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Mental Influences on States of the Body and Brain (Psychogenesis)

Within current Western philosophy, science and clinical practice it is largely taken for granted that physical causes can have physical effects and even that physical causes can have mental effects, for example in the way that changes in body and brain can produce changes in consciousness. However, within conventional Western materialism, that mental causes can have mental effects and even physical effects is often regarded as theoretically problematic (see R20, R21, R64). The evidence for mental influences on states of the body and brain (psychogenesis) is nevertheless extensive.

Psyhosomatics and Psychogenesis

Anees Sheikh et al (2003—R68) provide a brief history of psychosomatics (the view that psychological factors are capable of causing bodily illness and disease), and then gives an extensive, but succinct review of research on the physiological consequences of meditation, imagery, biofeedback, and hypnosis on body states. They review the effects of meditation on cardiopulmonary responses, electrodermal changes, electroencephalographic effects, and numerous other physiological effects ranging from decline in adrenocortical activity, decreased cortisol secretion, and increased urinary metabolite serotonin, to the amelioration of a variety of health problems such as asthma, insomnia, severe migraine and cluster headaches. They go on to review the effects of mental imagery on the control of heart rate, blood pressure, blood flow, sexual response (e.g. penis engorgement), body chemistry (e.g. changes in salivary pH with taste images), ocular response (e.g. pupil dilation), electrodermal and electromyographic activity, and effects on the immune system. They briefly review the extensive research on the effects of biofeedback on cardiovascular and cardiopulmonary changes, gastrointestinal motility, brain rhythms, striate muscle activity, blood flow to various parts of the body, blood glucose and insulin levels, and immune system functioning along with evidence for the therapeutic uses of this technique. They then give a brief review of the effects of hypnosis and its close association with imagery. In conclusion, they stress the need to develop more inclusive models of human mind/body interactions that can make better sense of such extensive evidence than materialist-reductionist models can provide.

Hypnosis

The study of hypnosis can be traced back to the theory and practice of animal

magnetism by F. A. Mesmer at the end of the 18th century. In his instructive review, Etzel Cardeña (2014—R69) focuses specifically on how studies of hypnosis have influenced our understanding of altered states of consciousness. He begins with a historical introduction to different ways of categorizing such altered states and the particular contribution that studies of hypnosis made to developing procedures for both creating such states and psychological instruments to measure them, such as the *Phenomenology of Consciousness Inventory* (PCI; Pekala, 1991), which has been used in research on hypnosis, meditation, out-of-body experiences, and fire-walking, among others (Cardeña & Pekala, 2014). Experienced changes in these states are wide-ranging. For example, in studies using the PCI, highly hypnotizable individuals have reported significant alterations in body image, sense of time, perception, and meaning; a sense of an altered state of awareness; increases in affect, attentional focus, and amount and vividness of imagery; and decreases in self-awareness, rationality, voluntary control, and memory. An important early contribution to the study of consciousness was the notion that an ostensible hypnotic state is not homogeneous but that it varies according to what came to be known as the depth of the state. Just as sleep has different psychophysiological states or stages, the hypnotic state can be analyzed according to varying levels of depth. This, in turn, enabled the study of the neurodynamics accompanying such transitions, the study of individual differences in hypnotisability and so on. Studies have also revealed *equifinality* and *heterogeneity*—that similar states can be arrived at by different subjects following different trajectories—a principle that might also apply to other altered states (for example the different routes by which different meditators arrive at equivalent meditative states). Cardeña then evaluates the evidence that hypnosis can enhance a range of human potentialities, ranging from the well-established finding that it can be used in the control of pain to the less well-established claims that it can enable accurate recall of otherwise inaccessible memories or enhance parapsychological abilities such as telepathy, clairvoyance and so on. He also reviews the evidence for how hypnotism can produce various dissociations in consciousness, supporting a neo-dissociation model of the mind with multiple nonconscious control and supervisory processes, relevant not only to hypnosis but to psychology as a whole. Finally, he reviews the powerful influence of sociocultural setting (the hypnotist-participant relationship, cultural beliefs, expectations etc.) on hypnotic effects—again relevant to studies of consciousness in general, and to psychology as a whole.

Placebos

The most widely accepted evidence for the effect of states of mind on medical outcomes is undoubtedly the *placebo effect*—well know to every medical practitioner and researcher. Simply receiving treatment and having confidence in the therapy or therapist has *itself* been found to be therapeutic in many clinical situations, and this has generated an extensive literature not only on how to control for such effects in clinical trials, but also on how such effects operate, and how to harness them for the benefit of patients.

In an excellent review of the literature, Finniss, Kaptchuk, Miller and Benedetti

2010—R70) examine the biological mechanisms, clinical applications and ethical issues associated with such effects. They clarify the various definitions of placebo and their role in randomised control trials (RCTs), pointing out that rather than there being just one placebo effect, there are many placebos and consequent effects, involving a range of psychological processes, including expectation, conditioning, learning, memory, motivation, somatic focus, reward, anxiety reduction and meaning. Of these, the consequences of manipulating the expectation that a given treatment will elicit a given response, and the effects of classical conditioning have been particularly well researched and well supported. Neurobiological studies also demonstrate multiple placebo effects on different physiological systems both in healthy volunteers and in patients with many different clinical conditions. For example, placebo analgesia has been found to operate via both opioid and non-opioid mechanisms. It can be reversed by the opioid antagonist naloxone, and it can be enhanced by a cholecystokinin (CCK) antagonist, suggesting that CCK normally acts as a placebo analgesia inhibitor. They go on to review studies relevant to application of placebos in clinical practice, for example in studies that demonstrated ritual placebo administration to be more effective when it was accompanied by a supportive clinical relationship. Patient extraversion, agreeableness, and openness to experience were additional contributory factors. Different placebo rituals (e.g. placebo acupuncture versus placebo pills) also had different effects, and the same applied to nocebo effects (where patients were told that the treatment might have adverse side-effects). Strong placebo effects are also found in "open-hidden" treatment paradigms using conventional treatments where no placebo is administered. Treatments are found to be more effective when given in a routine (open) way where patients know that the treatment is being administered than in a hidden way, for example where patients know a drug will be administered by a pump, but they don't know when the drug is given. Placebo is also enhanced not just by patient expectations, but also the positive expectations of the practitioner. Finniss et al go on to discuss the complex ethical issues surrounding the harnessing of placebo effects in clinical practice, for example whether placebos can be administered without deception, and whether it is ethical to promote a placebo as a potentially beneficial treatment.

