Lorne M. Mendell. "Assessing the Decade of the Brain." *Science*, vol., 284, no. 5415, 30 Apr. 1999, 739.
- McCleary, Robert. "Autonomic Discrimination without Awareness: A Study of Subception." *Psychological Review*, vol. 58, no. 2, 1951, 113–22.
- McGilchrist, Iain. *The Master and His Emissary: The Divided Brain and the Making of the Western World*. New Haven, Yale UP, 2009.
- Narváez, Darcia. *Neurobiology and the Development of Human Morality: Evolution, Culture, and Wisdom*. New York, Norton, 2014.

- Narváez, Darcia, et al., editors. *Ancestral Landscapes in Human Evolution: Culture, Childrearing and Social Wellbeing*. Oxford, Oxford U P, 2014.
- Narváez, Darcia, et al., editors. *Evolution, Early Experience and Human Development: From Research to Practice and Policy*. Oxford, Oxford U P, 2012.
- Ornstein, Robert E. *The Right Mind: Making Sense of the Hemispheres*. New York, Harcourt Brace, 1997.
- Project on the Decade of the Brain*. Library of Congress, 31 Oct. 2016, <https://www.loc.gov/loc/brain/>.
- Read, Rupert. "The Heidegger and His McGilchrist." *Talking Philosophy: The Philosophers' Magazine Blog*, 15 Apr. 2014, <http://blog.talkingphilosophy.com/?p=3398>.
- Roy, David E. *Toward a Process Psychology: A Model of Integration*. Fresno, Adobe Creations, 2000.
- Schore, Allan N. *Affect Dysregulation and Disorders of the Self*. New York, W. W. Norton, 2003.
- . *Affect Regulation and the Origin of the Self: The Neurobiology of Emotional Development*. Hillsdale, L. Erlbaum Associates, 1994.
- . *Affect Regulation and the Repair of the Self*. New York, W. W. Norton, 2003.
- . "Attachment and the Regulation of the Right Brain." *Attachment & Human Development*, vol. 2, no. 1, April 2000, 23–47.
- . "Dysregulation of the Right Brain: A Fundamental Mechanism of Traumatic Attachment and the Psychopathogenesis of Posttraumatic Stress Disorder." *Australian and New Zealand Journal of Psychiatry*, vol. 36, 2002, 9–30.
- . "Effects of a Secure Attachment Relationship on Right Brain Development, Affect Regulation, and Infant Mental Health." *Infant Mental Health Journal*, vol. 22, no. 1–2, 2001. 7–66.
- . "The Paradigm Shift: The Right Brain and the Relational Unconscious." American Psychological Association Annual Meeting, 2009, Plenary Address, <http://allanschore.com/pdf/SchoreAPAPlenaryFinal09.pdf>.
- Sperry, Roger. "Mental Phenomena as Causal Determinants in Brain Functions." *Process Studies*, vol. 5, no. 4, 1975, 247–56.
- Whitehead, Alfred North. *Process and Reality: An Essay in Cosmology*. Corrected ed., edited by David Ray Griffin and Donald W. Sherburne, New York, Free P, 1978.
- . *Symbolism: Its Meaning and Effect*. New York, Fordham U P, 1985.

PROCESS STUDIES
46.1 (2017): 128–151