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# JASON W. BROWN, NEUROPSYCHOLOGICAL FOUNDATIONS OF CONSCIOUS EXPERIENCE. BRUSSELS: CHROMATIKA, 2010. 359 PP.

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## INTRODUCTION

The sequence in this review is the same as the microgenetic and morphodynamic process described by Brown in his book (2010), and his own ontogenesis, as well. It will begin with philosophy, because this will give us a general starting point. It makes possible the evaluation of the physical outside world, and the brain processes, both in functioning and in growth, as well as various pathologies with which Brown has had to cope while working as a neurologist with brain-damaged patients. Such work always requires a psychological insight, so the next phase to be discussed will correspond to the world Inside. The review will end with a consideration of time, which is to say, more on a quantum level.

The brilliance of Brown for me lies in his bringing together the outside world (neurology: processes in the brains and growth of the brain) and the inside world (psychology). Brown is a great analyst, also in relation to his own experiences, as in the case of dreams. He points out that processes that can be observed in morphogenesis, or on a cellular (body) level, can also be seen on a psycholog-

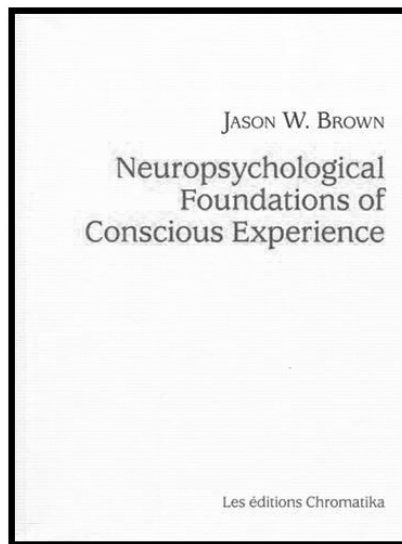


Fig. 1. The cover of Brown's book, Neuropsychological Foundations of Conscious Experience.

ical, or mind level. So we start off with his philosophical views, or to state it in his terms, "the Whole".

## **PHILOSOPHY, MICROGENESIS, AND PROCESS THEORY**

As William James states, "Philosophy is more a matter of passionate vision than logic, the logic coming afterwards to justify the vision." The same goes for his development of microgenetic theory. Brown describes it as follows:

*The shift from process to substance theory was one from continuities, transitions and internal relations to logical solids, discrete brain areas or components. For substance theory, being is the source of becoming. For process theory becoming is the source of being. For microgenesis and process theory, the mental evolves with the physical by an expansion of proto-psychic features.*

In other words, we ask, "how do things or thoughts come about," and not, "what are they." Consequently, Brown focuses continually on process/ development/ growth, and not on the question of ascribing this function to this structure: "The whole is not constructed from the parts but is antecedent to them." Now we will see where the development of this theory started.

## **NEUROPATHOLOGY**

Brown presents a number of cases in his book. For the reader this gives an everyday reality to the theory. We can see that Brown's diagnostic skills are to be reckoned with:

*A patient of mine with a retrograde amnesia did not recall being in an accident in which his fiancé was killed, nor did he show an affective reaction when he was repeatedly told what happened. As recall improved, he developed nightmares for some days prior to the return of sufficient recall to ask what occurred in the accident, at which point, when told, he was overcome with grief. The nightmares, however, were not directly about the accident; they reflected the anxiety that forecasted the recall. The symptom is not a bizarre occurrence unrelated to the normal, but reveals preliminary or "pre-processing" phases in the elaboration of normal function.*

This means that Brown realised that he should look at the process of conscious experience, and not at the fragments or presentations.

*In this respect the symptoms of brain pathology are fragments of unconscious phases that are usually inaccessible to waking cognition. One of Freud's more*

*important insights was the recognition that psycho-pathological symptoms are not additions but uncoverings.*

## **BRAIN PROCESSES**

It is vital to take a process theory viewpoint on the brain processes that take place. Brown points out that

*[t]he activation of neurons by external stimuli does not mean neurons are responsible for the perception of those stimuli. Levitan (2006) gives the example of regions in left hemisphere shown to be active in the perception of musical structure that are also active in the perception of sign language.*

Also, on the brain stem level, he sees a phylontogenetic development, where an oscillation is a basic action, and voluntary movements develop on top of it.