Psychoneuroimmunology

From the 1980s there was an explosion of interest in the ways that emotions and behavior can affect immune system functioning requiring a fuller understanding of the interconnections and reciprocal control between cortical, neuroendocrine, autonomic and immune systems. These have been extensively investigated within *psychoneuroimmunology* (PNI)—and, following a detailed review of the early research, Watkins (1997) concluded that

> "It is apparent that the immune system can no longer be thought of as autoregulatory. Virtually every aspect of immune function can be modulated by the autonomic nervous system and centrally produced neuropeptides. These efferent neuroimmunomodulatory pathways are themselves modulated by afferent inputs from the immune system, the cortex and the limbic emotional

centers. Thus the brain and the immune system communicate in a complex bidirectional flow of cytokines, steroids and neuropeptides, sharing information and regulating each other's function. This enables the two systems to respond in an integrated manner to environmental challenges, be they immunological or behavioral, and thereby maintain homeostatic balance." (p. 15)

In a subsequent, authoritative review, Kiecolt-Glaser et al (2002—R71) focus on the many ways in which psychological states affect immune functioning. They survey the effects of both laboratory induced and naturally occurring short and long-term stressors, negative affective states (ranging from acute depression, to transient mood changes induced by laboratory manipulations), the positive effects of supportive social relationships and the negative effect of dysfunctional ones, and the associations between personality, coping style and immune functioning. They go on to review research on PNI intervention strategies including hypnosis, relaxation, exercise, classical conditioning, self-disclosure, exposure to a phobic stressor to enhance perceived coping self-efficacy, and cognitive–behavioral therapies with a range of populations. They then consider the effects of psychological variables on immune responses to infectious disease, cancer, wound healing, autoimmune diseases, and HIV—and conclude with a discussion of explanatory biological models and directions for future research.

Altered States of Consciousness

In his introduction to altered states of consciousness (ASC) Ludwig (1966—R72) defines them as "any mental state(s), induced by various physiological, psychological, or pharmacological maneuvers or agents, which can be recognized subjectively by the individual himself (or by an objective observer of the individual) as representing a sufficient deviation in subjective experience or psychological functioning from certain general norms for that individual during alert, waking consciousness." (p. 225). Such states may be either pathological or not pathological, and in his paper he aims to determine (a) the conditions necessary for their emergence, (b) the factors that influence their outward manifestations, (c) their relatedness and/or common denominators, and (d) their adaptive or maladaptive functions. He reviews the many triggers of ASCs, ranging from sensory and social isolation, profound emotional arousal in ritually induced and other trance states, and pathological states that include fugues, amnesias, traumatic neuroses, depersonalization, panic states, rage reactions, hysterical conversion reactions bewitchment, demoniacal possession states, and acute psychotic states, such as schizophrenia. ASCs may also arise from prolonged, heightened mental involvement and absorption, or from a "passive state of mind" in which active goal-directed thinking is minimal—a precursor in the latter case of mystical, transcendental and revelatory states such as *satori* and *samadhi*. They may also arise through alterations in body chemistry or neurophysiology, for example from administration of anesthetics and psychedelic, narcotic, sedative, and stimulant drugs. From studies that compared hypnosis with effects of LSD-25 Ludwig then reviews evidence of common features such as alterations in thinking, disturbed time sense, loss of control, body image change, perceptual distortions, sense of the ineffable, and

feelings of rejuvenation. He then considers the functions of ASCs, ranging from maladaptive expressions in the neuroses and psychoses, to adaptive expressions in healing shamanic, spiritual and psychotherapeutic practices, or in the pursuit of new knowledge, inspiration, or experience, for example in the realm of religion, meditation, revelatory and prophetic states, and mystical and transcendental experiences.

In his introduction to his two-volume edited work on *Altering Consciousness: Multidisciplinary Perspectives*, Etzel Cardeña (2011—R73) provides an excellent summary of the basic concepts and common misunderstanding of ASCs, starting with an evaluation of its varied definitions. He gives a brief survey of the history of different ASC classification systems and points out that, although a number of useful systems exist, given the vast range of ASCs and the limits of current understanding, none are entirely satisfactory. He stresses the importance of distinguishing the characterization of an ASC from the procedure(s) that can induce it, that ASCs are dynamic rather than static, and that there are individual differences in how and whether these can be produced under given circumstances. He goes on to ask why we should study such states, and argues (following James—R80) that no understanding of consciousness or of reality itself can be complete without, in some way, taking these into account; within clinical practice it is also important to distinguish maladaptive ASCs from those that may be of benefit to long-term psychological health. Cardeña then introduces the many ways such states have been studied, surveyed in the chapters of his two-volume collection.

In the final reading in this section, Frank Larøi, et al (2014) provide an insightful review of cultural influences on the nature, prevalence, meaning and treatment of ASCs, focusing specifically on hallucinations in a way that draws on both psychological and anthropological research. They argue that that culture has a significant impact on the experience, understanding, and labeling of hallucinations, which may have important theoretical, as well as clinical consequences. Culture can affect what is identified as a hallucination, and produce different patterns of hallucination among both clinical and nonclinical populations. Hallucinations are often culturally meaningful, and occur at different rates in different settings. Culture also affects the meaning and characteristics of hallucinations associated with psychosis, and cultural variations of psychotic hallucinations may have implications for the clinical outcome of those who struggle with psychosis. They conclude that a clinician should never assume that the mere report of what seems to be a hallucination is necessarily a symptom of pathology and that the patient's cultural background needs to be taken into account when assessing and treating such symptoms.

