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Major Works on Consciousness

Volume 1: The Origins of Psychology and the Study of Consciousness

Introduction: A psychological view of the long history of thought about consciousness

In this introduction we examine, in a very brief way, the long history of thought about human consciousness that provides the context for these Major Works. The introduction is brief owing to space restrictions, but the history is long, for the reason that, in one way or another, human beings have been concerned with issues surrounding the nature of consciousness from well before recorded history. In the prehistoric period, the evidence for this can only be indirect—in the burial rites of ancient peoples—but it is direct in the earliest writings of ancient Egypt, and the philosophies of ancient India and Greece, although for millennia, the founding philosopher-psychologists made no consistently clear distinctions between what we now think of as “consciousness”, “mind” and “soul”.

Selection criteria

As this collection of *Major Works on Consciousness* forms part of a *Critical Concepts in Psychology* series, this selection of major works focuses mainly on works that have a direct psychological relevance. From the mid 19th Century onwards, psychology began to separate itself from philosophy, and the development of psychological thought about consciousness links intimately to the development of psychology itself. In order to trace this development, the four volumes of this collection follow a rough, historical sequence. Volume 1 deals with *The Origins of Psychology and the Study of Consciousness*. Volumes 2 and 3 deal with contemporary *Cognitive and Neuropsychological Approaches to the Study of Consciousness*. And Volume 4 focuses mainly on *New Directions: Psychogenesis, Transformations of Consciousness and Non-reductive, Integrative Theories*, which deal with issues likely to expand current, mainstream thought in potentially novel, and, sometimes, challenging directions. Ultimately, such novel investigations of and theories about consciousness lead us back us back to the same questions asked by the ancients about the relation of consciousness, mind, and soul to the material world.

Although experimental psychology was originally designed to be a study of mind and consciousness, with the emergence of behaviorism in the first half of the 20th Century, it refashioned itself as a study of behavior. Consequently, over the years 1850-1950 Google Scholar lists only 1470 articles with the word “consciousness” in their title. However, with the emergence of cognitive psychology and related sciences in the late 1950s interest in consciousness as a subject of study began to increase in roughly exponential fashion. By 1960 titles mentioning consciousness had increased to 2,420, by 1970 to 4,280, by 1980 to 10,600, by 1990 to 15,700, by 2000 to 22,800, by 2010 to 39,300, and by 2015 to 46,600. This is of course a vast underestimate of work in this field, for the reason that most studies of conscious experience do not mention “consciousness” in the title at all: for example over the period 1850 to 2015 Google

Scholar lists about 251,000 such articles on the subject of “pain”—a sensation that is often thought of as exemplifying a “private”, “subjective” conscious experience, within contemporary philosophy of mind.

Publisher’s guidelines for this collection were to select just 80-100 Major Works, compiled into 4 volumes, in no more than 1600 pages. While many of the selected works were in some way seminal, to cope with the wide scope of the subject and the vast, available literature, many of the works are themselves illuminating reviews of extensive research and/or theoretical development. In spite of this, no selection from such a large literature can be entirely representative or comprehensive.¹

The problems of consciousness

Conveniently, however, consciousness presents a number of fundamental, enduring problems that serve as organizing themes for the entire field. As I have argued in Velmans (2000, 2008, 2009), the puzzles surrounding consciousness have traditionally been known as the “mind-body” problem. However, it is now clear that “mind” is not quite the same thing as “consciousness”, and that the aspect of body most closely involved with consciousness is the brain. It is also clear that there is not one consciousness-brain problem, but many. As a first approximation, these can be divided into five groups, each focused on a few, central questions:

Problem 1. What and where is consciousness?

Problem 2. How are we to understand the *causal relationships* between consciousness and matter and, in particular, the causal relationships between consciousness and the brain?

Problem 3. What is the *function* of consciousness? How, for example, does it relate to human information processing?

Problem 4. What *forms of matter* are associated with consciousness—in particular, what are the neural substrates of consciousness in the human brain?

Problem 5. What are the appropriate ways to *examine* consciousness, to discover its nature? Which features can we examine with first-person methods, which features require third-person methods, and how do first- and third-person findings relate to each other?

A historical introduction to these themes, the debates surrounding them, and their influence on the development of psychology provide the organizing principle for Volume 1. As this introduction to the entire collection also forms part of Volume 1 it includes an

¹ In order to include even a rough, representative sample of post 19th Century psychological works, it was necessary to largely exclude writings in philosophy of mind (written mainly for other philosophers). Nor was it possible to include a representative sample of the vast literature that explores the nature of and transformation of consciousness from Eastern philosophical/psychological perspectives. Many references to both Western philosophy and Eastern philosophy/psychology nevertheless appear in these collected works, particularly in Volumes 1 and 4. For collections that combine both contemporary psychological/scientific and philosophical works see Velmans & Schneider (2007) and Schneider & Velmans (2017).

introduction to the Volume 1 readings (labeled R1, R2 etc.). Volumes 2, 3 and 4 will include added introductions, specific to the themes and readings in those volumes.

Psyche-logos: the ancient history of thought about consciousness, mind, and soul

The belief that humans may have some spiritual essence that cannot be reduced to their material bodies appears to precede recorded history by at least 70,000 years. In their review of the archeological evidence Rossano and Vandewalle (2015) note that:

“Upper Paleolithic burials associated with *Homo sapiens* leave little doubt concerning ritual intent. At sites such as Sungir, Le Madeleine, Dolni Vestonice, Saint-Germain-la-Riviere, or the famous “Red Lady” burial at Paviland, highly elaborate burials have been found. Bodies, often covered in red ochre and lavishly adorned with bracelets, necklaces, and headbands containing tens to thousands of carefully manufactured beads and pendants, were interred with copious graves goods such as ceremonial tools, weapons, and animal bones. In some cases, hundreds to thousands of hours of labor were required to complete the burial (Dickson, 1992; Klima, 1988; Vanhaeren & d’Errico, 2001, 2005; R. White, 1993). In addition, at Cussac Cave in France, a rare deep cave burial has been found. *Homo sapiens* apparently lugged multiple bodies 200 meters deep into the cave (Aujoulat et al., 2002). Among traditional societies, such elaborate, effortful burials are typically associated with ancestor worship (Hayden, 2003, pp. 115–118, 132–133).” (Rossano and Vandewalle, 2015, p. 17)

Pyramid texts, carved on the walls and sarcophagi of the pyramids at Saqqara (dating back to between ca. 2400–2300 BCE) provide the earliest written evidence, providing spells not only to protect the pharaoh's remains, but also to reanimate his body after death and help him ascend to the heavens (Allen, 2005).

However, over the millennia, the terms “consciousness”, “mind”, and “soul” have acquired different meanings. Even in modern terms, “consciousness” is not easy to define. However, one can begin to define it ostensibly by contrasting situations where it is present and absent, for example, situations where one is conscious *of* something as opposed to not being conscious of that thing. That is, consciousness can partly be defined in terms of the presence or absence of *phenomenal contents* that can, in principle, be categorized and measured. In contemporary psychology, “mind”, by contrast, refers to psychological *processes* that may or may not have associated conscious contents. For example, as shown by the readings in this collection, there is considerable evidence for a “cognitive unconscious.” And “soul” continues to have its traditional reference to some essential aspect of human identity that survives bodily death.