*A simpler observation is that a voluntary movement such as lifting the finger develops at the cyclical peaks of normal resting "tremor." This indicates that unconscious rhythms or oscillators underlie voluntary action, as in the respiratory timing that frames an utterance.*

This shows that Brown focuses on process rather than on functions, since he states:

*Most imaging studies localize functions rather than display mental or neural process. This is no doubt true for most, if not all, studies that purport to map brain areas to cognitive function. A single process is iterated at multiple phases rather than multiple processes acting at different loci.*

Here we can observe a clear break with currently popular research, where, on the basis of fMRI studies, it is presumed that fear is connected with amygdala, decisions with prefrontal cortex, etc. At the same time, Brown stresses a shift from brain state towards mental state (see also Pachalska et al. 2012):

*A brain state is that configuration of neuronal activity generating a mental state. A mental state is a virtual duration that corresponds with an epoch of brain activity. Identification of the mental state with the brain state does not apply just to its vegetative core but to every phase in transition.*

Brown stresses that phylontogenetical older information comes from the viscera and the autonomic nervous system (vegetative system): "The transition from

limbic to neocortical formation is the forward direction of microgenesis.” This information arrives at the brain. Then it continues through the limbic system and ends at the cortex, traversing the same path as phylontogeny. In other words, Brown believes that brain mental processes show the same pattern as morphogenetic development.

## **MORPHOGENESIS**

Brown sees this pattern also on the lowest level, namely, the cell:

*Mitosis is the model of individuation as complexity grows from within. Some have argued that the tension between the active and the passive in cognition traces back to the biology of approach and avoidance in unicellular organisms (Schneirla, 1965), which evolves to grasping and withdrawal, extro- and introversion, and even aggressive and dependent personality types.*

What does this morphogenetic process entail? It is a balance between life and death, that is, growth and apoptosis. It takes place also on a genetic level (Kupiec, 2009). Again we see the underlying process.

*In a mature cognition, the endogenous constraints of the just-prior act are comparable to genetic influences on growth, while the exogenous constraints of the external world (sense-data) are comparable to the effects of the micro-environment on gene expression. Polygenes and timing mechanisms limit the degrees of freedom in the growth process, increasing the likelihood of a given outcome.*

The development can be understood as the growth of the tree, where in the trunk you see all the growth circles. Brown writes:

*The similarity of the process of growth to that of cognition becomes clear when we consider morphogenesis not as an open end linear succession but as a recurrent pattern, in which new form is laid down over antecedent structure. This shift in perspective helps us to see how the same process that is for the growth of the brain continues as the process that is responsible for behaviour.*

It is important to note that process theory, such as microgenetic theory, introduces time as a new component, moving from three dimensions to four; heterochrony is the rate or timing of this process. As Belousov (1998) states, “...to understand a landscape we must not just understand the structures that are there, but also its history in order to analyse it.” Brown writes:

*Behaviour is four-dimensional morphology or structure over time. Memory is the obvious link from structure to function. Early in development, the persistence (recurrence) of brain structure is a kind of organic or "physical" memory. The "permanence" of a learned or remembered item is the structural aspect of thought.*

In morphogenesis it is not just time that is important, but also the axes. Grid patterns are laid down first, before further development. This can be compared to the development of roads before a city develops. As Brown himself puts it:

*The development that goes from archaic to recent in evolutionary structure corresponds with the transition from axial to distal innervation, from bodily space to the external world, from symmetry to asymmetry, from low frequency kinetic rhythms that mediate inter alia walking and respiration, to higher frequency oscillators or harmonics that mediate selective kinetic patterns such as those involved in prosody or asymmetric limb movement.*

Asymmetry is a new field of study, which began in quantum physics, and which is now coming to the biological sciences. More and more literature is appearing on the left right asymmetry of the body.

*The dissolution of the self and the inter-penetration with the other accompany a retreat from asymmetric and deliberate limb movements to automatic and symmetrical axial motility. Focal voluntary actions are replaced by rhythmic impulses.*

The body strives for symmetry while it is not symmetrical. A symmetrical face is seen as more beautiful.