Studies of the Nature and Effects of Meditation

Studies of the physiological effects of meditation and various Yogic practices dating back to the 1950s and 1960s investigated the ways in which such practices can alter physiological functions. However, many of these studies were poorly controlled. The relatively detailed, well-controlled study by Wallace, Benson and Wilson (1971—

R75) on the effects of transcendental meditation (TM) on physiological changes was consequently seminal. As they noted, hypermetabolic physiological states, with increased oxygen consumption, normally accompany anticipated stressful situations. However, hypometabolic physiological states, other than those occurring during sleep and hibernation, are more difficult to produce. Nevertheless, transcendental meditation did produce such states, marked by respiratory changes consisting of decreased O_2 consumption, CO_2 elimination, respiratory rate, and minute ventilation, with no change in respiratory quotient. Arterial blood pH and blood lactate also decreased. Conversely, skin resistance markedly increased and the EEG showed an increase in the intensity of slow alpha waves with occasional theta-wave activity. This pattern of changes differed both from sleep and those produced by hypnosis. Wallace et al review evidence that some of these changes can also be produced with biofeedback using operant conditioning procedures, but note that with TM no biofeedback is involved. They conclude that TM provides one route by which such hypometabolic states can be produced, but left open the possibility that such states could be produced by other practices—leading to an extended program of research into what Benson (1975) later termed the *Relaxation Response*.

A similarly seminal study into the therapeutic uses of meditation was carried by Jon Kabat-Zinn (1982—R76), which launched the current interest in the uses of mindfulness meditation in clinical practice, starting with its use in a 10-week stress and relaxation program for alleviating chronic pain. This appeared to cause an "uncoupling" of the sensory dimension of the pain experience from the affective/ evaluative alarm reaction and reduce the experience of suffering via cognitive reappraisal. The technique was then developed into *Mindfulness-Based Stress Reduction* (MBSR) and applied to many other clinical conditions such as stress, anxiety and depression. Since the establishment of MBSR, several other interventions have also been developed using mindfulness-related principles and practices, including *Mindfulness-Based Cognitive Therapy* (MBCT; Segal, Williams, & Teasdale, 2002), *Dialectical Behavior Therapy* (DBT; Linehan, 1993) and *Acceptance and Commitment Therapy* (ACT; Hayes, Strosahl, & Wilson, 1999)—see R79 below.

The recent explosion of interest in meditation in Western culture, science and therapeutic practice had many additional sources, surveyed by Eugene Taylor (1997—R77) in his Introduction to M. Murphy, S. Donovan and E. Taylor's extensive bibliography of research on the physical and psychological effects of meditation. He briefly reviews its origins in various Eastern traditions, stressing the importance of understanding how given techniques are culturally embedded in particular spiritual traditions and historical times, and contextualized by the philosophies of those traditions and/or specific teachers. He then gives a fascinating history of the infusion of Eastern ideas to America from before the American Revolution, influencing the Declaration of Independence, and, in the 19th Century, the Spiritualists, Transcendentalists and Theosophists. From 1893 (at the World Parliament of Religions, held in Chicago), Vivekananda introduced the philosophy underlying, and practice of meditation, as did many subsequent Asian teachers including Yogananda, Krisnamurti, Suzuki, and Aurobindo Ghose. The 1960s led to a further explosion of interest in meditation and spiritual practices fueled by experimentation with the

mind expanding drugs mescaline and LSD, and a new influx of teachers from Asia to the West, stimulated in part by the increasing influence of communism in India and Korea, and by the Chinese invasion of Mongolia and Tibet.

Following the widespread ban on the use of psychedelics in 1967, Taylor then traces the institutionalization of Asian meditative practices and associated traditions in America from the 1970s onwards along with the emergence of a new generation of Western practitioners who themselves became teachers, finding ways of accommodating Eastern methods to the West. Taylor then turns to the development, in subsequent years, of the scientific study of meditation, pointing out the difficulties of accommodation such Eastern practices to a Western scientific mindset. In spite of this, examination of its physiological, psychological, and behavioral effects flourished, and Murphy, Donovan and Taylor's bibliography, *The Physical and Psychological Effects of Meditation* traces these developments, focusing particularly on research with *Transcendental Meditation*, Benson's work on the *Relaxation Response* along with its subsequent developments, and the research on *Mindfulness Based Stress Reduction*, originated by Kabat Zin. Extensive programs were also developed to incorporate meditative techniques into cognitive-behavioural therapy, health psychology and a range of complementary medicines. In conclusion Taylor focuses on broad theoretical questions, pointing out the difficulties of fully understanding such practices within a reductionist, scientific worldview, and the consequent need to develop a more inclusive, integrative approach.

The emergence of brain imaging techniques opened up new possibilities for studying the effects of meditation on neural dynamics, and Lutz et al (2008—R78) provide an excellent review of research that focuses on the mental processes and underlying neural circuitry involved in two styles of meditation. One style, Focused Attention (FA) meditation, entails the voluntary focusing of attention on a chosen object. The other style, Open Monitoring (OM) meditation, involves non-reactive monitoring of the content of experience from moment to moment. They also discuss the potential regulatory functions of these practices on attention and emotion processes as well as their potential long-term impact on the brain and behavior.

In recent years there has been widespread interest in the potential benefits of *mindfulness*, a particular form of meditative attentiveness, and in the final reading in this section Keng, Smoski, and Robins (2011—R79) provide an extensive, authoritative review of research on the effects of mindfulness on psychological health. They begin with a discussion of mindfulness as a theoretical construct, noting that the term may be used to describe a psychological trait, a practice that can be cultivated (e.g., mindfulness meditation), a mode or state of awareness, or a psychological process. They discuss differences between Buddhist and Western psychological conceptualizations of mindfulness, and how mindfulness has been integrated into Western medicine and psychology. They then review three areas of research: cross-sectional, correlational research on the associations between mindfulness and various indicators of psychological health; intervention research on the effects of mindfulness-oriented interventions, such as MBSR, MBCT, DBT and

ACT on psychological health; and laboratory-based, experimental research on the immediate effects of mindfulness inductions on emotional and behavioral functioning. They conclude that mindfulness brings about various positive psychological effects, including increased subjective well being, reduced negative psychological symptoms and emotional reactivity, and improved behavioral regulation. The review ends with a discussion of the mechanisms of change underlying mindfulness interventions and go on to suggest future directions for research.