But this did not prevent the ancient philosopher-psychologists from exploring the nature of soul/mind/consciousness. Systematic writings about the relationship of the self or soul (*Ātman*) to the ultimate nature of reality (*Brahman*), written in Sanskrit, are found in the Hindu Brhadaranyaka, Chandogya and later Upanishads, dating back to around 800-700 BCE (Philips, 2009), while, in the Western tradition, *reasoned arguments* about

the nature of the soul (a *psyche-logos*) first appeared in the philosophical writings of the Ancient Greeks.

The Orphic and Pythagorean mystery teachings of ancient Greece also held the soul to be immortal. But, then, as now, theories about how soul/mind/consciousness relate to the physical world were wide ranging. Early Greek thinkers were panpsychist (Skrbina, 2009—R3). For example, Thales (c. 624 – 546 BCE) believed that souls provide the power of movement; all things had such power and, therefore, had souls. Pythagoras (c. 570 – 495 BCE), believed Number (mathematics) to be the basis of everything—and viewed Number as a form of intelligence. Consequently there is intelligence in everything. For Anaxagoras (c.510 – 428 BCE), the fundamental force in the cosmos was Mind (*nous*). Although it is more evident in living organisms (humans, animals, plants), it also penetrates into non-living things. Hence, reality itself is mind-like and intelligent. In contrast, Leucippus and his student Democritus (460–370 BCE) were materialists, believing the ultimate components of nature to consist of atoms and the void. The soul, according to Democritus, consists of atoms of a particular kind—spherical fire atoms that can move easily amongst other atoms and support the heat and mobility associated with life (Berriman, 2016).

And, in Greek philosophy, the "soul" also begins to have more specific properties that we now associate with consciousness and mind. For example, Plato (427-347 BCE) in his *Republic*, argues (through the figure of Socrates) that the soul is composed of three parts: *logos* (the ability to reason), *thumos* (passionate emotions such as anger) and *epithumia* (natural appetites such as hunger, thirst and sex). The immortal aspect of *psyche* is not just some insubstantial shadow of the body that dwells in Hades when the body dies, but rather it is man's true self or *nous*, that faculty of intuitive insight that allows one to distinguish good from evil and aspires to choose the good. The aim of life, for Socrates, is the perfection of the soul, achieved by *knowledge*, particularly knowledge of oneself.

According to Plato's *Phaido*, the material body *interacts* with the soul. In the acquisition of knowledge, the body influences the soul through the operation of its senses, but the reasoning soul provides man's only means of understanding the true nature of the world. The body and its sensations provide a world of ever-changing appearances, but these are mere reflections of the unchanging patterns or universal forms that underlie the structure the world. Being itself a universal form, the soul has intuitive knowledge of the forms, which it can recover through its power of reason. The soul is also the "form of life" which has the ability to make the body move and act. In short, in Platonic thought the soul is a *knowing agent*. It is the source of consciousness and reason, and through the exercise of will, it manipulates the body. The body in turn acts on the soul, forming impressions on its consciousness via the senses. This is classical, *dualist-interactionism*, a philosophy that, in the 17th Century was given a more concrete form in the writings of the French philosopher and mathematician René Descartes.

By contrast, other Greek writings of the same period associated the operations of mind with the operations of the brain. The medical treatise *On the Sacred Disease* (c. 400 BCE), attributed to Hippocrates (460 – 370 BCE) makes this very explicit:

“Men ought to know that from nothing else but the brain come joys, delights, laughter and sports, and sorrows, griefs, despondency, and lamentations. And by this, in an especial manner, we acquire wisdom and knowledge, and see and hear, and know what are foul and what are fair, what are bad and what are good, what are sweet, and what unsavory; some we discriminate by habit, and some we perceive by their utility. By this we distinguish objects of relish and disrelish, according to the seasons; and the same things do not always please us. And by the same organ we become mad and delirious, and fears and terrors assail us, some by night, and some by day, and dreams and untimely wanderings, and cares that are not suitable, and ignorance of present circumstances, desuetude, and unskilfulness.” (Adams, 1849)

And Plato’s student Aristotle (384–322 BC) introduced a *functionalist* analysis of soul that anticipates *functionalism* (sometimes known as *psychofunctionalism*) in modern psychology and philosophy of mind. In his *De Anima and Parva Naturalia* Aristotle argues that the ‘soul’ associated with a given body is just the way that body is formed, which, in turn, determines the way that it functions. Consequently, all living beings have souls, or a mix of souls, of different kinds. Plants for example have a “nutritive soul” that enables nourishment and reproduction. Animals have an additional “sensitive soul” that allows them to perceive and feel. Such ‘souls’ are not immortal. Without their embodiments such forms and functions would not exist, and consequently such ‘souls’ would not exist. However, humans also have a “rational soul” or mind (*nous*) that enables them to think and reason, and it is this that makes them unique.²

De Anima goes on to give a detailed analysis of *mental functions* including the relation of sensation to thought, sense qualities in sight, hearing, smell, taste and touch, imagination, reasoning, the relation of thought to its objects, ideas and images, volition, desire and their effect on conduct (behaviour), thereby providing the most detailed psychological text of the classical Greek era—and consequently the first reading (R1) in this collection.

Over the following 1800 years or so, philosophical writings on the nature of soul/mind/consciousness and their relationship to the material world continued to develop both in the East and West. The fundamental *monism* of the early Upanishads

² On this point Aristotle was not a functionalist reductionist. Rather (following Anaximander and Plato), he suggests that “... in regard to reason and the speculative faculty, we have as yet no certain evidence, but it seems to be a generically distinct type of soul and it alone is capable of existing in a state of separation from the body, as the eternal is separable from the mortal” (p.49) He elaborates on this in his *Metaphysics*, where he argues that the *prime mover* or *final cause* of the universe must be active but itself *unmoved* and immaterial, having neither parts nor magnitude. Only *nous* (intellect), he argues, could have such qualities. Consequently, in their exercise of higher forms of reasoning and contemplation, humans can engage not just in mortal thoughts, but also in the activity of the immortals themselves.

for example was developed into 108 works, and additional later works, competing with *dualist* Samkhya Yoga philosophy, and even Lokāyata (empirically oriented) *materialism*—although, unlike the West, the latter had little influence in Indian thought (Rao, 2011).

Around the first century BCE the *Abhidhamma Pitaka*, including a collection of writings on the relation of mind to reality based on orally transmitted teachings of the Buddha also appeared, forming the basis for the (scholarly) Theravadan school of Buddhism. According to Sorenson (2008), from the fourth century BCE to the third century CE these issues were the subject of continuing debate that have a surprising sophistication, with opposing factions including, for example *Sthaviravada* (implicit realism), *Mahasanghika* (dualistic realism), and *Sarvastivada* (existential realism) along with many variations such as *Sarvastivada-Vaibhasika* (indirect realism) and *Sarvastivada-Sautrantika* (representationalism), positions still much discussed in Western philosophy and science.

In Europe, Greek philosophy continued to influence theorising about these issues throughout the Roman and Medieval periods, for example in the work of Cicero, Plotinus, and Thomas Aquinas. However, historians of Western Consciousness Studies and Philosophy of Mind, generally agree that the agenda for the modern period was set in the 17th Century by the seminal writings of René Descartes (R2).