Fractal development, like the Mandelbroth set, is well known in the biological sciences. Brown states:

*Growth does not lay down a fixed anatomy, but rather morphology is the behaviour of a developing brain. Microgenesis entails a single fractal-like process. The remedy is a concept of brain and psyche in terms of fields or fractals instead of cities and highways.*

There are two morphogenetic processes which shape growth:

- parcellation or pruning (the equivalent of parcellation in growth, or surround inhibition in physiology, is the whole-to-part or context-to-item transformation in cognition);
- neoteny lays down "force lines" that become the process of cognition. This is a selective retardation or prolongation of a juvenile stage that can be a springboard of evolutionary growth.

## BROWN'S PERSONAL DEVELOPMENT

As we have seen, Brown's development as a neurologist was getting to know the structures first in order to analyse the development. This is the same approach he took to analysing psychology (psychoanalysis), and also his own dreams. So here we see an analysis of the inside world. His personal experience with dreams is also a factor in the development of microgenetic theory. The following sample shows this:

*I awoke and could only remember the first two lines of what seemed to be a wonderful poem. The lines were:  
Run thee a poem in thy time  
Pay not a fare to the rhyme or the meter.  
However brief, this was not at all a poem I could have written awake.  
The interpretation of the dream tells us more about the dreamer than the content that is interpreted. We study the reality given in mind, not a reality mind can perfectly measure.*

The difference between Brown and other researchers is that he approaches this problem from a process and morphogenetic point of view. He writes:

*Consciousness is always preceded by, and enfolds, an unconscious transition, so that an attenuated mental state could exist without realizing consciousness. For most psychologists it is the other way around, i.e. experience first passes through consciousness in order to be revived in the unconscious.*

Let us look more closely at this Inside World.

## WORLD OUTSIDE – WORLD INSIDE

Brown gives a good example of the above dichotomy:

*Consider brain and perception like a celluloid film and moving picture. The celluloid is felt to be more real than the movie because it does not represent something other than what it is, whereas events in the film have no actual correlates. We might think a documentary is more real than an ordinary film, but we are still looking at images, not "real" objects. Since all films (and objects) are images, it is not the imaginary or perceptual quality that counts for the unreality. There is a presumption that some mental objects – ideas more than dreams, words more than ideas, objects more than words – are more real than others. Independent of whether or not the self is illusory. We refer to the mental objects as a footprint. We are in error, we should say, it has the shape of a footprint...To exist and to be real*

*are different states of affairs. When psychic experience does not conform to the physical world, survival is in danger.*

In this dialogue between Inside and Outside world, Brown observes how a self develops:

*The sense of causal power in the infant who reaches for a rubber ball is perhaps no more than the behaviour of a cat that reaches for a rolling ball of wool. Further individuation of self and object leads to greater autonomy and a feeling of a self opposed to inner and outer contents.*

When we look at the psychological “development” that Brown mentions, there are of course different points of view. Brown describes a development from core to outside world, and states that it is unidirectional; Indian philosophy (i.e. Swami Rama, 1979) describes a movement where it is a circle coming back: from core to consciousness and back to the core. Through self-reflection and dream analysis we get to know our core. In India the path also entails that one can stay in this state, and not in an outside state/ phase. So to follow this path back inwards we start with perception, through consciousness, ego, dream state, towards self and finally non-self. Again this is different point of view from that of Brown, who states that the movement is unidirectional (from core towards consciousness) and ends in the non-self (outside world).

## **DREAM**

The dream state is a chance to see unconscious processes. It is a natural state, yet:

*...delusion is intermediate between the pathological symptom with its delimited interpretation and the dream as a natural phenomenon relating to one's life. The thin line that separates the passive intention of dream from the active volition of agency is a point in the passage of internal to external mind.*

This means that it is the shaping of the outside world that determines if we experience a dream state or a delusion. In the dream there is no outside perception and we experience the dream in an awake state. In a delusion there is outside perception but we experience it in a dreamlike state.

Brown continues:

*Given the relation between inner speech, hallucination and perception, the relative depth of realization in perception and action, or the dominant segment of the actualization, determines whether a verbal*

*image is apprehended as voluntary, passive (hallucination), or mind-independent (perception).*

The next stage which we encounter on our path inside, is the ego.