Mystical Experiences

Of all the positive, altered states of consciousness, mystical experiences are perhaps the most extraordinary and transformative. Already well explored by William James, his 'Lectures XVI and XVII on Mysticism' published in James (1902—R80) are as relevant and thoughtfully balanced as any contemporary writings on this subject. He begins by listing two main characteristics of such experiences: *ineffability*–a quality that must be directly experienced and defies expression, and *noetic quality*, which, to those who experience them, appears to give "insights into depths of truth unplumbed by the discursive intellect." Two additional common qualities are *transiency* (they cannot be sustained for long periods), and *passivity*—although they can be facilitated by voluntary operations, once they set in, the experiencer no longer feels in control. He then reviews various reports of such states, including his own experimentation with nitrous oxide—which led him to the following famous conclusion:

> "It is that our normal waking consciousness, rational consciousness as we call it, is but one special type of consciousness, whilst all about it, parted from it by the filmiest of screens, there lie potential forms of consciousness entirely different. We may go through life without suspecting their existence; but apply the requisite stimulus, and at a touch they are there in all their completeness, definite types of mentality which probably somewhere have their field of application and adaptation. No account of the universe in its totality can be final which leaves these other forms of consciousness quite disregarded. How to regard them is the question, for they are so discontinuous with ordinary consciousness. Yet they may determine attitudes though they cannot furnish formulas, and open a region though they fail to give a map. At any rate, they forbid a premature closing of our accounts with reality. Looking back on my own experiences, they all converge towards a kind of insight to which I cannot help ascribing some metaphysical significance. The keynote of it is invariably a reconciliation. It is as if the opposites of the world, whose contradictoriness and conflict make all our difficulties and troubles, were melted into unity." (Ibid. p. 388)

At the same time, he notes that reports of mystical experiences from different cultural settings and practices vary widely in their details, and many extraordinary states with equal conviction to those who have them are reported in various forms of psychopathology. Given this, he evaluates the arguments for and against the

apparent authority of mystical states, and concludes that, while non-mystics are under no obligation to accord them uncritical authority, one cannot deny their authority to those who have had them. Whichever view one takes, they demonstrate that "rationalistic consciousness, based upon the understanding and the senses alone" are only one kind of consciousness—and without an understanding of such states, no account of consciousness can be complete.

In his comprehensive review of studies of mystical experience, David Wulff (2014—R81) brings the literature up-to-date. He discusses the various definitions and historical antecedents of the term "mysticism", introduced in the West in the mid 18th Century to describe what most researchers (essentialists) would regard as a potentially universal (perennial) human experience, although some researchers (contextualists) stress that such experiences are heavily contextualized by language, tradition, discipline and culture. He provides illustrative examples, and reviews a range of typologies, e.g. those proposed by Otto, James and Stace, each with its associated set of characteristics. Wulff then reviews the after-effects of such experiences (a) as reported in the older literature and (b) in empirical studies. The first controlled experiment to evaluate the relationship of psychedelic to mystic-like experiences was carried out by Pankhe (1966). This studied the effects of psilocybin versus nicotinic acid administered to a group of 20 Protestant seminarians, in a chapel, listening to a 2.5 hour Good Friday service in the floor above the chapel. The effects, assessed after the service, suggested that the psilocybin group had experiences significantly closer to classical mystical ones than the nicotinic controls. In a 6-month follow-up, the experimental group confirmed their initial reports of having had mystic-like experiences, reported significantly more enduring positive changes in their attitudes and behaviour toward themselves, others, life, and the psilocybin experience itself than the control group. 25 years later, Doblin (1991) tracked down 7 of the experimental subjects and 9 of the controls, who confirmed both the differences in their remembered experiences and the continued differences in the associated after-effects.

Government restrictions on the use and study of psychedelics prevented follow up experiments until the 1990s. However, Wulff reviews a series of more recent, well-controlled, confirmatory experiments, initiated by Griffiths et al (2006—R83). He also briefly reviews reported associations between mystical experiences and parapsychological effects, their prevalence and predisposing factors, and their relation to psychopathological experiences, teasing out both their similarities and their important differences. He then turns to their therapeutic potential, for example in association with psychedelic drug therapy, extensively researched prior to the mid 1960s and once more the subject of serious study (see below). In respect to this, Wulff also considers the clinical issues and risks, and turns finally to explanations—ranging from neurophysiological explanations, psychoanalytic, analytic, humanistic and transpersonal interpretations, to perceptual-cognitive and contextual explanations. He ends with a discussion of methodological issues, for example the difficulty of fully studying such experiences from an entirely removed, external-observer's view.

The Use of Drugs in the Transformation of Consciousness

The use of mind-altering substances for recreational, ceremonial, ritual, shamanic, and religious purposes has ancient origins, however the potential use of such substances for the transformation of consciousness went through a step-change with the synthesis of LSD-25, by the Swiss pharmacologist, Albert Hoffman in 1938—although its consciousness transforming properties were only noticed, accidentally, in 1943. In Hoffman (1980—R82) we include three chapters from *LSD – My Problem Child* (his autobiographical book), focusing on: 'How LSD originated'; 'The use of LSD in psychiatry'; and 'LSD experience and reality'. In these he describes his accidental discovery of the consciousness-altering properties of LSD, his self-experiments, and the subsequent early uses of LSD in *psychotytic*, *psycholytic*, and *psychedelic* therapy, for example as an adjunct to psychoanalysis and other forms of psychotherapy—as well as a therapeutic aid in the dying process, for example with cancer patients who are terminally ill. He then recounts how his own LSD experiences changed his view of everyday reality to one in which " … different realities, more correctly designated as different aspects of *the* reality, are not mutually exclusive but are complementary, and form together a portion of the all-encompassing, timeless, transcendental reality … ". He then goes on to argue for the value of such experiences, particularly "… for the recovery of people in Western industrial societies who are sickened by a one-sided, rational, materialistic world view", encouraging a broadened worldview that is also open to the philosophies of the East.