In an intellectual climate dominated by the conviction that the material universe consisted of nothing but "insensate corpuscles" or "atoms", Descartes found it difficult to believe that the bodies and brains of animals and man could be anything other than machines, whose operations are entirely determined by mechanical principles. Like other aspects of the physical world they are composed of a substance that is extended in space (*res extensa*) and their behaviour may be understood in terms of the way bits of *res extensa* move and interact.

Yet, there are some human capacities, Descartes argued, which simply *cannot* be explained in mechanistic terms. For example, in 1637 in his *Discourse on the Method* (Part V) he suggested that the capacity for language and the faculty of reason provide a flexibility, an ability to respond appropriately to every novel situation in humans, which could never be accomplished by any mechanistic system. Descartes also believed that the same principles could be used to distinguish humans from "brutes" (his rather anthropocentric term for other animals).

Descartes' clear separation of humans from the rest of nature was also driven by his epistemology. Like the Greek rationalists before him, Descartes was skeptical about the sensory world. Secure knowledge, he believed, could not be grounded in the world of appearances provided by the senses, as one cannot rule out the possibility that these are illusory or even a dream. Only the rational mind can provide secure knowledge. And to a mind prepared to doubt everything only one thing could be certain—the fact that it *was* something which experienced doubt. The existence of the thought guarantees the existence of the thinker. "Cogito, ergo sum"—*I think, therefore I am*. Descartes therefore

concluded that the ability to think is the indubitable essence of man. And it exists *only* in man, not in other animals.

Descartes believed that this separation of man from the rest of nature is a consequence of the fact that humans alone have a rational, immaterial soul. It is this that enables them to think, speak, feel, and have conscious sensations. Indeed, in Descartes' view, it is impossible that matter alone could have conscious thought no matter how it is arranged. Rather, these capacities must be manifestations of a second, fundamentally different substance in the Universe—*res cogitans*, a substance that thinks. Human nature, then, is a duality—a union of *res extensa*, in the form of a material body and brain extended in space, and *res cogitans*, an immaterial soul or mind.

In his *Passions of the Soul* (1649) Descartes argued that causal interactions between body and mind operate in a hydraulic fashion. Stimulation of the sense organs produce motions in the "animal spirits" contained in the nerves, which produce motions in the pineal gland, and these produce perceptions in the soul. Conversely, the exercise of free will by the soul produces movements in the animal spirits in the pineal gland, which are transmitted via the nerves to the muscles—and this more concrete version of Plato's dualist-interactionism is commonly thought to be responsible for the "mind-body problem" in its modern form.

If the body and brain are *res extensa* and the soul is *res cogitans*, how could substances as different as these causally interact? Expressed in modern terms, how could activities in neurons cause changes in consciousness? And how could activities in consciousness cause changes in the activities of neurons? As early as 1643, (in her personal correspondence with Descartes), princess Elizabeth of Bohemia thought such interactions were inconceivable, as did Spinoza (1677), who suggested an alternative, dual-aspect monism that viewed soul/mind/consciousness and matter as two aspects of one underlying process, which he variously referred to as *Nature* or *God*. And Leibniz (1686) proposed a form of non-interactionist dualism, or "parallelism", in which a pre-established harmony or perfect alignment of soul and body (a perfect correlation), established by *God*, gives the *appearance* of causal interaction, without *actual* causal interaction. Contemporary thought offers more naturalistic ways of addressing this problem (to which we will return) while accepting that this remains one of the hardest problems of consciousness.

In clearly separating man's extended substance from his thinking substance, Descartes is often thought to be responsible for liberating science from the restrictions of the church, leaving science free to explore the workings of the body and brain, while leaving the nature of the soul to theologians. However, like the ancients, Descartes made no clear distinction between consciousness, mind, and soul, thereby impeding research into those aspects of consciousness and mind that are in principle open to empirical investigation.

The emergence of psychology as the empirical study of consciousness and mind

The term “psychology” first appears to have been used in the title of a collection of writings on “Psychologia”³ compiled by Rudolf Goclenius in 1590 on the nature and origin of the human soul. But the call to supplement a rational examination of the psyche with a psychology based on an empirical examination was introduced in 1732 by the German Rationalist philosopher, Christian Wolff in his *Psychologia Empirica* (Richards, 1980). The suggested method was direct introspection, either of the mind’s spontaneous activities, or of experimentally induced, particular mental acts. Through careful attention, he argued, we can have veridical experience of the mind’s activities, which can then form a basis for discerning the general principles governing the mind’s operations (elaborated in his *Psychologia Rationalis* in 1734). In this way, he argued, experimental psychology would be similar to experimental physics (Richards, 1980).

Such rational examination does of course fall short of *measurement*, and perhaps the first attempt to quantify some aspect of conscious experience was carried out by Pierre Bouguer in 1725, who devised a measurement of the apparent brightness of the moon by comparing it with that of a standard candle flame set at different distances (reported in Bouguer, 1729).⁴ In 1834, Ernst Heinrich Weber, a medical doctor and specialist in anatomy at the University of Leipzig carried out analogous experiments with just-noticeable differences (JNDs) in weight. Weber found that two weights needed to differ by around 1/50th in order to tell them apart, irrespective of their actual weight. A weight of 1Kg would need to increase to around 1.02Kg to feel heavier; a weight of 2Kg would need to increase to around 2.04Kg and so on. In short $\Delta W/W=k$, a relationship now known as the Weber fraction (where W is the reference weight, ΔW is the just-noticeable change in that weight, and k is a constant). As a first approximation, and within given intensity ranges, the Weber fraction has also been found to apply to many other sense modalities although the value of k differs. For example for brightness k is roughly 1/100, whereas for loudness k is roughly 1/5 and so on.

Gustav Theodore Fechner, initially a doctor of medicine and one of Weber’s students, was subsequently appointed a professor of physics at Leipzig. However a long illness that took him close to death inspired him to redirect the focus of his life’s work on formulating a precise, non-reductive understanding of mind/body relationships. For example, in his seminal text *Elemente der Psychophysik* (1860-R8) he provided an explanatory basis for Weber’s fraction, based on two assumptions: (1) For any stimulus there is a threshold intensity at which it can be detected (I_t), (2). A just noticeable increase in the perceived magnitude of that stimulus (a JND) will be a fixed proportion of its magnitude, initially at threshold ($\Delta I_t / I_t = k$), and also for subsequent JNDs, with intensity increasing for each JND in logarithmic fashion. Consequently the perceived magnitude of a given stimulus can be expressed as $P = k \log I$, where P is perceived magnitude, I is stimulus intensity, and k is a constant for any given sense modality.

This relationship, which Fechner referred to as Weber’s Law is now commonly referred to as the Weber-Fechner Law and remains one of the very few laws found in experimental psychology. Fechner noted, however, that the relationships of physical

³ The exact title was “*ψυχολογία hoc est de hominis perfectione, anima, ortu*”

⁴ Bouguer is generally regarded as the founder of optometry—the branch of optics concerned with measuring the intensity of light.

stimuli to experienced stimuli were mediated by biological processes, so the general application of this law could only be approximate. Consequently, he argued for the need to supplement an “outer psychophysics” with an “inner psychophysics”, in which experienced stimuli could be related directly and precisely to the biological processes that supported them, a project that continues to this day, particularly in studies of sensation, perception, neuropsychology and consciousness, making psychophysics the oldest, most enduring research program in experimental psychology.