## **EGO: I AND ME**

Let us start with the following quotation:

*The distinction is embodied in the unconscious and timeless self of the “me”, and the conditional or temporal self of the “I”, one constant and authentic, another transient and adaptive. In the child the “me” precedes the ‘I’. The agent – the “I” – is inferred from the activity of thinking. The state is not divisible into a self, an object and a direction. Without the object, there is no self. The “I” is always “I am (think, want, etc.)”. The “I” does not exist without a verb or relation.*

Here it is a matter of how we define the “I” and the “me”. Like the iPad, or iPhone, one can also take the “I” as the Core and the “me” as the outward development. It is worth pointing out that in the Indian tradition of Vedanta the whole meditation is on “Who am I” (Nisargadata Maharash, 1973). Also Eckhart Tolle (2005) says that when he was in deep depression, the feeling that “I want to kill myself”, made him realise the “I” is different from the “myself”. Is it Ego and Self? Again there are many viewpoints possible on this.

The fact remains that more and more research shows that most of our behaviour is an inside-out development. Core drives and experiences determine our perception. For instance, when holding a heavy object we experience a conversation as heavier, than when holding a light object. In consequence: *A person can either mistakenly believe his act is intentional, or unknowingly act intentionally.*

The next phase on our way to the core is the self.

## **THE SELF**

*The relation of the self to inner objects is introspection or reflection. The relation of the self to outer objects is exteroception or perception. In perceiving an object, the self, indeed the entire perception, is generated with the object.*

Again we encounter here the matter of defining the self.

*There are two categories of the self, a deep core or unconscious self aligned with values, implicit beliefs and character, and a liminal, conscious or empirical self that adapts to momentary needs and future expectations.*



*Core self and its drive-representations, which are then derived to an empirical self and its conceptual feelings, then to images, and to objects and external space.*

It is closely connected with inner speech:

*In passing to a perceptual development, inner speech dissociates from the self of agency, and actualizes in voices distinct from the patient.*

## **PSYCHOLOGY: DRIVES**

When we go deeper into ourselves we arrive at what Brown calls the “core self.” This is where the basic drives are. In the work of Stephen Porges (2006) we come across the same phylontogeny, but for the autonomic nervous system. We start with visceral sensations, which correspond with the enteric nervous system (reptilian, the “freeze” reaction), then up through the sympathetic nervous system (mammalian, the “fight/ flight” reaction) up to the parasympathetic nervous system (communication). Here we see again a “rising up” of information from deeper levels towards the surface. This information reaches the brainstem, where for Brown microgenesis starts. So we could assume that it is the interoceptive experience from the body, and its memories, where the core feelings arrive from.

He writes:

*The initial phases of the mental state arise out of an instinctual core – the inherited repertoire of drive categories - then pass through a phase of affective and experiential memories that shape conceptual feeling in the direction of perception. Instead of perception laying down memory, memory lays down perception. The transition from self to world is from contents that are memory-like to those that are perception-like, from the personal past to the impersonal present. A memory is an incomplete perception, and a perception is a memory specified to an object.*

And further:

*We come to understand that feeling is not applied to objects but develops into them. Generally Feeling is more intense at early phases of drive and desire, less so at distal ones of object and word-production. Moreover, feeling is felt as a pressure behind or directed to the object, not in it.*

## PSYCHOLOGY: NON-SELF

At the point, while going further down into our mind, we come to a point where Indian philosophy places the non-self. Brown names the non-self the “experience outside oneself”: “The end-point of the outward-going development is non-self (other, object).” When we get to this core, according to Indian philosophy, this is where our convictions, and even deeper our universal feeling of connectedness, bliss, the feeling of divinity are located. Brown states:

*This is where conviction (non-self) replaces the need for choice and decision. It is closer to drive, desire and the core self, often bound up with the self-concept. The continuance of the core due to the overlap of initial phases explains the “persistence,” i.e. recurrence, of implicit beliefs and values, or character, while the rapid vanishing at the perceptual surface “clears the slate” for the next perception.*

The trilogy that is common in osteopathic philosophy is that of body – mind – spirit. So spirit is the deepest level in ourselves, according to Indian and osteopathic philosophy. Brown writes:

*Soul and other forms of spirit are not of mind or matter. They inhabit a nether world between the cognitive and the physical. The common belief in spirits indicates that it is not necessary to have a body (or any substrate) to infer a mind.*

It should be noted that there is not much difference in Brown’s point of view and these philosophies, since he states:

*To be selfless is not to be without a self, but to revive the other in the self before it individuates. When such relatedness occurs with full absorption and abolition of self and a disappearance of the self, it is a kind of death from which a return to life and consciousness is possible. To be worthy is to be selfless. Self-denial is a mode of active passivity that is the primary condition of submission. In Buddhism, as in most religions, self-denial is central. It is the timelessness of the category that inspires the belief that individuals persist after death as souls, or as ideas in god’s mind.*

## QUANTUM PHYSICS

When we arrive at this core level within ourselves, the question arises if this is also on a deeper physical level. Fantappie (1942; cf. Vannini & DiCorpo, 2011) states that if we go beyond 200 Angstroms, we arrive at the quantum level in ourselves. At this level Newtonian laws do not apply and quantum laws come into play. Also at this level time is no longer the linear unidirectional movement we are so familiar with.

Brown stresses that:

*In organic systems the becoming of the organism is unidirectional. In basic or elementary physical entities the becoming may be reversible or isotropic. The becoming or directionality of the mental state is fundamental to its existence, its being.*

He further compares the time to the light as understood by Quantum Physics:

*In my view, subjective time is neither particle, nor wave but in some sense both; wave-like in an actualization over the temporal extensibility of elementary physical entities or brain states, and particle-like in the modularity of the state once it actualizes.*

Time plays an important role in microgenetic theory, and Brown, like Bergson, studies time from a phenomenological viewpoint. The first important fact is that the becoming of consciousness takes place at a fast rate, so that we experience everything as a continuum. Brown gives the following example:

*In a movie continuity requires a frequency of around 40 milliseconds per frame, which is close to the estimated duration of a mental state, thus the rate postulated for the replacement. This rate is likely governed by a pacemaker and is relatively constant. Think of the mental state as having a duration of about 50 to 100 milliseconds. The present does not have a fixed duration. James wrote of fuzzy boundaries. In meditation, the present may expand; in states of confusion, it may contract.*

Pacemakers have been identified in the brain, in both brainstem and hypothalamus, comparable to the AV and SA knot in the heart. This makes it possible to assume that these pacemakers generate an electrical signal, which travels through the body and returns to the brainstem, where the becoming of consciousness further advances. We have to keep in mind that information is not just transferred through electrical signals, but also via electromagnetic fields, light, sound, etc. Hence, a new mental state comes out about every 40-100 milliseconds. In connection with this, Brown writes:

*The acceleration and deceleration of events in pathological cases, as in the speed of a film projector, might reflect the frequency of replacement. Subjective time does not exist until the process is completed. The existence of a thing depends on the duration over which it actualizes. A tree that exists for a millisecond is not perceived at all. Sustained recurrence creates objects, novelty in the recurrence*

*creates events. All objects are events in which change (recurrence) is more or less imperceptible...*

*The future is not what the present moves into, it is another present that the past deposits.*

Also, the origin of time comes from symmetry. This is aptly put by Feynman (1949), who points out that symmetry is the origin and asymmetry is the end point:

*If the Inception of the mental is simultaneous, and temporal order occurs at the conscious endpoint, simultaneity and seriality refer to earlier and later in a single epoch. The less coherent the music, the less a sequence can be anticipated, the less revival is facilitated.*

## **TELEODYNAMICS**

Terence Deacon (2008) distinguishes physics, morphodynamics, and teleodynamics, which means that there is a direction giver. Similar assumptions have been proposed by several authors (Lazlo, 2004; Haisch, 2006; Sheldrake, 1988), who believe that on a quantum level time is reversible and thus can inform the past. Brown states:

*In a process approach, objects are states of flux that only appear to be solids. The flux is not random or chaotic but has a direction. In the mind, possibility is the ground of freedom and fact is the final stage of belief. In mind, the progression is from potential to actual, in the world, from cause to effect. A transition from the voluntary to the involuntary in the passage outward to objects.*

He then concludes:

*...that a model of the real should grow out of fantasy, that objects are recognized before they are consciously perceived, that the world is an extension of the mind, that succession in time is generated out of simultaneity.*

To sum up, Brown has done an excellent job on bringing the Outside World and the Inside World together. It means that the dichotomy of Descartes is slowly fading away, and we are becoming more and more a unity experiencing ourselves as a whole. It allows to the outside world more united with ourselves.

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