Once the mind-altering effects of LSD became evident, research into its potential medical and psychiatric uses flourished. By the mid 1960s, over 40,000 patients had taken LSD and psychedelic research had produced over 1,000 scientific papers, several dozen books, and six international conferences (Grinspoon and Bakalar, 1981). However, fears about its uncontrolled, widespread use and potentially disruptive cultural effects led to a widespread ban on its use from 1967 onwards, even in restricted medical and scientific contexts for almost 40 years. In recent years however, restrictions have gradually eased, and research into the potential uses of the major psychedelics is once more beginning to develop.

In a seminal study that helped to reintroduce the investigation of psychedelics to contemporary research Griffiths et al (2006—R83) extended Panke's work on psilocybin, this time using methylphenidate hydrochloride, a psychoactive drug that produces subjective effects overlapping with those of psilocybin as a control in a repeated-measures, counterbalanced design. The study recruited 36 carefully selected participants, all high functioning, highly educated, and hallucinogen-naïve, who reported regular participation in religious or spiritual activities. Volunteers completed questionnaires assessing drug effects and mystical experience immediately after and 2 months after sessions. Community observers (family members, friends, or coworkers/colleagues at work) also rated changes in the volunteer's attitudes and behavior. They found that psilocybin produced a range of acute perceptual changes, subjective experiences, and labile moods including anxiety. Psilocybin also increased measures of mystical experience, with 22 of the 36 reporting a "complete" mystical experience after psilocybin compared to only 4 of

the 36 doing so after the control. At 2 months, the volunteers rated the psilocybin experience as having substantial personal meaning and spiritual significance and 67% of them rated the experience with psilocybin to be either the single most meaningful experience, or among the top five most meaningful experiences of their life. They also attributed to the experience sustained positive changes in their own attitudes and behavior, which were consistent with changes also noted by external observers in their community.

In recent years, studies of the effects of psychedelics on brain dynamics have become highly technical and sophisticated. A good example is Carhart-Harris et al. (2016—R84), which employed three complementary neuroimaging techniques to study the effects of LSD. They found that arterial spin labeling (ASL), blood oxygen level dependent (BOLD) measures, and magnetoencephalography (MEG) measures, during resting state conditions, revealed marked changes in brain activity after ingestion of LSD, which correlated strongly with its characteristic psychological effects. For example, increased visual cortex cerebral blood flow (CBF), decreased visual cortex alpha power, and a greatly expanded primary visual cortex (V1) functional connectivity correlated strongly with ratings of visual hallucinations, implying that intrinsic brain activity exerts greater influence on visual processing in the psychedelic state, thereby defining its hallucinatory quality. However these visual cortex changes did not significantly correlate with the drug's other characteristic effects on consciousness. Rather, *decreased connectivity* (and therefore increased entropy) in the *Default Network* that normally operates to integrate the brains' operations correlated strongly with ratings of "ego-dissolution" and "altered meaning," implicating the importance of this particular circuit both for the maintenance of "self" or "ego" and for the processing of "meaning." According to Carhart-Harris et al, this suggests that under LSD the brain reverts to a more 'primitive' level of functioning (see also the expanded theoretical discussion in Carhart-Harris et al., 2014).

In the final reading in this section David Presti (2017—R85) provides a succinct, well-balanced review of the entire field of research on drugs that alter consciousness to produce arousal, sedation, sleep, anesthesia, analgesia, euphoria, amnesia, hallucinations, or psychedelic-like intensification of perceptions, thoughts, and feelings, by interacting in many complex ways with the receptor sites of neurotransmitters in the brain. He provides a detailed analysis of these interactions for a wide range of substances, from stimulants such as caffeine and cocaine, drugs that decrease arousal such as low-dose alcohol and the barbiturates, to general anesthetics and hypno-anesthetics. He then turns to widely used psychoactive drugs such as tobacco, arica nut (betel nut), opium, and cannabis, and the major psychedelics LSD, DMT, psilocin (and its pro-drug psilocybin), and mescaline. He also considers the actions of the 'minor' psychedelics, including MDMA, Salvia Divinorum and salvinorin A, the Amanita Muscaria mushroom, tropane alkaloids, delta-9-tetrahydrocannabinol, ketamine, nitrous oxide, and carbogen. Presti then reviews contemporary research on the clinical uses of psychedelics which includes studies of the physiological and phenomenological effects of DMT; psilocybin for anxiety associated with terminal cancer, and for the treatment of obsessive-compulsive

disorder; LSD and MDMA for anxiety associated with life-threatening illness; MDMA for post-traumatic stress; psilocybin and LSD for severe headache; and ayahuasca, peyote, ibogaine, and psilocybin for addiction. While contemporary psychiatric pharmacology largely focuses on the utility of long-term daily use of medications labeled as anti-depressant, anti-psychotic, mood-stabilizing, or anxiolytic, psychedelic psychotherapy employs very limited (once, several times, or very sporadic) use of psychedelic substances to catalyze experiences that will have lasting therapeutic impact. In conclusion, Presti notes the ways in which modern neuroimaging techniques are beginning to reveal the action of the psychedelics on the brain—but suggests, as did William James, that the powerful experiences they foster "challenges us to be open to explanatory frameworks that go well beyond our current biophysical models of mind and reality."

Broader, Integrative Theories of Consciousness

In the final section of this collection, we present five explanatory frameworks, each suggesting broader, integrated ways of understanding the phenomenology of, and processes supporting conscious experience, from different theoretical perspectives.