Although it is rarely mentioned in psychology textbooks, Fechner also developed a panpsychist worldview very similar to that of Spinoza, in which he argued that the relation of conscious experience to biology found in humans is just one manifestation of a general principle that applies to all of Nature. Rather than experience being nothing more than a product of, or confined to, particular forms of biological activity in the human brain, matter and its associated experience are external and inner aspects of *Nature*. Rather than Nature being physical, it is *psychophysical*, in which case psychophysics, ultimately becomes the study of Nature itself (Stanley Hall, 1902—R4).⁵

Given his work on psychophysics, Fechner is often thought of as the founder of experimental psychology—a distinction he shares with Wilhelm Wundt.

Initially trained as a doctor of medicine and physiologist, Wundt became an assistant to Helmholtz at the University of Heidelberg, where he became more interested in sense perception and related psychological issues, culminating in his major work on the *Principles of Physiological Psychology* (1874). Much of this focused on the structures and functioning of the central nervous system (as understood by Wundt) and its connexions to conscious experience, including (in its later editions) the elements of mental life, sensation, feelings, ideas, and voluntary acts. In 1875 he was appointed professor of philosophy at Leipzig, and, following Weber and Fechner, began to develop psychophysics into a more elaborate, experimental science, founding the first laboratory explicitly devoted to this subject in 1879, including equipment such as chronoscopes, kymographs and tachistoscopes. His subsequent 186 research students engaged in an impressive list of experimental projects, which, from 1881, were reported in *Philosophische Studien*, the first experimental psychology journal. The findings of this research program were also reported in his *Principles of Physiological Psychology* expanded from one book in 1874 over six editions to three volumes in 1908-11 (edition 5, completed in 1902, was translated into English by Titchener in 1904—R9).

Although Wundt is often credited with, and criticised for, the early development of *introspection* as a method of investigating consciousness, his commitment to this has

⁵ In his *Elemente der Psychophysik*, Fechner defines psychophysics as an “exact science of the functional relations or relations of dependency between body and mind, or, in more general terms, between the bodily and mental, the physical and psychical worlds”; and his main object is, accordingly, to establish the laws that govern the inter-action of mental and bodily phenomena. A very detailed account of Fechner’s illness, and his subsequent philosophical writing and empirical work is given by J. Stanley Hall (1902) in his *Founders of Modern Psychology*.

often been misinterpreted in the historical record.⁶ For example, in his *Physiological Psychology* he explicitly *dissociates* himself from a psychology based *solely* on introspection, arguing that this can never be sufficiently precise or objective to found an experimental science. Nevertheless, carefully controlled psychophysical methods that focus on the precise relationship of experiences, evoked under controlled conditions, to their supporting physiology can, he argued, found a precise science that can inform both psychology and physiology—thereby anticipating the development modern neuropsychological studies of consciousness by over 100 years. At the same time, Wundt rejected materialism (a reduction of psychological facts to physiological facts), which he thought of as “pseudo-science”, arguing instead that psychological causes can be best understood within a psychological language, without recourse to any reductive metaphysics.

In the founding history of consciousness studies (and psychology itself) William James (1842-1910) also deserves special mention. Initially trained as a doctor at Harvard Medical School, he was appointed there to teach physiology and anatomy there in 1873. However after what he described as a period of “soul-sickness” he had already joined the *Theosophical Society*, spent a year in Germany, and decided that his true interests lay in philosophy and psychology, which he subsequently taught at Harvard from 1876 to 1907, and continued to the end of his working life. In pursuit of his interests in both ordinary conscious experience and extra-ordinary conscious experience, he was also a founding member and vice president of the *American Society for Psychical Research*.

James published extensively in both philosophy and psychology, and his widely acclaimed *Principles of Psychology* (1890—R10, R11, R31), *The Varieties of Religious Experience* (1902—R82) and many other writings have a continuing relevance for contemporary studies of consciousness. For example, in the *Principles*, William James supported Wundt’s approach to psychological research. Rejecting both extravagant appeals to the “soul” and to stripped-down forms of “associationism” as explanatory principles, he re-affirmed the importance of physiology to psychology, citing for example the many ways that brain states can be shown to affect conscious experience—and the many ways that conscious experiences can be shown to affect the body and brain. He also re-affirms introspective observation (of one’s percepts, mental states and other experiences) as the necessary point of departure for psychological understanding of mental life, arguing that although this method is difficult and fallible, it shares these difficulties with other forms of observation, for the reason that translation of perceived phenomena into descriptions are always fallible—and simply need to be open to correction by subsequent observations, triangulation by supporting evidence and so on.

The *Principles* also introduced functional analyses of how consciousness relates to mental processing. For example, James noted the close relation of attention to what appears in consciousness (R31). He also distinguished between two forms of memory, a temporary form of “primary memory” (now often thought of as “working memory” or a

⁶ Titchener, one of Wundt’s American students introduced a form of introspectionism into the USA that focused largely on a componential analysis of the contents of consciousness, which he referred to as structuralism and attributed to Wundt. See Danziger (1980) for an instructive review of Wundt’s actual writings on this subject and the likely reasons for their historical misinterpretation.

“short-term store”) and a more permanent form of “secondary memory” (now often thought of as ‘long-term memory’, or a “long-term store”). According to James, attended to information becomes conscious, enters primary memory, and thereby becomes part of one’s psychological present. Once in primary memory it can be transferred to secondary memory in which case it becomes part of one’s psychological past. James’ analyses of how these relate have a continuing, contemporary relevance, as do many of his philosophical writings, for example his “radical empiricism”, his “pragmatism” and his “neutral monist” analysis of how consciousness relates to the material world (to which we will return).

The emergence of behaviorism

The first phase of experimental psychology, sometimes disparagingly referred to as “armchair psychology”, focused on introspection. However, it should be apparent from the above that, although the founders of psychology were deeply interested in philosophical issues, their aim was to transform the ancient *psyche-logos* into a precise, experimental science focused on a careful analysis of the structure of consciousness, a functional analysis of mind and brain and the relations among these expressed, for example, in a form of external and inner psychophysics.

However, doubts about introspection as a scientific method dated back at least to Auguste Comte (1838). Mind and consciousness could not be measured with the precision of physics and disputes about the structure of given forms of consciousness could be difficult to settle as these varied somewhat with the precise training and instructions given to the observers in different experimental groups. Nor could introspective methods be used to study the psychology of non-human animals. In contrast, overt behavior seemed to offer the possibility of more precise measurement in both humans and other animals.

By the turn of the 20th Century, Ivan Pavlov had already demonstrated that salivary responses in dogs to a food stimulus could also be produced by the ringing of a bell, if the bell had been associated (by the dog) with the appearance of the food—a process known as classical conditioning. Pavlov regarded such learnt (conditioned) reflexes as basic psychological phenomena, and, he thought, if these were basic, their full understanding would eventually allow one to understand and predict more complex behaviour. In his studies of animals escaping from cages, Edward Thorndike had also discovered that if a particular behavior led to success, it was likely to be repeated, i.e. that response was reinforced, which he termed “the law of effect”. None of this required reference to non-observable variables such as “thought”, or “consciousness” and workers with similar interests argued that this manner of investigating behavior provided a general model for how a science of psychology should proceed. In his famous paper *Psychology as the Behaviorist Views It* (R12), John Watson wrote:

“Psychology as the behaviourist views it is a purely objective experimental branch of natural science. Its theoretical goal is the prediction and control of behavior. Introspection forms no essential part of its methods, nor is the scientific value of its data dependent upon the readiness with which they lend themselves to

interpretation in terms of consciousness. The behaviorist, in his efforts to get a unitary scheme of animal response, recognizes no dividing line between man and brute." (Watson, 2013, p.158) Consequently, "The time has come when psychology must discard all reference to consciousness; when it need no longer delude itself into thinking that it is making mental states the object of observation..." (Ibid, p.163).