Giulio Tononi and Christof Koch (2015—R86) provide a lucid review of Tononi's *Integrated Information Theory* (IIT) of consciousness and its potential applications, which is currently attracting considerable interest in the search for the neural correlates of consciousness. They start with five phenomenological axioms that arguably characterise experience itself: intrinsic existence, composition, information, integration and exclusion. From these they derive five postulates about the properties required of physical mechanisms to support consciousness. They argue that the theory provides a principled account of both the quantity and the quality of an individual experience (a quale), and a calculus to evaluate whether or not a particular physical system is conscious and of what. Moreover, they argue that IIT can explain a range of clinical and laboratory findings, makes a number of testable predictions and extrapolates to a number of problematic conditions. The theory has panpsychist leanings, in that it holds that consciousness is a fundamental property possessed by physical systems having specific causal properties. It predicts that consciousness is graded, is common among biological organisms and can occur in some very simple systems. Conversely, it predicts that feed-forward networks, even complex ones, are not conscious, nor are aggregates such as groups of individuals or heaps of sand. Also, in sharp contrast to widespread functionalist beliefs, IIT implies that digital computers, even if their behaviour were to be functionally equivalent to ours, and even if they were to run faithful simulations of the human brain, would experience next to nothing.

Mark Solms (2016—R87) provides a persuasive case for a form of *neuropsychoanalysis* that integrates modern findings on the workings of the "cognitive unconscious" (see R24, R25, R26) with older, psychoanalytic theories about the workings of the "unconscious" proposed by Freud. Drawing on Freud's (1915—R18) essay on "The Unconscious", he suggests ways of updating Freud's classical metapsychology in the light of recent developments in cognitive and

affective neuroscience, thereby integrating Freud's concept of repression with contemporary notions of the cognitive - unrepressed - unconscious. He sets out his arguments under eight headings: most mental processes are unconscious; unconscious processes are automatized cognition; consciousness is endogenous (cognitive processes are served by phylogenetically ancient subcortical structures, and by the instinctual and affective processes associated with them); affect is always conscious; not all consciousness is declarative (affective consciousness and pre-reflexive perceptual consciousness are not dependent on language); the systems *underlying* both conscious material (Cs) and potentially conscious material (PCs) are not themselves conscious. He then argues that *repression* is a form of premature automatisation, and concludes by summarising the ways in which Freud's metapsychology needs to be updated to fit in with modern cognitive and affective neuroscience research.

There is considerable interest in modern consciousness studies in how advances in physics might in some way illuminate our understanding of consciousness, for example by finding a place for consciousness in the operations of quantum mechanics (see Atmanspacher, 2015, for a useful review). Such endeavours are consonant with the ancient view that consciousness is in some way "basic" (see R3) and that quantum mechanics might provide some physical basis for the fundamental "unity" experienced in or underlying a range of extraordinary experiences (see R80, R81, R82, R88). Although speculative, some theories in this area have been elaborately developed (see, e.g. Hammeroff and Penrose, 2014), although, as yet, these have little direct application to psychological research.

In contrast, Fingelkurts, Fingelkurts and Neves (2010) provide an extensive case for a macrocosmic *psychophysical* theory that integrates external world space-time, with neural space-time and the space-time of phenomenal experience in a way that relates neurobiological micro-operations to higher order electromagnetic fields that provide the binding of micro-activities into the fluid, integrated dynamic structures that might plausibly be the close correlates of phenomenal experiences. After a brief introduction to physical space and time, they give a very detailed, well-referenced review of the spatial–temporal activity of the brain at microscopic (neuronal), mesoscopic (neuronal assembly), and macroscopic levels (the relations between many neuronal assemblies)—and specify the ways in which the brain's functional connectivity can be studied with EEG. They then review various ways of conceptualizing and measuring the spatial and temporal organization of phenomenal space, and go on to describe a form of "Operational Architectonics" that allows an understanding of how the brain's microscopic, mesoscopic and macroscopic functions combine to form an "operational space time" at the level of the brain's electromagnetic fields that "parallel in a causal manner the patterns of phenomenal consciousness of different complexity during normal and pathological conditions." They present evidence of ways in which the space-time of such fields can be isomorphic with phenomenal space-time and suggest how mental (subjective) space-time, through brain operational space–time can be connected to the otherwise distant physical space–time reality. Overall, they interpret their explanatory framework as a form of dual-aspect monism in which the physical

(neurophysiological) and mental (subjective) aspects of brain functioning are considered to be complimentary aspects of the same reality, rather than contradictory (see also R4, R26, R61, R64).[1]

It is sobering to recall that for much of the materialist-reductionist 20th Century, the study of consciousness and *even its existence* was regarded with suspicion in psychology, regarded as "fringe" and even, during the behaviourist period, as pseudo-science. As many of the readings in this collection demonstrate, that era has long passed into history. However, the study of parapsychology and of extremely unusual human capacities commonly retains the mantle of being fringe and pseudo-science, for the simple reason that such phenomena cannot be easily assimilated into a conventional materialist-reductionist worldview. This field is nevertheless large, and in response to common scepticism, has developed increasingly rigorous methods. Edward Kelley (2015—R88) provides a thoughtful overview, drawing on psychological and neuropsychological evidence reviewed in depth and detail in Kelley, et al's (2007) *Irreducible Mind*—an encyclopaedic 800-page, edited book. He begins with a summary of the prevailing physicalist conception of the brain/mind relationship and lists 10 areas of empirical research that challenge its adequacy: Psi phenomena; instances of extreme psychological influence (of the kind reviewed in R68, R69 and R70); cases of extreme human information processing capacity, precision, or depth; apparently well-authenticated cases of autobiographical, semantic, and procedural memories that survive bodily death (past-life memories, etc.); psychological automatisms and secondary centres of consciousness in humans that sometimes operate *concurrently* albeit outside the stream of conscious awareness; the presence of integrated experiences under conditions where the integration mechanisms proposed by current science are not operative, for example, in "near-death experiences", deep general anaesthesia, cardiac arrest, and coma, which all preclude normal "global workspace" operation; genius-level creativity that cannot be explained in terms of the normal operations of the conscious mind—thereby implicating the operations of an unconscious or "subliminal" mind; mystical experiences (of the kind reviewed in R80 and R81); the nature of meaning and intentionality (being about something) which implies a *being to whom* experiences are meaningful or about something (rather than an entirely physical set of processes); and finally quantum mechanics, which challenges conventional physicalism (based on classical physics) at its roots. He argues, finally for a more inclusive theory that can accommodate such "rogue" phenomena, including for example an expanded understanding of the subliminal mind along the lines proposed by F. W H. Myers (see R17) and the panpsychist, pluralist or panentheist metaphysics that William James (1909) was trying to articulate in his mature work.

In the final reading in this volume, Velmans (2012—R89) summarises some of the main features of *Reflexive Monism* (RM), a non-reductive philosophical framework for understanding consciousness developed in Velmans (2000, 2009) that provides an initial, multidimensional map of the complex relationships among consciousness,

[1] Unfortunately, the reprint cost of this article was too expensive to include in this collection. However, a prepublication version of it is available online at http://www.bm-science.com/team/art61.pdf

mind, brain and the external world in a way that both follows the contours of everyday experience and the findings of science. Starting with a non-reductive view of phenomenal consciousness that preserves its appearances (R23), RM presents a reflexive model of perception that takes account of the fact that, rather than being phenomenally located "in the head", the contents of consciousness include the entire phenomenal world (see also R5, R58 and R60). It then develops a dual-aspect monist analysis of the relation of conscious experiences to their neural correlates, in which the nature of mind is viewed as a psychophysical form of information processing (see also R4, R61). From this one can derive both an epistemology for the study of consciousness (R61) and a non-dualist/non-reductionist understanding of the causal relations between consciousness and brain (R64—see also R21, R61, R67). The paper moves on to how conscious appearances relate to the complex, unconscious entities, events, and processes that give rise to those appearances, both in the brain (see R24, R25, R26, R18) and the surrounding, embedding world (see also R58, R59, R60). Interpreted broadly, this supporting ground can be thought of as an "unconscious ground of being" (see also R17, R19) from which material bodies, brains and associated conscious experiences arise, that can be explored both from a third-person perspective by the methods of science and from a personal, first-person perspective, for example through meditative and other introspective methods (see R58 to R63, R78, R79). This ground may also provide the source of the unitive aspects of mystical and other non-pathological, extraordinary experiences (R72, R73, R80, R81, R82, R83, R85), the unconscious interconnections suggested by some paranormal findings (R88), and a bridge between Western consciousness studies and some of the philosophies of the East (see Rao, 2011, and Velmans, 2013). The paper then demonstrates how this reflexive monist map can be used to evaluate the utility and resolve some of the oppositions of the many "isms" that currently populate consciousness studies. While no conventional, one-dimensional "ism" such as physicalism can do justice to this web of relationships, physicalism, functionalism, dualism, neutral monism, and dual-aspect monism can all be seen to provide useful ways of understanding different aspects of the relationships among consciousness, mind, brain and the external world when these are viewed in either a first- or a third-person way from within this web of relationships by sentient creatures such as ourselves. For an integrated understanding one needs to understand how these phenomena and relationships combine into an integrated whole.

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R69. Etzel Cardeña (2014), 'Hypnos and Psyche: How Hypnosis Has Contributed to the Study of Consciousness', *Psychology of Consciousness: Theory, Research, and Practice*, 1, 2, 123–138.

Placebos

R70. Damien G. Finniss, Ted J. Kaptchuk, Franklin Miller and Fabrizio Benedetti (2010) 'Biological, clinical, and ethical advances of placebo effects', *The Lancet*, 375, 9715, 686-695.

Psychoneuroimmunology

R71. Janice K. Kiecolt-Glaser, Lynanne McGuire, Theodore F. Robles and Ronald Glaser (2002) 'Psychoneuroimmunology: Psychological Influences on Immune Function and Health', *Journal of Consulting and Clinical Psychology*, 70, 3, 537–547.

Altered States of Consciousness

R72. A. M. Ludwig (1966) Altered States of Consciousness. *Archives of General Psychiatry*, 15, 225-234.

R73. Etzel Cardeña (2011) 'Altering consciousness: Setting up the stage', in E. Cardeña and M. Winkelman (eds.), *Altering consciousness. Multidisciplinary perspectives. Volume I. History, culture, and the humanities* Santa Barbara, CA: Praeger, pp. 1-21.

R74. Frank Larøi, Tanya Marie Luhrmann, Vaughan Bell, William A. Christian Jr, Smita Deshpande, Charles Fernyhough, Janis Jenkins, and Angela Woods (2014) 'Culture and Hallucinations: Overview and Future Directions', *Schizophrenia Bulletin*, 40 (suppl. no. 4), S213–S220.

Studies of the Nature and Effects of Meditation

R75. Robert K. Wallace, Herbert Benson, H., and Archie F. Wilson (1971) 'A wakeful hypometabolic physiologic state', *American Journal of Physiology*, 221(3), 795-799.

R76. Jon Kabat-Zinn (1982) 'An outpatient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation: theoretical considerations and preliminary results', *J. Gen Hosp Psychiatry*, 4, 1, 33-47.

R77. Eugene Taylor (1997) 'Introduction' to M. Murphy and S. Donovan and E. Taylor, *The Physical and Psychological Effects of Meditation*: *A Review Of Contemporary Research*, Petaluma, CA: Institute of Noetic Sciences, pp. 1-23.

R78. Antoine Lutz, Heleen A. Slagter, John D. Dunne, and Richard, J. Davidson (2008) 'Attention regulation and monitoring in meditation', *Trends Cogn. Sci.*, 12, 4, 63–169.

R79. Shiang-Ling Keng, Moria J. Smoski, and Clive J. Robins (2011) 'Effects of mindfulness on psychological health: A review of empirical studies', *Clinical Psychology Review*, 31, 6, 1041-1056.

Mystical Experiences

R80. William James (1902) Extracts from 'Lectures XVI and XVII on Mysticism', in W. James, *The Varieties of Religious Experience: A study in Human Nature*, New York: Longmans Green & Co.

R81. David M. Wulff (2014) 'Mystical experiences', in E. Cardeña, S. J. Lynn and S. Krippner (eds.) *Varieties of Anomalous Experience: Examining the Scientific Evidence, Second Edition*, Washington D.C.: American Psychological Association, pp.369-408.