And, for around 50 years, this became the dominant principle. Rather than viewing mind and consciousness as its subject matter, psychology redefined itself as "the study of behavior", the study of learning (how animals learn to respond to stimuli) became a central focus of investigation and explanation, and inner determinants of behavior (mind, brain etc.) were externalized by "operationalizing" them (defining them purely in terms of the overt means used to measure them). Within academic psychology departments, reference to mind or consciousness in psychological explanations of behavior were commonly regarded as "prescientific". Although in many psychological experiments, subjects were still required to make reports of various kinds in response to stimuli of varying kinds, these reports were treated as a form of behavior, for example as a form of "verbal behavior".

In his review of *The History of Introspection*, Boring (1953—R14) concluded that:

" ... the answer to the question, "What became of introspection?" seems to be this. Introspection as a special technic has gone. The object of introspection—sometimes called consciousness, sometimes something else is a construct like an ability, or an intervening variable, or a conditioned response, or any of the other "realities" out of which a general psychology is formed." (p. 185) "...human consciousness is an inferred construct, a concept as inferential as any of the other psychologists' realities ... and that literally immediate observation, the introspection that cannot lie, does not exist. All observation is a process that takes some time and is subject to error in the course of its occurrence." (p. 187)

However, from their inception, behaviorist principles were never universally agreed. To bolster his case for behaviorist methodology, Watson had adopted an implausible, eliminative form of behaviorist ontology, arguing that "thought" is nothing more than minute movements of the larynx, that there are no centrally (as opposed to peripherally) initiated processes, and that "mental imagery" doesn't exist! In the following year, Edward Titchener (1914—R13) published a thoughtful response, arguing (a) that Watson had given an entirely misleading evaluation of the psychology he was trying to overturn and (b) that Watson's behaviorist ontology was both implausible and extreme. To avoid such extremes, Titchener argued, one should continue to employ introspective methods, relating their findings to activities in the peripheral and central nervous system in ways already being explored in early forms of physiological psychology, psychophysiology, psychobiology, and psychophysics.

In any case, it proved extremely difficult to describe what subjects were required to do in psychophysical experiments without reference to conscious experience. For example, to justify the behaviorist credentials of his psychophysical research, S.S. Stevens (1966) argued that, "... the meaning of sensations rests in a set of operations

involving an observer, a set of stimuli and a repertoire of responses. *Sensations are reactions of organisms to energetic configurations in the environment.*" (p. 218—my italics). But he then went on to give examples of responses subjects might give to stimuli in psychophysical experiments, such as "assigning a number to the brightness of a light *that they see*", adjusting a dial to signify "the changing loudness of a sound *that they hear*", and so on (my italics)—making it difficult to pretend that subjects are simply responding to stimuli rather than reporting on what they experience.

Nor, during this period, were behaviorist principles universally adopted. Many areas of investigation did not fit naturally into a behaviorist mold. For example, the study of intelligence (following Binet, 1903) and the study of concept development in children (following Piaget, 1936) focused on internal cognitive structures, some innate and some acquired, which simply could not be described in behaviorist language; Helmholtz (1878) argued that unconscious inference must operate in order to explain why the world does not appear to move when the eyes move in visual perception; From 1891 onwards, F. W. H. Meyers wrote extensively on the nature of the unconscious mind (referred to as the "subliminal self"), its relation to the conscious mind, and its role in the human psyche (Kelly, 2007—R17); From 1900 onwards, the role of the unconscious mind in psychopathology was also explored in depth by Sigmund Freud, his student Carl Jung and many others (c.f. Freud, 2015—R18, and Jung, 1960—R19); And, following the phenomenology of Husserl, Gestalt psychologists studying visual perception such as Wertheimer, and Köhler simply referred to the data of direct experience as *phenomena*, replacing the term "introspection" with *phenomenological observation*.

Cognitive psychology and the re-emergence of the study of mind

With the emergence of cognitive psychology in the second half of the 20th Century, the influence of behaviorism rapidly waned, although this had less to do with its inadequate account of consciousness and mind than with its inability to carry out its manifesto. According to Watson and other prominent behaviorists such as Skinner (1953), it matters little whether mental states exist as they exert little, if any, autonomous influence on behavior. Behavior is controlled by stimulus configurations combined with appropriate schedules of reinforcement. Given the stimuli and the reinforcement history one can predict the behavior.

Unfortunately for this position, there was very little evidence in its favour, particularly for complex and novel behaviors such as speech production—the subject of Skinner's 1957 book *Verbal Behavior*. In his influential 1959 review of this book the linguist Noam Chomsky argued persuasively that environmental stimuli alone could not predict verbal responses, that Skinner's analysis of language and speech was incoherent, and that the problems of explaining language in behaviorist terms were insurmountable. Faced with such a "loose coupling" between external stimuli and overt response in many forms of complex behavior, psychologists in the second half of the 20th century turned once more to a study of inner mental events—to a cognitive psychology that investigates the states and processes which *enable* human beings to produce the behavior that they do. Rather than behavior being determined in a rigid mechanistic fashion by impinging stimuli, it was recognized that human beings are able to select and interpret the information to

which they attend and they may respond in ways that are flexible, adaptive and potentially novel. This resurgent interest in cognitive processes within psychology was also extensively cross-fertilized by theoretical developments in other disciplines—by information theory, signal detection theory, control theory and systems analysis in engineering, linguistics, and above all, by the impact of computers.⁷

Cognitive psychology and associated fields such as cognitive neuropsychology and cognitive neuroscience remain the dominant paradigm in Western psychological science, and it has a distinct *functionalist* approach to the analysis of consciousness and mind. Within it, mind is viewed as a complex system, thought of as a form of *human information processing* embodied in the brain, roughly in the way that software is embodied in the hardware of computers (although it was soon recognized that such analogies can only be approximate).

Initial ideas about the role of consciousness in human information processing

By 1962, George Miller, in his classic *Psychology: The Science of Mental Life* (R7), felt able to assert that while most psychologists confess they do not know what consciousness is, “They are sure it is not a substance—a material thing—but a process or group of processes, which occurs in some objects and not in others” (Miller, 1962, p. 40). However, in the early years of cognitive psychology, references to consciousness were made only in passing, in discussions that were really focused on the details of information processing. For example, Broadbent (1958) mentioned consciousness in his “filter” model of selective attention. This model was intended to account for the finding that subjects have a limited capacity to process information arriving simultaneously at the sense organs. A cocktail party is typical, in that one can fully attend to only one of the many conversations occurring at any given moment. The conversation to which one attends enters consciousness, but the other non-attended conversations form a kind of background “buzz.” As Broadbent put it, this is evidence for an “information processing bottleneck” in the system. So the brain needs to select the information to which to attend. How is this done? In Broadbent’s initial model (based on the evidence available in the 1950’s) selection is achieved by a preconscious “sensory filter” which performs a rough *physical* analysis of input stimuli. It then selects the information that will be passed through the bottleneck of the brain’s “limited capacity decision channel” (LCDC) for further processing. Only information that enters the LCDC is analysed for meaning, becomes conscious, and may be used to organise a response. James’ linking of consciousness to primary memory was also reintroduced into experimental psychology by Waugh & Norman (1965), but, again, their work had more to do with the relation of primary to secondary memory than consciousness.

In the late 1960’s theories of selective attention and memory converged. That is, a number of models appeared each summarising a large body of research in which

⁷ These paradigmatic changes were summarised in Ulrich Neisser’s landmark book *Cognitive Psychology* (1967). Useful accounts of the influences that led to the emergence of cognitive psychology, along with an analysis of its debts to and divergences from behaviorism, are given by Lachman, Lachman & Butterfield (1979) and Gardner (1987).

selection, attention, and transfer of information between primary and secondary memory were combined into one integrated system (e.g. Atkinson and Shiffrin, 1968; Norman, 1969—R33). For example, in the model proposed by Donald Norman, stimuli arriving in parallel at the sense organs are initially subject to analysis of a preconscious, automatic kind so that they may be identified (by matching them to traces in secondary memory formed by previous experience with those stimuli). Once matched, they are assessed for significance. Only the most “pertinent” of the input stimuli are selected for further processing by a limited capacity attention system, thereby entering consciousness. Conscious processing is voluntary and flexible in contrast to unconscious processing, which is involuntary and inflexible. Attended to stimuli may be processed in a variety of ways, for example, they may be rehearsed and stored in secondary memory, they may enter into problem solving, or they may form the basis of some overt response. Information that is not selected for more detailed attention remains unconscious and is eventually lost from the system.

While such theories *associated* consciousness with particular forms and stages of processing (typically with focal attention or primary memory), they remained uncommitted about the *nature* of this association. However, from around 1970 a number of papers appeared in which the *ontological identification* of consciousness with a form of processing becomes explicit. Following Broadbent (1958) for example, Posner and Warren (1972) asserted that the use of a limited capacity central processing system “... becomes the central definition of a conscious process and its non-use is what is meant by a process being automatic.” Comparisons were also made between the operations of the limited capacity central processor and an “executive monitor program” sometimes used in large computing installations to allocate processing resources efficiently to the many simultaneous tasks in which the system is engaged (Shallice 1972; Bower, 1972; Bjork, 1975). Bjork (1975) for example, outlined a model of human information processing in which, “... an explicit central processor is proposed as a kind of executive consciousness that controls and governs the system; without the involvement of the central processor, nothing happens in the system beyond the formation of input traces.”

Similarly, Mandler (1975—R22) argued that, “... relational processes operate primarily if not exclusively on conscious content. In addition to choice, these include evaluation, comparison, grouping, categorization and serial ordering. In short, practically all novel relational orderings require that the events to be ordered must be simultaneously present in the conscious field ...”, and he went on to develop this into a general theory about the functions of consciousness.

As George Miller noted, cognitive psychological theories of consciousness over this period generally adopted the view that consciousness is a form of information processing. To investigate its nature, psychologists typically contrasted subjects’ performance in tasks that are accompanied by consciousness, with their performance on the same (or very similar) tasks without accompanying consciousness. Differences in performance were then attributed to the *added functions of consciousness*—giving it many things to do in the economy of the mind. Such investigations continue to this day, along with investigations of how such processes are embodied in the operations of the

brain. As these developments are dealt with in volumes 2 and 3 of this collection, we will return to them in more detail in the introductions to those volumes.

The strengths of functionalist accounts of mind

In many respects, psychofunctionalism seems intuitively plausible. Psychologists study mental processes. So it is hardly surprising that psychological theories might, indeed, be theories of mental processes. The identification of mind with certain modes of functioning also reconciles the intuition that the mind is somehow embodied in the brain with the contrary intuition that the mind does not seem to have a specific spatial location in the brain.

Psychofunctionalism also seems consistent with our natural language usage of many mental terms. For example our ability to think, solve problems and so on seems to relate to our capacity to function in certain ways. Likewise, when comparing ourselves with other humans or other animals, it is common to assess our mental abilities in functional terms. Historically, this has been accepted even by dualists such as Descartes. Indeed, for Descartes, man's ability to use language and to respond appropriately to changing situations gives him capacities which are beyond any machine or any non-human animal. One might or might not agree with Descartes that this is evidence for a thinking, non-material soul (*res cogitans*). But it seems difficult to deny that theories that specify the detailed processes involved in language, thinking, problem solving and so on, illuminate at least some aspects of the nature of mind.

The weaknesses of functionalist accounts of consciousness

However, from the time of Helmholtz's work on unconscious inference in visual perception, and voluminous writings on subliminal and unconscious mental processing by Myers, James, Freud, Jung and many others it became increasingly apparent that not all aspects of mental processing are conscious. With the advent of cognitive psychology this became undeniable (a topic to which we return in Volume 2). Given this, it was no longer obvious that information-processing theories that specify the details of *mental processing* also specify the nature or functions of *consciousness*.

As Velmans (1991—R26) later noted, theories of mind, expressed in functional, information-processing terms are "third-person" accounts of what is going on. That is, they are inferences about intervening processes based on observations of input-output contingencies. Neurophysiological accounts are similarly based on "third-person" observations of the brain. By contrast, consciousness is, in essence, a "first-person" phenomenon (we cannot observe someone else's consciousness from the outside, so if we did not have it ourselves, we would not suspect it was there). Consequently, *one cannot take it for granted* that third-person functional accounts of mind or brain are also accounts of consciousness.

Nor does one need to appeal to the functions of consciousness to describe how such processes operate. The truth of this is evident from the fact that, for many years, cognitive accounts of mental processes later thought to be *closely associated* with

consciousness (attention, a central processor, working memory, etc.) *made little if any reference to consciousness*. These forms of information processing, specified in the same way would work equally well for example if they could be instantiated in a nonconscious machine.

And crucially (and counterintuitively), as Miller himself observed in 1962, the processes responsible for producing “conscious” thoughts, memories, emotions and so on are *unconscious*. To notice this we just have to attend to what we actually experience when we try to think or remember something, or experience an emotion or a motivation to do something:

“The fact that the process of thinking has no possible access into consciousness may seem surprising at first, but it can be verified quite simply. At this moment, as you are now reading, try to think of your mother's maiden name. What happened? What was your conscious awareness of the process that produced the name? Most persons report they had feelings of tension, of strain unrelated to the task, and then suddenly the answer was there in full consciousness. There may have been a fleeting image or two, but they were irrelevant. Consciousness gives no clue as to where the answer comes from; the processes that produce it are unconscious. It is the result of thinking, not the process of thinking, that appears spontaneously in consciousness.” (Miller, 1962, p. 71)

And, “What is true of thinking and of perceiving is true in general. We can state it as a general rule. No activity of mind is ever conscious. In particular, the mental processes involved in our desires and emotions are never conscious. Only the end product of these motivational processes can ever become known to us directly.” (Ibid, p.72)

Competing psychological theories about the nature and function of consciousness

But, if “No activity of mind is ever conscious” what is the nature and function of consciousness? Modern functionalist theories of consciousness often try to deal with this by trying to argue that consciousness *is nothing more than* the information processing with which it is most closely associated. Such maneuvers have their own problems to which we return in the following volumes when we examine that relationship of consciousness to its associated functioning in detail. For the present it is enough to note that, over millennia, theories of consciousness were largely non-reductive. The 19th Century pioneers of psychology, for example, largely adopted one or another form of *parallelism*, in which researchers such as Wundt accepted that conscious experiences *correlated* with given neurophysiological activities without *reducing* to them. This allowed psychological investigations of consciousness (through introspection), neurobiological investigations of the brain, and the possibility of relating these to each other without any prior commitment to *how* to relate conscious experiences to their neural correlates (c.f. Boring, 1953).