The Use of Drugs in the Transformation of Consciousness

R82. Albert Hoffman (1980) 'How LSD originated'; 'The use of LSD in psychiatry'; 'LSD experience and reality', in A. Hofman, *LSD - My Problem Child*' translated by Jonathan Ott, New York: McGraw-Hill Book Company, pp. 5-15 (ch1); pp. 21-29(ch4); pp. 96-102 (ch11)

R83. Roland R. Griffiths, William A. Richards, Una D. McCann and Robert Jesse (2006) Psilocybin can occasion mystical-type experiences having substantial and sustained personal meaning and spiritual significance', *Psychopharmacology*, 2006, 187, 268–283.

R84. Robin L. Carhart-Harris, Suresh Muthukumaraswamy, Leor Rosemana, Mendel Kaelena, Wouter Droog, Kevin Murphy, Enzo Tagliazucchif, Eduardo E. Schenberg, Timothy Nest, Csaba Orbana, Robert Leeche, Luke T. Williams, Tim M. Williams, Mark Bolstridge, Ben Sessa, John McGonigle, Martin I. Sereno, David Nichols, Peter J. Hellyer, Peter Hobden, John Evans, Krish D. Singh, Richard G. Wise, H. Valerie Curran, Amanda Feilding, and David J. Nutt (2016) 'Neural correlates of the LSD experience revealed by multimodal neuroimaging', *Proceedings of the National Academy of Sciences*, 113, 17, 4853-4858.

R85. David Presti (2017) 'Altered states of consciousness: drug-induced states', in S. Schneider and M. Velmans (eds.), *The Blackwell Companion to Consciousness Second Edition*, Chichester: Wiley-Blackwell, pp. 171-186.

Broader, Integrative Theories of Consciousness

R86. Giulio Tononi and Christof Koch (2015) 'Consciousness: here, there and everywhere?' *Phil. Trans. R. Soc. B*, 370: 20140167.

R87. Mark Solms (2016) ''The unconscious' in psychoanalysis and neuroscience: an integrated approach to the cognitive unconscious', in M. Leuzinger-Bohleber, S.

Arnold, and M. Solms, M. (eds.) *The Unconscious: A bridge between psychoanalysis and cognitive neuroscience*, London: Routledge, pp.16-35.

R88. Edward F. Kelley (2015) 'Parapsychology in context: The big picture', in E. Cardeña, J. Palmer, and D. Marcusson-Clavertz, *Parapsychology: A Handbook for the 21st Century*, Jefferson, NC: McFarland & Company, pp. 30-41.

R89. Max Velmans (2012) 'Reflexive monism: psychophysical relations among mind, matter and consciousness', *Journal of Consciousness Studies*, 19, 9-10, 143-165.

Additional References

Atmanspacher, H. (2015) Quantum approached to consciousness. *Stanford Encyclopedia of Philosophy.* http://plato.stanford.edu/entries/qt-consciousness/

Benson, H. (1975) *The Relaxation Response*. New York: William Morrow and company.

Carhart-Harris, R.L., Leech, R., Hellyer, P. j., Shanahan, M., Feilding, A., Tagliazucchi, E., Chialvo, D. R. and Nutt, D. (2014) The entropic brain: A theory of conscious states informed by neuroimaging research with psychedelic drugs. *Front. Hum. Neurosci*., 8, 20. http://journal.frontiersin.org/article/10.3389/fnhum.2014.00020/full

Fingelkurts, A. A., Fingelkurts, A. A. and Neves, C. F. H. (2010) Natural world physical, brain operational, and mind phenomenal space–time. *Physics of Life Reviews* 7, 20, 195–249. http://www.bm-science.com/team/art61.pdf

Grinspoon, L. and Bakalar, J. B. (1981) The psychedelic drug therapies, *Current Psychiatric Therapies*, 20, 275-283

Hameroff S.R. and Penrose R. (2014) Consciousness in the universe: A review of the Orch OR theory (with commentaries and replies). *Physics of Life Reviews* **11**, 39–112.

Hayes, S. C., Strosahl, K., & Wilson, K. G. (1999). *Acceptance and Commitment Therapy: An experiential approach to behavior change*. New York: Guilford Press.

James, W. (1909 [1971]) A pluralistic universe, In *Essays in Radical Empiricism and A Pluralistic Universe*, New York: E. P. Dutton, pp. 121-284.

Kelly, E. F. Kelly, E. W. Crabtree, A. Gauld, Grosso, A. M. and Greyson, B. (eds.) (2007) *Irreducible Mind: Towards a Psychology for the 21st Century*, Lanham: Rowman & Littlefield.

Linehan, M. M. (1993) *Cognitive Behavioral Therapy of Borderline Personality Disorder*. New York: Guilford Press.

Murphy, M., Donovan S. and Taylor, E. (1997) *The Physical and Psychological Effects of Meditation*: *A Review Of Contemporary Research*, Petaluma, CA: Institute of Noetic Sciences.

Rao, K. R. (2011) *Cognitive Anomalies, Consciousness and Yoga*. New Delhi: Centre for Studies in Civilizations and Matrix Publishers.

Segal, Z. V., Williams, J. M. G., Teasdale, J. D. (2002) *Mindfulness-Based Cognitive Therapy for Depression: A New Approach to Preventing Relapse*. New York: Guilford Press.

Velmans, M. (2000) *Understanding Consciousness*, London: Routledge.

Velmans, M. (2009) *Understanding Consciousness, Second Edition*, Hove, East Sussex: Routledge/Psychology Press.

Velmans, M. (2013) How to arrive at an Eastern place from a Western Direction: Convergences and divergences among Samkya Yoga, Advaita Vedanta, the Body-Mind-Consciousness (Trident) Model and Reflexive Monism, in B. S. Prasad (ed.) *Consciousness Gandhi and Yoga: Interdisciplinary, East-West Odyssey of K.Ramakrishna Rao*, New Delhi: D.K.Printworld, pp. 107-139.

Watkins, A. (1997) Mind-body pathways, in A. Watkins (ed.) *Mind-Body Medicine: A Clinician's Guide to Psychoneuroimmunology*. New York: Churchill Livingstone.