These relationships were nevertheless much debated. As noted earlier, Fechner (1860) was a dual-aspect monist, arguing that conscious experiences and their neural correlates were dual aspects of an underlying psychophysical reality. As with Spinoza’s dual-aspect

monism, and Leibniz's parallelism, this allows one to explain the *appearance* of causal interaction without requiring *actual* causal interaction between consciousness and brain—an option we explore in more depth when we examine how to combine first- and third-person perspectives on the operations of mind in Volume 3. In contrast, the physician-psychiatrist Henry Maudsley (1871), and the philosopher-psychologist Alexander Bain (1873) stressed the causal primacy of brain processes. Darwin's staunch defender Thomas Huxley (1874—R20) also stressed the causal dependency of conscious states on brain processes, while denying any possibility of reciprocal causation of mental/conscious states on states of the brain—a position that became known as “epiphenomenalism”. As Huxley famously put it:

“... we have as much reason for regarding the mode of motion of nervous system as the cause of the state of consciousness, as we have for regarding any event as the cause of another. How the one phenomenon causes the other we know, as much or as little, as in any other case of causation.” (Huxley, 1874, p. 238) In contrast, “The consciousness of brutes would appear to be related to the mechanism of their body simply as a collateral product of its working, and to be as completely without any power of modifying that working as the steam-whistle which accompanies the work of a locomotive engine is without influence upon its machinery. Their volition, if they have any, is an emotion indicative of physical changes, not a cause of such changes.” (Ibid. p. 240)

However, another friend of Darwin, the evolutionary biologist and comparative psychologist George Romanes (1885—R21), armoured with a more detailed analysis of the functioning of the brain, suggested a far subtler analysis of the same data. To begin with, Romanes accepted that conscious thoughts, emotions and so on are indicative of changes in the brain, not the changes themselves. But that does not justify a form of reductive materialism. Insofar as such mental changes are indicative, they can be used as an instrument that provides useful information about the neural changes that they indicate. Nor can external observations of those neural changes be made without engaging the minds of external observers. As he notes, “We cannot think any of the facts of external nature without presupposing the existence of a mind which thinks them, and therefore, so far at least as we are concerned, mind is necessarily prior to everything else. It is for us the only mode of existence which is real in its own right; and to it, as to a standard, all other modes of existence which may be *inferred* must be *referred*.” (Romanes, 1885, p. 21)

He then considers the opposite position that mind is causally primary, but finds that mental causation of basic physical properties such as motion is just as problematic as physical motion being the cause of conscious experiences in the brain—and, he opts instead, as Fechner did before him, for a form of dual-aspect monism:

“We have only to suppose that the antithesis between mind and motion—subject and object—is itself phenomenal or apparent: not absolute or real. We have only to suppose that the seeming duality is relative to our modes of apprehension; and, therefore, that any change taking place in the mind, and any corresponding change taking place in the brain, are really not two changes, but one change. When a violin is played upon we hear a musical sound, and at the same time we see a vibration of the strings. Relatively to

our consciousness, therefore, we have here two sets of changes, which appear to be very different in kind; yet we know that in an absolute sense they are one and the same: we know that the diversity in consciousness is created only by the difference in our modes of perceiving the same event—whether we see or whether we hear the vibration of the strings. Similarly, we may suppose that a vibration of nerve-strings and a process of thought are really one and the same event, which is dual or diverse only in relation to our modes of perceiving it.” (Ibid. p. 28)

We will return to more elaborate forms of such epistemological dualism combined with ontological monism when we consider how first- and third-person views of the mind can be related to each other in Volume 3.

Nor were these the only options. Ernst Mach and William James for example developed a form of *neutral monism*, which they were at pains to *dissociate* from dual-aspect monism. As Mach put it

“The view here advocated is different from Fechner's conception of the physical and psychical as two different aspects of one and the same reality. In the first place, our view has no metaphysical background, but corresponds only to the generalized expression of experiences. Again, we refuse to distinguish two different aspects of an unknown *tertium quid*; the elements given in experience, whose connexion we are investigating, are always the same, and are of only one nature, though they appear, according to the nature of the connexion, at one moment as physical and at another as psychical elements.” (Mach 1886, p61)

And, in his paper, “Does consciousness exist?” (1904—R5), William James argued that it is a mistake to think of consciousness as a substance that is distinctly different to what we normally think of as the material world. Rather it is a process of knowing—and everything that we can empirically know, whether in the external world or our own thought, is based on what we experience. If we take that as our point of departure, the seemingly unbridgeable divide between “subject” and “object”, “mind” and “matter” can be resolved:

“My thesis is that if we start with the supposition that there is only one primal stuff or material in the world, a stuff of which everything is composed, and if we call that stuff 'pure experience', then knowing can easily be explained as a particular sort of relation towards one another into which portions of pure experience may enter. The relation itself is a part of pure experience; one of its 'terms' becomes the subject or bearer of the knowledge, the knower, the other becomes the object known.” (James, 1904, p. 478).

“If the reader will take his own experiences, he will see what I mean. Let him begin with a perceptual experience, the 'presentation,' so called, of a physical object, his actual field of vision, the room he sits in, with the book he is reading as its center; and let him for the present treat this complex object in the common-sense way as being 'really' what it seems to be, namely, a collection of physical things cut out from an envioning world of other physical things with which these physical things have actual or potential relations. Now at the same

time it is just those self-same things which his mind, as we say, perceives; and the whole philosophy of perception from Democritus's time downwards has been just one long wrangle over the paradox that what is evidently one reality should be in two places at once, both in outer space and in a person's mind. 'Representative' theories of perception avoid the logical paradox, but on the other hand they violate the reader's sense of life, which knows no intervening mental image but seems to see the room and the book immediately just as they physically exist." (Ibid. p.481)

The fundamental point that the perceived physical world (the phenomenal world) is itself part of conscious experience (not apart from it) is also the point of departure for European phenomenology (following Husserl) and is again an important issue to which we return in Volume 3. But, as noted earlier, in the behaviorist years that followed, it was largely ignored in psychological science, which retained a sharp distinction between the "objective" physical world and "subjective" conscious experience, along with a distrust of the "subjective", and, in its more extreme versions, a denial that consciousness exists!

For example, in his seminal paper "Is consciousness a brain process?" (1956—R6) the philosophical psychologist Ullin Place argued that, in spite of appearances, science would eventually demonstrate conscious experiences to be nothing more than states of the central nervous system. This position, known at the time as "central state identity theory", subsequently had wide influence in philosophy of mind (currently known as "physicalism" or "biological naturalism")—while in cognitive psychology, (from the late 1950s onwards) consciousness was more commonly thought of as a brain process (rather than a brain state) as we have seen.

Interdisciplinary influences and the formation of consciousness studies

As Boring (1953) noted, "introspective" investigations of conscious experience never really disappeared from psychology in its behaviorist period, even though it was often redescribed in behaviorist terms—a situation that continued, even in the subsequent cognitive period. Nor, for much of the 20th Century, was introspection formally developed. There were however some notable exceptions. For example, Ericsson & Simon (1987—R15) developed a method of "protocol analysis" which aimed to improve the accuracy of subjective reports by relating the processes involved in making them to the forms of information processing underlying them. And, Jerome Singer (1993—R16) surveyed work on methods of sampling the ongoing stream of thought extending over 40 years. From the 1960s onwards there was also a renewed cultural interest not just in methods of studying consciousness but also on methods of *transforming* it, influenced for example by humanistic and transpersonal psychologies, Eastern Hindu and Buddhist teachings and practices, and experimentation with psychoactive drugs (see Volume 4).

In response to this, from the early 1990s, *Consciousness Studies* emerged as a distinct interdisciplinary field with its own conferences, journals, professional bodies and textbooks, that drew mainly on cognitive and neuropsychological approaches, but also on philosophy of mind, artificial intelligence, first-person methods for investigation and

transforming consciousness, and many other fields that have an interest in consciousness ranging from the arts to microphysics. For example, in 1992 the *Ciba Foundation* (London) hosted a three-day conference gathering together 25 of the leading international scientists and philosophers then working on consciousness (cf. Bock and Marsh, 1993) and over the period 1994 to 1997 a new *Consciousness and Experiential Psychology Section*, holding its own annual conferences and workshops, was established within the *British Psychological Society*.⁸ In 1992, a new journal, *Consciousness and Cognition* (focusing mainly on cognitive science) was founded in the USA, followed, in 1994, by the interdisciplinary *Journal of Consciousness Studies* in the UK. In 1994 and 1996 conferences on “Towards a Science of Consciousness” were hosted by the University of Arizona, Tucson and, in 1998, a *Center for Consciousness Studies* was formed there that organised interdisciplinary, annual conferences. From 1997 onwards, the newly formed, international *Association for the Scientific Study of Consciousness* also ran annual conferences, focusing mainly on cognitive, neuroscientific and mainstream philosophical issues. In 2002, the interdisciplinary journal *Phenomenology and the Cognitive Sciences* was launched followed in 2013 by *Psychology of Consciousness: Theory, Research and Practice*, published by the *American Psychological Association*.

With the approach of the 1990s, major surveys of the field also appeared. In 1988 Bernard Baars published *A Cognitive Theory of Consciousness*, a review of cognitive studies of consciousness synthesised into his own “global workspace” model of consciousness. In 1992, G. William Farthing published *The Psychology of Consciousness*, the first general textbook devoted to consciousness studies in its modern form, followed in 1996 by Velmans’ edited *The Science of Consciousness: Psychological, Neuropsychological and Clinical Reviews* intended to survey emerging areas of consciousness studies in a form suitable for undergraduate students. This was soon followed by a survey on *Scientific Approaches to Consciousness* edited by Cohen & Schooler (1997); Velmans (2000, 2009) provided an integrated survey of the developing science and philosophy in the field, viewed from the perspective of *reflexive monism*; Baars, Banks and Newman (2003) compiled a useful collection of *Essential Resources in the Scientific Study of Consciousness*; and Zeman (2002), Blackmore (2003, 2010), and Rose (2006) produced introductory texts, specifically directed at undergraduate students. Major surveys of the developing state of the art in both the science and philosophy of the field were also compiled by Velmans and Schneider (2007), Zelazo, Moscovitch and Thomson (2007) and Schneider and Velmans (2017).

As noted earlier, the field of consciousness studies was expanding exponentially during this period. The increasing sophistication of neuro-imaging techniques, such as EEG, MRI, fMRI, PET, and MEG, were forming consciousness studies into “big science” with major laboratories around the world, engaged in an extensive search for the neural correlates of consciousness. Nor were these developments confined to purely *cognitive* neuroscience approaches. In 1998, Jaak Panksepp founded a form of *Affective Neuroscience* that related the evolution of consciousness more deeply to the

⁸ See Velmans (2017, pp. 10-11) for a more detailed historical account of these developments.

evolution of sub-neocortical structures of human brain that support emotion and motivation, which are also found in other mammals. And, following the publication of *The Embodied Mind* by Varela, Thomson & Rosch (1991) there was interest in the influence of embodied, embedded, enactive approaches to understanding mental functions and conscious experience. There was also expanded interest in psychogenesis—the influence of mind/consciousness on bodily states, for example in studies of hypnosis, meditation, the placebo effect, and psychoneuroimmunology. And, in response to all these developments, there was a renewed interest in developing more sophisticated first-person methods for studying conscious experience as such, to complement the increasing sophistication of third-person methods for studying mind and brain, for example in *Neurophenomenology* and *Experiential Neuroscience*. We return to these, and other developments in Volumes, 2, 3 and 4.

Given this proliferation of interests in and approaches to the study of consciousness, it is, perhaps, not surprising that, as with the ancient Greeks and the 19th Century founders of modern psychology, the nature and function of consciousness, how it relates to the brain and physical world, and even how to define it remain contested issues—to the extent that, as recently as 2009, the *Journal of Consciousness Studies* felt it appropriate to devote a special issue to *Defining Consciousness* (Nunn, 2009). Volume 1 therefore closes with Velmans (2009—R23), the concluding paper from that issue, which also provides some of the basic ground-rules for the readings in this collection. After ranging over the various options for how to define “consciousness” and how to define a “conscious process”, this paper argues that the *phenomenology* of consciousness provides the only secure departure point for scientific and philosophical investigations of its nature. Conversely, theories of consciousness that do not in some way deal with its phenomenology are not theories of consciousness:

“Maybe consciousness will ultimately be shown to be nothing more than a state or function of the brain—and maybe it won’t. That is, after all, what much of the current debate is about. But it is a mistake to *define* consciousness in a way that begs this question. It is a mistake to claim that one is investigating phenomenal consciousness directly when one is investigating its neural causes and correlates. And it is similarly a mistake to presume phenomenal consciousness to be *identical* to the operations of some aspect of information processing with which it is *associated*, for example the operations of a “global workspace.” The mistake in these instances is one of *premature closure*. If one makes up one’s mind about the ontology of phenomenal consciousness before fully investigating how its phenomenology relates to processing in the brain and surrounding world, one precludes a deeper understanding of that ontology. Conversely, no research is impeded by remaining open. One can for example investigate the neural causal antecedents and correlates of given conscious states whether one is a physicalist, a naturalistic dualist or a dual-aspect theorist.

Once a given reference for the term “consciousness” is fixed in its *phenomenology*, the investigation of its nature can begin, and this may in time transmute the meaning (or sense) of the term. As Dewey (1910) noted, to grasp the meaning of

a thing, an event or situation is to see it in its relations to other things—to note how it operates or functions, what consequences follow from it, what causes it, and what uses it can be put to. Thus, to understand what consciousness is, we need to understand what causes it, what its function(s) may be, how it relates to nonconscious processing in the brain, and so on. As our scientific understanding of these matters deepens, our understanding of what consciousness *is* will also deepen. A similar transmutation of meaning (with growth of knowledge) occurs with basic terms in physics such as "energy", and "time." (Velmans, 2009, p. 152)

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Early Theories of Consciousness

The origins of psychological functionalism

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